ATTACHMENT A TO ED DECISION 2020/020/R

AMC and GM to Annex XIII (Part-PERS) to Commission Implementing Regulation (EU) 2017/373

Update of the initial training objectives for ATSEP

NOTE: the tables below contain the clean revised text. Due to the numerous amendments made to the Appendices 1a to 4a, applying the standard convention of change identification would result in producing a document that would be very difficult to read. To identify the changes made to these Appendices, a 'Change information document' that indicates the individual changes at training objective level is available upon request in excel format for informative purposes and to support implementation. The latter document has no legal effect.

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The subjects, topics and sub-topics are repeated in this AMC for the convenience of the reader and do not form a part of it.

Appendix 1a – ATSEP Basic training - Shared

ATSEP UOID *(Unique Objective IDentifier)*	**CORPUS**	**TAX**	**CONTENT**
ATSEP.BAS	**ATSEP BASIC**		
ATSEP.BAS.IND	**INDUCTION**		
ATSEP.BAS.IND_1	**INDUCTION**		
ATSEP.BAS.IND_1.1	**Training and Assessment Overview**		
ATSEP.BAS.IND_1.1.1	Describe the training scheme and progression towards ATSEP competence	2	Initial (Basic and Qualification), S/E Rating and Continuation training; course aims, objectives, and topics
ATSEP.BAS.IND_1.1.2	State the assessment requirements, procedures, and methods	1	-
ATSEP.BAS.IND_1.2	**National Organisation**		
ATSEP.BAS.IND_1.2.1	Describe the organisational structure, purpose and functions of the service provider(s) and regulatory structures	2	e.g. headquarters, control centres, training facilities, airports, outstations, civil/military interfaces, regulatory interfaces
ATSEP.BAS.IND_1.2.2	Describe the structure and functions of the major departments within the service provider	2	e.g. organisational handbook (plans, concepts and structure, finance model)
ATSEP.BAS.IND_1.2.3	State appropriate accountabilities and responsibilities of the service provider(s) and competent authority	1	-
ATSEP.BAS.IND_1.3	**Workplace**		
ATSEP.BAS.IND_1.3.1	State the role of trade unions and professional organisations	1	e.g. international, European, national, local level
ATSEP.BAS.IND_1.3.2	Consider security of site facilities and personnel against unlawful interference	2	Environmental, physical and information security measures, employee vetting, and reference checks
ATSEP.BAS.IND_1.3.3	Describe actions when suspecting a security breach	2	e.g. inform police, security agencies and managers; follow the security manual and/or contingency plan
ATSEP.BAS.IND_1.4	**ATSEP Role**		
ATSEP.BAS.IND_1.4.1	Describe the key responsibilities of an ATSEP	2	-
ATSEP.BAS.IND_1.5	**European/Worldwide Dimension**		
ATSEP.BAS.IND_1.5.1	Explain the relationship between States and its relevance to ATM operations	2	e.g. harmonisation, flow management, bilateral agreement, sharing of ATM relevant data, major studies, research programmes, and policy documents
ATSEP.BAS.IND_1.5.2	Define the regulatory framework of international and national ATM	1	e.g. ICAO, European and national concepts, responsibilities
ATSEP.BAS.IND_1.5.3	State the purpose of a range of international bodies	1	ICAO, EU, EASA e.g. ECAC, EUROCONTROL, RTCA, EUROCAE

Appendix 1a – ATSEP Basic training - Shared

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ATSEP.BAS.IND_1.6	**International Standards and Recommended Practices**		
ATSEP.BAS.IND_1.6.1	Explain how the regulatory environment of ICAO notifies and implements legislation	2	ICAO Annexes
ATSEP.BAS.IND_1.6.2	State which major/key ATM engineering 'standards' and 'practices' are applicable	1	e.g. ICAO Annex 10, ICAO Doc 8071, ICAO Doc 9426-3, available EUROCONTROL standards, guidance material on reliability, maintainability and availability
ATSEP.BAS.IND_1.7	**Data Security**		
ATSEP.BAS.IND_1.7.1	Explain the importance of ATM security	2	-
ATSEP.BAS.IND_1.7.2	Describe the security of operational data	2	Secure, restricted access by authorised personnel
ATSEP.BAS.IND_1.7.3	Explain security policies and practices for information and data	2	Backup, storing, hacking, confidentiality, copyright
ATSEP.BAS.IND_1.7.4	Describe the possible external interventions which may interrupt or corrupt ATM services	2	Introduction of software viruses, illegal broadcasts, jamming, spoofing
ATSEP.BAS.IND_1.8	**Quality Management**		
ATSEP.BAS.IND_1.8.1	Explain the need for quality management	2	e.g. ISO, EFQM (European Foundation for Quality Management)
ATSEP.BAS.IND_1.8.2	Explain the need for configuration management	2	Importance for safe operations
ATSEP.BAS.IND_1.9	**Safety Management System**		
ATSEP.BAS.IND_1.9.1	Explain why there is a need for high-level safety requirements for ATM/ANS activities	2	Safety policy and rules, system safety cases, system safety requirements
ATSEP.BAS.IND_1.10	**Health and Safety**		
ATSEP.BAS.IND_1.10.1	Explain personal safety responsibilities in the work environment	2	Safety statement, first aid, rules about climbing
ATSEP.BAS.IND_1.10.2	Explain potential hazards to health and safety generated by equipment, or contained within the work environment	2	e.g. health consequences of electric shock and static discharges, precautions with chemical products (batteries), mechanical hazards (rotating machinery/antennas), toxic materials (beryllium), biological hazards, faulty earthing
ATSEP.BAS.IND_1.10.3	Describe fire safety and first-aid regulations and practices	2	Requirements and rules e.g. standards
ATSEP.BAS.IND_1.10.4	State any applicable legal requirements and safety rules	1	National, international regulations e.g. for working on power supply and/or air conditioning

Appendix 1a – ATSEP Basic training - Shared

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ATSEP.BAS.IND_1.10.5	Describe the main features and uses of the different types of fire detectors and extinguishers	2	e.g. VESDA, Type A, B, C, D extinguishers
ATSEP.BAS.ATF	**AIR TRAFFIC FAMILIARISATION**		
ATSEP.BAS.ATF_1	**AIR TRAFFIC FAMILIARISATION**		
ATSEP.BAS.ATF_1.1	**Air Traffic Management**		
ATSEP.BAS.ATF_1.1.1	Define Air Traffic Management	1	ICAO, EU regulations
ATSEP.BAS.ATF_1.1.2	Describe operational ATM functions	2	ATFCM, ATS, ASM
ATSEP.BAS.ATF_1.1.3	Describe ATM concepts and associated terminology	2	e.g. concepts: FUA, free flight, gate-to-gate, performance-based ATM operations (PBN, RCP), operational concepts (ICAO, EUROCONTROL, SESAR)
ATSEP.BAS.ATF_1.1.4	Explain the operational importance of technical services required for ATM	2	e.g. Interoperability
ATSEP.BAS.ATF_1.1.5	State future developments in systems and/or ATM/ANS practices which may have an impact on services provided	1	e.g. data link, satellite-based navigation, gate-to-gate (CDM), ATC tools, continuous approach, 4D trajectory, business trajectory, SWIM, NOP, SESAR (UDPP, modes of separation), ASAS
ATSEP.BAS.ATF_1.1.6	List the standard units of measurement used in aviation	1	Speed, distance, vertical distance, time, direction, pressure, temperature
ATSEP.BAS.ATF_1.2	**Air Traffic Control**		
ATSEP.BAS.ATF_1.2.1	Define airspace organisation	1	ICAO Annex 11, Regulation (EU) No 923/2012 e.g. FIR, UTA, TMA, CTR, ATS routes
ATSEP.BAS.ATF_1.2.2	Describe commonly used airspace terminologies and concepts	2	e.g. sectorisation, identification of ATS routes, restricted airspace, significant points
ATSEP.BAS.ATF_1.2.3	State the general organisation of aerodromes	1	e.g. obstacle limitation surfaces, different departure and arrival trajectories, approach and landing categories, operational status of radio navigation aids
ATSEP.BAS.ATF_1.2.4	State the purpose of ATC	1	ICAO Doc 4444
ATSEP.BAS.ATF_1.2.5	State the organisation of ATC services	1	ICAO Doc 4444 e.g. area, approach, aerodrome control services
ATSEP.BAS.ATF_1.3	**Ground-based Safety Nets**		
ATSEP.BAS.ATF_1.3.1	Describe the purpose of ground-based safety nets	2	e.g. STCA, MSAW, APW, runway incursion alerts

Appendix 1a – ATSEP Basic training - Shared

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ATSEP.BAS.ATF_1.4	**Air Traffic Control Tools and Monitoring Aids**		
ATSEP.BAS.ATF_1.4.1	Explain the main characteristics and use of ATC support and monitoring tools	2	e.g. MTCD, sequencing and metering tools (AMAN, DMAN), A-SMGCS, CLAM, RAM, CORA
ATSEP.BAS.ATF_1.5	**Familiarisation**		
ATSEP.BAS.ATF_1.5.1	Take account of the tasks of ATC	2	e.g. simulation, role play, PC, Part Task Trainer, observations in the operational environment
ATSEP.BAS.ATF_1.5.2	Explain the need for good communication, coordination and cooperation between operational staff	2	e.g. handovers, MIL/CIV, planner/tactical, SV Tech (SMC) and SV ATCO, site visit(s) to ATC units
ATSEP.BAS.ATF_1.5.3	Consider the purpose, function and role of various operational stations in respect of ATM-related operations	2	Site visit(s) to ATC units e.g. meteorological services providers, remote sites, airport operations
ATSEP.BAS.ATF_1.5.4	Define the phases of flight	1	Take-off, climb, cruise, descent and initial approach, final approach and landing
ATSEP.BAS.ATF_1.5.5	Recognise the cockpit environment and associated equipment, in relation to ATC	1	Relevant pilot HMI e.g. familiarisation flight or cockpit simulator training (where practicable), antenna
ATSEP.BAS.ATF_1.5.6	Define airborne collision avoidance systems	1	ACAS, EGPWS e.g. TCAS
ATSEP.BAS.AIS	**AERONAUTICAL INFORMATION SERVICES**		
ATSEP.BAS.AIS_1	**AERONAUTICAL INFORMATION SERVICES (AIS)**		
ATSEP.BAS.AIS_1.1	**Aeronautical Information Services**		
ATSEP.BAS.AIS_1.1.1	State the organisation of the AIS	1	-
ATSEP.BAS.AIS_1.1.2	Define the AIP	1	e.g. contents of AIP, AIC and types of publication: AIRAC, non-AIRAC, data collection and preparation, data format, distribution channels, supporting systems and tools
ATSEP.BAS.AIS_1.1.3	Define the aeronautical charting service	1	Types of aeronautical charts, operational use of charts, supporting systems and tools
ATSEP.BAS.AIS_1.1.4	Define the NOTAM services	1	-
ATSEP.BAS.AIS_1.1.5	Define the ATS Reporting Office	1	e.g. purpose of flight plans and other ATS messages, types of flight plans (FPL and RPL), contents of flight plans and other ATS messages, distribution of flight plans and other ATS messages, supporting systems and tools

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ATSEP.BAS.AIS_1.1.6	Define the European AIS Database	1	e.g. central single source, validation, redundancy, EAD structure
ATSEP.BAS.AIS_1.1.7	Define procedures for providing Communications, Navigation and Surveillance (CNS) data	1	Information of a permanent nature, information of a temporary nature, status report of NAVAIDs
ATSEP.BAS.MET	**METEOROLOGY**		
ATSEP.BAS.MET_1	**METEOROLOGY (MET)**		
ATSEP.BAS.MET_1.1	**Introduction to Meteorology**		
ATSEP.BAS.MET_1.1.1	State the relevance of meteorology in aviation	1	Influence on the operation of aircraft, flying conditions, aerodrome conditions
ATSEP.BAS.MET_1.1.2	State the weather prediction and measurement systems available	1	wind, visibility, temperature, pressure, humidity, cloud base
ATSEP.BAS.MET_1.2	**Impact on Aircraft and ATS Operation**		
ATSEP.BAS.MET_1.2.1	State the meteorological conditions and their impact on aircraft operations	1	e.g. wind, visibility, temperature/humidity, clouds, precipitation, pressure, density
ATSEP.BAS.MET_1.2.2	State the meteorological conditions hazardous to aircraft operations	1	e.g. turbulence, thunderstorms, icing, squall, macro bursts, wind shear, contaminated runway
ATSEP.BAS.MET_1.2.3	Explain the impact of meteorological conditions and hazards on ATS operations	2	Increased vertical and horizontal separation, low visibility procedures, anticipation of flights not adhering to tracks, diversions, missed approaches e.g. effects on equipment performance
ATSEP.BAS.MET_1.2.4	Explain the effects of weather on propagation	2	e.g. anaprop, rain noise, sunspots
ATSEP.BAS.MET_1.3	**Meteorological Parameters and Information**		
ATSEP.BAS.MET_1.3.1	List the main meteorological parameters	1	Wind, visibility, temperature, pressure, humidity
ATSEP.BAS.MET_1.3.2	List the most common weather messages and broadcasts used in aviation	1	Meteorology messages: TAF, METAR, SNOWTAM, SIGMET Broadcasts: ATIS/VOLMET e.g. Regulation (EU) 2017/373 – Annex V (Part-MET)
ATSEP.BAS.MET_1.4	**Meteorological Systems**		
ATSEP.BAS.MET_1.4.1	Explain the basic principles of the main meteorological systems in use	2	e.g. weather display and information systems, wind speed (anemometer), wind direction (weather vane), visibility (types of IRVR, forward scatter), temperature probes, pressure (aneroid barometers), humidity, cloud base (laser ceilometers)

Appendix 2a – ATSEP Basic training - Streams

ATSEP UOID *(Unique Objective IDentifier)*	**CORPUS**	**TAX**	**CONTENT**
ATSEP.BAS.COM	**COMMUNICATION**		
ATSEP.BAS.COM_1	**GENERAL INTRODUCTION**		
ATSEP.BAS.COM_1.1	**Introduction to Communications**		
ATSEP.BAS.COM_1.1.1	State the structure of the communication domain	1	Voice communication, data communication
ATSEP.BAS.COM_1.1.2	State major substructures of the communication domain	1	Air-ground, ground-ground, air-air communications
ATSEP.BAS.COM_1.1.3	State ATS requirements for safe communications	1	Safety, reliability, availability, coverage, QoS, latency
ATSEP.BAS.COM_1.1.4	State the aeronautical communication services	1	Mobile, fixed
ATSEP.BAS.COM_2	**VOICE COMMUNICATION**		
ATSEP.BAS.COM_2.1	**Introduction to Voice Communications**		
ATSEP.BAS.COM_2.1.1	Describe system architecture	2	-
ATSEP.BAS.COM_2.1.2	Explain the purpose, principles and role of voice communication systems in ATS	2	e.g. audio bandwidth, dynamic range, fidelity, routing, switching, lineside/deskside, coverage, communication chain between controller and pilot
ATSEP.BAS.COM_2.1.3	Describe the way in which voice communication systems function	2	VoIP VCS, analogue/digital comparisons, distortion, harmonics
ATSEP.BAS.COM_2.1.4	State methods used to route and switch voice communications	1	e.g. multichannels, multi-users, party lines, VHF/UHF linkage, HF, SELCAL
ATSEP.BAS.COM_2.1.5	State how systems interface to produce an integrated service to ATS	1	-
ATSEP.BAS.COM_2.1.6	State radio spectrum and frequency allocation constraints and procedures	1	Spectrum, interference sources, commercial allocations, world radio conference, ITU, efficient utilisation of frequency bands, channel spacing
ATSEP.BAS.COM_2.1.7	State voice recording systems in use	1	e.g. digital recording equipment
ATSEP.BAS.COM_2.1.8	State ICAO and local legal requirements regarding recording and retention of voice communications	1	Regulatory requirements, incident recording and playback, recording equipment
ATSEP.BAS.COM_2.1.9	State the purpose of ATIS and VOLMET	1	-
ATSEP.BAS.COM_2.2	**Air-Ground Communication**		
ATSEP.BAS.COM_2.2.1	State the functions and basic operation of routing and switching equipment in use in the ATS environment	1	Voice switching
ATSEP.BAS.COM_2.2.2	Describe the purpose and operation of the elements of a communication chain in use in the ATS environment	2	Functionality, emergency systems, transmission/reception, CWP, on-board equipment e.g. channel spacing, antenna switching, CLIMAX, voting systems

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ATSEP UOID *(Unique Objective IDentifier)*	**CORPUS**	**TAX**	**CONTENT**
ATSEP.BAS.COM_2.2.3	State ways of achieving quality of service	1	e.g. importance of coverage and redundancy of equipment, overlapping coverage, backup system, functional redundancy vs element redundancy
ATSEP.BAS.COM_2.2.4	Recognise the elements of the CWP that are used for air-ground communication	1	Frequency selection, emergency, station selection, coupling, microphone, headset, loudspeaker, footswitch, Push-To-Talk
ATSEP.BAS.COM_2.2.5	List techniques and future developments which have, or may have an impact on ATS voice communications	1	e.g. CPDLC, VDL Mode 2
ATSEP.BAS.COM_2.3	**Ground-Ground Communication**		
ATSEP.BAS.COM_2.3.1	State the functions and the basic operations of routing and switching equipment in use in ATS environment	1	General architecture
ATSEP.BAS.COM_2.3.2	Describe how ground-ground systems interface to provide an integrated service to ATS environment	2	International/national links, ACC interoperability, voice and data integration
ATSEP.BAS.COM_2.3.3	Describe the functionality of the elements of a ground-ground communication system	2	Main and emergency systems, interfaces to telecom providers e.g. MFC and ATS-Qsig, switching, local PABX equipment
ATSEP.BAS.COM_2.3.4	Recognise the elements of the CWP used for ground-ground communication	1	Selection, emergency, loudspeaker, headset, microphone
ATSEP.BAS.COM_2.3.5	Describe developments in ground-ground technologies which may impact on ATS voice communication	2	TCP/IP, voice-over IP e.g. protocols future development
ATSEP.BAS.COM_3	**DATA COMMUNICATION**		
ATSEP.BAS.COM_3.1	**Introduction to Data Communication**		
ATSEP.BAS.COM_3.1.1	Explain the purpose, principles and role of data communication systems in ATS	2	e.g. terminology, principles and theory of networks, layering (OSI or TCP/IP), data links, LAN, WAN
ATSEP.BAS.COM_3.1.2	Define the concept of data transmission	1	e.g. packet switching, protocols, multiplexing, demultiplexing, error detection and correction, routing, switching, hops, cost, bandwidth/speed
ATSEP.BAS.COM_3.1.3	Describe the function of various elements of the data systems in use in ATS environment	2	Switch, router, gateways, end systems, redundancy
ATSEP.BAS.COM_3.1.4	Define protocols in current use	1	e.g. TCP/IP, frame relay, asynchronous transfer mode
ATSEP.BAS.COM_3.2	**Networks**		
ATSEP.BAS.COM_3.2.1	State ATS requirements for safe data communications	1	Reliability, availability
ATSEP.BAS.COM_3.2.2	Describe the different types of networks	2	LAN, WAN, ATN, national network for ATM e.g. satellite-dedicated networks, AFTN Priorities, rights
ATSEP.BAS.COM_3.2.3	State the functions of a network management system	1	e.g. SNMP

Appendix 2a – ATSEP Basic training - Streams

ATSEP UOID *(Unique Objective IDentifier)*	**CORPUS**	**TAX**	**CONTENT**
ATSEP.BAS.COM_3.3	**Aviation Specific Networks, Applications and ATM/ANS Providers**		
ATSEP.BAS.COM_3.3.1	Name a range of air-ground aviation-related network concepts	1	ATN e.g. Subnetworks: ATN air-ground subnetwork, AMSS, VDL, HFDL Protocols: ACARS Communication service providers: ARINC, SITA
ATSEP.BAS.COM_3.3.2	Name a range of ground-ground aviation-related network concepts	1	ATN, PENS e.g. Physical networks: PENS, AFTN, RAPNET Communication protocols: IP, ASTERIX, FMTP Communication service providers: SITA, ARINC, national carriers, ANSPs Applications: AMHS, AIDC, OLDI
ATSEP.BAS.COM_3.3.3	Define SWIM	1	SWIM institutional framework and applications e.g. SWIM providers and users
ATSEP.BAS.NAV	**NAVIGATION**		
ATSEP.BAS.NAV_1	**INTRODUCTION**		
ATSEP.BAS.NAV_1.1	**Purpose and Use of Navigation**		
ATSEP.BAS.NAV_1.1.1	Explain the need for navigation in aviation	2	Positioning, guidance, planning
ATSEP.BAS.NAV_1.1.2	Characterise navigation methods	2	e.g. historical overview, visual, celestial, electronic (on-board, radio, space-based and relative)
ATSEP.BAS.NAV_2	**THE EARTH**		
ATSEP.BAS.NAV_2.1	**Form of the Earth**		
ATSEP.BAS.NAV_2.1.1	State the shape of the Earth and its parameters	1	Oblate spheroid e.g. diameter, gravity, rotation, axis, magnetic field
ATSEP.BAS.NAV_2.1.2	Explain the Earth's properties and their effects	2	Polar axis, direction of rotation
ATSEP.BAS.NAV_2.1.3	State the accepted conventions for describing 2D position on a globe	1	Meridians, parallels of latitude, equatorial plane
ATSEP.BAS.NAV_2.2	**Coordinate Systems, Direction and Distance**		
ATSEP.BAS.NAV_2.2.1	State the general principles of reference systems	1	Geoid, reference ellipsoids, WGS 84 Latitude and longitude, undulation
ATSEP.BAS.NAV_2.2.2	Explain why a global reference system is required for aviation	2	-

