Supporting
European
Aviation

EUROCONTROL

National documents and FUA Manual

ICAO South American Region

Civil-Military Workshop, Lima

3rd December 2019

FOUNDING MEMBER SESAR JOINT UNDERTAKING

NETWORK MANAGER

Content

- ICAO Civil-Military Cooperation provisions in ATM/ASM
- Guidance for the implementation of ASM – International and EUROCONTROL
- Civil and Military actors in ATM – specific requirements
- Flexible use of Airspace – principles
- FUA implementation
- National ASM/FUA Policy – HLAPB
- Development of a FUA national guidance - State FUA Manual
- Reference documents

Civil-Military Cooperation

- ICAO - High level platform for civil-military coordination
- Does not <u>regulate either the civil, nor the military</u>
- Assists States to implement ICAO policies and provisions
- Guidance Materials:
  - ICAO Cir 330 – raise awareness and promote Flexible use of airspace (FUA) globally and regionally updated to a Manual;
  - Guidance for the implementation of FUA in the South American Region (SAM/FUA Guideline)
  - Best practice - EUROCONTROL ASM Handbook and Specifications for FUA application
- FUA Concept

ICAO Circular 330, Circ 330 AN/189, 2011

- Civil/Military Cooperationin Air Traffic Management
  - Civil/military interoperability
  - Airspace organisation and management
  - ATM Security and Crises management
  - State aircraft operations
  - Civil/military collaboration
- Advocates for FUA Implementation
- Being transposed into a Manual (Draft Doc 10088)

Civil-Military Cooperation

Creating a win-win Scenario – The European FUA Example

- **FUA concept**
  - described by ICAO
  - developed by ECTL
- **In the EU regulated by**
  - Commission Regulation No 2150/2005 - FUA
- **EUROCONTROL** contributes to FUA with
  - Guidance Material
  - Technical Enablers
  - facilitating FUA in the EATMN
  - R&D on AFUA in SESAR
  - supporting ICAO in global FUA implementation

to provide Flight Efficiency, Airspace Capacity & Military Mission Effectiveness in an Airspace facing ever-growing traffic demand

Who are the Civil and Military ATM actors?

<u>Civil - Predictability</u> for flying

The civil requirements for more capacity and flight efficiency

Airspace user

Airline operator

Service provider

Airports

Regulator

Supervisory authority CAA/MAA

<u>Military - Flexibility</u> for flying

The military community needs to be involved from the outset at all the steps of the ATM enhancement processes

Civil Operational Requirements for the Use of Airspace

- ✓ Highest level of safety
- ✓ Maximum route availability
- ✓ Most direct routes
- ✓ Least fuel consumption possible (CO2)
- ✓ Stability of the planning and predictability
- ✓ Quality of ATC service
- ✓ Performance based

= Ensure flight efficiency

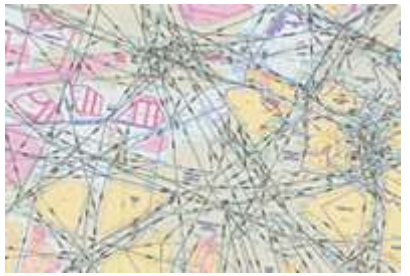
Military Operational Requirements for the Use of Airspace

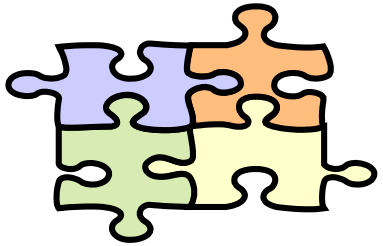
- ✓ Adequate volumes for the missions
- ✓ Possibility to have airspace in proximity of the air bases or ground installations
- ✓ Flexibility of planning and timing
- ✓ Quality of ATC service
- ✓ Most efficient use of airborne time
- ✓ Require reservation of airspace for its exclusive or special use (SUA)

= Ensure mission effectiveness

What is key for a successful Civil/Military Coordination?

- ✓ **Flexible Use of Airspace**
- ✓ **Interoperability of Systems**
- ✓ **Collaborative Decision-making**





How FUA is applied?

