Technical Competency Model

**GENERAL**
- General Administration
- Stakeholder Management
- Human Resources
- Translation and Interpretation
- Business Management
- Building and Facilities
- Finance
- Regulation and Legal

**OPERATIONAL**
- Air Traffic Management
- Airport Operations
- Aeronautical Information Services
- Airspace Management
- Airspace Design
- Air Traffic Flow and Capacity Management
- Air Traffic Services
- Flight Operations

**TECHNICAL**
- Information Management and Technology
  - ATM systems
  - Communication systems ATM
  - Navigation systems ATM
  - Surveillance systems ATM

**SCIENCES**
- Human Performance, Operational and Social sciences
  - Environment
  - Safety
  - Security
  - Training
- Economics, Mathematics, Statistics, Forecasts
- Geography and Meteorology

**2018**
FREQUENTLY ASKED QUESTIONS

- **What is a Domain of Knowledge (DOK)?**
  It is a grouping of technical competencies for the main domains of expertise within the Agency. 28 DOKs have been defined in the brochure - General Administration, Environment, Safety, etc.

- **Why does a given competency feature in one DOK and not in another?**
  A choice was made as to the most appropriate DOK for each competency. We wanted to avoid repetition of the same competencies in different DOKs.

- **Why can I not find all competencies related to my area in one DOK?**
  Any competency from the lists can be selected. The idea is to pick and choose the most appropriate competencies from the different areas.

- **How can I define the levels associated with the competencies?**
  Three levels are defined globally for all topics and can be associated transversally with each technical competency – please consult the brochure for details on the levels and examples of possible combinations between levels and technical competencies from the lists.

- **Why are there different levels of granularity in different DOKs?**
  Certain areas require more detail in the description of competencies. The choice was made to keep the different levels of granularity and adapt this later if necessary.

- **How can I add a competency which is missing?**
  Please contact the Team at email address: organisational.development@eurocontrol.int
## Technical Competency Model Structure

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The technical competency model is part of the Agency Competency Model introduced into various HR processes. The model is based on technical competencies grouped according to the main domains of expertise within the Agency - also called domains of knowledge (DOK) – and associated with certain levels. The different levels apply transversally to any technical competencies from the lists. The following table explains the levels and gives examples of how the different levels can be combined with the different competencies.

<table>
<thead>
<tr>
<th>Levels</th>
<th>Requirements</th>
<th>Definition</th>
<th>Examples of text to appear in the job description/vacancy notice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>Knowledge</td>
<td>Person has acquired knowledge through education, training, seminars, books, etc. Knowledge is usually theoretical. Person can recall learned material (What)</td>
<td>Knowledge of aviation law. Knowledge of web publishing tools.</td>
</tr>
<tr>
<td>Level 1</td>
<td>Understanding/Comprehension</td>
<td>Person has acquired an understanding or comprehension through education, training, seminars, books, etc. Understanding is usually theoretical. Person can explain the meaning but may have never applied it. (What)</td>
<td>Understanding of project management methodologies. Understanding of performance concepts.</td>
</tr>
<tr>
<td>Level 2</td>
<td>Skill</td>
<td>Person possesses a skill resulting from knowledge and understanding. Person demonstrates a learned or developed capability, either through training (e.g. in simulator or via case study) and/or experience (see hereunder). (What and/or How, if experienced Why)</td>
<td>Project management skills Skilful in drafting technical documentation</td>
</tr>
<tr>
<td>Level 2</td>
<td>Experience</td>
<td>Person has acquired a knowledge, understanding, comprehension and/or skill through experience. The person has put into practice knowledge and understanding. Person is able to explain theory and how it is put into practice. The term experience may include a notion of time. (What &amp; Why &amp; How &amp; How long or how often)</td>
<td>Experience in project management. Experience in drafting technical documents.</td>
</tr>
<tr>
<td>Level 3</td>
<td>Master/Proficiency/Specialisation</td>
<td>Person has the capability to apply knowledge, understanding, skills and experience (level 1 and level 2) and to question techniques, analyse, promote concepts and/or ideas. (What &amp; How &amp; What &amp; How long or how often)</td>
<td>Proficiency in conducting difficult negotiations. Master in using Excel for large ATM Performance data. Specialisation in programming skills.</td>
</tr>
<tr>
<td>Applicable to all levels</td>
<td>Ability</td>
<td>The person demonstrates an aptitude, capability, talent and/ or potential. The ability is something that will facilitate all the levels. It is not linked to experience but can be proven by experience. (What and/or How)</td>
<td>Ability to interpret complex data. Ability to interpret legal texts.</td>
</tr>
</tbody>
</table>
GENERAL
GENERAL ADMINISTRATION