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ATSEP UOID *(Unique Objective IDentifier)*	**CORPUS**	**TAX**	**CONTENT**
ATSEP.BAS.NAV_2.3	**Earth's Magnetism**		
ATSEP.BAS.NAV_2.3.1	State the general principles of Earth's magnetism	1	True North, magnetic North e.g. variation, declination, deviation, inclination
ATSEP.BAS.NAV_3	**NAVIGATIONAL SYSTEM PERFORMANCE**		
ATSEP.BAS.NAV_3.1	**Factors Affecting Electronic Navigation Performance**		
ATSEP.BAS.NAV_3.1.1	State how radio waves propagate	1	Ground, sky, line of sight
ATSEP.BAS.NAV_3.1.2	State why the siting of a terrestrial navigation aid is important	1	Multipath, blanking
ATSEP.BAS.NAV_3.2	**Performance of Navigation Systems**		
ATSEP.BAS.NAV_3.2.1	State the performance of navigation systems	1	Coverage, accuracy, integrity, continuity of service, availability
ATSEP.BAS.NAV_3.2.2	Explain the need for redundancy in navigation systems	2	Ensuring continuity of service, maintainability, reliability
ATSEP.BAS.NAV_3.3	**Means of Navigation**		
ATSEP.BAS.NAV_3.3.1	State the different means of navigation	1	Sole, primary, supplementary
ATSEP.BAS.NAV_4	**NAVIGATION SYSTEMS**		
ATSEP.BAS.NAV_4.1	**Terrestrial Navigation Aids**		
ATSEP.BAS.NAV_4.1.1	Explain the basic working principles of electronic positioning	2	Distance measurements (time and phase), angular measurements
ATSEP.BAS.NAV_4.1.2	Describe ground-based navigation systems	2	NDB, VOR, DME, ILS, DF e.g. TACAN, marker beacons
ATSEP.BAS.NAV_4.1.3	Recognise how the navigation information is displayed on the relevant pilot HMI	1	-
ATSEP.BAS.NAV_4.1.4	Explain the operational use of ground- based navigation systems in the different phases of flight	2	NDB, VOR, DME, ILS, DF
ATSEP.BAS.NAV_4.1.5	Recognise the frequency bands used by the ground-based navigation systems	1	-
ATSEP.BAS.NAV_4.1.6	State the need for calibration	1	Flight calibration, ground-based calibration and/or maintenance
ATSEP.BAS.NAV_4.2	**On-board Navigation Systems**		
ATSEP.BAS.NAV_4.2.1	State the use of on-board navigation systems	1	e.g. barometric altimetry, radio altimetry, INS/IRS, compass
ATSEP.BAS.NAV_4.2.2	State the use of an FMS	1	Sensors, navigation database
ATSEP.BAS.NAV_4.3	**Space-based Navigation Systems**		
ATSEP.BAS.NAV_4.3.1	Explain the basic working principles of satellite positioning	2	GNSS e.g. Galileo, GPS

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ATSEP.BAS.NAV_4.3.2	Recognise the basic architecture of a core satellite positioning system	1	GNSS e.g. Galileo, GPS
ATSEP.BAS.NAV_4.3.3	Recognise the frequency bands used by the space-based navigational systems	1	-
ATSEP.BAS.NAV_4.3.4	State the benefits of satellite-based navigation	1	Global coverage, accuracy, time dissemination e.g. redundancy, interoperability, single set of avionics
ATSEP.BAS.NAV_4.3.5	State the current limitations of space-based navigation systems	1	e.g. single frequency, weak signal, ionospheric delay, institutional, military, multipath
ATSEP.BAS.NAV_4.3.6	Describe the basic working principles of satellite augmentation	2	ABAS (RAIM, AAIM), SBAS (WAAS, EGNOS), GBAS
ATSEP.BAS.NAV_4.3.7	State the current implementations of satellite-based navigation systems	1	Core systems: GPS, GLONASS, GALILEO , BEIDOU, Augmentation systems: RAIM, AAIM, EGNOS, WAAS, GBAS
ATSEP.BAS.NAV_5	**PERFORMANCE-BASED NAVIGATION (PBN)**		
ATSEP.BAS.NAV_5.1	**PBN**		
ATSEP.BAS.NAV_5.1.1	Describe the performance based navigation concept	2	ICAO Doc 9613
ATSEP.BAS.NAV_5.1.2	List the navigation applications in use in Europe	1	RNAV-5 (B-RNAV), RNAV-1 (P-RNAV), RNP approaches
ATSEP.BAS.NAV_5.2	**Current Developments**		
ATSEP.BAS.NAV_5.2.1	State current navigation developments	1	e.g. 4D-RNAV, free routes, rationalisation plans, advanced RNP
ATSEP.BAS.SUR	**SURVEILLANCE**		
ATSEP.BAS.SUR_1	**INTRODUCTION TO SURVEILLANCE**		
ATSEP.BAS.SUR_1.1	**Introduction to Surveillance**		
ATSEP.BAS.SUR_1.1.1	Define surveillance in the context of ATM	1	What (positioning/identification) and why (maintain separation)
ATSEP.BAS.SUR_1.1.2	Define the various surveillance domains	1	Air-air, ground-air, ground-ground
ATSEP.BAS.SUR_1.1.3	List the surveillance techniques	1	Non-cooperative, cooperative, dependent, independent techniques
ATSEP.BAS.SUR_1.1.4	Define the current and emerging surveillance systems in use in ATM	1	Radar technology, ADS technology, multilateration e.g. TIS
ATSEP.BAS.SUR_1.1.5	Explain the role and the current use of surveillance equipment by ATM	2	Separation, vectoring, data acquisition Detection and ranging, safety nets e.g. weather mapping
ATSEP.BAS.SUR_1.1.6	State ICAO and any local legal requirements	1	e.g. ICAO Annex 10 Vol. IV
ATSEP.BAS.SUR_1.1.7	List the main users of surveillance data	1	HMI, safety nets, FDPS, air defence systems, flow management

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ATSEP UOID *(Unique Objective IDentifier)*	**CORPUS**	**TAX**	**CONTENT**
ATSEP.BAS.SUR_1.2	**Avionics**		
ATSEP.BAS.SUR_1.2.1	State the avionics used for the surveillance in ATM and their interdependencies	1	Transponder, GNSS, data link equipment, ACAS, ATC control panel e.g. FMS
ATSEP.BAS.SUR_1.2.2	Define the role of TCAS as a safety net	1	e.g. FMS
ATSEP.BAS.SUR_1.3	**Primary Radar**		
ATSEP.BAS.SUR_1.3.1	Describe the need for and the use of primary radar in ATC	2	Non-cooperative detection, improvement of detection and tracking e.g. types of PSR (en-route, terminal, SMR, weather)
ATSEP.BAS.SUR_1.3.2	Explain the principles of operation, basic elements and overall architecture of a primary radar	2	Detection, range measurement, azimuth indication, Doppler shift, antenna system, TX/RX, signal processing, plot extraction, local tracking, data transmission e.g. use of the parameters of the radar equation
ATSEP.BAS.SUR_1.3.3	State the limitations of primary radar	1	Line of sight, environmental, clutter, no identification of the target, no height information (in case of 2D radar)
ATSEP.BAS.SUR_1.4	**Secondary Radar**		
ATSEP.BAS.SUR_1.4.1	Describe needs for and the use of secondary radars in ATC	2	Cooperative detection, ICAO-defined standard, IFF, military and civil modes (include Mode S) and related code protocols, code limitations e.g. identification, SPI, flight level, BDS, specific and emergency codes
ATSEP.BAS.SUR_1.4.2	Explain the principles of operation, basic elements and overall architecture of a secondary radar	2	SSR, MSSR, Mode S antenna, TX/RX, extractor, tracking processor e.g. use of the parameters of the radar equation
ATSEP.BAS.SUR_1.4.3	State the limitations of secondary radar	1	FRUIT, garbling, ghost reply, code shortage, cooperation by the aircraft needed
ATSEP.BAS.SUR_1.5	**Surveillance Data Message Format**		
ATSEP.BAS.SUR_1.5.1	State the need for harmonisation	1	Surveillance data sharing, interoperability
ATSEP.BAS.SUR_1.5.2	State the techniques used for transmission of surveillance data	1	e.g. point-to-point, network, microwave, satellite
ATSEP.BAS.SUR_1.5.3	State main formats in use	1	ASTERIX, etc.

Appendix 2a – ATSEP Basic training - Streams

ATSEP UOID *(Unique Objective IDentifier)*	**CORPUS**	**TAX**	**CONTENT**
ATSEP.BAS.SUR_1.6	**Automatic Dependent Surveillance (ADS)**		
ATSEP.BAS.SUR_1.6.1	State surveillance-related FANS concepts and their impact on ATM	1	Sources of aircraft parameters (e.g. FMS outputs), communication mediums Application within oceanic and other non-radar airspace, ATC requirements
ATSEP.BAS.SUR_1.6.2	Explain the principles of operation, basic elements and overall architecture of ADS-C and ADS-B and the differences between them	2	Advantages/disadvantages, standards, data update rates
ATSEP.BAS.SUR_1.6.3	State the data link technologies proposed and the current situation of deployment	1	Extended squitter 1 090 MHz e.g. VDL 4, HFDL, UAT, AMSS
ATSEP.BAS.SUR_1.7	**Weather Radar**		
ATSEP.BAS.SUR_1.7.1	Define the use of weather radar in ATM	1	e.g. role in adverse weather in dense airspace, antenna, coverage, polarisation, multi-elevation scanning, frequency band
ATSEP.BAS.SUR_1.8	**Integration of Surveillance Information**		
ATSEP.BAS.SUR_1.8.1	Describe complementary use of different sensors	2	-
ATSEP.BAS.SUR_1.9	**Multilateration (MLAT)**		
ATSEP.BAS.SUR_1.9.1	State the use of MLAT in ATC	1	LAM and WAM
ATSEP.BAS.SUR_1.9.2	Explain the principles of operation, basic elements and overall architecture of MLAT	2	TDOA principle, hyperbolic positioning, accuracy, transmissions used
ATSEP.BAS.SUR_1.10	**Airport Surface Surveillance**		
ATSEP.BAS.SUR_1.10.1	State typical ATC requirements	1	e.g. safety (aircraft and mobiles), clear runway, low visibility, collision warnings, displays, mapping, data merging, aircraft identification, ground mobiles
ATSEP.BAS.SUR_1.10.2	State the current technologies for airport surface surveillance	1	Radar-based and MLAT-based technologies, example layout of airport surveillance infrastructure e.g. other systems (acoustic, vibration, induction loop, video, infrared, GNSS, ADS-B)
ATSEP.BAS.SUR_1.11	**Display of Surveillance Information**		
ATSEP.BAS.SUR_1.11.1	Recognise surveillance information on a display	1	e.g. PSR and MSSR tracks, position identification, FL, speed vector, RDP and FDP information
ATSEP.BAS.SUR_1.12	**Analysis Tools**		
ATSEP.BAS.SUR_1.12.1	State analysis tools	1	e.g. SASS-C, SASS-S, RAPS

Appendix 2a – ATSEP Basic training - Streams

ATSEP UOID *(Unique Objective IDentifier)*	**CORPUS**	**TAX**	**CONTENT**
ATSEP.BAS.DPR	**DATA PROCESSING**		
ATSEP.BAS.DPR_1	**DATA PROCESSING**		
ATSEP.BAS.DPR_1.1	**Introduction to Data Processing**		
ATSEP.BAS.DPR_1.1.1	Describe the functions and generic architecture of the systems	2	Generic FDP and SDP overall functional block diagrams
ATSEP.BAS.DPR_1.1.2	Describe how the systems interface with other systems	2	Surveillance sensors, displays, NMOC, recording, international ATM networks e.g. safety nets, military interfaces
ATSEP.BAS.DPR_1.1.3	Define basic software functions/applications	1	FDP (IFPS, route processing, code/call sign correlation, code allocation, strip distribution, track labelling) SDP (coordinate conversion, plot and track processing, MRP, safety nets, track labelling)
ATSEP.BAS.DPR_1.1.4	State the legal aspects for data processing in ATM	1	Traceability and recording of data and actions, configuration control
ATSEP.BAS.DPR_1.1.5	State current developments and future possibilities	1	e.g. Coflight, iTEC, SESAR, multisensor tracking, SWIM, flight object
ATSEP.BAS.DPR_1.2	**System Software and Hardware Principles**		
ATSEP.BAS.DPR_1.2.1	Describe the current hardware configurations used in ATM	2	Redundancy and backup e.g. driver, interfaces, hardware platforms, fault tolerant systems
ATSEP.BAS.DPR_1.2.2	Describe the current software platforms, used in ATM	2	Operating systems
ATSEP.BAS.DPR_1.2.3	Describe concepts of virtualisation in ATM	2	Virtual Centre (Remote CWP - SESAR) e.g. display virtualisation (RDU: Remote Display Unit), server virtualisation (server consolidation)
ATSEP.BAS.DPR_1.3	**Surveillance Data Processing (SDP)**		
ATSEP.BAS.DPR_1.3.1	State ATC requirements	1	QoS, mandatory data recording, dependability
ATSEP.BAS.DPR_1.3.2	Explain the principles of SDP	2	e.g. single, multi, plot, track
ATSEP.BAS.DPR_1.3.3	Describe the functions of SDP	2	Plot processing, tracking, single sensor and multisensor tracker (e.g. radar, ADS, MLAT), estimating limits and accuracy of multisensor tracker, recording e.g. ARTAS tracker
ATSEP.BAS.DPR_1.3.4	Describe radar data inputs/outputs	2	Tracks, plots, messages, code/call sign, time, control and monitoring, conflict alerts, FDP interface, maps, adaptation

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ATSEP UOID *(Unique Objective IDentifier)*	**CORPUS**	**TAX**	**CONTENT**
ATSEP.BAS.DPR_1.3.5	Describe the surveillance data-based monitoring functions	2	Safety nets, ATC tools e.g. safety nets: STCA, MSAW, APW, runway incursion alerts ATC Tools: MTCD, AMAN, DMAN, A-SMGCS
ATSEP.BAS.DPR_1.4	**Flight Data Processing (FDP)**		
ATSEP.BAS.DPR_1.4.1	State ATC requirements	1	QoS, unambiguous, accurate, error free, timely
ATSEP.BAS.DPR_1.4.2	Explain the functions of FDP	2	Flight strip production, flight plan data updates, code/call sign correlation, flight progress monitoring, coordination and transfer e.g. CIV/MIL coordination
ATSEP.BAS.DPR_1.4.3	Define inputs and outputs	1	Flow control (NMOC/IFPS/FMP, ETFMS), flight strips/data displays, MRT, environmental data, static data, airspace adaptation
ATSEP.BAS.DPR_1.4.4	Describe the basic software functions/applications	2	FDP (IFPS, route processing, code/call sign correlation, code allocation, strip distribution, track labelling)
ATSEP.BAS.DPR_1.4.5	Describe the FPL data update process	2	Automatic and manual update
ATSEP.BAS.DPR_1.5	**Human Machine Interface (HMI)**		
ATSEP.BAS.DPR_1.5.1	Describe the different display technologies and interfaces	2	Common graphic display interface, LCD, TFT, Touch Input Device, video interfaces, extenders e.g. DVI, HDMI, DisplayPort, Thunderbolt, video and USB signal extenders, video splitters and video frame rate encoders
ATSEP.BAS.DPR_1.5.2	Recognise what information is normally displayed on the ATCO and ATSEP HMI	1	-
ATSEP.BAS.DPR_1.6	**Miscellaneous Information**		
ATSEP.BAS.DPR_1.6.1	State the additional data used by ATM system	1	e.g. MET, AIM (NOTAMs), CDM, aircraft data

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ATSEP UOID *(Unique Objective IDentifier)*	**CORPUS**	**TAX**	**CONTENT**
ATSEP.BAS.SMC	**SYSTEM MONITORING AND CONTROL**		
ATSEP.BAS.SMC_1	**SYSTEM MONITORING AND CONTROL (SMC)**		
ATSEP.BAS.SMC_1.1	**Overview of SMC Function**		
ATSEP.BAS.SMC_1.1.1	Describe the principles and purpose of the operational management of the technical services	2	Service requirements, interfaces, boundaries of tactical responsibility e.g. hierarchy of authority for the technical and ATC structures
ATSEP.BAS.SMC_1.1.2	Describe the technical system architecture of the SMC function and its subordinate systems	2	Main monitoring and control architecture e.g. Surveillance: Radar stations, communications, processing, display Communication: TX/RX, circuit management, networks, HMI, standby facilities, recording Navigation: NDB, VOR, ILS, DF Facilities: Power, generators, UPS, battery, environmental (heating, cooling), fire and security DP: FDPS, data communications
ATSEP.BAS.SMC_1.1.3	Describe the transfer of responsibility for a service	2	Operational and technical responsibility Configuration and monitoring access and responsibility
ATSEP.BAS.SMC_1.2	**System Configuration**		
ATSEP.BAS.SMC_1.2.1	Describe the range of configurations that can be used	2	Equipment or channel switching, parameter settings
ATSEP.BAS.SMC_1.2.2	Describe the general techniques that are employed to make configuration changes	2	e.g. physical switching
ATSEP.BAS.SMC_1.2.3	State procedures required to implement a planned major system change	1	e.g. safety requirement, authorisation, coordination, implementation plan, fallback strategies, major system change, activation of new version of software in a subordinate system, transfer of a service to a new system, change of a database
ATSEP.BAS.SMC_1.3	**Monitoring and Control Functions**		
ATSEP.BAS.SMC_1.3.1	State the monitoring functions that are available	1	e.g. BITE, status, parameters, software and hardware watchdogs
ATSEP.BAS.SMC_1.3.2	State the control functions that are available	1	e.g. switching, parameters, set configurations
ATSEP.BAS.SMC_1.3.3	Explain the importance of SMC management and coordination of maintenance activities	2	-
ATSEP.BAS.SMC_1.3.4	State analysis tools associated with SMC	1	e.g. possible malfunctions (SASS-C, SASS-S, RAPS, track and noise monitoring tools)

Appendix 2a – ATSEP Basic training - Streams

ATSEP UOID *(Unique Objective IDentifier)*	**CORPUS**	**TAX**	**CONTENT**
ATSEP.BAS.SMC_1.4	**Coordination and Reporting**		
ATSEP.BAS.SMC_1.4.1	State why coordination and reporting is required and how it is achieved	1	Facility interrupts, deconflict multiple outages, legal requirements e.g. causes: service failure, planned outage, loss of backup, software upgrade Relevant parties: external service providers, ATC, other centres Relevant information: NOTAM, logbook
ATSEP.BAS.SMC_1.5	**Emergency Coordination**		
ATSEP.BAS.SMC_1.5.1	Describe situations where coordination and reporting will be necessary	2	e.g. hijack, mayday, R/T fail, loss of aircraft, MIL action, fire, flood, security, terrorist threat or action, medical
ATSEP.BAS.SMC_1.5.2	State which parties may be involved in the coordination and reporting of emergency situations	1	e.g. ATC supervisors (local and remote), ATSEP supervisors (local and remote), management, police, MIL, medical, accident investigation branch
ATSEP.BAS.SMC_1.5.3	Explain the responsibilities and/or duties of SMC members during an emergency situation by using an example scenario	2	-
ATSEP.BAS.SMC_1.5.4	State the succession of authorities and responsibilities in the event that the nominated person or function is not available	1	Hierarchy of responsibility
ATSEP.BAS.SMC_1.6	**Equipment Operating**		
ATSEP.BAS.SMC_1.6.1	Define the principles and ergonomics of the HMI of the SMC central system and its subordinate systems	1	Permissions, control tokens, ergonomic conventions (e.g. green is good or safe, red is fail or unsafe)
ATSEP.BAS.SMC_1.6.2	State the routine tasks required and the criticality of their completion and any legal requirements	1	e.g. audio circuit voice checking, audio recording checking, archive media changing and storage, VOLMET