By ensuring balanced consideration between commercial and national security and defence needs

Based on dialogue, cooperation, collaboration and trust

This requires intensive cooperation and consultation processes between the competent civil and military authorities at State level

Through a set of actions, developed procedures and requirements for the implementation and application of the Flexible Use of the Airspace Concept

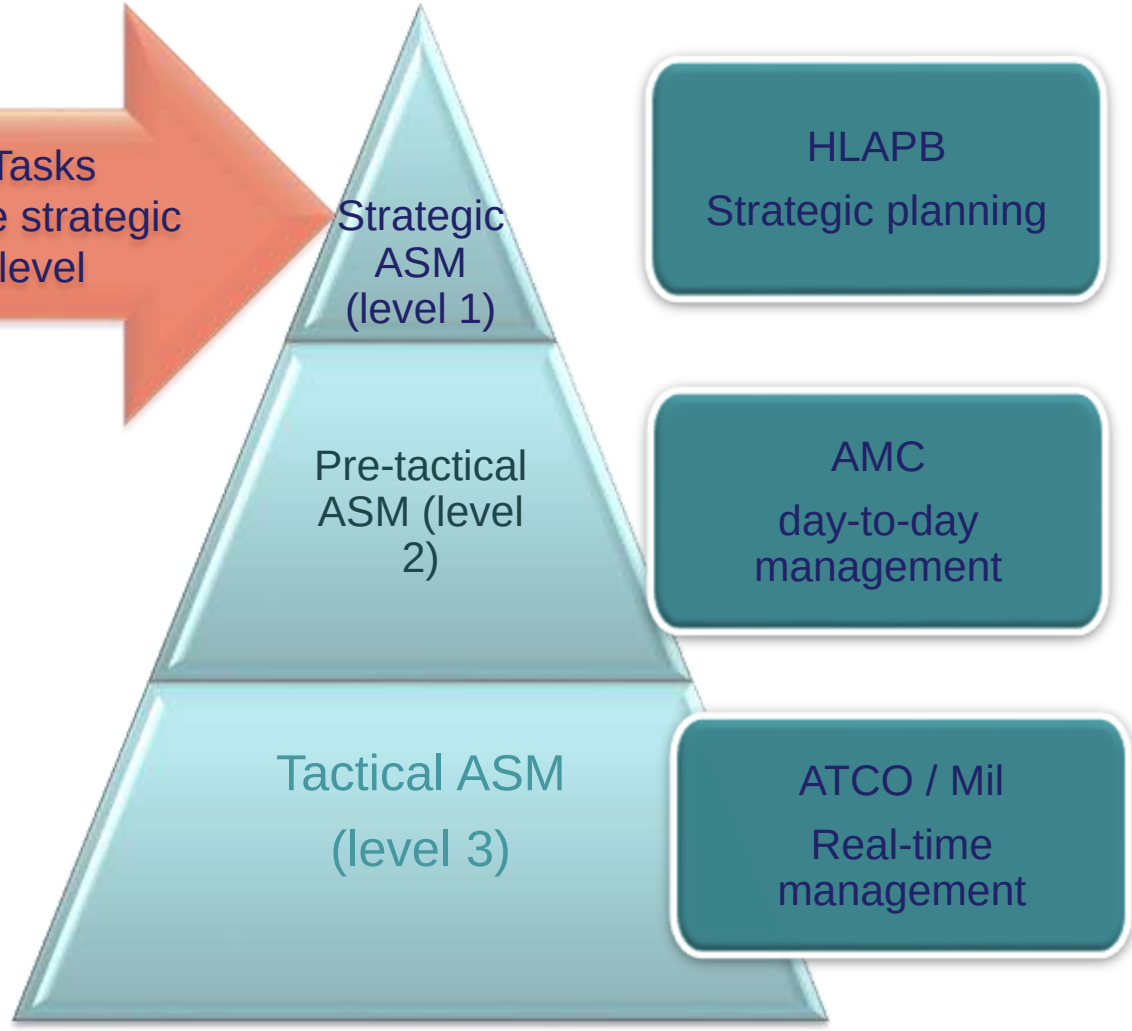
In practice - by dynamic airspace configuration

FUA: From the principles to the tasks

FUA principles:

- Civil-Mil coordination at three levels of ASM;
- Consistency between ASM/ATFM/ATS;
- Airspace reservation on temporarily nature;
- Cooperation across national boundaries;
- The best use of the available airspace

Tasks at the strategic level



FUA transition

- To reassess current national airspace and route structures with the aim to implement the FUA;
- Analysis of the use and management of Restricted, Prohibited, Danger and Special use areas - to achieve a comprehensive ATS route through the implementation of collaborative decision making (CDM);
- Establish procedures or letters of agreement to avoid tactical airspace management;
- States should establish policies on the use of temporarily or permanently reserved airspace, to avoid, as much as possible, the adoption of airspace restrictions;
- In many States FUA is an adaptation of older ASM practices to the new concept.