- Administration process management (meeting requests, e-mails, phone calls, routeing sheets, signing)
- Agenda management
- Document management
- Editing/Publishing
- English drafting (e.g. complex reports, WPs, legal documents, project documentation)
- English writing (e.g. different texts, expression of oneself in a foreign language)
- Event management (visits, conferences)
- Facilitation techniques
- French drafting (e.g. complex reports, WPs, legal documents, project documentation)
- French writing (e.g. different texts, expression of oneself in a foreign language)
- Legal drafting
- Library and archive management
- Meeting support (e.g. room booking, catering, printing, scanning, setting up presentations, filing, typing, copying)
- Mission preparation (e.g. flights, hotel bookings)
- Presentation skills (preparation, delivery)
- Priority management
- Reporting
- Speech writing
- Technical writing/drafting
- Time management
- Tracking system/ticketing tools
- Travel agent expertise (e.g. tools, codes)
STAKEHOLDER MANAGEMENT

- Claims management
- Complaints management
- Crisis communication
- Employer branding
- External communication
- Internal communication
- Lobbying
- Marketing
- Negotiation skills
- Political awareness
- Press management
- Relationship management
- Survey techniques (design, set-up, analysis)
- Social media
HUMAN RESOURCES

- Air Traffic Controller (ATCO) selection
- Coaching
- Learning and development
- Mediation
- Mentoring
- Organisational development
- Recruitment process (e.g. job application screening, interviewing techniques, assessment centers, evaluation, qualification, deliberation)
- Remuneration
- Selection tests (administration, interpretation: psychological/personality, cognitive, job-related)
- Social dialogue
- Social security benefits (e.g. allowance, sickness and accident insurance, unemployment, pensions)
- Staff performance management (e.g. e-PAs, incentives, rewards, bonuses)
- Welfare policies
- Workforce planning (e.g. career management, talent management, succession planning, HR forecasting, downsizing, outplacement)
TRANSLATION AND INTERPRETATION

- Answering linguistic queries
- Designing language tests
- Interpretation
- Proofreading
- Revision
- Terminology work (acronym list, ATM Lexicon)
- Translation
- Use of optical character recognition software
Audit techniques

Business analysis, planning, development

Change Management (e.g. reorganisation, transformation/transition of activities, processes, resources)

Compliance management

Configuration management

Contract management (partnership agreement, specification writing, contract negotiation, follow-up, service-level agreements)

Document management

Licence management

Process management

Procurement management

Programme management

Project management (scope, Time, Cost, Quality, Human Resource, Communications, Benefit, Risk, Procurement and Stakeholder management)

Quality management

Release management

Requirement management (e.g. operational, technical)

Resource management

Risk management (risk identification, mitigation, reporting)

Service management

Strategy analysis, planning, development

Supplier management

TENT T/Connecting Europe Facility (CEF)/INEA funding mechanism

User requirements documentation
BUILDING AND FACILITIES

- Building safety/security management
- Conference support
- Electrical systems (e.g. operation, maintenance)
- Electromechanical systems (e.g. operations, maintenance)
- Emergency procedures (Emergency power systems)
- Facility management
- Fire detection
- Heating, ventilating, air conditioning (HVAC)
- Local Committee for Prevention & Protection (LCPP) work
- Mail processing
- Maintenance management
- Occupational risk assessment
- Office space management
- Printing
- Service for Prevention and Protection (SPP) work
- Stock management (inventory work)
FINANCE

- Accounts receivable (e.g. bills)
- Budgeting
- Cost accounting (e.g. cash flows)
- Cost and financial analysis
- Financial accounting (e.g. balance sheet, forecasting of depreciation, general ledger, profit and loss, fixed asset, IFRS)
- Financial auditing
- Financial awareness
- Financial compliance
- Financial market
- Financial reporting
- Financial risk management
- Financial valuations
- Insurance
- Tax awareness
- Tax management
- Treasury/cash management
REGULATION AND LEGAL