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ATSEP UOID *(Unique Objective IDentifier)*	**CORPUS**	**TAX**	**CONTENT**
ATSEP.BAS.MTN	**MAINTENANCE PROCEDURES**		
ATSEP.BAS.MTN_1	**MAINTENANCE PROCEDURES**		
ATSEP.BAS.MTN_1.1	**Maintenance Procedures**		
ATSEP.BAS.MTN_1.1.1	Explain handling precautions to be taken to ensure equipment protection	2	Isolation, protection devices, electrostatic sensitive devices, power supplies, heavy loads, high voltage
ATSEP.BAS.MTN_1.1.2	Explain the classifications of maintenance	2	e.g. preventative, corrective, service configuration
ATSEP.BAS.MTN_1.1.3	Explain the maintenance strategy and rules	2	Organisation and planning of maintenance, rules controlling deviation from planned maintenance, intervention tracking, return to service
ATSEP.BAS.MTN_1.1.4	State the scope or responsibility of an S/E rated person	1	e.g. tracing maintenance actions and objectives, liability of maintenance personnel actions, safety of service, safety of equipment
ATSEP.BAS.FAC	**FACILITIES**		
ATSEP.BAS.FAC_1	**FACILITIES**		
ATSEP.BAS.FAC_1.1	**Power Supply Systems**		
ATSEP.BAS.FAC_1.1.1	Define the performance for power supply systems in the operational environment	1	Availability, quality, Continuity of Service
ATSEP.BAS.FAC_1.1.2	Define the main features of current power supply systems	1	e.g. UPS systems, batteries and emergency generators, high voltage, earthing techniques, power provider(s)
ATSEP.BAS.FAC_1.1.3	Describe the power distribution system at an example operational site	2	e.g. power distribution redundancy, input, output, protections, measurements and monitoring, block schematic
ATSEP.BAS.FAC_1.2	**Air Conditioning Systems**		
ATSEP.BAS.FAC_1.2.1	State the function, appropriate terminology and performance of current air conditioning systems in use	1	e.g. air conditioning, water cooling, humidity control, air filtering system, visit to stations
ATSEP.BAS.FAC_1.2.2	State the importance and criticality of maintaining a controlled environment	1	Short- and long-term effect on people and equipment

Appendix 3a – ATSEP Qualification training - Shared

ATSEP UOID *(Unique Objective IDentifier)*	**CORPUS**	**TAX**	**CONTENT**
ATSEP.QLF.SHR	**ATSEP QUALIFICATION DOMAIN - SHARED**		
ATSEP.QLF.SHR.SAF	**SAFETY**		
ATSEP.QLF.SHR.SAF_1	**SAFETY MANAGEMENT**		
ATSEP.QLF.SHR.SAF_1.1	**Policies and Principles**		
ATSEP.QLF.SHR.SAF_1.1.1	Explain the underlying need for safety management policies and principles	2	ICAO Annex 19, lessons learnt from events, evolving environment, requirements
ATSEP.QLF.SHR.SAF_1.1.2	State the safety management policy	1	ICAO Annex 19, priority of safety, the safety objective of ATM, roles and responsibilities
ATSEP.QLF.SHR.SAF_1.1.3	Explain safety management principles	2	ICAO Annex 19, safety achievement, safety assurance, safety promotion
ATSEP.QLF.SHR.SAF_1.1.4	Differentiate the reactive and proactive nature of safety management policy and principles	3	e.g. ICAO Annex 19, nature of events, Swiss Cheese Model (J. Reason), events investigation, safety assessment
ATSEP.QLF.SHR.SAF_1.1.5	Explain the link between safety management principles and the life cycle of an ATM system	2	ICAO Annex 19, safety occurrences, setting of safety levels, system safety assessment, safety surveys, safety monitoring, system safety assessment documentation, lesson dissemination, safety improvement, use of safety data to assist in decommissioning or replacement of system
ATSEP.QLF.SHR.SAF_1.1.6	Appreciate the ATSEP role and responsibilities to safety management	3	Competency, occurrence reporting
ATSEP.QLF.SHR.SAF_1.1.7	State the role and content of a typical SMS within an ANSP	1	ICAO Annex 19
ATSEP.QLF.SHR.SAF_1.1.8	Explain the ‘just culture’ concept	2	Benefits, prerequisites, constraints
ATSEP.QLF.SHR.SAF_1.2	**Concept of Risk and Principles of Risk Assessment**		
ATSEP.QLF.SHR.SAF_1.2.1	Describe the concept of risk	2	Types of risk, components of risk, risk contributors (people, procedure, organisations and equipment)
ATSEP.QLF.SHR.SAF_1.2.2	State ways of assessing risk	1	Risk comparisons, risk analysis
ATSEP.QLF.SHR.SAF_1.2.3	Describe the concept of risk tolerability	2	Risk assessment and mitigation, ALARP Principle e.g. Risk perception, risk management

Appendix 3a – ATSEP Qualification training - Shared

ATSEP UOID *(Unique Objective IDentifier)*	**CORPUS**	**TAX**	**CONTENT**
ATSEP.QLF.SHR.SAF_1.3	**Safety Assessment Process**		
ATSEP.QLF.SHR.SAF_1.3.1	Explain the methods for the assessment of hazards and possible failures	2	e.g. Failure and hazard brainstorm session, Fault tree analysis
ATSEP.QLF.SHR.SAF_1.3.2	Characterise the importance of adopting a total system approach covering human, procedure, organisation and equipment elements	2	ATM system description (including scope definition and limitation), end-to-end integrity of safety assessment e.g. Concept of TRM
ATSEP.QLF.SHR.SAF_1.3.3	Describe the overall safety assessment process and its relationships with risk assessment during the total life cycle of ANS system	2	Collection and presentation of results, contingency arrangements, back-up procedures e.g. Risk-based process, FHA, (safety objectives), preliminary system safety assessment PSSA (safety requirements), system safety assessment SSA (safety monitoring and evidence)
ATSEP.QLF.SHR.SAF_1.4	**Air Navigation System Risk Classification Scheme**		
ATSEP.QLF.SHR.SAF_1.4.1	Describe the ATM system risk classification scheme	2	e.g. Scenario of failure of air navigation system (incident chain), component of a risk classification scheme, severity classes, probability classes (qualitative and quantitative)
ATSEP.QLF.SHR.SAF_1.5	**Safety Regulation**		
ATSEP.QLF.SHR.SAF_1.5.1	Describe the role of safety regulation	2	The purpose of European (EASA, EU) regulations and international standards, objective of the national regulator
ATSEP.QLF.SHR.SAF_1.5.2	Explain the relationship between the safety regulation documents	2	ICAO documentation (SARPS), EASA/EU Regulations, AMCs and GM, national regulation
ATSEP.QLF.SHR.SAF_1.5.3	Explain how the safety regulation documents affect ATM service provision	2	ICAO documentation (SARPS), EASA/EU Regulations, AMCs and GM, national regulation
ATSEP.QLF.SHR.SAF_1.5.4	Explain the interface between the safety regulator and the ANSP	2	Information to be provided to regulator by ANSP and vice versa, importance of incident reporting

Appendix 3a – ATSEP Qualification training - Shared

ATSEP UOID *(Unique Objective IDentifier)*	**CORPUS**	**TAX**	**CONTENT**
ATSEP.QLF.SHR.HAS	**HEALTH AND SAFETY**		
ATSEP.QLF.SHR.HAS_1	**HAZARD AWARENESS AND LEGAL RULES**		
ATSEP.QLF.SHR.HAS_1.1	**Hazard Awareness**		
ATSEP.QLF.SHR.HAS_1.1.1	Consider potential hazards to health and safety generated by equipment used in the functional system	2	e.g. mechanical hazards, electrical hazards (LV, HV, EMI), chemical hazards DP: none
ATSEP.QLF.SHR.HAS_1.2	**Regulations and Procedures**		
ATSEP.QLF.SHR.HAS_1.2.1	State applicable international requirements	1	e.g. European and industry standards
ATSEP.QLF.SHR.HAS_1.2.2	State any applicable national requirements	1	-
ATSEP.QLF.SHR.HAS_1.2.3	Describe safety procedures or measures for persons working on or near relevant equipment and generally in working environment	2	e.g. Protection and isolation (clothing, tools), fire extinguisher types, safety man presence, safety interlocks, isolating switches, security of the site, climbing procedures, earthing, direct or indirect contact with HV
ATSEP.QLF.SHR.HAS_1.3	**Handling of Hazardous Material**		
ATSEP.QLF.SHR.HAS_1.3.1	State European and local regulations for electronic device disposal	1	Protection of environment e.g. WEEE (Directive 2012/19/EU), ROHS (Directive 2011/65/EU) and other corresponding European Regulations
ATSEP.QLF.SHR.HUF	**HUMAN FACTORS**		
ATSEP.QLF.SHR.HUF_1	**INTRODUCTION TO HUMAN FACTORS**		
ATSEP.QLF.SHR.HUF_1.1	**Introduction**		
ATSEP.QLF.SHR.HUF_1.1.1	Explain why human factors are particularly important in the ATM environment	2	Historical background, safety impact on ATM, incidents
ATSEP.QLF.SHR.HUF_1.1.2	Define human factors	1	e.g. ICAO Human Factors Training Manual
ATSEP.QLF.SHR.HUF_1.1.3	Explain the concept of systems and its relevance in the ATM environment	2	People, procedures, equipment
ATSEP.QLF.SHR.HUF_1.1.4	Explain the use of the SHELL model	2	e.g. ICAO Human Factors Training Manual, visits to OPS and technical rooms
ATSEP.QLF.SHR.HUF_1.1.5	State the factors which can affect personal and team performance	1	e.g. psychological, medical, physiological, social, organisational, communication, stress, human error, working knowledge and skills

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ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	TAX	CONTENT
ATSEP.QLF.SHR.HUF_2	**WORKING KNOWLEDGE AND SKILLS**		
ATSEP.QLF.SHR.HUF_2.1	**ATSEP Knowledge, Skills and Competence**		
ATSEP.QLF.SHR.HUF_2.1.1	Explain the importance of maintaining and updating professional knowledge and skills	2	Assure safety
ATSEP.QLF.SHR.HUF_2.1.2	Explain the importance of maintaining non-technical skills and professional competence	2	e.g. communication, human relationship, knowledge of environment, human limit awareness
ATSEP.QLF.SHR.HUF_2.1.3	State the available means to maintain professional knowledge and skills	1	e.g. practice, personal study, briefing, seminars, courses, technical periodicals, technical books, OJT, simulation, CBT, e-learning, visits, feedback, TRM
ATSEP.QLF.SHR.HUF_3	**PSYCHOLOGICAL FACTORS**		
ATSEP.QLF.SHR.HUF_3.1	**Cognition**		
ATSEP.QLF.SHR.HUF_3.1.1	Describe major aspects of human information processing	2	Attention, memory, situation awareness (perception, comprehension, projection), , decision making, action, feedback, environment
ATSEP.QLF.SHR.HUF_3.1.2	Describe the factors which influence information processing	2	e.g. stress and strain, experience, knowledge, distraction, interpersonal relations, working environment, risk perception, attitude, workload, fatigue, confidence, job security
ATSEP.QLF.SHR.HUF_3.1.3	Characterise factors which influence information processing	3	e.g. case study, simulation, role playing
ATSEP.QLF.SHR.HUF_4	**MEDICAL FACTORS**		
ATSEP.QLF.SHR.HUF_4.1	**Fatigue**		
ATSEP.QLF.SHR.HUF_4.1.1	Describe the effect of fatigue on human performance	2	Physiological, cognitive and relational effects e.g. lack of concentration, irritability, frustration
ATSEP.QLF.SHR.HUF_4.1.2	Recognise the signs of fatigue in oneself and in others	1	e.g. making frequent mistakes, unable to concentrate, lack of normal humour, sleeping and/or eating disorders
ATSEP.QLF.SHR.HUF_4.1.3	Explain how to respond to indications of fatigue in an appropriate manner	2	Take time off, rest for short periods of time, seek professional help
ATSEP.QLF.SHR.HUF_4.2	**Fitness**		
ATSEP.QLF.SHR.HUF_4.2.1	Describe signs of lack of personal fitness	2	-
ATSEP.QLF.SHR.HUF_4.2.2	Describe actions to prevent or resolve lack of personal fitness	2	Healthy lifestyle e.g. healthy diet, sleeping, physical and mental activities
ATSEP.QLF.SHR.HUF_4.2.3	Explain the influence of psychoactive substances on human performance	2	e.g. nervous system, medication, smoking, alcohol, habitual and occasional use of psychoactive substances

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ATSEP UOID *(Unique Objective IDentifier)*	**CORPUS**	**TAX**	**CONTENT**
ATSEP.QLF.SHR.HUF_4.3	**Work Environment**		
ATSEP.QLF.SHR.HUF_4.3.1	Describe the influence of the work environment on human performance	2	Ergonomics, effects of noise, electromagnetic waves, temperature, working circumstances
ATSEP.QLF.SHR.HUF_5	**ORGANISATIONAL AND SOCIAL FACTORS**		
ATSEP.QLF.SHR.HUF_5.1	**Basic Needs of People at Work**		
ATSEP.QLF.SHR.HUF_5.1.1	Explain basic needs of people at work	2	e.g. balance between individual ability and workload, working time and rest periods; adequate working conditions, positive working environment
ATSEP.QLF.SHR.HUF_5.1.2	Characterise the factors of work satisfaction	2	e.g. money, motivation, achievement, recognition, advancement, challenge
ATSEP.QLF.SHR.HUF_5.2	**Team Resource Management (TRM)**		
ATSEP.QLF.SHR.HUF_5.2.1	State the objectives of TRM	1	Experience sharing, feedback, improved interpersonal relations, indirect increase in safety
ATSEP.QLF.SHR.HUF_5.3	**Teamwork and Team Roles**		
ATSEP.QLF.SHR.HUF_5.3.1	Describe the differences between social human relations and professional interactions	2	-
ATSEP.QLF.SHR.HUF_5.3.2	Take account of reasons for loss of team effectiveness and actions to prevent it and prevent repetition	2	e.g. roles poorly defined, goals poorly identified, bad planning, too many leaders or not enough, respect for others, divergence in values, misunderstandings
ATSEP.QLF.SHR.HUF_5.3.3	Describe the principles of teamwork	2	e.g. team membership, group dynamics, advantages/disadvantages of teamwork
ATSEP.QLF.SHR.HUF_5.3.4	Appreciate reasons for conflict	3	-
ATSEP.QLF.SHR.HUF_5.3.5	Describe actions to prevent human conflicts	2	-
ATSEP.QLF.SHR.HUF_5.3.6	Describe strategies to cope with human conflicts	2	-
ATSEP.QLF.SHR.HUF_6	**COMMUNICATION**		
ATSEP.QLF.SHR.HUF_6.1	**Written Report**		
ATSEP.QLF.SHR.HUF_6.1.1	Describe the importance of recording information by writing effectively	2	ATSEP technical report, logs, system degradation reports, specification, system manager report
ATSEP.QLF.SHR.HUF_6.1.2	Use appropriate terminology to communicate effectively in writing	3	Be concise, clear; common technical terms; convey key points

Appendix 3a – ATSEP Qualification training - Shared

ATSEP UOID *(Unique Objective IDentifier)*	**CORPUS**	**TAX**	**CONTENT**
ATSEP.QLF.SHR.HUF_6.2	**Verbal and Non-Verbal Communication**		
ATSEP.QLF.SHR.HUF_6.2.1	Describe the human communication process	2	-
ATSEP.QLF.SHR.HUF_6.2.2	Characterise the factors which affect verbal communication	2	e.g. Cognitive: lack of knowledge of the procedures, of technical terms, workload, poor receiver references Affective: being shy, feelings of not being listened to, not being part of the group, not being assertive, poor eye contact while talking, stress Physiological: stuttering, low voice level
ATSEP.QLF.SHR.HUF_6.2.3	Describe factors which affect non- verbal communication	2	e.g. touch, noise, interruption, body language
ATSEP.QLF.SHR.HUF_6.2.4	Use appropriate vocabulary to communicate effectively on technical matters	3	Technical 'jargon', language differences, standard words/phrases
ATSEP.QLF.SHR.HUF_6.2.5	Use appropriate language for professional communication with non-ATSEP	3	Term sharing, translation, being concise, simple words, selection of information and detail level according to the receiver
ATSEP.QLF.SHR.HUF_7	**STRESS**		
ATSEP.QLF.SHR.HUF_7.1	**Stress**		
ATSEP.QLF.SHR.HUF_7.1.1	Explain the process of stress	2	Causes, stress mechanism, consequences in different work situations (e.g. online intervention, maintenance, training)
ATSEP.QLF.SHR.HUF_7.1.2	State the symptoms of stress	1	e.g. frustration, anger, irritability, aggressive and/or irrational behaviour, helplessness
ATSEP.QLF.SHR.HUF_7.2	**Stress Management**		
ATSEP.QLF.SHR.HUF_7.2.1	Explain to relieve or minimise stress in self and/or others	2	The effect of personality in coping with stress, benefits of active stress management
ATSEP.QLF.SHR.HUF_7.2.2	Appreciate how assistance is obtained in stressful situations	3	Benefits of asking, offering and accepting help in stressful situations e.g. CISM
ATSEP.QLF.SHR.HUF_7.2.3	Recognise the effects of shocking and stressful situations	1	For oneself and for others, abnormal situations
ATSEP.QLF.SHR.HUF_7.2.4	Consider the benefits of critical incident stress management	2	-

Appendix 3a – ATSEP Qualification training - Shared

ATSEP UOID *(Unique Objective IDentifier)*	**CORPUS**	**TAX**	**CONTENT**
ATSEP.QLF.SHR.HUF_8	**HUMAN ERROR**		
ATSEP.QLF.SHR.HUF_8.1	**Human Error**		
ATSEP.QLF.SHR.HUF_8.1.1	Describe human error	2	-
ATSEP.QLF.SHR.HUF_8.1.2	Explain the relationship between human error and safety	2	Mechanism, error-prone conditions, consequences e.g. Reason model, feedback
ATSEP.QLF.SHR.HUF_8.1.3	State different types of errors using an appropriate model	1	e.g. Rasmussen model, Gagne model
ATSEP.QLF.SHR.HUF_8.1.4	Differentiate between errors and violations	2	-
ATSEP.QLF.SHR.HUF_8.1.5	Explain how to detect errors	2	e.g. individual and collective strategy, event report, procedure
ATSEP.QLF.SHR.HUF_8.1.6	Explain, in general terms, how errors are mitigated	2	-
ATSEP.QLF.SHR.HUF_8.1.7	Describe two significant ATM incidents/accidents involving ATSEP/engineering contributory factors	2	-
ATSEP.QLF.SHR.FST	**FUNCTIONAL SAFETY**		
ATSEP.QLF.SHR.FST_1	**SAFETY ATTITUDE**		
ATSEP.QLF.SHR.FST_1.1	**Safety Attitude**		
ATSEP.QLF.SHR.FST_1.1.1	State the role of ATSEP in safety management routines and in reporting processes	1	Safety assessment documentation related to navigation, communication and surveillance system, safety reports and occurrences, safety monitoring
ATSEP.QLF.SHR.FST_2	**FUNCTIONAL SAFETY**		
ATSEP.QLF.SHR.FST_2.1	**Functional Safety**		
ATSEP.QLF.SHR.FST_2.1.1	Describe the implications of functional failures in terms of exposure time, environment, effect on controller and effect on pilot	2	Total or partial, premature or delayed operation, spurious, intermittent, loss or corruption of data, missing or incorrect input or output Ref.: safety policy and implementation
ATSEP.QLF.SHR.FST_2.1.2	Explain the need for NOTAMs	2	e.g. for PBN and GNSS status

Appendix 3a – ATSEP Qualification training - Shared

ATSEP UOID *(Unique Objective IDentifier)*	**CORPUS**	**TAX**	**CONTENT**
ATSEP.QLF.SHR.ISS	**INFORMATION SYSTEM SECURITY**		
ATSEP.QLF.SHR.ISS_1	**INTRODUCTION**		
ATSEP.QLF.SHR.ISS_1.1	**Purpose and Principles**		
ATSEP.QLF.SHR.ISS_1.1.1	Define information system security and the relevant terminology	1	e.g. information security, cyber security, network security, physical security, etc.
ATSEP.QLF.SHR.ISS_1.1.2	Define the regulatory framework	1	ICAO, EU regulations, NIS Directive
ATSEP.QLF.SHR.ISS_1.1.3	List the concepts governing a security policy	1	Security objectives, business continuity e.g. resilience, recovery plan
ATSEP.QLF.SHR.ISS_1.1.4	List the relevant security managerial personnel	1	
ATSEP.QLF.SHR.ISS_1.1.5	Appreciate the security risk management system in an ANSP's organisation	3	Risk based approach, risk assessment, threats, vulnerabilities, residual risks, impact, likelihood, risk treatment
ATSEP.QLF.SHR.ISS_1.1.6	Explain information security frameworks	2	e.g. ISO, NIST
ATSEP.QLF.SHR.ISS_1.1.7	Explain the Confidentiality, Integrity and Availability (CIA) concept	2	
ATSEP.QLF.SHR.ISS_1.1.8	Appreciate the security threats faced by the functional system	3	ATM/ANS
ATSEP.QLF.SHR.ISS_1.1.9	Explain different network and physical attacks	2	DoS, DDoS, port scanning, network sniffing, spoofing, MITM, APT(Advance Persistent Threat) e.g. tailgating, crypto-jacking
ATSEP.QLF.SHR.ISS_1.1.10	Explain social engineering techniques	2	Social networking, human flaws, phishing, spear head phishing
ATSEP.QLF.SHR.ISS_1.1.11	Explain different types of malware	2	Viruses, worms, spyware, ransomware
ATSEP.QLF.SHR.ISS_1.1.12	Identify the different phases of security attack	3	e.g. cyber kill chain, Swiss cheese model
ATSEP.QLF.SHR.ISS_1.1.13	Appreciate how to detect and stop security attacks	3	e.g. cyber kill chain
ATSEP.QLF.SHR.ISS_1.1.14	Appreciate a holistic security architecture	3	Application security, network security, operating systems security, role of SOC/CERT, system of systems e.g. firewalls, proxies, routers, switches, network data flow, PKIs, DMZ, IDS/IPS, etc.