FUA implementation

❑ National ASM/FUA Policy – State commitment

- FUA in the national legislation;
- The national government's future development plans and strategy for the organisation, management and use of the airspace;
- Shared responsibilities between the Minister of Transport and the Minister of Defence, could delegate the tasks;
- Optimisation of the airspace management and organization to implement the policy measures and translated into a future main airspace structure;
- Gives guidance on acceptable and unacceptable types of action to those with executive responsibility;
- Specify practical and cooperative solutions regarding technological, financial and legal frameworks;
- Establishing common policies for the regional States
- Awareness complain (Workshops, Seminars) is essential
- Airspace Policy Statement – Airspace Charter - Airspace policy decision-making body - establishment of a HLAPB (EUROCONTROL ASM Handbook)
- **Development of FUA Manual** – by the HLAPB to ensure the implementation of FUA

Guidance for the implementation of FUA

A Sample Structure

- Foreword
- Definitions Chapter 1
- General/Introduction Chapter 2
- Strategic Level (ASM Level 1) Chapter 3
- Pre-tactical (ASM Level 2) Chapter 4
- FUA Information Management Chapter 5
- Tactical Level (ASM Level 3) Chapter 6
- (Optional) CNS Interoperability Chapter 7
- Appendix Acronyms and Abbreviations

FUA Manual Chapter 2
Introduction

- Purpose
  - FUA as an ASM concept needs guidance – common understanding
  - Implementation of FUA – benefits
  - Airspace policy decision-making body - establishment of a HLAPB
  - **Development of FUA Manual** – by the HLAPB to ensure the implementation of FUA
  - Take into consideration National and International requirements
  - Describes processes used to provide a high quality of service to the airspace users and ATS providers
  - Describes the national defence requirements
  - Uniform application for civil and military use of the FUA structures and conditional routs network
  - Structure of the FUA Manual

Target Audience
- ✓Civil and Military airspace users/stakeholders
- ✓ATS providers
- ✓Regulators (e.g. MoT/MoD/CAA/MAA)

FUA Manual Chapter 3
Strategic level (ASM Level 1)

- ✓ Definition and review of national airspace policy
- ✓ Definition of working structures and airspace management procedures for Levels 2 and 3
- ✓ Establishment of pre-determined airspace structures
- ✓ Development of Airspace Charter
- ✓ Establishment of HLAPB
- ✓ Establishment of AMC
- ✓ Conclude agreements with neighbouring States

FUA Manual Chapter 3
Strategic level (ASM Level 1)

Airspace Charter: Airspace policy document

❑ Charter

- *A document outlining the principles, functions, and organization of a corporate body;*
- *Document owner: national HLAPB*

❑ Policy

- statement of **intent** implemented as a procedure or protocol to **guide** decisions and achieve **rational outcomes**
- generally adopted by the **senior** governance body
- assists in both subjective and objective **decision making**.
- differs from rules or law; it is mechanisms arranged to reach **explicit goals**;
- *In the context of the Airspace Policy Formulation and Review Process, "Policy" refers to: "**a standing decision rule which gives guidance on acceptable and unacceptable types of action.**"*

FUA Manual Chapter 3
Strategic level (ASM Level 1)

Airspace Charter: Airspace policy document

- Airspace Charter content:
  - Purpose
  - Role of the National HLAPB
  - Strategic Objectives
  - Responsibilities
  - Principles
  - Working Organisation
  - ASM Policy and Review Process
  - Airspace Change Process
  - FUA and Dynamic Airspace Management
  - Cross-Border Operations
  - Airspace Delineation: *Objective criteria for the airspace design*
  - Publication
- Airspace Charter owner: national High Level Airspace Policy Body

FUA Manual Chapter 3
Strategic level (ASM Level 1)

The composition of the National High-Level Civil / Military Airspace Policy Body (HLAPB)

- National HLAPB consists of civil and military stakeholders authorised to formulate national ASM Policy and carry out Level 1 tasks

- HLAPB composition is an individual State's decision
  - Ministry of Transportation / CAA
  - Ministry of Defence / Military Aviation Authority
  - ANSP civil
  - ANSP military
  - Civil airspace users
  - Military airspace users