- Actuarial knowledge
- Aeronautical Radio, Incorporated (ARINC)
- Air law
- Airlines Electronic Engineering Committee (AEEC)
- Aviation law
- Conditions of employment in the international environment (e.g. general, pensions, allowances)
- EU legislation (e.g. regulation, SES)
- European Organisation for Civil Aviation Equipment (EUROCAE)/Radio Technical Commission for Aeronautics (RTCA) documentation
- EUROCONTROL Safety Regulatory Requirements (ESARRs) documentation
- European Aviation Safety Agency (EASA) documentation
- European Telecommunications Standards Institute (ETSI) documentation
- Financial rules and regulations
- Global and European regulatory and standardisation framework
- HR rules and regulations
- International Air Transport Association (IATA) documentation
- International Civil Aviation Organization (ICAO) documentation
- International law
- International Telecommunication Union (ITU) documentation
- Internet Engineering Task Force (IETF) documentation
- Labour law, immigration law
- Military standard (STANAG)
- National law (e.g. France, Belgium, Netherland, Luxembourg)
- Open Geospatial Consortium (OGC) documentation
- Principles for establishing the cost base for en route charges and the calculation of the unit rates
- Procurement rules and regulations
- Social security
- Taxation
- Well-being legislation (Bilbao Agency, SPP)
TECHNICAL
INFORMATION MANAGEMENT AND TECHNOLOGY

Architecture
- Algorithm design
- Application design
- Architecture design
- Best industry practice in design
- Enterprise architecture (e.g. software, infrastructure)
- Information architecture (e.g. data modelling)
- Information process modelling
- Service architecture
- Software design

Development
- Acceptance methodology (e.g. knowledge of the full V cycle)
- Application development
- Database development
- Database Query language (e.g. SQL)
- Graphic designing (e.g. web, elearning, publications)
- Media (e.g. pictures, video, audio, self-simulation tools)
- Programming languages
- Software development
- Software development lifecycle model
- Software quality
- Software testing
- System development
- System integration
- Testing and validation (test plan, design, execution, recording) and best industry practice in development
- User requirements (e.g. definition)
Technologies
- Collaboration management (e.g. document management, SharePoint)
- Data analysis (e.g. Business Intelligence tools)
- Database (e.g. Access, Oracle)
- Database Technology and Evolutions
- Network
- Middleware
- Operating System and Virtualisation
- Platform (e.g. servers, workstations, storage)
- Web services

Support/operation
- Configuration management (e.g. clearcase)
- Change management
- Database maintenance
- Incident management
- Problem management
- Software assurance
- System maintenance
- System support

*Including associated relevant tools, systems and software*
ATM SYSTEMS

- Air safety net (ACAS X, TCAS)
- Analysis techniques (issue analysis, task analysis, real-time simulations and trials)
- ATC infrastructure
- ATC tools (conflict detection, resolution, conformance monitoring)
- ATM systems architecture design
- Avionics architecture
- Business case
- Concept development
- Concept integration
- Display systems
- European Operational Concept Validation Methodology (EOCVM)
- Experimental design
- Experimental validation
- Flight data processing
- Flight object
- Frequency management, planning, modelling
- Gaming technique
- Ground safety net (APW, MSAW, STCA)
- Height monitoring units
- Interference reporting assessment and mitigation
- Interoperability
ATM SYSTEMS

- Maastricht Data Processing and Display System (MADAP)
- Military ATC infrastructure
- Military ATM systems
- Modelling tools and analysis
- Network manager radio frequency function rules and practices
- Performance assessment (e.g. influencing diagrams, total quality management)
- Performance concepts
- Radiofrequency assignment and licencing
- Reduced Vertical Separation Minima (RVSM)
- Remotely Piloted Aircraft System (RPAS) technology
- Simulation tools
- Simulations (fast-time, real-time)
- Spectrum management
- Validation techniques
COMMUNICATION SYSTEMS ATM