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
X	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**		**X**				**ATSEP.QLF.COM**	**ATSEP QUALIFICATION DOMAIN - COMMUNICATION**		
X		**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**		**X**				**ATSEP.QLF.COM.VCE**	**VOICE**		
X		**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**		**X**				**ATSEP.QLF.COM.VCE_1**	**AIR-GROUND**		
X															**ATSEP.QLF.COM.VCE_1.1**	**Transmission/Reception**		
X															ATSEP.QLF.COM.VCE_1.1.1	Appreciate typical measurements on a transmitter	3	Frequency (single carrier, offset carrier), modulation, output power, SWR, adjacent channel power
X															ATSEP.QLF.COM.VCE_1.1.2	Appreciate a generic radio transmitter	3	Frequency power, modulation index, audio input level
X															ATSEP.QLF.COM.VCE_1.1.3	Identify the main elements in a block diagram of a generic radio transmitter	3	Characteristics (modulation, single carrier, channel spacing), functionalities
X															ATSEP.QLF.COM.VCE_1.1.4	Perform typical measurements on a receiver	3	Frequency, modulation, channel spacing, sensitivity, selectivity
X															ATSEP.QLF.COM.VCE_1.1.5	Appreciate a generic radio receiver	3	Signal to noise ratio, audio input level, frequency
X															ATSEP.QLF.COM.VCE_1.1.6	Identify the main elements of a block diagram of a generic radio receiver	3	Characteristics (single carrier, channel spacing, sensitivity, selectivity)
X															ATSEP.QLF.COM.VCE_1.1.7	Characterise intermodulation and interference phenomena	2	Collocation of multiple transmitters at the same radio site, external interference (jamming, etc.)
X		**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**						**ATSEP.QLF.COM.VCE_1.2**	**Radio Antenna Systems**		
X		X	X	X	X	X	X	X	X						ATSEP.QLF.COM.VCE_1.2.1	Explain antenna parameters	2	Impedance, polar diagram, bandwidth, gain, polarisation, types of antennas
X		X	X	X	X	X	X	X	X						ATSEP.QLF.COM.VCE_1.2.2	Characterise the coverage of the radio system	2	Polar diagram, types of antennas, frequency bands, propagation mode
X															ATSEP.QLF.COM.VCE_1.2.3	Characterise link budget according to various conditions	2	Output power, antennae, propagation, geographic, meteorological, day and night
X															ATSEP.QLF.COM.VCE_1.2.4	Characterise the elements of a generic antenna system	2	Filters, combiners, multi-cavity system

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
X															ATSEP.QLF.COM.VCE_1.2.5	Consider the conformity of a system to ITU and national regulation	2	Ref.: ICAO Annex 10 (VHF, UHF)
X															ATSEP.QLF.COM.VCE_1.2.6	Appreciate measurements with generic radio test equipment	3	e.g. Spectrum analyser, scanner
X															**ATSEP.QLF.COM.VCE_1.3**	**Voice Switch**		
X															ATSEP.QLF.COM.VCE_1.3.1	Explain switching functionalities	2	General architecture, digital, analogue, multiplex types, PCM e.g. cross-coupling, split headset (radio both ears, telephone single ear)
X															ATSEP.QLF.COM.VCE_1.3.2	Explain the principles of non-blocking switches	2	Advantages, disadvantages, delays (digital)
X															ATSEP.QLF.COM.VCE_1.3.3	Describe the signal processing all along the chain	2	Signal tracing treatment, protocols (a few), data flow
X											**X**				**ATSEP.QLF.COM.VCE_1.4**	**Controller Working Position**		
X											X				ATSEP.QLF.COM.VCE_1.4.1	Describe the most common features of a controller working position and the HMI	2	Frequency selection, emergency, station selection, coupling, headset, loudspeaker, footswitch, Push to Talk e.g. microphone (noise cancelling), short time recording
X															**ATSEP.QLF.COM.VCE_1.5**	**Radio Interfaces**		
X															ATSEP.QLF.COM.VCE_1.5.1	Describe the different types of interface	2	Internal, external, phantom signalling, in-band signal
X											**X**				**ATSEP.QLF.COM.VCE_2**	**GROUND-GROUND**		
X											**X**				**ATSEP.QLF.COM.VCE_2.1**	**Interfaces**		
X											X				ATSEP.QLF.COM.VCE_2.1.1	Describe the different types of interfaces	2	e.g. Analogue (2, 4, 6 and 8 wires), digital (ISDN; 64 Kb, 2 Mb, IP)
X															ATSEP.QLF.COM.VCE_2.1.2	Explain the advantages and disadvantages of each type	2	e.g. Analogue (2, 4, 6 and 8 wires), digital (ISDN; 64 Kb, 2 Mb, IP)
X															ATSEP.QLF.COM.VCE_2.1.3	Operate measuring equipment	3	e.g. dB meters, level meters, generators, sniffer

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
X															**ATSEP.QLF.COM.VCE_2.2**	**Protocols**		
X															ATSEP.QLF.COM.VCE_2.2.1	Operate standard protocol analysers	3	e.g. MFC R2 and/or ATS QSIG (rerouting), impulse dialling and DTMF dialling, ISDN, SIP, RTP
X															ATSEP.QLF.COM.VCE_2.2.2	Analyse communication protocol with appropriate tools and documentation	4	e.g. MFC R2 , ATS QSIG (rerouting), impulse dialling and DTMF dialling, ISDN, national protocols, SIP, RTP
X											**X**				**ATSEP.QLF.COM.VCE_2.3**	**Switch**		
X											X				ATSEP.QLF.COM.VCE_2.3.1	State the similarities between ground-ground and air-ground switches	1	Switching techniques
X											X				ATSEP.QLF.COM.VCE_2.3.2	Describe the most commonly used functionality of PABX	2	General architecture, digital, analogue, multiplex types, PCM30 e.g. IPBX
X											X				ATSEP.QLF.COM.VCE_2.3.3	Explain conversion analogue-digital, digital-analogue	2	General architecture, analogue-digital-analogue
X															**ATSEP.QLF.COM.VCE_2.4**	**Communication Chain**		
X															ATSEP.QLF.COM.VCE_2.4.1	Appreciate the replacement of components in a communication chain in a safe way	3	Continuity of service, communication chain integrity
X											**X**				**ATSEP.QLF.COM.VCE_2.5**	**Controller Working Position**		
X											X				ATSEP.QLF.COM.VCE_2.5.1	Describe the most common features of a controller working position and the HMI	2	-

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
	X									**X**	**X**	**X**	**X**	**X**	**ATSEP.QLF.COM.DTA**	**DATA**		
	X									**X**					**ATSEP.QLF.COM.DTA_1**	**INTRODUCTION TO NETWORKS**		
	X									**X**					**ATSEP.QLF.COM.DTA_1.1**	**Types**		
	X									X					ATSEP.QLF.COM.DTA_1.1.1	State the evolution of network topologies	1	LAN, WAN e.g. architectures, size of the segments, length of the systems, quality of service
	X									X					ATSEP.QLF.COM.DTA_1.1.2	Explain how networks meet requirements	2	Redundancy, bandwidth, BER, time delay, network security
	X									**X**					**ATSEP.QLF.COM.DTA_1.2**	**Networks**		
	X									X					ATSEP.QLF.COM.DTA_1.2.1	Analyse the features of a network	3	Routing scheme, rate, internal networking, routers, gateways, switches, firewalls e.g. wireless networks, bridges, modems, IRB, vrf, etherchannels, vlan-trunking, nfv, spanning-tree, ipsec-tunnels, hierarchical design-mode
	X									X					ATSEP.QLF.COM.DTA_1.2.2	Describe network standards and devices	2	Ethernet, optical fibre e.g. LAN/MAN: CSMA/CD, Ethernet frame types, VLAN tag (802.1q), FO cable qualities for SM and MM, connectors, SFP module types, wireless; WAN: MPLS, pdH, sdH networks
	X									X					ATSEP.QLF.COM.DTA_1.2.3	Appreciate the replacement of components in a network in a safe way	3	Continuity of service, network integrity
	X									**X**					**ATSEP.QLF.COM.DTA_1.3**	**External Network Services**		
	X									X					ATSEP.QLF.COM.DTA_1.3.1	Explain aspects of external network services	2	Provided QoS e.g. SLAs
	X									**X**					**ATSEP.QLF.COM.DTA_1.4**	**Measuring Tools**		

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
	X									X					ATSEP.QLF.COM.DTA_1.4.1	Identify the main parameters of the network to be measured as well as the corresponding instruments to be used	3	Types of measurements, typical parameters e.g. Data analyser (sniffer), NetScout, Wireshark
	X									**X**					**ATSEP.QLF.COM.DTA_1.5**	**Troubleshooting**		
	X									X					ATSEP.QLF.COM.DTA_1.5.1	Appreciate how to troubleshoot a network	3	
	X									X					ATSEP.QLF.COM.DTA_1.5.2	Explain the principles on how to troubleshoot a network	2	-
	X									**X**					**ATSEP.QLF.COM.DTA_2**	**PROTOCOLS**		
	X									**X**					**ATSEP.QLF.COM.DTA_2.1**	**Fundamental Theory**		
	X									X					ATSEP.QLF.COM.DTA_2.1.1	Appreciate the principles of layers	3	Differences between layers e.g. layer(s) of sniffer information
	X									X					ATSEP.QLF.COM.DTA_2.1.2	Appreciate the principles of network addressing	3	Masks, prefixes, subnets IP addressing, (unicast, multicast) IPv4 and IPv6, MAC addressing e.g. same logical network computers and systems, broadcast, multicast mac addressing, dhcpv4, dhcpv6
	X									X					ATSEP.QLF.COM.DTA_2.1.3	Appreciate the principles of IP routing	3	Routing tables, preferences, fault tolerance, static and dynamic routing protocols for IPv4 and IPv6, HSRP/VRRP e.g. unicast, multicast, broadcast, OSPF, BGP, IS-IS, IDRP, multicast routing, ECMP, route summarisation
	X									**X**					**ATSEP.QLF.COM.DTA_2.2**	**General Protocols**		
	X									X					ATSEP.QLF.COM.DTA_2.2.1	Describe the general protocol structure	2	IPv4 and IPv6 (header, fragmentation), UDP and TCP header, TCP reliable transport

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
	X									X					ATSEP.QLF.COM.DTA_2.2.2	Appreciate the general application layer protocols using the appropriate tools and documentation	3	NTP, FTP e.g. SIP (Session Initiation Protocol), SMTP, HTTP
	X									**X**					**ATSEP.QLF.COM.DTA_2.3**	**Specific Protocols**		
	X									X					ATSEP.QLF.COM.DTA_2.3.1	Describe the specific protocols	2	FMTP e.g. BATAP — ARINC 620
	X									**X**					**ATSEP.QLF.COM.DTA_3**	**NATIONAL NETWORKS**		
	X									**X**					**ATSEP.QLF.COM.DTA_3.1**	**National Networks**		
	X									X					ATSEP.QLF.COM.DTA_3.1.1	Name the national networks to which the organisation is connected	1	e.g. ANSP, MET, Military, Commercial Telecom providers, airlines, national network(s)
	X									X					ATSEP.QLF.COM.DTA_3.1.2	Describe the interfaces between national and global networks	2	-
	X										**X**	**X**	**X**	**X**	**ATSEP.QLF.COM.DTA_4**	**EUROPEAN NETWORKS**		
	X										**X**	**X**	**X**	**X**	**ATSEP.QLF.COM.DTA_4.1**	**Network Technologies**		
	X										X	X	X	X	ATSEP.QLF.COM.DTA_4.1.1	State current and emerging network concepts	1	e.g.as used AMHS, PENS
	X										X	X	X	X	ATSEP.QLF.COM.DTA_4.1.2	Describe the characteristics of current networks	2	Surveillance data, flight plan data and AIS networks e.g. OLDI, quality of service, architecture, FMTP, AMHS
	X										**X**	**X**	**X**	**X**	**ATSEP.QLF.COM.DTA_5**	**GLOBAL NETWORKS**		
	X										**X**	**X**	**X**	**X**	**ATSEP.QLF.COM.DTA_5.1**	**Networks and Standards**		
	X										X	X	X	X	ATSEP.QLF.COM.DTA_5.1.1	List the global networks and the standards on which they are based	1	e.g. ICAO for AFTN/CIDIN/AMHS, ICAO for ATN, FANS 1 and FANS A for ACARS applications (SITA and ARINC)
	X										**X**	**X**	**X**	**X**	**ATSEP.QLF.COM.DTA_5.2**	**Global Architecture**		
	X														ATSEP.QLF.COM.DTA_5.2.1	Describe the architecture of the ATN	2	Air-ground subnetworks, ground-ground subnetworks, airborne networks

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
	X									X	X	X	X	X	ATSEP.QLF.COM.DTA_5.2.2	Describe the SWIM concept	2	Main SWIM Standards, SWIM Profiles, standards & protocols , TCP/IP version, compatibility issues e.g. topology, potential development , challenges (cyber security), opportunities
	X									X	X	X	X	X	ATSEP.QLF.COM.DTA_5.2.3	Describe SWIM data	2	Types of aeronautical data (dynamic, static), other data relevant for aviation e.g. AMHS data, MET data, 4D trajectory data, aerodrome data, flight procedures
	X														**ATSEP.QLF.COM.DTA_5.3**	**Air-ground Subnetworks**		
	X														ATSEP.QLF.COM.DTA_5.3.1	Describe the air-ground subnetworks	2	VDL (mode 2), AMSS
	X														**ATSEP.QLF.COM.DTA_5.4**	**Ground-ground Subnetworks**		
	X														ATSEP.QLF.COM.DTA_5.4.1	Describe the composition of ground-ground subnetworks	2	Commercial telecom providers, Rockwell Collins, SITA
	X														**ATSEP.QLF.COM.DTA_5.5**	**Networks On Board of the Aircraft**		
	X														ATSEP.QLF.COM.DTA_5.5.1	State the existence of subnetworks inside the aircraft relevant for ATM communications	1	e.g. AFDX — ARINC 429
	X														**ATSEP.QLF.COM.DTA_5.6**	**Air-ground Applications**		
	X														ATSEP.QLF.COM.DTA_5.6.1	State the main communication applications using data link systems	1	e.g. CPDLC, DLIC/AFN, ATIS, DCL
X	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**						**ATSEP.QLF.COM.TRP**	**TRANSMISSION PATH**		
X	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**						**ATSEP.QLF.COM.TRP_1**	**LINES**		
X	**X**														**ATSEP.QLF.COM.TRP_1.1**	**Lines Theory**		
X	X														ATSEP.QLF.COM.TRP_1.1.1	Explain parameters of a line	2	e.g. equation, attenuation, impedance, S-parameters, Smith chart, bandwidth, HF specifics (dipoles, multipoles), SWR

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
X	**X**														**ATSEP.QLF.COM.TRP_1.2**	**Digital Transmission**		
X	X														ATSEP.QLF.COM.TRP_1.2.1	Describe parameters for digital transmission	2	e.g. signal definition, Fourier Theory, signal processing (sampling, etc.), bandwidth, carrier, modulation, noises, S/N, delays, group delay, line quality (signal distortion, rate of failure), transmission speed
X	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**						**ATSEP.QLF.COM.TRP_1.3**	**Types of Lines**		
X	X	X	X	X	X	X	X	X	X						ATSEP.QLF.COM.TRP_1.3.1	Describe the different types of lines and their physical characteristics	2	e.g. copper wires (twisted pairs, symmetrical cables), optic fibres (mono or multimodes, connectors, splicer), coaxial attenuation, losses, bending, characteristic impedance, EMC and noise immunity, crosstalk
X	X														ATSEP.QLF.COM.TRP_1.3.2	Consider the appropriate type of line for a given specific application	2	e.g. bandwidth, noise immunity
X	X														ATSEP.QLF.COM.TRP_1.3.3	Describe the typical parameters of lines	2	e.g. impedance, insulation, signal level, time delay
X	**X**														**ATSEP.QLF.COM.TRP_2**	**SPECIFIC LINKS**		
X	**X**														**ATSEP.QLF.COM.TRP_2.1**	**Microwave Link**		
X	X														ATSEP.QLF.COM.TRP_2.1.1	Describe a microwave link	2	e.g. carrier frequency, type of modulation, Fresnel Theory, loss, atmospheric influences
X	**X**														**ATSEP.QLF.COM.TRP_2.2**	**Satellite**		
X	X														ATSEP.QLF.COM.TRP_2.2.1	Describe the parameters of a satellite link	2	Uplinks, downlinks, antennas, footprint, delays, atmospheric influences
X	**X**										**X**	**X**	**X**	**X**	**ATSEP.QLF.COM.REC**	**RECORDERS**		
X	**X**										**X**	**X**	**X**	**X**	**ATSEP.QLF.COM.REC_1**	**LEGAL RECORDERS**		
X	**X**										**X**	**X**	**X**	**X**	**ATSEP.QLF.COM.REC_1.1**	**Regulations**		
X	X										X	X	X	X	ATSEP.QLF.COM.REC_1.1.1	Explain the international regulations	2	ICAO (recording and reproducing)

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
X	X										X	X	X	X	ATSEP.QLF.COM.REC_1.1.2	Explain national regulations	2	Appropriate national regulations
X	X										X	X	X	X	ATSEP.QLF.COM.REC_1.1.3	Consider recording and reproducing processes	2	e.g. confidentiality when handling recorders, procedures for access to recorders, storage media, access to recording and reproducing room, time to store information (overwrite/erase voice or data), procedure to reproduce information
X	**X**										**X**	**X**	**X**	**X**	**ATSEP.QLF.COM.REC_1.2**	**Principles**		
X	X										X	X	X	X	ATSEP.QLF.COM.REC_1.2.1	Explain the principles of voice recording	2	Recording Interfaces, codecs, ambient recording e.g. analogue - A/D converters, E1, VoIP office telephony, VoIP VCS ED-137; A-law, u-law codecs; frequency range (300 to 3400 Hz)
X	X										X	X	X	X	ATSEP.QLF.COM.REC_1.2.2	Explain the principles of video recording	2	Software recording, hardware recording, evidence
X	X										X	X	X	X	ATSEP.QLF.COM.REC_1.2.3	Explain security of recorded data	2	Confidentiality, protection against tampering, access protection, access logging
X	X										X	X	X	X	ATSEP.QLF.COM.REC_1.2.4	Explain the principles of replay	2	Synchronisation of screen / radar and voice recording, replay limitations e.g. unability of measuring separation on screen replay

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
		X	**X**	**X**	**X**	**X**					**X**	**X**	**X**	**X**	**ATSEP.QLF.NAV**	**ATSEP QUALIFICATION DOMAIN - NAVIGATION**		
		X	**X**	**X**	**X**	**X**					**X**	**X**	**X**	**X**	**ATSEP.QLF.NAV.PBN**	**PERFORMANCE-BASED NAVIGATION**		
		X	**X**	**X**	**X**	**X**					**X**	**X**	**X**	**X**	**ATSEP.QLF.NAV.PBN_1**	**NAV CONCEPTS**		
		X	**X**	**X**	**X**	**X**									**ATSEP.QLF.NAV.PBN_1.1**	**Operational Requirements**		
		X	X	X	X	X									ATSEP.QLF.NAV.PBN_1.1.1	Explain the main performance characteristics of a navigation system	2	Accuracy, precision, stability, integrity, availability, continuity of service, coverage, robustness e.g. Time To First Fix
		X	X	X	X	X									ATSEP.QLF.NAV.PBN_1.1.2	Explain the relationship between performance measures and the phases of flight	2	PBN Manual ICAO Doc 9613
		X	**X**	**X**	**X**	**X**									**ATSEP.QLF.NAV.PBN_1.2**	**Performance-based Navigation**		
		X	X	X	X	X									ATSEP.QLF.NAV.PBN_1.2.1	Describe the PBN concept	2	ICAO and EUROCONTROL documents, airspace concept, application supported by navigation infrastructure and navigation specifications, functionality of the avionics
		X	X	X	X	X									ATSEP.QLF.NAV.PBN_1.2.2	Differentiate between an RNAV and an RNP navigation specification	2	On-Board Performance Monitoring and Alerting
		X	X	X	X	X									ATSEP.QLF.NAV.PBN_1.2.3	State which navigation applications support the different phases of flight	1	PBN Manual ICAO Doc 9613
		X	X	X	X	X									ATSEP.QLF.NAV.PBN_1.2.4	Describe the navigation infrastructure supporting the PBN concept	2	e.g. VOR/DME, DME/DME, ILS, GNSS
		X	**X**	**X**	**X**	**X**									**ATSEP.QLF.NAV.PBN_1.3**	**Area Navigation Concept (RNAV)**		
		X	X	X	X	X									ATSEP.QLF.NAV.PBN_1.3.1	Differentiate between conventional navigation and area navigation	2	Fixed route vs flexible route structure
															ATSEP.QLF.NAV.PBN_1.4	**NOTAM**		
															-	-		-