- National Airspace Management Advisory Committee assists HLAPB

FUA Manual Chapter 3 - *Strategic level (ASM Level 1)*

The role of the National High-Level Civil / Military Airspace Policy Body (HLAPB)

- Formulate the national policy for airspace management - the "*Airspace Charter*";
- Periodically reassess the national airspace structure and ATS route network with the aim of planning, as far as possible, for flexible airspace structures and procedures in the upper and lower airspace (including Terminal Areas);
- Validate activities requiring airspace segregation and assess the level of risk for other airspace users;
- Conduct a safety assessment when planning for the establishment of FRA, CDRs, TRAs, TSAs, CBAs , AMC-manageable D and R areas, if required;
- Change or modify, if required and if practicable, D and R areas into temporary allocated airspace;
- Take into account the FUA concept when planning for airspace classifications.

FUA Manual Chapter 3
Strategic level (ASM Level 1)

The role of the National High-Level Civil / Military Airspace Policy Body (HLAPB)

- Coordinate major events such as large scale military exercises planned well in advance of the day of operation, which require additional segregated airspace, and notify these activities by AIS publication
- Periodically review the procedures and efficiency of ASM Level 2 operations, the submission of airspace requests by the national Approved Agencies (AAs), and the negotiating procedures and priority rules for airspace allocation
- Periodically review the procedures and efficiency of ASM Level 3 operations, the prompt exchange and dynamic update of all necessary flight plan and radar data, and the use of adequate civil/military coordination facilities
- Provide a continuum and transparency of operational handling at national borders through collaborative airspace planning and harmonized airspace management procedures with neighbouring States

FUA Manual *Chapter 3 - Strategic level (ASM Level 1)*

Principles of the National High-Level Civil / Military Airspace Policy Body (HLAPB)

- The National High-Level Airspace Policy Body will conform to international best practices and will ensure that the Airspace Change Processes, procedures and instructions are compatible with appropriate Military and Civil Aviation safety procedures.
- Consultation with airspace users, service providers and other relevant bodies will be conducted with the aim of obtaining consensus, wherever possible, before making changes in the planning or design of airspace arrangements.
- Develop the necessary letters of operational agreement *(LoAs)*
- The National HLAPB is charged with reconciling civil and military operational needs, without affording preferential treatment to either, and ensuring that airspace planning takes into account all user interests.
- The National HLAPB is chaired by …. (usually is the CAA), with membership from military- and civil aviation authorities.
- development of airspace policies, configurations and procedures in order that due attention is given to the diverse requirements of all airspace users and ATS providers, civil and military.
- National HLAPB ToR – working arrangements.
- National HLAPB will frame the associated changes to legislation and/or alternate airspace boundaries or associated procedures.

FUA Manual Chapter 3 - *Strategic level (ASM Level 1)*

Woking Arrangements of the HLAPB (1)

The HLAPB may delegate some policy coordination or development tasks to appropriate working arrangements

Airspace Policy formulation, review and change process

- Policy Formulation Process
  - Identification of need, Analysis of the potential impact, Decision to proceed, Consultation, Approval (by CAA), Publication.
- Policy Review
  - The criteria for reviewing a policy will be set out in the policy statement,
  - The review period will typically be between 18 months and 3 years after its publication.
- Airspace change process
  - All airspace changes require some form of consultation
  - Phases: Framework Introduction; Proposal Development; Preliminary Informal Consultation; Case Consideration; Formal Consultation; Approval; Implementation; Review;
  - Fast Track Process - when an imminent “safety critical” or national security change is needed.
  - A Change Sponsor – proposing a change can be an Aerodrome Operator, an ANSP, a combination of Aerodrome Operator and ANSP or an Airspace User. Ownership of the proposal will always remain with the Change Sponsor.
  - Promulgate and complete the implementation of the proposed change within 6 months of the initial approval of the proposal.

FUA Manual *Chapter 3 - Strategic level (ASM Level 1)*

Woking Arrangements of the HLAPB (2)

Airspace Policy formulation, review and change process - safety

- Impact Assessment (IA) – e.g. a safety case (iaw SMS procedures), an environmental assessment, a legal assessment and a cost benefit analysis);

- A Regulatory Impact Assessment (RIA) document describes the overall impact of a regulatory measure or policy change.

- Case Study – with all the necessary documentation for the change proposal from the Change Sponsor. Proper co-ordination with the military during the Case Study is a critical element of the process as well as formal agreement after the external consultations.