- 4G technology, Orthogonal Frequency Division Multiplexing (OFDM), AEROMACS
- Aeronautical Communication systems
- Air Traffic Services (ATS) message handling system (AMHS), X500 messaging
- Aircraft radio systems (8.33 kHz +25, climax)
- Airline Operational Communications (AOC)
- Analog and digital modulation
- Atmospheric propagation
- Data link (CPDLC - Controller-Pilot Data-Link Communications)
- Electromagnetic radio spectrum
- Ground radio systems
- High Frequency (HF)
- Impact of solar weather
- Military communication systems
- Network supervision (SNMP (Simple Network Management Protocol), MIB (Management Information Base))
- RPAS command and control data link (RPAS C2 Link)
- Satellite based communication and services
- Terrestrial communication services (e.g. Telecommunication providers)
- Voice communication system (VCS)
- VDL mode 2
- Military navigation systems
- Navaid infrastructure, ground DME coverage for PBN applications
- Navaid infrastructure, ground VOR, DME
- Navaid Infrastructure, Navigation Spectrum Defence and Long-term evolution
- Navaid infrastructure, space: GNSS (incl GPS, Glonass, Galileo, BeiDou)
- Navaid infrastructure, space: GNSS (Monitoring)
- Navaid Infrastructure, space: GNSS dependent CNS and common mode failures
- Navaid Infrastructure, space: GNSS including augmentations (SBAS; GBAS)
- Navaid Infrastructure, space: GNSS MC-MF
- Navaid Infrastructure, space: GNSS, Radius Frequency Interference (RFI); Spoofing
- Navaid Infrastructure: Alternative Position, Navigation & Timing (medium and long-term)
- Navigation Applications (PBN: ENR; Terminal; Approach)
- Navigation Applications, i4D and 4d
- Navigation Applications, PBN Instrument Flight Procedure Design
- Navigation Applications, PBN to final approach transitions
- Navigation Applications, Precision Approach (GBAS Cat 1,2,3; ILS; MLS)
- Navigation Applications, Route Spacing
- Navigation Avionics supporting navigation applications
- Navigation Functions of Multi-Mode Receivers (MMR)
- Navigation Functions of RNAV Systems
- Navigation functions of the flight management system (incl. FRT [Fixed Radius Transitions]; RF [Radius to Fix])
- Navigation in CNS integration (long-term)
- Navigation specifications, GLS (certification and flight operations)
- Navigation specifications, PBN (certification and flight operations)
- PBN (Performance Based Navigation)
- RAIM (Receiver Autonomous Integrity Monitoring)
SURVEILLANCE SYSTEMS ATM

- 1030/1090 Mhz frequency analysis
- ADS-B (ground and airborne surveillance)
- Advanced Surface Movement, Guidance and Control Systems (A-SMGCS)
- All Purpose Structured EUROCONTROL Surveillance Information Exchange (ASTERIX)
- Military surveillance systems (e.g. Mode 5)
- Multilateration (e.g. LAM, WAM)
- SSR code allocation
- Surveillance applications
- Surveillance avionics
- Surveillance data distribution (e.g. SDDS)
- Surveillance data processing system (e.g. ARTAS)
- Surveillance security (spoofing, spectrum, protocol)
- Surveillance sensors performance analysis (e.g. SASS-C)
- Surveillance systems (e.g. aerodrome, en-route)
- Surveillance technologies (e.g. primary radar, MSPSR, secondary radar, Mode A/C, Mode S, ADS-C, ADS-B, multilateration, surface movement)
- Surveillance tracking or data reconstruction (e.g. technics and algorithm)
OPERATIONAL
<table>
<thead>
<tr>
<th>Category</th>
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<tbody>
<tr>
<td>Air Navigation Services (ANS)</td>
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<tr>
<td>Air Traffic Control (ATC)</td>
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<td>Air Traffic Management (ATM)</td>
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<tr>
<td>Aircraft manufacturing industry</td>
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<td>ATM master plan</td>
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<tr>
<td>ATM operational concept (En-Route, Approach, Airport, ASM, ATFCM)</td>
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<tr>
<td>Aviation business</td>
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<td>Capacity analysis</td>
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<td>Centralised services</td>
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<td>Civil airspace users operations</td>
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<td>Civil aviation authorities</td>
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<td>Civil-Military coordination</td>
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<tr>
<td>Collaborative decision making</td>
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<tr>
<td>Continuous Descent/Continuous Climb Operations (CDO/CCO)</td>
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<td>ESSIP (European Single Sky ImPlementation)/LSSIP (Local Single Sky ImPlementation)</td>
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<tr>
<td>Incident/occurrences investigations</td>
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<tr>
<td>Military aviation</td>
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<tr>
<td>Military operations</td>
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<tr>
<td>Network Manager functions</td>
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<td>Network Operation Plan</td>
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<tr>
<td>Network Strategy Plan</td>
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<tr>
<td>Next Gen</td>
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<td>NMIR (network manager interactive reporting)</td>
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<tr>
<td>Performance analysis (ICAO KPAs, KPIs, measures, monitoring, metrics)</td>
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<tr>
<td>Performance plan (e.g. Network, MUAC, ANSP)</td>
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<tr>
<td>RPAS (R&amp;D, ATM impact assessment, roadmap, global-scale development)</td>
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<tr>
<td>RPAS operations (e.g. including low level operations)</td>
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<tr>
<td>SESAR (SESAR 2020)</td>
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<td>SESAR Deployment</td>
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<td>Traffic forecast</td>
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</tbody>
</table>
AIRPORT OPERATIONS