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
		X										**X**			**ATSEP.QLF.NAV.NDB**	**GROUND-BASED SYSTEMS - NDB**		
		X										**X**			**ATSEP.QLF.NAV.NDB_1**	**NON-DIRECTIONAL BEACON (NDB)**		
		X										**X**			**ATSEP.QLF.NAV.NDB_1.1**	**Use of the System**		
		X										X			ATSEP.QLF.NAV.NDB_1.1.1	Appreciate the principles of NDB	3	Relative bearing, measuring method
		X										X			ATSEP.QLF.NAV.NDB_1.1.2	Describe the overall performance	2	Coverage, accuracy, availability of the system, integrity, continuity
		X										X			ATSEP.QLF.NAV.NDB_1.1.3	Explain the technical limitations of NDB	2	Lack of accuracy, lack of integrity, sensitivity to interference
		X										X			ATSEP.QLF.NAV.NDB_1.1.4	Describe the current situation	2	e.g. number, type, users, user groups, European context
		X													**ATSEP.QLF.NAV.NDB_1.2**	**Ground Station Architecture**		
		X													ATSEP.QLF.NAV.NDB_1.2.1	Describe the main components of an NDB ground station	2	Electronic cabinet, antennas, power supply, remote controls and monitoring
		X													ATSEP.QLF.NAV.NDB_1.2.2	Relate NDB station design to operational requirements	4	Coverage, ID code, VOR backup, double beacon approach, siting
		X													**ATSEP.QLF.NAV.NDB_1.3**	**Transmitter Subsystem**		
		X													ATSEP.QLF.NAV.NDB_1.3.1	Characterise the main NDB signal parameters	2	Carrier and ident frequency, output power, depth of modulation
		X													ATSEP.QLF.NAV.NDB_1.3.2	Perform typical measurements on the main NDB signal parameters	3	e.g. carrier and ident frequency, power measurements, depth of modulation, audio distortion, antenna current, spectrum measurements, ID code
		X													**ATSEP.QLF.NAV.NDB_1.4**	**Antenna Subsystem**		
		X													ATSEP.QLF.NAV.NDB_1.4.1	Explain NDB antenna characteristics	2	Impedance, polar diagram, polarisation, ground reflections
		X													ATSEP.QLF.NAV.NDB_1.4.2	Appreciate the interface between power stage and the antenna	3	Antenna tuning units, matching filter, SWR, radiated power
		X													**ATSEP.QLF.NAV.NDB_1.5**	**Monitoring and Control Subsystems**		
		X													ATSEP.QLF.NAV.NDB_1.5.1	Describe the purpose of monitoring	2	Integrity, continuity of service, availability
		X													ATSEP.QLF.NAV.NDB_1.5.2	Describe which parameters are used for the monitoring	2	Antenna current, ID code, depth of modulation

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
		X													ATSEP.QLF.NAV.NDB_1.5.3	Appreciate how the operational status of the NDB monitoring system is checked	3	System status
		X													ATSEP.QLF.NAV.NDB_1.5.4	Describe the issues associated with NDB obstacle limitations and obstacle removal	2	Siting
		X													**ATSEP.QLF.NAV.NDB_1.6**	**On-board Equipment**		
		X													ATSEP.QLF.NAV.NDB_1.6.1	Describe the on-board equipment (ADF)	2	Receiver, antenna, displays
		X													ATSEP.QLF.NAV.NDB_1.6.2	Describe how NDB information is used on-board	2	ADF indicator, RMI, HSI, ND
		X													**ATSEP.QLF.NAV.NDB_1.7**	**System Check and Maintenance**		
		X													ATSEP.QLF.NAV.NDB_1.7.1	Describe the conformity to international and national regulations	2	ITU regulations (EMC + SAR), ICAO Annex 10 e.g. European regulations
		X													ATSEP.QLF.NAV.NDB_1.7.2	Appreciate calibration tasks and flight inspection results	3	e.g. maintenance and flight inspection manuals, procedures and reports
		X													ATSEP.QLF.NAV.NDB_1.7.3	Appreciate troubleshooting of an NDB	3	e.g. maintenance and flight inspection manuals, procedures and reports
		X													ATSEP.QLF.NAV.NDB_1.7.4	Appreciate the origins of NDB errors	3	e.g. multipath, EMC, interference with radio broadcast transmissions

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
			X									**X**			**ATSEP.QLF.NAV.DFI**	**GROUND-BASED SYSTEMS - DF**		
			X									**X**			**ATSEP.QLF.NAV.DFI_1**	**DIRECTION FINDER (DF)**		
			X									**X**			**ATSEP.QLF.NAV.DFI_1.1**	**Use of the System**		
			X									X			ATSEP.QLF.NAV.DFI_1.1.1	State the different types of DF	1	VDF, DDF, IDF
			X									X			ATSEP.QLF.NAV.DFI_1.1.2	Describe the user HMI	2	Indication on radar picture, DF indicator
			X									X			ATSEP.QLF.NAV.DFI_1.1.3	Appreciate the principles of DF	3	Bearing, measuring method (standard, Doppler, interferometry)
			X									X			ATSEP.QLF.NAV.DFI_1.1.4	Describe the overall performance	2	Coverage, accuracy, availability of the system, integrity, continuity
			X									X			ATSEP.QLF.NAV.DFI_1.1.5	Explain the technical limitations of DF	2	Sensitivity to interference
			X									X			ATSEP.QLF.NAV.DFI_1.1.6	Describe the current situation	2	e.g. number, type, users, national context
			X												**ATSEP.QLF.NAV.DFI_1.2**	**VDF/DDF Equipment Architecture**		
			X												ATSEP.QLF.NAV.DFI_1.2.1	Describe the main components of DF equipment	2	Electronic cabinet, antennas, power supply, remote controls and monitoring
			X												**ATSEP.QLF.NAV.DFI_1.3**	**Receiver Subsystem**		
			X												ATSEP.QLF.NAV.DFI_1.3.1	Explain the main signal parameters	2	Frequency band (UHF, VHF)
			X												**ATSEP.QLF.NAV.DFI_1.4**	**Antenna Subsystem**		
			X												ATSEP.QLF.NAV.DFI_1.4.1	Explain DF antenna characteristics	2	Impedance, polar diagram, polarisation, types of antennas
			X												ATSEP.QLF.NAV.DFI_1.4.2	Appreciate protection areas	3	Obstacles, ICAO Annex 10 e.g. manufacturers manuals
			X												**ATSEP.QLF.NAV.DFI_1.5**	**Monitoring and Control Subsystems**		
			X												ATSEP.QLF.NAV.DFI_1.5.1	Describe the purpose of monitoring	2	Integrity, continuity of service, availability
			X												ATSEP.QLF.NAV.DFI_1.5.2	Describe which parameters are used for the monitoring	2	Noise figure, stability of measurement
			X												ATSEP.QLF.NAV.DFI_1.5.3	Appreciate how the operational status of the DF monitoring system is checked	3	System status

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
			X												ATSEP.QLF.NAV.DFI_1.5.4	Describe the issues associated with DF obstacle limitations and obstacle removal	2	Surrounding environment, protection of bearing accuracy
			X												**ATSEP.QLF.NAV.DFI_1.6**	**System Check and Maintenance**		
			X												ATSEP.QLF.NAV.DFI_1.6.1	Describe the conformity to international and national regulations	2	ITU regulations (EMV + SAR), ICAO Annex 10 e.g. European regulations
			X												ATSEP.QLF.NAV.DFI_1.6.2	Perform typical measurements on a DF system	3	Frequency, channel spacing, sensitivity, selectivity, bearing accuracy
			X												ATSEP.QLF.NAV.DFI_1.6.3	Appreciate calibration tasks and flight inspection results	3	Ground-based bearing checks, test oscillator e.g. North setting, range, multipath maintenance and flight inspection manuals, procedures and reports
			X												ATSEP.QLF.NAV.DFI_1.6.4	Appreciate troubleshooting of DF	3	e.g. sensitivity, local oscillator level Maintenance and flight inspection manuals, procedures and reports
			X												ATSEP.QLF.NAV.DFI_1.6.5	Appreciate the origin of DF errors	3	e.g. multipath, EMC, interference with radio broadcast transmissions

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
				X								**X**			**ATSEP.QLF.NAV.VOR**	**GROUND-BASED SYSTEMS - VOR**		
				X								**X**			**ATSEP.QLF.NAV.VOR_1**	**VHF OMNIDIRECTIONAl RADIO RANGE (VOR)**		
				X								**X**			**ATSEP.QLF.NAV.VOR_1.1**	**Use of the System**		
				X								X			ATSEP.QLF.NAV.VOR_1.1.1	State the types of VOR Systems	1	Conventional, Doppler
				X								X			ATSEP.QLF.NAV.VOR_1.1.2	Describe the overall performance	2	Coverage, accuracy, availability of the system, integrity, continuity
				X								X			ATSEP.QLF.NAV.VOR_1.1.3	Explain the technical limitations of CVOR	2	Type of information (azimuth), accuracy, integrity, suitable for a network of fixed routes
				X								X			ATSEP.QLF.NAV.VOR_1.1.4	Appreciate the differences between CVOR and DVOR	3	Signal broadcast differences, bearing information robustness
				X								X			ATSEP.QLF.NAV.VOR_1.1.5	Describe the current situation	2	e.g. number, type, users, user groups, national context, European context
				X											**ATSEP.QLF.NAV.VOR_1.2**	**Fundamentals of CVOR and/or DVOR**		
				X											ATSEP.QLF.NAV.VOR_1.2.1	Appreciate the mathematical signal description	3	Declination, equations of CVOR and/or DVOR, reference and variable signals
				X											ATSEP.QLF.NAV.VOR_1.2.2	Appreciate the principles for generating the variable signal	3	CVOR Rotating antennae principle Generating a rotating radiation pattern with static antennae and/or DVOR Frequency modulation through switching antenna
				X											**ATSEP.QLF.NAV.VOR_1.3**	**Ground Station Architecture**		
				X											ATSEP.QLF.NAV.VOR_1.3.1	Describe the main components of a CVOR and/or DVOR ground station	2	Electronic cabinet, antenna system, power supply, remote controls and monitoring
				X											ATSEP.QLF.NAV.VOR_1.3.2	Identify the relation between VOR station design and the operational requirements	4	Siting, coverage, ID code, backup systems

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
				X											**ATSEP.QLF.NAV.VOR_1.4**	**Transmitter Subsystem**		
				X											ATSEP.QLF.NAV.VOR_1.4.1	Characterise main signal parameters for a CVOR and/or DVOR	2	Carrier frequency stability, output power, signals generated
				X											ATSEP.QLF.NAV.VOR_1.4.2	Perform typical transmitter measurements on VOR signals	3	Radiation pattern accuracy, power and modulation measurements, spectrum measurements, ID coding
				X											**ATSEP.QLF.NAV.VOR_1.5**	**Antenna Subsystem**		
				X											ATSEP.QLF.NAV.VOR_1.5.1	Explain VOR antenna characteristics	2	Impedance, polar diagram, polarisation, types of antennas
				X											ATSEP.QLF.NAV.VOR_1.5.2	Appreciate the interface between power stage and the antennae	3	SWR, radiated power
				X											ATSEP.QLF.NAV.VOR_1.5.3	Appreciate protection areas	3	Obstacles, ICAO Annex 10 e.g. manufacturers manuals
				X											**ATSEP.QLF.NAV.VOR_1.6**	**Monitoring and Control Subsystem**		
				X											ATSEP.QLF.NAV.VOR_1.6.1	Describe the purpose of monitoring	2	Integrity, continuity of service, availability
				X											ATSEP.QLF.NAV.VOR_1.6.2	Describe which VOR parameters are monitored	2	ICAO and RTCA/EUROCAE requirements e.g. NSA requirements
				X											ATSEP.QLF.NAV.VOR_1.6.3	Describe the principles of the CVOR and/or DVOR monitoring systems	2	Near field sensors, far field sensors, Local and remote monitoring
				X											ATSEP.QLF.NAV.VOR_1.6.4	Appreciate how the operational status of the CVOR and/or DVOR monitoring systems are checked	3	Near field sensors, far field sensors, recombination, Local and remote monitoring e.g. BITE, Watchdog
				X											ATSEP.QLF.NAV.VOR_1.6.5	Describe the issues associated with VOR obstacle limitations and obstacle removal	2	Surrounding environment, multipath prevention

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
				X											**ATSEP.QLF.NAV.VOR_1.7**	**On-board Equipment**		
				X											ATSEP.QLF.NAV.VOR_1.7.1	Describe the on-board equipment	2	Antenna, receiver HMI e.g. CDI, RMI, HSI, ND
				X											ATSEP.QLF.NAV.VOR_1.7.2	Describe how the VOR information is used on board	2	e.g. single VOR, VOR-VOR, approach procedures, manual mode, automatic mode
				X											**ATSEP.QLF.NAV.VOR_1.8**	**System Check and Maintenance**		
				X											ATSEP.QLF.NAV.VOR_1.8.1	Describe the conformity to international and national regulations	2	ITU regulations (EMC + SAR), ICAO Annex 10
				X											ATSEP.QLF.NAV.VOR_1.8.2	Perform typical system measurements	3	In space modulation, phase sideband/carrier, ground check for bearing errors
				X											ATSEP.QLF.NAV.VOR_1.8.3	Appreciate calibration tasks and flight inspection results	3	Flight inspection (coverage, flight check for bearing errors and modulation) e.g. maintenance manuals, procedures and reports
				X											ATSEP.QLF.NAV.VOR_1.8.4	Appreciate troubleshooting of a CVOR and/or DVOR	3	Carrier frequency deviation, depth of modulation, lack of power, harmonics ratio e.g. maintenance and flight inspection manuals, procedures and reports
				X											ATSEP.QLF.NAV.VOR_1.8.5	Analyse the origins of CVOR and/or DVOR errors	4	CVOR System-dependent, adjustments, drifts, multipath, on-board errors and/or DVOR North Adjustment e.g. DVOR: antenna feeding DVOR and CVOR: multipath, EMC, interference with radio broadcast transmissions

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
					X							**X**			**ATSEP.QLF.NAV.DME**	**GROUND-BASED SYSTEMS - DME**		
					X							**X**			**ATSEP.QLF.NAV.DME_1**	**DISTANCE MEASURING EQUIPMENT (DME)**		
					X							**X**			**ATSEP.QLF.NAV.DME_1.1**	**Use of the System**		
					X							X			ATSEP.QLF.NAV.DME_1.1.1	Describe the overall performances for DME	2	Coverage, accuracy, availability of the system, integrity, continuity, number of users
					X							X			ATSEP.QLF.NAV.DME_1.1.2	Explain the limitations of DME	2	Accuracy, integrity, capacity
					X							X			ATSEP.QLF.NAV.DME_1.1.3	Describe the current situation	2	e.g. number, types, users, user groups, national context, European context
					X							X			ATSEP.QLF.NAV.DME_1.1.4	State the role of the DME infrastructure in the future navigation applications	1	PBN
					X							X			ATSEP.QLF.NAV.DME_1.1.5	Explain the differences between DME and TACAN for civilian use	2	e.g. azimuth and range
					X										**ATSEP.QLF.NAV.DME_1.2**	**Fundamentals of DME**		
					X										ATSEP.QLF.NAV.DME_1.2.1	Describe the key elements of DME system operation	2	Two-way ranging technique, slant range, time measurement A/C interrogation, pulse pairs, ground reply, fixed time delay, interrogation stagger, 'X' and 'Y' channels
					X										ATSEP.QLF.NAV.DME_1.2.2	Explain the frequency spectrum and the channel spacing allocated	2	ICAO Annex 10, EUROCAE ED-57, L-band
					X										**ATSEP.QLF.NAV.DME_1.3**	**Ground Station Architecture**		
					X										ATSEP.QLF.NAV.DME_1.3.1	Describe the main components of a DME ground station	2	Electronic cabinet, antenna system, power supply, remote controls and monitoring
					X										ATSEP.QLF.NAV.DME_1.3.2	Identify the relation between DME station design and the operational requirements	3	Coverage, ID code, siting

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
					X										**ATSEP.QLF.NAV.DME_1.4**	**Receiver Subsystem**		
					X										ATSEP.QLF.NAV.DME_1.4.1	Explain the main receiver parameters for a DME	2	Sensitivity, selectivity, dynamic range, jamming immunity
					X										ATSEP.QLF.NAV.DME_1.4.2	Appreciate the typical measurements on the interrogation signals	3	Sensitivity, selectivity, dynamic range, jamming immunity
					X										**ATSEP.QLF.NAV.DME_1.5**	**Signal Processing**		
					X										ATSEP.QLF.NAV.DME_1.5.1	Explain the functions performed by a DME signal processor	2	Decode, reply delay, automatic reply rate control, encode, priority (Ident, DME signal, squitter)
					X										ATSEP.QLF.NAV.DME_1.5.2	Appreciate the typical measurement on the DME transponder signals	3	Reply delay, Reply delay offset, decode parameters, rate of replies
					X										**ATSEP.QLF.NAV.DME_1.6**	**Transmitter Subsystem**		
					X										ATSEP.QLF.NAV.DME_1.6.1	Characterise the main signal parameters from the ground station	2	Carrier frequency, output power, pulse shape, pulse spacing, pulse repetition frequency, main delay, ID code
					X										ATSEP.QLF.NAV.DME_1.6.2	Appreciate the typical measurements on a DME	3	Power and pulse measurements, spectrum measurements, modulation measurements
					X										**ATSEP.QLF.NAV.DME_1.7**	**Antenna Subsystem**		
					X										ATSEP.QLF.NAV.DME_1.7.1	Explain DME antenna characteristics	2	Patterns, antennas
					X										ATSEP.QLF.NAV.DME_1.7.2	Appreciate the interface between power stage and the antenna	3	SWR, radiated power, propagation delay, distribution circuit (e.g. duplexer, circulator)
					X										ATSEP.QLF.NAV.DME_1.7.3	Appreciate protection areas	3	ICAO Annex 10, protection area criteria and enforcement e.g. manufacturers manuals

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
					X										**ATSEP.QLF.NAV.DME_1.8**	**Monitoring and Control Subsystem**		
					X										ATSEP.QLF.NAV.DME_1.8.1	Describe the purpose of monitoring	2	Integrity, continuity of service, availability
					X										ATSEP.QLF.NAV.DME_1.8.2	Describe which DME parameters are monitored	2	ICAO and RTCA/EUROCAE requirements e.g. NSA requirements
					X										ATSEP.QLF.NAV.DME_1.8.3	Appreciate how the operational status of the DME monitoring system is checked	3	-
					X										ATSEP.QLF.NAV.DME_1.8.4	Describe the issues associated with DME obstacle limitations and obstacle removal	2	Multipath, blanking
					X										**ATSEP.QLF.NAV.DME_1.9**	**On-board Equipment**		
					X										ATSEP.QLF.NAV.DME_1.9.1	Describe the on-board equipment	2	Transmitter, antenna, receiver, HMI e.g. HSI, DME range indication, ND
					X										ATSEP.QLF.NAV.DME_1.9.2	Describe how the DME information is used on board	2	e.g. single DME, multi-DME navigation (rho rho), approach procedures, manual mode, automatic mode
					X										**ATSEP.QLF.NAV.DME_1.10**	**System Check and Maintenance**		
					X										ATSEP.QLF.NAV.DME_1.10.1	Describe the conformity to international and national regulations	2	ITU regulations (EMC + SAR), ICAO Annex 10 e.g. European regulations
					X										ATSEP.QLF.NAV.DME_1.10.2	Appreciate calibration tasks and flight inspection results	3	e.g. maintenance and flight inspection manuals, procedures and reports
					X										ATSEP.QLF.NAV.DME_1.10.3	Appreciate troubleshooting of a DME	3	Carrier frequency deviation, depth of modulation, lack of power, harmonics ratio e.g. main delay and monitor shutdown errors, interference Maintenance and flight inspection manuals, procedures and reports
					X										ATSEP.QLF.NAV.DME_1.10.4	Appreciate the origin of DME errors	3	e.g. Multipath, EMC, interference with radio broadcast transmissions (harmonics)

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
						X						**X**			**ATSEP.QLF.NAV.ILS**	**GROUND-BASED SYSTEMS - ILS**		
						X						**X**			**ATSEP.QLF.NAV.ILS_1**	**INSTRUMENT LANDING SYSTEM (ILS)**		
						X						**X**			**ATSEP.QLF.NAV.ILS_1.1**	**Use of the System**		
						X						X			ATSEP.QLF.NAV.ILS_1.1.1	Describe the overall performance for ILS	2	ICAO Annexes 10 and 14 Coverage, accuracy, availability of the system, integrity, continuity, number of users
						X						X			ATSEP.QLF.NAV.ILS_1.1.2	Explain the limitations of ILS	2	ICAO Annexes 10 and 14 Only 40 channels, no segmented paths of approach, beam corruption due to multipath
						X						X			ATSEP.QLF.NAV.ILS_1.1.3	Explain ILS facility performance categories	2	ICAO Annexes 10 and 14 Cat I, Cat II, Cat III Different operational category depending on operational minima, equipment and airport facilities
						X						X			ATSEP.QLF.NAV.ILS_1.1.4	Explain the importance and need for ILS obstacle-free zones	2	ICAO Annexes 10 and 14 Dimensions ILS beam protection, increased significance during LVP conditions e.g. national regulations
						X						X			ATSEP.QLF.NAV.ILS_1.1.5	Consider the need for ATC ILS status indications	2	No continuous monitoring by ATSEP
						X						X			ATSEP.QLF.NAV.ILS_1.1.6	Explain the current situation	2	e.g. number, type, users, national context
						X									**ATSEP.QLF.NAV.ILS_1.2**	**Fundamentals of ILS**		
						X									ATSEP.QLF.NAV.ILS_1.2.1	Explain how to obtain a change in depth of modulation of an amplitude-modulated signal as a function of angular position	2	Addition of a carrier signal and a side band signal in space
						X									ATSEP.QLF.NAV.ILS_1.2.2	Characterise the signals to be radiated	2	Amplitude and phase relationship, antenna systems