- Promulgation of the change in the State Aeronautical Information Publication (AIP)
  - depends on the nature and scale of the change, the publication cycle (NOTAM, AIC, AIP) and whether changes are required to regulations (needs more time);
  - Ideally the promulgation will be not less than one AIRAC cycle (i.e. 28 days notice after the publication of the relevant documentation) prior to effective date of a change.
  - For some major changes (e.g. extensive new procedures, cross-border airspace, etc.), ICAO requires two AIRAC cycles (56 days) for promulgation.
  - Some changes may be concluded in less than the stated period, but where such changes are subject to publication by AIRAC cycle, unless a full AIRAC cycle can be achieved, no reduction can be initiated.

FUA Manual Chapter 3 - *Strategic level (ASM Level 1)*

Woking Arrangements of the HLAPB (3)

Dynamic airspace management (DAM)

- Exploiting the airspace in a dynamic manner as close as practical to the time of operations;
- Allows all airspace users to follow preferred and flexible flight profiles in equal manner to use at short notice the allocation of airspace and the trajectories, as well as the possible routing options;
- HLAPB shall ensure:
  - Monitoring of the DAM process and the associated procedures for delineation, allocation of airspace and the dissemination of the information to achieve route optimisation;
  - DAM addresses the planning, allocation and use of dynamic airspace structures;
  - 'ad-hoc structures' can be established, whether routes or areas to met operational needs at short notice;
- DAM process implementation - developing airspace structures and defining their conditions of use; temporary airspace reservations or restrictions and related CDR routes; delineation of additional ad-hoc airspace structures at ASM Levels 2 and 3.

FUA Manual Chapter 3
Strategic level (ASM Level 1)

Airspace Delineation

- The HLAPB is responsible for establishing objective criteria for the design of airspace.
- The HLAPB is to ensure that airspace planning and design principles are in accordance with the “European Airspace Design Methodology – Guidelines” – European example;
- The HLAPB is responsible for establishing the defined criteria allowing delineation of ad-hoc structures at ASM Levels 2 and 3;
- The HLAPB is responsible for developing an efficient coordination process between all airspace users and ANS providers, allowing the delineation of ad hoc structures at ASM Levels 2 and 3;
- The HLAPB is responsible for establishing LoAs where ASM Levels 2 and 3 negotiation procedures are published.

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FUA Manual Chapter 4
Pre-Tactical level (ASM Level 2)

- ✓ The pre-tactical level is the conduct of **operational airspace management within the framework of the structures and procedures defined at ASM Level 1, including the priority rules**.
- ✓ Pre-Tactical tasks include **the day-to-day allocation of airspace** and the communication of airspace allocation data to all parties concerned temporary nature
- ✓ Each State could chose a different style of pre-tactical operations according to the level of traffic complexity, military demand and the main characteristics of the national airspace structures. Clearly there is not a single pre-tactical style which is the best one in all circumstances.
- ✓ Coordinates, if required, the additional segregated airspace (subject to Level 1) as a result of planned major events
- ✓ ASM Level 2 is the most appropriate ATM process to provide extra ATC capacity, when problems are identified in advance due to it enables negotiations and the implementation of mature solutions

FUA Manual Chapter 4 – *Pre-Tactical level (ASM Level 2)*

- ✓ **Airspace Management Cell (AMC)** – joint civil and military entity authorized to manage national airspace on daily bases
  - Collect and analyse airspace structures' requests
  - Resolve conflicts
  - Negotiate
  - Coordinate with NM and adjacent AMC
  - Promulgate AUP/UUP
  - Participate in post-ops analysis
  - Conduct, where authorised, some ASM Level 3 tasks
- ✓ **Approved Agencies (AA)** – civil or military :
  - Units that represent users that are using the airspace suitable for managements/allocation by the AMC(e.g. squadrons, wings, ACC, Flow Management Position FMU / FMP, management units and other military zones and accredited agencies).
  - Entities authorized to:
    - Request airspace (TRA/TSA/R/D/CDR)
    - Participate in the negotiation and coordination process

FUA Manual Chapter 5

Airspace Information Management

Publication and Notification

Publication

Aeronautical information preparation and promulgation is executed in accordance with the national legislation:

- How to originate/generate and exchange aeronautical data;
- How aeronautical data originators are approved;
- How aeronautical data are processed and how the aeronautical information is produced and promulgated.