- Airport capacity assessment (constraints, enhancement, throughput, measuring)
- Airport CDM (collaborative decision-making), APOC (Airport Operation Center), TAM (Total Airport Management)
- Airport crisis management
- Airport design and certification
- Airport emergency services
- Airport infrastructure (e.g. wingtip clearance, gate and stand disposition)
- Airport operational plans (link with Network Manager Operation Center)
- Airport operations (airside, landside)
- Airport operators
- Airport performance
- Airport security
- Airport slot management
- Airport surface management
- Apron management
- De-icing
- Environmentnal implication (e.g. noise, pollution, snow removal)
- Ground handling
- ICAO aircraft and runway categories
- Remote Towers
- Runway incursion prevention
- Runway safety
- Runway separation (separation minima, ROT management, contamination, weather)
AERONAUTICAL INFORMATION SERVICES

- Aeronautical data quality (ADQ)
- Aeronautical Information Exchange Model (AIXM): UML, XML, GML
- Aeronautical Information Publication (AIP) Processing
- Aeronautical Information System (AIS) data management
- Chart processing
- European AIS Database (EAD) applications (EAD Basic, Static Data operations, Static and Dynamic data)
- Military requirements (confidentiality, data sharing)
- (Notice to Airmen) NOTAM processing
- Operational knowledge and procedures of aeronautical information domain (AIS/AIM)
- Preflight Information Bulletin (PIB)
- System Wide Information Management (SWIM)
Airspace management (ASM)
Airspace management cell (AMC)
Airspace Management Planning tools
Airspace capacity (in relation with NMOC)
Flexible use of airspace (FUA or Advanced-FUA) (principles, procedures, processes, tools, data)
Military operations (e.g. air defence)
Network capacity planning
Network management
RPAS airspace access requirements
Air Traffic Flow and Capacity Management

- Alerting service
- Collaboration Human Machine Interface (CHMI), EHMI, NOP portal
- Crisis disruption and contingency processes and procedures
- European aviation crisis communication cell
- Flight routes validation
- Flow Management Position (FMP) tasks
- Impact of military activities/Military Liaison Officer (MILO)
- Network incident management
- NMOC (Network Manager Operations Centre) systems, processes and procedures
- NMOC operational tools: airspace data
- NMOC operational tools: flight planning
- NMOC operational tools: flow management
AIR TRAFFIC SERVICES

- Air traffic advisory services
- Air Traffic Management (ATM) procedures
- Alerting services
- Approach lighting system (ALS)
- Cross border international Air Traffic Control (ATC)
- En route control (Air Traffic Control (ATC), Area Control Center (ACC))
- Flight information services (FIS)
- Remotely provided Air Traffic Services
- Terminal Manoeuvring Area (TMA) approach (APP) control
- Tower (TWR) control
FLIGHT OPERATIONS

- Aircraft design (e.g. aerodynamic profiles)
- Aircraft guidance (docking station)
- Aircraft operations
- Aircraft operators
- Aircraft performance
- Airline flight operations
- Airline ground operations
- Airline scheduling and slot handling
- Cargo system
- Flight dispatching
- Pilot operations
- User Driven Prioritisation Process (UDPP)
SCIENCE
Air Traffic Controller (ATCO) medical requirements

Cognitive processes (e.g. human cognitive architecture, information processing, response execution etc.)