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
						X									ATSEP.QLF.NAV.ILS_1.2.3	Appreciate the relation between adjustment of signals generated and the resulting beam patterns and standards	3	Phases and amplitudes in antenna array, modulations on carrier signal, phase and amplitude of side band
						X									ATSEP.QLF.NAV.ILS_1.2.4	Describe the required performance of an antenna array	2	Beam bend potential, coverage, impact on location of critical and sensitive area
						X									**ATSEP.QLF.NAV.ILS_1.3**	**2F-Systems**		
						X									ATSEP.QLF.NAV.ILS_1.3.1	Explain the limitations of a 1F system	2	Multipath in adverse environment and terrain
						X									ATSEP.QLF.NAV.ILS_1.3.2	Describe the capture effect	2	Capture effect in receiver circuits and its consequences on monitoring
						X									ATSEP.QLF.NAV.ILS_1.3.3	Explain radiation parameters for 2F-LOC and 2F-GP	2	Types of antenna arrays, patterns, coverage, signal distribution, radiated power and their consequences on monitoring
						X									**ATSEP.QLF.NAV.ILS_1.4**	**Ground Station Architecture**		
						X									ATSEP.QLF.NAV.ILS_1.4.1	Describe the layout of an ILS	2	-
						X									ATSEP.QLF.NAV.ILS_1.4.2	Describe the main components of the LOC (1F and 2F), GP (1F and 2F), markers and field monitors	2	Electronic cabinet, antennas, power supply, remote controls and monitoring, tower indication e.g. DME
						X									ATSEP.QLF.NAV.ILS_1.4.3	Identify the relation between an ILS station design and operational requirements	3	Coverage, ID code, siting
						X									ATSEP.QLF.NAV.ILS_1.4.4	Explain the optional DME interface	2	Identity coding ratio
						X									**ATSEP.QLF.NAV.ILS_1.5**	**Transmitter Subsystem**		
						X									ATSEP.QLF.NAV.ILS_1.5.1	Appreciate main signal parameters for LOC (1F and 2F), GP (1F and 2F) and markers	2	Carrier frequency, output power, signals generated

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
						X									ATSEP.QLF.NAV.ILS_1.5.2	Explain the block diagram of the ILS transmitters	4	LOC, GP, Marker beacons Synthesizer, modulator, power amplifier, control coupler, RF changeover
						X									**ATSEP.QLF.NAV.ILS_1.6**	**Antenna Subsystem**		
						X									ATSEP.QLF.NAV.ILS_1.6.1	Explain ILS antenna characteristics: LOC, GP and Marker Beacons	2	Types, position, polarisation, patterns, coverage, antenna matching, distribution circuits, radiated power, ground reflection
						X									**ATSEP.QLF.NAV.ILS_1.7**	**Monitoring and Control Subsystem**		
						X									ATSEP.QLF.NAV.ILS_1.7.1	Describe the purpose of monitoring	2	Integrity, continuity of service, availability
						X									ATSEP.QLF.NAV.ILS_1.7.2	Describe the parameters for the monitoring according to ICAO Annex 10: LOC, GP and Marker Beacons	2	RF level, DDM, SDM on position and width
						X									ATSEP.QLF.NAV.ILS_1.7.3	Explain the key additional required monitoring: LOC and GP	2	External, internal and integral monitoring
						X									ATSEP.QLF.NAV.ILS_1.7.4	Explain the purpose, advantages and disadvantages of the FFM system	2	e.g. content position, width, requirement for Cat III operations (some States)
						X									ATSEP.QLF.NAV.ILS_1.7.5	Describe (with a diagram) the monitoring system: LOC, GP, FFM and Marker Beacons	2	Near-field, integral network, internal network, monitor signal processor e.g. DME
						X									**ATSEP.QLF.NAV.ILS_1.8**	**On-board Equipment**		
						X									ATSEP.QLF.NAV.ILS_1.8.1	Describe the on-board equipment associated with LOC, GP and Marker Beacon	2	Antennas, receiver, pilot interface (cross pointer) e.g. FMS
						X									ATSEP.QLF.NAV.ILS_1.8.2	Describe how ILS information is used on board	2	e.g. approach procedures, landing, roll-out, manual, automatic mode (auto-pilot)

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
						X									**ATSEP.QLF.NAV.ILS_1.9**	**System Check and Maintenance**		
						X									ATSEP.QLF.NAV.ILS_1.9.1	Describe the conformity of LOC, GP and marker beacons to international and national regulations	2	ITU regulations (EMC + SAR), ICAO Annex 10 e.g. European regulations
						X									ATSEP.QLF.NAV.ILS_1.9.2	Explain the occasions when it is necessary to downgrade an ILS facility performance category	2	e.g. system failures, environmental changes/disturbance
						X									ATSEP.QLF.NAV.ILS_1.9.3	Explain the implications of ILS facility performance categories to the pilot	2	Link with prevailing Instrument RVR, weather dictating decision height
						X									ATSEP.QLF.NAV.ILS_1.9.4	Perform some typical measurements	3	Output power, spectrum analysis, modulation, ID code
						X									ATSEP.QLF.NAV.ILS_1.9.5	Appreciate calibration tasks and flight inspection results	3	LOC, GP and marker beacons Flight inspection and ground calibration results, LOC Centreline measurement, width and centreline field measurements e.g. RF interference monitoring maintenance and flight inspection manuals, procedures and reports
						X									ATSEP.QLF.NAV.ILS_1.9.6	Appreciate troubleshooting of ILS LOC, GP and marker beacons	3	DDM and SDM misalignment, coverage pilot reported errors, field checks, monitor checks e.g. lack of power, carrier frequency deviation, harmonic ratio, depth of modulation maintenance and flight inspection manuals, procedures and reports
						X									ATSEP.QLF.NAV.ILS_1.9.7	Appreciate the origin of ILS errors	3	e.g. Multipath, EMC, interference with radio broadcast transmissions (harmonics)

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
		X	**X**	**X**	**X**	**X**									**ATSEP.QLF.NAV.GNS**	**GLOBAL NAVIGATION SATELLITE SYSTEM**		
		X	**X**	**X**	**X**	**X**									**ATSEP.QLF.NAV.GNS_1**	**GLOBAL NAVIGATION SATELLITE SYSTEM (GNSS)**		
		X	**X**	**X**	**X**	**X**									**ATSEP.QLF.NAV.GNS_1.1**	**General View**		
		X	X	X	X	X									ATSEP.QLF.NAV.GNS_1.1.1	Explain the importance of continuing the development of GNSS in aviation	2	ICAO Doc 9849, SESAR ATM Master Plan, EU Navigation Strategy
		X	X	X	X	X									ATSEP.QLF.NAV.GNS_1.1.2	Describe the elements of GNSS within Europe	2	Core systems : GPS, GLONASS, GALILEO, BEIDOU, Augmentations e.g. Augmentation systems: RAIM, AAIM, EGNOS, WAAS, GBA
		X	X	X	X	X									ATSEP.QLF.NAV.GNS_1.1.3	Appreciate the sources of interference to GNSS signals	3	Intentional, unintentional, ionospheric interference, solar activity, jamming, spoofing
		X	X	X	X	X									ATSEP.QLF.NAV.GNS_1.1.4	Explain who has responsibility for GNSS oversight in your State and how it is carried out	2	e.g. EASA, GSA, NSA, ANSP
		X	X	X	X	X									ATSEP.QLF.NAV.GNS_1.1.5	Appreciate the impact of the modernisation of GNSS on the ARNS bands	3	Introduction of L5, E5A, E5B
		X	X	X	X	X									ATSEP.QLF.NAV.GNS_1.1.6	Describe the purpose of the GNSS NOTAM	2	ICAO Annex 10, Vol. 1 e.g. AUGUR

Appendix 4a – ATSEP Qualification training - Streams

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		X	**X**	**X**	**X**	**X**									**ATSEP.QLF.NAV.OBE**	**ON-BOARD EQUIPMENT**		
		X	**X**	**X**	**X**	**X**									**ATSEP.QLF.NAV.OBE_1**	**ON-BOARD SYSTEMS**		
		X	**X**	**X**	**X**	**X**									**ATSEP.QLF.NAV.OBE_1.1**	**On-board Systems**		
		X	X	X	X	X									ATSEP.QLF.NAV.OBE_1.1.1	Explain the purpose and use of a navigation computer	2	Sensors, navigation database
		X	X	X	X	X									ATSEP.QLF.NAV.OBE_1.1.2	Explain the purpose and use of an FMS	2	Sensors, navigation database, path steering, displays
		X	**X**	**X**	**X**	**X**									**ATSEP.QLF.NAV.OBE_2**	**AUTONOMOUS NAVIGATION**		
		X	**X**	**X**	**X**	**X**									**ATSEP.QLF.NAV.OBE_2.1**	**Inertial Navigation**		
		X	X	X	X	X									ATSEP.QLF.NAV.OBE_2.1.1	Describe the principles and key features of INS/IRS navigation	2	Gyros, accelerometer, accuracy, drift, updating
		X	**X**	**X**	**X**	**X**									**ATSEP.QLF.NAV.OBE_3**	**VERTICAL NAVIGATION**		
		X	**X**	**X**	**X**	**X**									**ATSEP.QLF.NAV.OBE_3.1**	**Vertical Navigation**		
		X	X	X	X	X									ATSEP.QLF.NAV.OBE_3.1.1	Describe the different types of vertical sensors and their limitations	2	Barometric, Radio Altimetry, Geodetic e.g. air data computers, manual intervention, dynamic information (AGL), undulation (WGS84)

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
							X			X			X	X	**ATSEP.QLF.SUR**	**ATSEP QUALIFICATION DOMAIN - SURVEILLANCE**		
							X			X			X	X	**ATSEP.QLF.SUR.PSR**	**PRIMARY SURVEILLANCE RADAR (PSR)**		
							X			X			X	X	**ATSEP.QLF.SUR.PSR_1**	**PSR**		
							X			X			X	X	**ATSEP.QLF.SUR.PSR_1.1**	**Use of PSR for Air Traffic Services**		
							X			X			X	X	ATSEP.QLF.SUR.PSR_1.1.1	Describe the operational requirements of an en-route or an approach PSR	2	Range, resolution, coverage, availability
							X								ATSEP.QLF.SUR.PSR_1.1.2	Relate key parameters of PSR to system performance	4	Key parameters: PRF, signal energy, frequency diversity, antenna gain, update rate, polarisation, receiver MDS, beamwidth Performance: range, accuracy, resolution, extractor minimum target threshold, weather influence, PD, blind speed, ambiguities, capacity e.g. weather channel
							X								**ATSEP.QLF.SUR.PSR_1.2**	**Antenna (PSR)**		
							X								ATSEP.QLF.SUR.PSR_1.2.1	Describe antenna types, accuracy and problems	2	Antenna beam(s), side lobes, reflector antenna, active (phased array) antenna, rotating joints, waveguide interface, pressurisation, dehumidification, polarisation, azimuth encoding, drive systems
							X								**ATSEP.QLF.SUR.PSR_1.3**	**Transmitters**		
							X								ATSEP.QLF.SUR.PSR_1.3.1	Describe the basic characteristics of a transmitter	2	Timing, coherence, modulation, pulse width, pulse compression, pulse energy, frequency diversity/agility
							X								ATSEP.QLF.SUR.PSR_1.3.2	Describe the signals at all key points	2	Supply, EHT, RF source (appropriate to type chosen), modulation, interlocks

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
							X								ATSEP.QLF.SUR.PSR_1.3.3	Describe a generic transmitter block diagram for both compressed and non-compressed system	2	e.g. solid state, klystron, magnetron, travelling wave tube
							X								ATSEP.QLF.SUR.PSR_1.3.4	State possible failures and where they can occur in the transmitter system	1	e.g. solid state modules, arcing, corona discharge, component stress, control loops, isolation
							X								ATSEP.QLF.SUR.PSR_1.3.5	State constraints and problems on the high voltage circuitry	1	e.g. corona discharge, dielectric stress, isolation, arcing, ageing, interlocks, stability (including control loop)
							X								**ATSEP.QLF.SUR.PSR_1.4**	**Characteristics of Primary Targets**		
							X								ATSEP.QLF.SUR.PSR_1.4.1	Appreciate the characteristics of targets detected by PSR	3	Backscatter, radar cross section (such as reflectivity, stealth technologies, aspect), Doppler shift, ground speed, wind turbines e.g. Swerling Case
							X								**ATSEP.QLF.SUR.PSR_1.5**	**Receivers**		
							X								ATSEP.QLF.SUR.PSR_1.5.1	Describe the basic characteristics of a receiver	2	Low noise, high dynamic range, bandwidth, detection, frequency, sensitivity, selectivity
							X								ATSEP.QLF.SUR.PSR_1.5.2	Describe the basic elements of a generic receiver	2	LNA, local oscillator, coherent oscillator, down-converter, filtering, rejection, IF, PSD, AGC, STC, beam switching
							X								ATSEP.QLF.SUR.PSR_1.5.3	Appreciate the importance of STC	3	Saturation, RF-IF dynamic range
							X								**ATSEP.QLF.SUR.PSR_1.6**	**Signal Processing and Plot Extraction**		
							X								ATSEP.QLF.SUR.PSR_1.6.1	Describe the basic function of data processing	2	Plot extraction (range bin reports, range correlation, azimuth correlation), target reports, sliding window, weighted centre, local tracking
							X								ATSEP.QLF.SUR.PSR_1.6.2	Appreciate the basic functions of a current radar signal processor	3	A/D conversion, I/Q matching, target detection, detection criteria (fixed, adaptive), MTD and clutter maps

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
							X								ATSEP.QLF.SUR.PSR_1.6.3	Describe the processing techniques to improve the quality of target reports using scan-to-scan information	2	Tracking, environment mapping, adaptive feedback to extraction parameters
							X								**ATSEP.QLF.SUR.PSR_1.7**	**Plot Combining**		
							X								ATSEP.QLF.SUR.PSR_1.7.1	Describe the basic function of plot combining	2	Secondary/primary combining, secondary/primary assigning, prime target, range and azimuth collimation
							X								ATSEP.QLF.SUR.PSR_1.7.2	Describe the basic functions of a current radar plot combiner	2	Scan-to-scan correlation, angel filtering, vehicle filtering, output format
							X								**ATSEP.QLF.SUR.PSR_1.8**	**Characteristics of Primary Radar**		
							X								ATSEP.QLF.SUR.PSR_1.8.1	Explain the basic principles of electromagnetism, propagation, signal detection, RF power generation and distribution	2	Frequency and phase, electromagnetic radiation, spectrum and bandwidth, noise, HPA, waveguide problems
							X								**ATSEP.QLF.SUR.PSR_2**	**SURFACE MOVEMENT RADAR**		
							X								**ATSEP.QLF.SUR.PSR_2.1**	**Use of SMR for Air Traffic Services**		
							X								ATSEP.QLF.SUR.PSR_2.1.1	Describe the operational requirements of SMR	2	Range, resolution, coverage, MTBF, availability
							X								ATSEP.QLF.SUR.PSR_2.1.2	Relate key parameters and necessity to achieve performances	4	Specific equations for ranging and power budget, PRF, frequency with respect to range and accuracy, PD, frequency diversity, range with respect to TX power, antenna gain, receiver MDS, update rate, beamwidth, extractor minimum target threshold, polarisation, influence to meteorology
							X								**ATSEP.QLF.SUR.PSR_2.2**	**Radar Sensor**		
							X								ATSEP.QLF.SUR.PSR_2.2.1	Explain the layout of the SMR	2	Dual system, service display
							X								ATSEP.QLF.SUR.PSR_2.2.2	Describe the basic functions of the receiver/transmitter unit	2	Hardware/function overview

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
							X								ATSEP.QLF.SUR.PSR_2.2.3	Describe how to operate a sensor	2	e.g. block diagram, timing relations, video path, frequency diversity, polarisation, controller structure
							X								ATSEP.QLF.SUR.PSR_2.2.4	Describe the basic functions of the antenna unit	2	e.g. hardware function overview, control/switch unit, external interface, azimuth encoding, monopulse techniques
							X								**ATSEP.QLF.SUR.PSR_3**	**TEST AND MEASUREMENT**		
							X								**ATSEP.QLF.SUR.PSR_3.1**	**Test and Measurement**		
							X								ATSEP.QLF.SUR.PSR_3.1.1	Appreciate how measurements can be made on PSR and SMR	3	e.g. spectrum analyser, vector voltmeter, oscilloscope, SWR meter, sensor analysis tools

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
								X		**X**			**X**	**X**	**ATSEP.QLF.SUR.SSR**	**SECONDARY SURVEILLANCE RADAR (SSR)**		
								X		**X**			**X**	**X**	**ATSEP.QLF.SUR.SSR_1**	**SSR AND MONO-PULSE SSR (MSSR)**		
								X		**X**			**X**	**X**	**ATSEP.QLF.SUR.SSR_1.1**	**Use of SSR for Air Traffic Services**		
								X		X			X	X	ATSEP.QLF.SUR.SSR_1.1.1	Describe the operational requirements of an en-route or an approach SSR	2	Range, coverage, resolution, performance, update rate ICAO Doc 9684
								X							ATSEP.QLF.SUR.SSR_1.1.2	Relate key parameters of SSR to system performance	4	Key parameters: rotation rate, PRF, interlaced modes, capacity, frequencies, power budget (uplink, downlink), monopulse techniques Consequences: FRUIT, garbling, side lobes reception and transmission, transponder availability, PD, 2nd recurrence replies
								X							**ATSEP.QLF.SUR.SSR_1.2**	**Antenna (SSR)**		
								X							ATSEP.QLF.SUR.SSR_1.2.1	Describe the principles of SSR/MSSR antenna	2	Monopulse antenna techniques, coaxial connection, sum, difference and control pattern, off-boresight angle measurement, azimuth encoding, beam sharpening, side lobes
								X							**ATSEP.QLF.SUR.SSR_1.3**	**Interrogator**		
								X							ATSEP.QLF.SUR.SSR_1.3.1	Describe the characteristics of an interrogator	2	Frequency, spectrum, interrogation modes, duty cycle, ISLS, IISLS, staggering
								X							ATSEP.QLF.SUR.SSR_1.3.2	Explain a generic interrogator	2	Timing, interface, modulator, BITE
								X							ATSEP.QLF.SUR.SSR_1.3.3	Explain the need and methods for integrity monitoring	2	Safeguards against erroneous transmission, BITE, power and temperature monitoring

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
								X							**ATSEP.QLF.SUR.SSR_1.4**	**Transponder**		
								X							ATSEP.QLF.SUR.SSR_1.4.1	Explain the operational use of the transponder	2	Diagram of interaction between transponder and aeroplane
								X							ATSEP.QLF.SUR.SSR_1.4.2	Define the global performances	1	Range, accuracy, fixed delay to respond
								X							ATSEP.QLF.SUR.SSR_1.4.3	Describe the basic characteristics of a transponder	2	Transceiver, aerial location, switching and polar diagram, size ACAS Mode S and ADS compatibility, maximum reply rate, ISLS compatibility
								X							ATSEP.QLF.SUR.SSR_1.4.4	Explain the advantages of the transponder	2	Longer range, more information
								X							ATSEP.QLF.SUR.SSR_1.4.5	Explain the limitations of the transponder	2	Hundreds of feet precision, 3A limited codes
								X							ATSEP.QLF.SUR.SSR_1.4.6	Describe the conformity to regulations	2	Equipage obligations, ICAO Annex 10
								X							ATSEP.QLF.SUR.SSR_1.4.7	Describe the data format of the messages received by the transponder	2	P1, P2, P3, P4, P5, P6 signals and DPSK modulation (P6)
								X							ATSEP.QLF.SUR.SSR_1.4.8	Describe the data format of the transmitted transponder messages	2	Field lengths, data bits, Gray code, unused bits, Mode S reply (preamble and data)
								X							ATSEP.QLF.SUR.SSR_1.4.9	Describe the basic characteristics of a transmitter	2	Timing, modulation, pulse width, power output
								X							ATSEP.QLF.SUR.SSR_1.4.10	Describe the use of the transponder as a field monitor	2	-
								X							**ATSEP.QLF.SUR.SSR_1.5**	**Receivers**		
								X							ATSEP.QLF.SUR.SSR_1.5.1	Describe the basic characteristics of an SSR receiver	2	Standard/MSSR receiver, sensibility, bandwidth, dynamic range, GTC (normal, sectorised), monopulse processor, RSLS, multi-path and interferences