Notification

- After coordination, AMCs promulgate the airspace allocation as an Airspace Use Plan (AUP) and changes thereto in the UUP (procedure in the ASM Handbook).
- According to criteria established at ASM Level 1, the promulgated AUPs/UUPs shall be distributed to national AAs and ACCs.
- The Lead AMC will be responsible for the promulgation of the airspace structures under its responsibility according to the signed LoAs.

FUA Manual Chapter 6
Tactical level (ASM Level 3)

Tactical ASM should be carried out at the level of ATS units and military control units in order to:

To establish enhanced supporting co-ordination equipment and **real-time civil/military co-ordination** procedures in order to:

- Activate, deactivate or reallocate in real-time the airspace allocated at Level 2;
- Resolve specific airspace problems and traffic situations between civil and military Air Traffic Services (ATS) units and controllers;
- Provide access to all necessary flight data including controller's intentions;
- Fully exploit the FUA Concept at Levels 1 and 2;
- Roles, responsibilities, policies and procedures are part of separate Civil Military LOA's as approved by HLAPB.

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FUA Manual Chapter 7
CNS Interoperability

Military ATM/CNS Integration

MILITARY CAPABILITIES TO FIGHT WAR

ATM/CNS

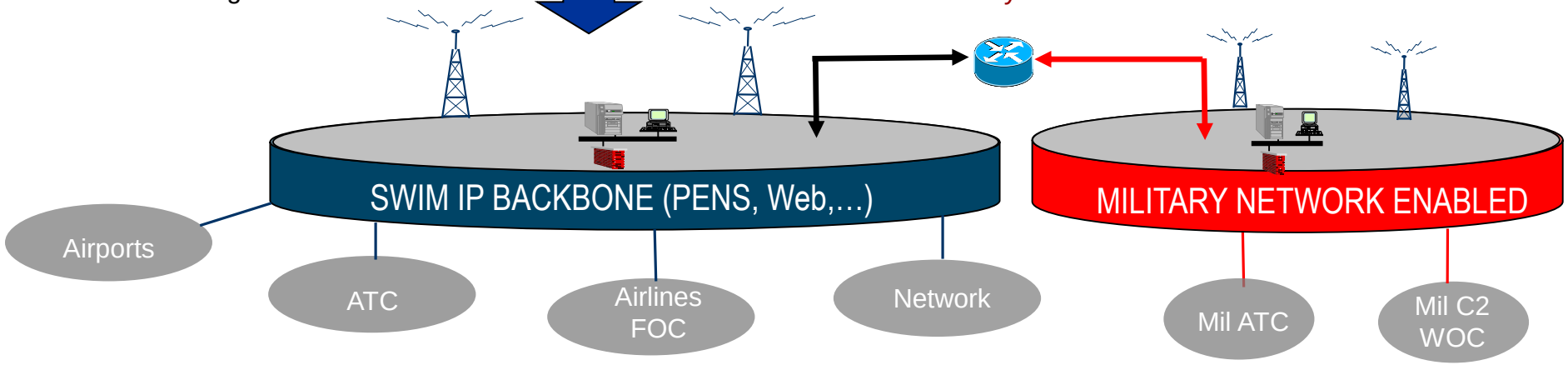
VHF 8.33	VDL2	Future DL, SATCOM , HF	Mode S ELS/EHS	ADS-B Out	ADS-B In	ACAS