Ergonomics

Human factors integration

Human in the loop for experimental design purposes

Human machine interface

Human performance assessment and validation

Human performance limitations

Human performance research methods

Integrating human factors into system design

Measures and tools for assessing human performance

Psychology

Psychometrics

Sociology

Test development

Work place design

Workload measures
ENVIRONMENT

- Climate change and its impact on aviation
- Combustion process
- Environmental impact assessment
- Environmental impact of aviation (e.g. noise, pollution)
- Green house gas emissions
- Local air quality
- Market based measures
- Methods of aircraft emissions calculation
- Methods of aircraft noise calculation
- Methods of fuel burn calculation
- United Nations framework convention on climate change
SAFETY

- ATC safety
- European safety programme (ESP)
- Fatigue management
- Functional hazard assessment (FHA)
- Human error analysis (HERA)
- Incident reporting (e.g. OPRA/INREP)
- Information safety management
- Just culture
- Military safety requirements
- Operational safety
- Preliminary system safety assessment (PSSA)/System safety assessment (SSA)
- RPAS safety requirements
- Safety alert
- Safety assessment
- Safety assurance tools (Integrated SAF-HP processes and activities, HF Integration in safe(r) design)
- Safety audit
- Safety awareness
- Safety cases
- Safety culture
- Safety data repository
- Safety investigation
- Safety management
- Safety management system
- Safety occurrence investigation (e.g. identify root causes, analytical skills)
- Safety occurrence reporting tools (e.g. Remedy)
- Safety performance monitoring tool
- Safety promotion
- Safety risk modelling
- Safety surveys
- Software safety assurance process
- Systematic occurrence assessment method (SOAM)
- TOKAI (Toolkit for ATM occurrence investigation)/RAT (Risk Analysis Tool)
SECURITY

- ‘BHV’ (Bedrijshulpverlening – first aid at work) in accordance with the Dutch working conditions acts
- ATM security (e.g. self-protection/resilience and collaborative support/inter-organisational response)
- Audit of security management systems
- Cyber security
- Data encryption
- Data ownership policy
- Data protection
- Incident reporting
- Information security management (e.g. protection of classified information)
- Military security requirements
- National security schemes
- Network security: SIEM (Security Information and Event Management)
- Physical security
- Risk prevention
- RPAS security requirements
- Security investigation
- Security management
- Security management system (e.g. IT or physical)
- Security occurrence management
- Security risk assessment
- Technical security system (e.g. access control system, CCTV, intrusion detection)
- Threat mitigation
TRAINING

- Assessment of training and learning needs
- E-learning
- Language proficiency testing (e.g. English Language Proficiency for Aeronautical Communication (ELPAC))
- Learning styles
- Licensing and certification (common core content)
- Pedagogical skills
- Teaching methods
- Testing and assessment
- Training delivery
- Training design methodology
- Training development
- Ability to work with numbers
- Air transport economics (e.g. value chain in ATM, incomes from airlines, airlines costs)
- Business modelling (e.g. explore the value of a service, project)
- Cost Benefits Analysis (CBA)
- Cost-sharing models
- Data filtering (e.g. kalman)
- Data mining
- Economic modelling (e.g. Econometrics)
- Economics (generic term)
- Forecasting
- Mathematical modelling
- Mathematics (e.g. geometry, trigonometry)
- Sampling data
- Statistical analysis (e.g. modelling, reporting)
- Statistical & reporting tools
GEOGRAPHY AND METEOROLOGY

- Airspace closure and warnings map
- Geographical Information System (GIS)
- Impact assessment of meteorological information
- Knowledge of physical geography (e.g. climatology & meteorology, geodesy, cartography)
- Re-categorisation of aircraft (RECAT-EU)
- Tool ArcGIS + extension “ArcGIS for Aviation”
- Wake vortices criteria
- Weather conditions
- Weather forecasting (levels of uncertainty)