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
								X							**ATSEP.QLF.SUR.SSR_1.6**	**Signal Processing and Plot Extraction**		
								X							ATSEP.QLF.SUR.SSR_1.6.1	Describe monopulse extraction	2	Phase and amplitude modulation, off boresight angle calculation, azimuth encoding
								X							ATSEP.QLF.SUR.SSR_1.6.2	Describe sliding window SSR extraction	2	Leading edge, trailing edge, azimuth accuracy, azimuth encoding
								X							ATSEP.QLF.SUR.SSR_1.6.3	Describe the signal processing	2	Video digitiser, pulse processor, reply decoder (bracket pair detector), synchronous reply correlator
								X							ATSEP.QLF.SUR.SSR_1.6.4	Decode a transponder message	3	Standard message with SPI set e.g. Mode S
								X							ATSEP.QLF.SUR.SSR_1.6.5	Describe the SSR processing techniques	2	Discrete code correlation, general association, zones, categories, code swapping, general correlation Mode A code data, Mode C data, target position report
								X							ATSEP.QLF.SUR.SSR_1.6.6	Explain the reasons for surveillance processing and the key options	2	False target identification and elimination, data validation, data correction, reflection identification and processing, enhanced resolution performance
								X							**ATSEP.QLF.SUR.SSR_1.7**	**Plot Combining**		
								X							ATSEP.QLF.SUR.SSR_1.7.1	Describe the basic function of plot combining	2	Secondary/primary combining, secondary/primary assigning, prime target, range and azimuth collimation
								X							ATSEP.QLF.SUR.SSR_1.7.2	Describe the basic functions of a current radar plot combiner	2	-
								X							**ATSEP.QLF.SUR.SSR_1.8**	**Test and Measurement**		
								X							ATSEP.QLF.SUR.SSR_1.8.1	Appreciate how measurements can be made on SSR	3	e.g. spectrum analyser, vector voltmeter, oscilloscope, SWR meter, sensor analysis tools

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
								X		**X**			**X**	**X**	**ATSEP.QLF.SUR.SSR_2**	**MODE S**		
								X		**X**			**X**	**X**	**ATSEP.QLF.SUR.SSR_2.1**	**Introduction to Mode S**		
								X		X			X	X	ATSEP.QLF.SUR.SSR_2.1.1	Explain the need for and benefits of Mode S	2	Classical SSR limitations, resolution, accuracy, integrity, enhanced data (e.g. 25 ft resolution, aircraft ID, BDS information)
								X		X			X	X	ATSEP.QLF.SUR.SSR_2.1.2	Explain the working principles of Mode S	2	Mode S interrogation, Mode S reply, Mode S uplink and downlink capability, Mode S formats/protocols, ELS, EHS
								X		X			X	X	ATSEP.QLF.SUR.SSR_2.1.3	Explain the complementary use of Mode S and conventional SSR	2	Mode interlace pattern, operational use of all-call, roll-call
								X		X			X	X	ATSEP.QLF.SUR.SSR_2.1.4	Explain Mode S implementation	2	Elementary and enhanced surveillance, II and SI codes, use of BDS
								X							**ATSEP.QLF.SUR.SSR_2.2**	**Mode S System**		
								X							ATSEP.QLF.SUR.SSR_2.2.1	Describe the theory of operation of Mode S hardware and software	2	Performance of the system, theory of operation of the system, interfaces to customer equipment
								X							ATSEP.QLF.SUR.SSR_2.2.2	Describe testing possibilities for Mode S	2	e.g. SASS-C, SASS-S
								X							**ATSEP.QLF.SUR.SSR_3**	**MULTILATERATION (MLAT)**		
								X							**ATSEP.QLF.SUR.SSR_3.1**	**MLAT in Use**		
								X							ATSEP.QLF.SUR.SSR_3.1.1	Explain how pilot and controller operations are impacted by the use of an MLAT system	2	Mode A assigned at gate, coverage of MLAT
								X							ATSEP.QLF.SUR.SSR_3.1.2	Describe the ground mode of transponders	2	Aircraft interrogations, squitters, change of transponder mode

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
								X		**X**			**X**	**X**	**ATSEP.QLF.SUR.SSR_3.2**	**MLAT Principles**		
								X		X			X	X	ATSEP.QLF.SUR.SSR_3.2.1	Explain the MLAT system architecture	2	Standards, transmitters and receivers, data processing/fusion, redundancy, performance, costs, timing solutions, etc.
								X		X			X	X	ATSEP.QLF.SUR.SSR_3.2.2	Appreciate the principles of MLAT system	3	Triangulation, coverage, position calculation e.g. SCAS
								X		X			X	X	ATSEP.QLF.SUR.SSR_3.2.3	Describe how to operate the system	2	Tracking, map creation and blanking
								X		X			X	X	ATSEP.QLF.SUR.SSR_3.2.4	Describe testing possibilities for MLAT	2	e.g. SASS-C
								X							**ATSEP.QLF.SUR.SSR_4**	**SSR ENVIRONMENT**		
								X							**ATSEP.QLF.SUR.SSR_4.1**	**SSR Environment**		
								X							ATSEP.QLF.SUR.SSR_4.1.1	Explain the operational use of ACAS and implications for pilots and controllers	2	Traffic Advisories, Resolution Advisories, pilot responses and controller information
								X							ATSEP.QLF.SUR.SSR_4.1.2	Describe the users of the 1 030 MHz 1 090 MHz channels	2	Modes 1, 3, A, C and S, military, Mode S uplink and downlink capability, ACAS (TCAS), acquisition and extended squitter, PRF-FRUIT ratios, DME and other interferences

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
									X						**ATSEP.QLF.SUR.ADS**	**AUTOMATIC DEPENDENT SURVEILLANCE (ADS)**		
									X						**ATSEP.QLF.SUR.ADS_1**	**GENERAL VIEW ON ADS**		
									X						**ATSEP.QLF.SUR.ADS_1.1**	**Definition of ADS**		
									X						ATSEP.QLF.SUR.ADS_1.1.1	Describe the basic characteristics of a ADS	2	Performance, integrity, latency, QoS, implementation options (e.g. ATN/FANS)
									X						ATSEP.QLF.SUR.ADS_1.1.2	List the types of navigation sensors	1	GNSS, INS, radio NAVAIDs, navigation solutions from FMS, FoM
									X						ATSEP.QLF.SUR.ADS_1.1.3	State the latest developments, implementation plans and projects	1	e.g. current and recent test and trials, ICAO status, EUROCONTROL, FAA and other authorities positions, airline and equipment manufacturer positions, ATC procedures, time scales
									X						**ATSEP.QLF.SUR.ADS_2**	**ADS-B**		
									X						**ATSEP.QLF.SUR.ADS_2.1**	**Introduction to ADS-B**		
									X						ATSEP.QLF.SUR.ADS_2.1.1	Explain the basic principles of ADS-B	2	Autonomous operation, navigation solutions, link options, aircraft situation awareness
									X						ATSEP.QLF.SUR.ADS_2.1.2	Identify the major elements of ADS-B	3	e.g. ADS-B global chain (from the aircraft to the controller HMI), GNSS, FMS, encoding, scheduling, link
									X						**ATSEP.QLF.SUR.ADS_2.2**	**Techniques of ADS-B**		
									X						ATSEP.QLF.SUR.ADS_2.2.1	Explain the characteristics of the data links used in ADS B	2	VDL Mode 4, 1090 MHz extended squitter (1090 ES), UAT
									X						ATSEP.QLF.SUR.ADS_2.2.2	Describe the major ADS-B applications	2	e.g. ADS-B-NRA, ADS-B-RAD, ASAS
									X						**ATSEP.QLF.SUR.ADS_2.3**	**VDL Mode 4**		
									X						ATSEP.QLF.SUR.ADS_2.3.1	Describe the use of VDL Mode 4	2	High-level description

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
									X						**ATSEP.QLF.SUR.ADS_2.4**	**1090 MHz Extended Squitter (1090 ES)**		
									X						ATSEP.QLF.SUR.ADS_2.4.1	Describe the use of the 1090 MHz extended squitter (1090 ES)	2	High-level description
									X						ATSEP.QLF.SUR.ADS_2.4.2	Explain the principles related to signals in space	2	Modulation scheme, signal structure, key data and frequency
									X						ATSEP.QLF.SUR.ADS_2.4.3	Explain the principles related to random access technology	2	Consequences on the RF environment (1 090 MHz)
									X						ATSEP.QLF.SUR.ADS_2.4.4	Explain the relevant messages	2	Information in each field, information encoding and decoding
									X						ATSEP.QLF.SUR.ADS_2.4.5	Recognise the structure of a Mode S extended squitter signal	1	Signal timing and sequencing, data encoding
									X						ATSEP.QLF.SUR.ADS_2.4.6	Explain the interface between the BDS and the extended squitter message	2	-
									X						**ATSEP.QLF.SUR.ADS_2.5**	**Universal Access Transceiver (UAT)**		
									X						ATSEP.QLF.SUR.ADS_2.5.1	State the use of the UAT	1	
									X						**ATSEP.QLF.SUR.ADS_2.6**	**ASTERIX**		
									X						ATSEP.QLF.SUR.ADS_2.6.1	Identify the data format according to the ASTERIX category 21 standard	3	Reference to ASTERIX standard Decode position, call sign, Mode S address, etc.
									X						**ATSEP.QLF.SUR.ADS_3**	**ADS-C**		
									X						**ATSEP.QLF.SUR.ADS_3.1**	**Introduction to ADS-C**		
									X						ATSEP.QLF.SUR.ADS_3.1.1	Explain the basic principles of ADS-C	2	Contract, multi-contract, time, event triggering
									X						ATSEP.QLF.SUR.ADS_3.1.2	Identify the major elements of the ADS-C system	3	ADS-C global chain (from the aircraft to the controller HMI), GNSS, processor, link, ground station
									X						**ATSEP.QLF.SUR.ADS_3.2**	**Techniques in ADS-C**		
									X						ATSEP.QLF.SUR.ADS_3.2.1	Explain the characteristics of the data links used in ADS-C	2	e.g. subnetworks (VDLs, AMSS, HFDL)

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
							X	**X**	**X**	**X**			**X**	**X**	**ATSEP.QLF.SUR.HMI**	**HUMAN MACHINE INTERFACE (HMI)**		
							X	**X**	**X**	**X**			**X**	**X**	**ATSEP.QLF.SUR.HMI_1**	**HMI**		
							X	**X**	**X**	**X**			**X**	**X**	**ATSEP.QLF.SUR.HMI_1.1**	**ATCO HMI**		
							X	X	X	X			X	X	ATSEP.QLF.SUR.HMI_1.1.1	Describe the display types available	2	Video, synthetic, mixed
							X	X	X	X			X	X	ATSEP.QLF.SUR.HMI_1.1.2	State the type of selections available	1	Source, range, maps, filters
							X	X	X	X			X	X	ATSEP.QLF.SUR.HMI_1.1.3	Describe the advantages of different display types	2	Clarity, configurability, fallback, data integration
							X	**X**	**X**						**ATSEP.QLF.SUR.HMI_1.2**	**ATSEP HMI**		
							X	X	X						ATSEP.QLF.SUR.HMI_1.2.1	Describe the user interface scope and ergonomics as seen by different users and at different locations	2	System management displays characteristics both control and monitoring
							X	X	X						ATSEP.QLF.SUR.HMI_1.2.2	Describe the analytical and status data available to the users	2	Radar video, front panel and CMS data, HMI on each subsystem
							X	**X**	**X**						**ATSEP.QLF.SUR.HMI_1.3**	**Pilot HMI**		
							X	X	X						ATSEP.QLF.SUR.HMI_1.3.1	Describe the transponder interface	2	Mode A, change procedure, SPI, Mode C, deselection, hijack
							X	X	X						ATSEP.QLF.SUR.HMI_1.3.2	Recognise the ACAS/TCAS display and future potential developments	1	Characteristics, accuracy, alerts, ADS B, CDTI
							X	X	X						ATSEP.QLF.SUR.HMI_1.3.3	Recognise the EGPWS display and of future potential developments	1	-
							X	**X**	**X**						**ATSEP.QLF.SUR.HMI_1.4**	**Displays**		
							X	X	X						ATSEP.QLF.SUR.HMI_1.4.1	Describe the display types available and their advantages and disadvantages	2	Raster/rotating, raw/synthetic, monochrome/colour, CRT/LCD, performances (cost, availability, maintainability, ergonomics)

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
							X	**X**	**X**	**X**			**X**	**X**	**ATSEP.QLF.SUR.SDT**	**SURVEILLANCE DATA TRANSMISSION**		
							X	**X**	**X**	**X**			**X**	**X**	**ATSEP.QLF.SUR.SDT_1**	**SURVEILLANCE DATA TRANSMISSION**		
							X	**X**	**X**	**X**			**X**	**X**	**ATSEP.QLF.SUR.SDT_1.1**	**Technology and Protocols**		
							X	X	X	X			X	X	ATSEP.QLF.SUR.SDT_1.1.1	Describe the implementation of formats and protocols	2	Network protocols, Surveillance Data Networks (e.g. RADNET), messages CAT 1+
							X	X	X	X			X	X	ATSEP.QLF.SUR.SDT_1.1.2	Decode ASTERIX messages	3	e.g. categories 1, 2, 20, 21, 34, 48, 62
							X	X	X	X			X	X	ATSEP.QLF.SUR.SDT_1.1.3	Identify the data transmission architecture in a multisensor environment	3	Fault tolerance, redundancy of line equipment e.g. software fallback capability, contingency of service, RADNET
							X	X	X	X			X	X	ATSEP.QLF.SUR.SDT_1.1.4	Characterise the degradations of the surveillance transmission network	2	e.g. saturation, excess latency
							X	**X**	**X**						**ATSEP.QLF.SUR.SDT_1.2**	**Verification Methods**		
							X	X	X						ATSEP.QLF.SUR.SDT_1.2.1	Identify the causes of a fault, based on test tool measurements	3	e.g. data analyser, line analyser

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
										X				X	**ATSEP.QLF.DPR**	**ATSEP QUALIFICATION DOMAIN - DATA PROCESSING**		
										X					**ATSEP.QLF.DPR.FST**	**FUNCTIONAL SAFETY**		
										X					**ATSEP.QLF.DPR.FST_1**	**FUNCTIONAL SAFETY**		
										X					**ATSEP.QLF.DPR.FST_1.1**	**Software Integrity and Security**		
										X					ATSEP.QLF.DPR.FST_1.1.1	Appreciate how a system can be defended against potential hostile intent via the data processing systems/internet	3	Input verification, secure sources e.g. leased lines, private networks, eligibility, firewall protection, user/password management, VPN connection
										X					ATSEP.QLF.DPR.FST_1.1.2	Explain how the normal input of a system could be used by non-authorised persons with hostile intent	2	e.g. obstruction of radar/sensor communication and location (Mode S, ADS-B, etc.)
										X					ATSEP.QLF.DPR.FST_1.1.3	Estimate the impact of security and integrity failure to the operational service	3	e.g. system crashes due to incorrect input data, main and standby and fallback systems all have same input, possible loss in total of system, results in capacity reductions and safety consequences
										X					ATSEP.QLF.DPR.FST_1.1.4	Appreciate error detection and handling in data, hardware and process	3	Identification, consequence, scope, reporting, fault tolerance, soft fail, failsafe, monitoring, fallback
										X				X	**ATSEP.QLF.DPR.DPS**	**DATA PROCESSING SYSTEMS**		
										X				X	**ATSEP.QLF.DPR.DPS_1**	**USER REQUIREMENTS**		
										X				X	**ATSEP.QLF.DPR.DPS_1.1**	**Controller Requirements**		
										X				X	ATSEP.QLF.DPR.DPS_1.1.1	Explain ATCO missions and services needed in an area control centre	2	Operational requirements e.g. separation, flight progress monitoring and coordination, trajectory prediction, coordination with adjacent centres
										X				X	ATSEP.QLF.DPR.DPS_1.1.2	Explain ATCO missions and services needed in an approach control unit	2	Operational requirements e.g. vectoring, sequencing, AMAN, CDM

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
										X				X	ATSEP.QLF.DPR.DPS_1.1.3	Explain ATCO missions and services needed in an aerodrome control tower	2	Operational requirements e.g. runway management, DMAN
										X				**X**	**ATSEP.QLF.DPR.DPS_1.2**	**Trajectories, Prediction and Calculation**		
										X				X	ATSEP.QLF.DPR.DPS_1.2.1	State different types of trajectories	1	e.g. FPL-based, surveillance data-based, FMS-based
										X				X	ATSEP.QLF.DPR.DPS_1.2.2	Explain the main processes for trajectory prediction	2	SDP trajectory, FPL trajectory, merged trajectory, predicted trajectory
										X				**X**	**ATSEP.QLF.DPR.DPS_1.3**	**Ground Safety Nets**		
										X				X	ATSEP.QLF.DPR.DPS_1.3.1	Describe the function of safety nets and their legal status	2	STCA, APW, MSAW, ASMGCS-based safety nets
										X				**X**	**ATSEP.QLF.DPR.DPS_1.4**	**Decision Support**		
										X				X	ATSEP.QLF.DPR.DPS_1.4.1	Explain the major steps in the air traffic planning process	2	ATFCM with strategic, pre-tactical and tactical, ATC sector planning, tactical control
										X				X	ATSEP.QLF.DPR.DPS_1.4.2	Explain the principles of trajectory prediction, conformance monitoring and medium term conflict detection processes	2	Route adherence monitoring e.g. CORA, MTCD, CLAM, Level adherence monitoring
										X				X	ATSEP.QLF.DPR.DPS_1.4.3	Explain the benefit of these tools for safety and efficiency	2	-
										X					**ATSEP.QLF.DPR.DPS_2**	**SYSTEM COMPONENTS**		
										X					**ATSEP.QLF.DPR.DPS_2.1**	**Processing Systems**		
										X					ATSEP.QLF.DPR.DPS_2.1.1	Describe all major components of a data processing system	2	Functional architecture, technical architecture, supervision

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ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
										X					**ATSEP.QLF.DPR.DPS_2.2**	**Flight Data Processing Systems**		
										X					ATSEP.QLF.DPR.DPS_2.2.1	Identify all functions of an FDP system	3	FDPS reference model, message handling, initial flight data handling, relationship with other functions, air-ground data link processing, trajectory prediction, flight data management and distribution, SSR Mode A code assignment and management, correlation, coordination and transfer, Mode S
										X					ATSEP.QLF.DPR.DPS_2.2.2	Describe all major components of an FDP	2	Functional architecture, technical architecture e.g. HMI, ATC tools, support tools (technical supervision, QoS monitors and logging)
										X					ATSEP.QLF.DPR.DPS_2.2.3	Differentiate FDP features in the ATS units	2	Area control centres Approach control units Aerodrome control towers
										X					ATSEP.QLF.DPR.DPS_2.2.4	Explain how to operate the system	2	e.g. configuration, adjust parameters, start up and shut down, monitoring
										X					ATSEP.QLF.DPR.DPS_2.2.5	Explain the principles of emergency switching	2	System degradation e.g. automatic versus manual cluster takover, need to notify ATCO's supervisor, operational consequences
							X	**X**	**X**	**X**					**ATSEP.QLF.DPR.DPS_2.3**	**Surveillance Data Processing Systems**		
							X	X	X	X					ATSEP.QLF.DPR.DPS_2.3.1	Identify all functions of an SDP system	3	Plot processing, tracking, single sensor and multisensor tracker (e.g. radar, ADS, MLAT), estimating limits and accuracy of multisensor tracker, recording e.g. ARTAS tracker
							X	X	X	X					ATSEP.QLF.DPR.DPS_2.3.2	Describe all major components of an SDP	2	Functional architecture, technical architecture

Appendix 4a – ATSEP Qualification training - Streams

ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
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							X	X	X	X					ATSEP.QLF.DPR.DPS_2.3.3	Differentiate SDP features in the ATS units	2	Area control centres Approach control units Aerodrome control towers
							X	X	X	X					ATSEP.QLF.DPR.DPS_2.3.4	Appreciate how to operate the system	3	e.g. configuration, adjust parameters, start up and shut down, monitoring
							X	X	X	X					ATSEP.QLF.DPR.DPS_2.3.5	Explain the principles of emergency switching	2	-
	X									**X**	**X**			**X**	**ATSEP.QLF.DPR.PRC**	**DATA PROCESS**		
	X									**X**	**X**			**X**	**ATSEP.QLF.DPR.PRC_1**	**SOFTWARE PROCESS**		
										X					**ATSEP.QLF.DPR.PRC_1.1**	**Middleware**		
										X					ATSEP.QLF.DPR.PRC_1.1.1	Characterise middleware	2	Additional specialised functional built on the OS
										X					ATSEP.QLF.DPR.PRC_1.1.2	List the middleware used on the national major systems	1	e.g. CORBA, UBSS, OTM, EJB
										X					ATSEP.QLF.DPR.PRC_1.1.3	Describe the use of a middleware in an ATM environment	2	Dual processing system
	X									**X**	**X**			**X**	**ATSEP.QLF.DPR.PRC_1.2**	**Operating Systems**		
										X					ATSEP.QLF.DPR.PRC_1.2.1	Describe the major aspects of a relevant operating system	2	e.g. design, start-up, configuration, back-up and restore
	X									X	X			X	ATSEP.QLF.DPR.PRC_1.2.2	Identify relevant operating system commands	3	e.g. LINUX systems
										X					ATSEP.QLF.DPR.PRC_1.2.3	Characterise typical consequences of an OS upgrade	2	Some possible implications on HW (performance, memory), middleware (compatibility) and SW components
										X					ATSEP.QLF.DPR.PRC_1.2.4	Explain downward compatibility	2	Checks on embedded SW modules ability to run under new OS version
										X					ATSEP.QLF.DPR.PRC_1.2.5	Take account of hardware/software compatibility	2	Examples of HW requirements of specific SW implementations
										X					ATSEP.QLF.DPR.PRC_1.2.6	Describe interactions between application and OS	2	Examples of OS calls by the application software if no middleware is in use

