PBN Airspace Design Program

Module 1: Airspace planner and procedure design (1.5 weeks)

1.1 Air traffic management principles	- Flight phases - Operator / flight plans - ATC service provision / Rules of the air - ATC tools: - ATC systems - Communications o Radar - Primary - Secondary - Mode-C - Other surveillance tools (MLAT, SMR, ADS-B) - Flight progression strips o E-strip - Routes / airways / Levels - Separation minima / RVSM - Airspace categorization - ATS services - ENR - APP - TWR
1.2 Flight procedures	- Inertial/conventional navigation - Instrumental procedures (non-precision) - Precision procedures
1.3 Airport approach protections	- ATZ - CTR - TMA - Criteria to design and operate - Departures. SID - Arrivals: STAR
1.4 Service provision	- Visual flight rules - Instrumental flight rules

1.5 Visual navigation	• VFR / VFR-N • Visual aids
1.6 Instrumental navigation	• IFR • Radio aids • Service provision • Procedure design

1.7 Precision navigation	• General concepts Performance-
	• based
	• GNSS
	• RNAV
	   o RNAV 1
	   o RNAV 5
	• RNP
	• PBN
	• GBAS
	• ABAS

	• SBAS
1.8 Latest trends	• ADS-B • Mode S

Module 2: Air Traffic Control service provision (1 week)

2. 1 Air traffic control responsibility	• Introduction to profession • Professional experience • Career path • Comparison amongst countries • Contingency plans / Safety management system
2.2 Tower control provision	• Principles • Separation • Surveillance tools

2.3 En-route control provision	• Principles
	• Conventional/ procedural en-route provision
	• Radar en-route provision
	• ATC tools:
	   o Vectoring
	   o Altitude management
	   o Speed control
	• Separation minima

2.4 Approach control provision	• Principles • Conventional / procedural approach • Radar approach • ATC tools: o Vectoring

	o Altitude management o Speed control ● Holding, waiting
2.5 ATC best practices	● Flight plan adherence ● CCO ● CDO ● Fuel efficiency
2.6 Human factors and Safety management	● Fatigue ● TRM ● Risk management

Module 3: Capacity management (1.5 week)

3.1 Basic concepts	● Capacity
	   o ENR-APP
	   o TWR
	● Demand
	● Delays

3.2 Capacity	● Capacity assessment concept ● Theoretical approaches ● Simulation approach
3.3 Demand-capacity balance	● Demand forecast ● Scheduled vs. estimated vs actual. ● Capacity optimization
3.4 Air traffic flow and capacity management (ATCM)	● Background (ATFM vs ATFCM) ● Centralised vs decentralised ● Eurocontrol's NM ● Decentralised experience ● Current status and future evolution
3.5 Collaborative Decision Making	● C-ATFM ● STAM ● Introduction to A-CDM
3.6 A-CDM	● Objectives ● Stakeholders ● Milestone approach ● Implementation steps ● International experiences ● TAM
3.7 Innovation in ATM to enhance service provision	● Free-route ● 4D trajectories ● Virtualisation o TWR – Remote towers o ACC