VHF	UHF	TACAN	JPALS	IFF

FM Immunity	RVSM	PBN (RNP-1)	PBN (APV Baro/SBAS)	ILS/MLS/ GBAS	ELT	EGPWS

SES Regulated

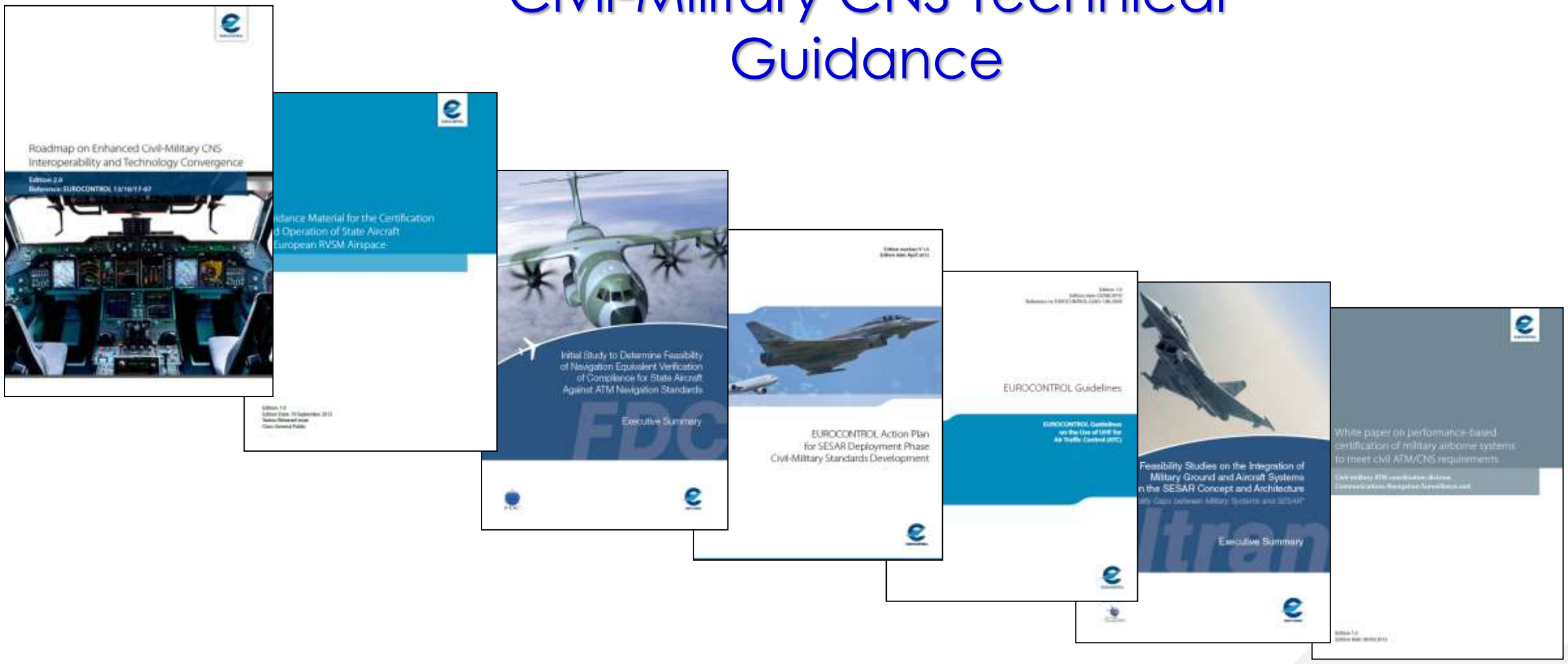
Civil-military interface



Capability re-use, optimized equipage, multi-mode avx, equivalent certification

FUA Manual Chapter 7
CNS Interoperability

Civil-Military CNS Technical Guidance



http://www.eurocontrol.int/articles/civil-military-cns-coordination

Reference documents

❑ EUROCONTROL

- EUROCONTROL Specification for the application of the Flexible Use of Airspace (FUA) EUROCONTROL-SPEC-0112; 2009
- Airspace Management Guidelines - The ASM Handbook – Airspace Management Handbook for the Application of the Concept of the Flexible Use of Airspace
- COMMISSION REGULATION (EC) No 2150/2005 of 23 December 2005 laying down common rules for the flexible use of airspace

❑ ICAO

- Convention on International Civil Aviation (Doc 7300)
- ICAO Annexes 2 (Rules of the Air), 11 (Air Traffic Services), 15 (Aeronautical Information Services)
- PANS-ATM (Doc 4444) and SUPPs (Doc 7030)
- Air Traffic Services Planning Manual (Doc 9426)
- Global Air Navigation Plan (Doc 9750)
- Global Air Traffic Management Operational Concept (Doc 9854)

European best practice
Route Network Improvement Plan, Part 3, Airspace Management Guidelines - The ASM Handbook

- ✓ COMMISSION REGULATION (EC) No 2150/2005 of 23 December 2005 - common rules for the European States for the flexible use of airspace
- ✓ Airspace Management Handbook for the Application of the Concept of the Flexible Use of Airspace

- ✓ Assist States in their organisation and operation of the Flexible Use of Airspace
  - ➢ Describes the FUA concept and structure
  - ➢ Provides guidance materials
  - ➢ Provides procedures and best practice

- ✓ Serve as the reference guidance material to the elements contained in the EUROCONTROL Specification for the application of the Flexible Use of Airspace (FUA)