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ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
										X					ATSEP.QLF.DPR.PRC_1.2.7	Describe the life cycle management of an operating system	2	e.g. versions, releases, patches, migration
										X					ATSEP.QLF.DPR.PRC_1.2.8	Appreciate different installation methods	3	e.g. RIS server, install server, PXE boot - services, configuration
										X					ATSEP.QLF.DPR.PRC_1.2.9	Differentiate operating systems and their potential application areas	2	Standard (COTS) edition vs. customised edition OS, consideration of security, upgradeability and compatibility
										X					**ATSEP.QLF.DPR.PRC_1.3**	**Configuration Control**		
										X					ATSEP.QLF.DPR.PRC_1.3.1	Describe the principles of configuration control	2	Clear identification of all versions, proof of testing and 'build state', tool and mechanisms to aid control, authorisation, audit trail, appropriate quality standard requirements of the administration
										X					**ATSEP.QLF.DPR.PRC_1.4**	**Software Development Process**		
										X					ATSEP.QLF.DPR.PRC_1.4.1	State the main software development processes	1	SWALs e.g. life cycle, waterfall model, RUP
										X					ATSEP.QLF.DPR.PRC_1.4.2	List the main steps of two of the main software development processes	1	-
										X					ATSEP.QLF.DPR.PRC_1.4.3	Explain the main differences between two software development processes	2	e.g. advantages/disadvantages

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ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
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										X				**X**	**ATSEP.QLF.DPR.PRC_2**	**HARDWARE PLATFORM**		
										X				**X**	**ATSEP.QLF.DPR.PRC_2.1**	**Equipment Upgrade**		
										X				X	ATSEP.QLF.DPR.PRC_2.1.1	Explain the key factors that have to be considered when data processing equipment is upgraded or changed	2	Specification, compatibility, 'proven' or 'state-of-the-art' technology, maintenance and operating consequence (e.g. personnel, training, spares, procedures), environmental requirements (e.g. size, power requirements, temperature, interfaces), testing
										X				**X**	**ATSEP.QLF.DPR.PRC_2.2**	**Commercial Off-The-Shelf (COTS)**		
										X				X	ATSEP.QLF.DPR.PRC_2.2.1	Explain the advantages and disadvantages of commercial off-the-shelf equipment	2	Cost, multiplicity of suppliers, quality, maintainability, life cycle, liability
										X				**X**	**ATSEP.QLF.DPR.PRC_2.3**	**Interdependence**		
										X				X	ATSEP.QLF.DPR.PRC_2.3.1	Describe the technical issues regarding the interdependence of various equipment and systems	2	Interface requirements, common point of failure, data conditioning, response time
										X					ATSEP.QLF.DPR.PRC_2.3.2	Describe techniques for virtualisation	2	Hypervisor e.g. Hypervisor Type-1, Hypervisor Type-2, container technology (LXC, Docker)
										X					**ATSEP.QLF.DPR.PRC_2.4**	**Maintainability**		
										X					ATSEP.QLF.DPR.PRC_2.4.1	Identify the issues that will affect the maintainability of hardware for the planned life of a system	3	Commercial product life, commercial support commitments, company volatility, spares provision, shelf life and logistics

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ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
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										X					**ATSEP.QLF.DPR.PRC_3**	**TESTING**		
										X					**ATSEP.QLF.DPR.PRC_3.1**	**Testing**		
										X					ATSEP.QLF.DPR.PRC_3.1.1	Appreciate the techniques available for system and performance requirements testing	3	e.g. code walkthrough, modelling, simulation real time and fast time, black box testing, formal methods, use of independent test personnel, data corruption simulation, hardware failure simulation
										X					ATSEP.QLF.DPR.PRC_3.1.2	Appreciate the techniques available for system testing and integration	3	e.g. system integration testing, load testing, regression testing
										X					**ATSEP.QLF.DPR.PRC_4**	**VIRTUALISATION**		
										X					**ATSEP.QLF.DPR.PRC_4.1**	**Introduction to Virtualisation**		
										X					ATSEP.QLF.DPR.PRC_4.1.1	Explain the concept of virtualisation	2	the working principles, advantages and disadvantages
										X					ATSEP.QLF.DPR.PRC_4.1.2	Describe the virtualisation technologies and tools in use	2	e.g. VMWare, Hypervisor
										X					ATSEP.QLF.DPR.PRC_4.1.3	Consider how virtualisation can be used in ATM environment	2	
										X				**X**	**ATSEP.QLF.DPR.DTA**	**DATA**		
										X				**X**	**ATSEP.QLF.DPR.DTA_1**	**DATA ESSENTIALS FEATURES**		
										X				**X**	**ATSEP.QLF.DPR.DTA_1.1**	**Data Significance**		
										X				X	ATSEP.QLF.DPR.DTA_1.1.1	Explain the significance of data	2	Criticality (critical/non critical), legality (ICAO, CAA, organisation), use (advisory, control)
										X				**X**	**ATSEP.QLF.DPR.DTA_1.2**	**Data Configuration Control**		
										X				X	ATSEP.QLF.DPR.DTA_1.2.1	Explain the control procedures for changes to operational data	2	Designated roles/persons for authorising changes and verifying/checking changes
										X				**X**	**ATSEP.QLF.DPR.DTA_1.3**	**Data Standards**		
										X				X	ATSEP.QLF.DPR.DTA_1.3.1	Name the authority responsible for standards	1	e.g. EUROCONTROL, ICAO, ISO

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										X				X	ATSEP.QLF.DPR.DTA_1.3.2	State the standards related to ATM data, their sources and their status	1	e.g. ASTERIX, WGS84, OLDI, FMTP, AMHS, ADEX-P, FPL
										X				X	ATSEP.QLF.DPR.DTA_1.3.3	Decode a typical OLDI message	3	e.g. ACT, PAC
										X				X	ATSEP.QLF.DPR.DTA_1.3.4	State the nature of ATM processing requirements	1	Data volatility (e.g. radar), system integrity, consequence of failure
										X					**ATSEP.QLF.DPR.DTA_2**	**ATM DATA DETAILED STRUCTURE**		
										X					**ATSEP.QLF.DPR.DTA_2.1**	**System Area**		
										X					ATSEP.QLF.DPR.DTA_2.1.1	Describe how a system area is defined	2	e.g. size, system centre (reference point)
										X					ATSEP.QLF.DPR.DTA_2.1.2	Describe the data related to the system area	2	e.g. radar data, flight plan data, maps, coordinates
										X					**ATSEP.QLF.DPR.DTA_2.2**	**Characteristic Points**		
										X					ATSEP.QLF.DPR.DTA_2.2.1	State types of characteristic points used in an ATM system and their structure	1	Geographic, routing, sector e.g. Geographic: airports and runways, ILS, radar, limit points Routing and sectors: coded routes, SID allocation parameters, area navigation waypoints, adjacent FIRs, holding, sectors
										X					ATSEP.QLF.DPR.DTA_2.2.2	Explain the importance of characteristic points in the correct presentation of data	2	-
										X					ATSEP.QLF.DPR.DTA_2.2.3	Describe the process by which amended adaptation files are introduced	2	-
										X					**ATSEP.QLF.DPR.DTA_2.3**	**Aircraft Performance**		
										X					ATSEP.QLF.DPR.DTA_2.3.1	List the performance data used in FDPS	1	Example of data from in-house system
										X					ATSEP.QLF.DPR.DTA_2.3.2	Describe the structure of aircraft performance data	2	-
										X					ATSEP.QLF.DPR.DTA_2.3.3	Define speeds, rates and levels	1	-

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										X					ATSEP.QLF.DPR.DTA_2.3.4	Explain the consequences of the use of the wrong type of aircraft	2	-
										X					**ATSEP.QLF.DPR.DTA_2.4**	**Screen Manager**		
										X					ATSEP.QLF.DPR.DTA_2.4.1	Describe how the screen manager is used to set up the ATC HMI	2	-
										X					**ATSEP.QLF.DPR.DTA_2.5**	**Auto-coordination Messages**		
										X					ATSEP.QLF.DPR.DTA_2.5.1	Describe the meaning of coordination messages in the control process	2	Coordination parameters, conditions groups, OLDI conditions groups, characteristics of remote centres
										X					ATSEP.QLF.DPR.DTA_2.5.2	Describe the characteristics of the remote centres relevant to OLDI	2	Civil and military
										X					**ATSEP.QLF.DPR.DTA_2.6**	**Configuration Control Data**		
										X					ATSEP.QLF.DPR.DTA_2.6.1	Explain the structure of the configuration data	2	Sector CSU link, sectorisation plan, control parameters
										X					**ATSEP.QLF.DPR.DTA_2.7**	**Physical Configuration Data**		
										X					ATSEP.QLF.DPR.DTA_2.7.1	Explain the structure of the physical configuration data	2	External configuration, device configuration
										X					**ATSEP.QLF.DPR.DTA_2.8**	**Relevant Meteorology Data**		
										X					ATSEP.QLF.DPR.DTA_2.8.1	Explain the organisation of the data related to meteorology	2	Meteorology, QNH TL areas, CB activity
										X					**ATSEP.QLF.DPR.DTA_2.9**	**Alert and Error Messages to ATSEP**		
										X					ATSEP.QLF.DPR.DTA_2.9.1	Explain the importance of alert and error messages	2	-
										X					ATSEP.QLF.DPR.DTA_2.9.2	Describe different categories of alert and error messages	2	-
										X					**ATSEP.QLF.DPR.DTA_2.10**	**Alert and Error Messages to ATCO**		
										X					ATSEP.QLF.DPR.DTA_2.10.1	Describe the structure of the data used in these types of message	2	MSAW, conflict alert parameters
										X					ATSEP.QLF.DPR.DTA_2.10.2	Explain alerts and error messages, and their importance from an ATCO point of view	2	e.g. MSAW, conflict alert, MTCD

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											X	**X**	**X**	**X**	**ATSEP.QLF.SMC**	**ATSEP QUALIFICATION DOMAIN - SYSTEM MONITORING AND CONTROL**		
											X	**X**	**X**	**X**	**ATSEP.QLF.SMC.ANS**	**ANS STRUCTURE**		
											X	**X**	**X**	**X**	**ATSEP.QLF.SMC.ANS_1**	**ANSP ORGANISATION AND OPERATION**		
											X	**X**	**X**	**X**	**ATSEP.QLF.SMC.ANS_1.1**	**ANSP Organisation and Operation**		
											X	X	X	X	ATSEP.QLF.SMC.ANS_1.1.1	Describe the SMC function within the organisation	2	What the SMC does, interfaces with other functions, similarities and major differences between SMC function at different sites
											X	X	X	X	ATSEP.QLF.SMC.ANS_1.1.2	Describe the structure, roles and responsibilities of the SMC team and any direct interfaces	2	-
											X	X	X	X	ATSEP.QLF.SMC.ANS_1.1.3	Explain the duties of the ATC supervisor	2	-
											X	**X**	**X**	**X**	**ATSEP.QLF.SMC.ANS_2**	**ANSP MAINTENANCE PROGRAM**		
											X	**X**	**X**	**X**	**ATSEP.QLF.SMC.ANS_2.1**	**Policy**		
											X	X	X	X	ATSEP.QLF.SMC.ANS_2.1.1	Describe, in general terms, the ANSP maintenance policy	2	-
											X	X	X	X	ATSEP.QLF.SMC.ANS_2.1.2	Describe the aspects of the maintenance policy that apply specifically to SMC	2	-
											X	**X**	**X**	**X**	**ATSEP.QLF.SMC.ANS_3**	**ATM CONTEXT**		
											X	**X**	**X**	**X**	**ATSEP.QLF.SMC.ANS_3.1**	**ATM Context**		
											X	X	X	X	ATSEP.QLF.SMC.ANS_3.1.1	Describe the ATM requirements and the related services provided by the SMC	2	Service level agreements, working arrangements e.g. ASM, ATFCM
											X	**X**	**X**	**X**	**ATSEP.QLF.SMC.ANS_4**	**ANSP ADMINISTRATIVE PRACTICES**		
											X	**X**	**X**	**X**	**ATSEP.QLF.SMC.ANS_4.1**	**Administration**		
											X	X	X	X	ATSEP.QLF.SMC.ANS_4.1.1	Describe any ANSP administrative procedures, specifically applicable to SMC	2	Any non-technical practices e.g. security, access control (building and platform), safety, fire

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ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
											X	**X**	**X**	**X**	**ATSEP.QLF.SMC.ASE**	**ANS SYSTEM/EQUIPMENT**		
											X	**X**	**X**	**X**	**ATSEP.QLF.SMC.ASE_1**	**OPERATIONAL IMPACTS**		
											X	**X**	**X**	**X**	**ATSEP.QLF.SMC.ASE_1.1**	**Degradation or Loss of System/Equipment Services**		
											X	X	X	X	ATSEP.QLF.SMC.ASE_1.1.1	Describe the importance of monitoring system performance	2	-
											X	X	X	X	ATSEP.QLF.SMC.ASE_1.1.2	Describe possible ways in which the SMC may become aware of degradation of services and/or systems	2	e.g. monitoring systems, telephone calls, aural alerts, user complaint
											X	X	X	X	ATSEP.QLF.SMC.ASE_1.1.3	Take account of the end users/customers affected	2	e.g. ATC Units, airports, airlines
											X	X	X	X	ATSEP.QLF.SMC.ASE_1.1.4	Appreciate the implications for end users/customers	3	-
											X	X	X	X	ATSEP.QLF.SMC.ASE_1.1.5	Appreciate the appropriate actions to restore service	3	e.g. switching, replacing, reconfiguration, calling external service provider
											X	X	X	X	ATSEP.QLF.SMC.ASE_1.1.6	Appreciate the need for appropriate communication before and after restoring service	3	e.g. users, customers, external and internal providers
											X	**X**	**X**	**X**	**ATSEP.QLF.SMC.ASE_2**	**USER POSITION FUNCTIONALITY AND OPERATION**		
											X	**X**	**X**	**X**	**ATSEP.QLF.SMC.ASE_2.1**	**User Working Position**		
											X	X	X	X	ATSEP.QLF.SMC.ASE_2.1.1	Appreciate working position performance to agreed parameters	3	e.g. ATCO, MET, ATSEP, airport positions
											X	**X**	**X**	**X**	**ATSEP.QLF.SMC.ASE_2.2**	**SMC Working Position**		
											X	X	X	X	ATSEP.QLF.SMC.ASE_2.2.1	Appreciate SMC working position performance to agreed parameters	3	-
											X	**X**	**X**	**X**	**ATSEP.QLF.SMC.TPP**	**TOOLS, PROCESSES AND PROCEDURES**		
											X	**X**	**X**	**X**	**ATSEP.QLF.SMC.TPP_1**	**REQUIREMENTS**		
											X	**X**	**X**	**X**	**ATSEP.QLF.SMC.TPP_1.1**	**Safety Management System (SMS)**		
											X	X	X	X	ATSEP.QLF.SMC.TPP_1.1.1	Describe the ICAO and European requirements and the national and ATSP SMS	2	ICAO Annex 19, Annex IV to Regulation (EU) 2017/373

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ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
											X	**X**	**X**	**X**	**ATSEP.QLF.SMC.TPP_1.2**	**Quality Management System (QMS)**		
											X	X	X	X	ATSEP.QLF.SMC.TPP_1.2.1	Describe the quality management system requirements	2	e.g. ISO, EFQM
											X	**X**	**X**	**X**	**ATSEP.QLF.SMC.TPP_1.3**	**SMS Application in the Working Environment**		
											X	X	X	X	ATSEP.QLF.SMC.TPP_1.3.1	Describe the relationship between the SMS and the application of SMC	2	Reporting procedures
											X	X	X	X	ATSEP.QLF.SMC.TPP_1.3.2	Explain which occurrences require incident reporting and follow-up action(s)	2	e.g. national categories for reporting, safety event processing
											X	X	X	X	ATSEP.QLF.SMC.TPP_1.3.3	Apply incident reporting procedures to example occurrence(s)	3	e.g. safety event procedure
											X	**X**	**X**	**X**	**ATSEP.QLF.SMC.TPP_2**	**MAINTENANCE AGREEMENTS WITH OUTSIDE AGENCIES REQUIREMENTS**		
											X	**X**	**X**	**X**	**ATSEP.QLF.SMC.TPP_2.1**	**Principles of Agreements**		
											X	X	X	X	ATSEP.QLF.SMC.TPP_2.1.1	Describe the principles and need for maintenance agreements	2	e.g. types of service level provided
											X	X	X	X	ATSEP.QLF.SMC.TPP_2.1.2	Describe within which functional areas maintenance agreements will occur	2	e.g. network providers, facilities management, communications
											X	X	X	X	ATSEP.QLF.SMC.TPP_2.1.3	Describe where in the SMS manual these agreements are included or referenced	2	-
											X	**X**	**X**	**X**	**ATSEP.QLF.SMC.TPP_3**	**SMC GENERAL PROCESSES**		
											X	**X**	**X**	**X**	**ATSEP.QLF.SMC.TPP_3.1**	**Roles and Responsibilities**		
											X	X	X	X	ATSEP.QLF.SMC.TPP_3.1.1	Describe the role and general method of operations of the SMC	2	-
											X	X	X	X	ATSEP.QLF.SMC.TPP_3.1.2	Describe the need to monitor service conditions and the way to take appropriate action to ensure service performance	2	e.g. process to interrupt services for planned maintenance purposes, management of service provision during corrective maintenance, continuity of service, availability

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ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
											X	X	X	X	ATSEP.QLF.SMC.TPP_3.1.3	Describe the coordination role of the SMC	2	e.g. ATSEPs, ATCOs, external service providers, ATM stakeholders
											X	X	X	X	ATSEP.QLF.SMC.TPP_3.1.4	Describe how risk analysis can contribute towards decision-making	2	e.g. assessing risk, handling of service interventions
											X	**X**	**X**	**X**	**ATSEP.QLF.SMC.TPP_4**	**MAINTENANCE MANAGEMENT SYSTEMS**		
											X	**X**	**X**	**X**	**ATSEP.QLF.SMC.TPP_4.1**	**Reporting**		
											X	X	X	X	ATSEP.QLF.SMC.TPP_4.1.1	Describe how maintenance activities and SMC events/actions are recorded	2	e.g. procedures to follow, terminology to use, record keeping for traceability
											X	X	X	X	ATSEP.QLF.SMC.TPP_4.1.2	Explain the importance of accurate record keeping and dissemination for handover and quality management purposes	2	e.g. information is logged in database or report is generated and distributed according to defined procedures
											X	**X**	**X**	**X**	**ATSEP.QLF.SMC.TEC**	**TECHNOLOGY**		
											X	**X**	**X**	**X**	**ATSEP.QLF.SMC.TEC_1**	**TECHNOLOGIES AND PRINCIPLES**		
											X	**X**	**X**	**X**	**ATSEP.QLF.SMC.TEC_1.1**	**General**		
											X	X	X	X	ATSEP.QLF.SMC.TEC_1.1.1	Describe the principles of control and monitoring systems used	2	e.g. national basis, colour codes, ergonomics
											X				**ATSEP.QLF.SMC.TEC_1.2**	**Communication**		
											X				ATSEP.QLF.SMC.TEC_1.2.1	Describe the key aspects of control and monitoring system capability	2	e.g. parameters presented to the SMC and types of actions that can be taken
											X				ATSEP.QLF.SMC.TEC_1.2.2	Appreciate the impact of the replacement of components in a communication chain	3	Continuity of service, communication chain integrity
												X			**ATSEP.QLF.SMC.TEC_1.3**	**Navigation**		
												X			ATSEP.QLF.SMC.TEC_1.3.1	Describe the key aspects of control and monitoring system capability	2	e.g. parameters presented to the SMC and types of actions that can be taken
												X			ATSEP.QLF.SMC.TEC_1.3.2	Appreciate the impact of the replacement of components in navigation equipment	3	Continuity of service, navigation aid integrity

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ATSEP QUALIFICATION - Streams															ATSEP UOID *(Unique Objective IDentifier)*	CORPUS	Tax	CONTENT
COM-Voice	COM-Data	NAV-NDB	NAV-DF	NAV-VOR	NAV-DME	NAV-ILS	SUR-PSR	SUR-SSR	SUR-ADS	DPR-DP	SMC-COM	SMC-NAV	SMC-SUR	SMC-DP				
													X		**ATSEP.QLF.SMC.TEC_1.4**	**Surveillance**		
													X		ATSEP.QLF.SMC.TEC_1.4.1	Describe the key aspects of control and monitoring system capability	2	e.g. parameters presented to the SMC and types of actions that can be taken
													X		ATSEP.QLF.SMC.TEC_1.4.2	Appreciate the impact of the replacement of components in a surveillance chain	3	Continuity of service, surveillance chain integrity
														X	**ATSEP.QLF.SMC.TEC_1.5**	**Data Processing**		
														X	ATSEP.QLF.SMC.TEC_1.5.1	Describe the key aspects of control and monitoring system capability	2	e.g. parameters presented to the SMC and types of actions that can be taken
														X	ATSEP.QLF.SMC.TEC_1.5.2	Appreciate the impact of the replacement of components in data processing chain	3	Continuity of service, data processing, chain integrity
											X	**X**	**X**	**X**	**ATSEP.QLF.SMC.TEC_1.6**	**Facilities**		
											X	X	X	X	ATSEP.QLF.SMC.TEC_1.6.1	Describe the key aspects of system management capability	2	e.g. parameters presented to the SMC and types of actions that can be taken
											X	X	X	X	ATSEP.QLF.SMC.TEC_1.6.2	Appreciate the impact of the loss of supply and/or replacement of components in facility equipment	3	Continuity of service, integrity