SAFE SKIES.
SUSTAINABLE FUTURE.

# Considerations of Flexible Use of Airspace in FRA Settings

Ms. ZHANG Ying
Deputy Chief, ICAO APAC Regional Sub Office
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# Presentation Overview

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# What is Airspace Management?

- **Airspace Management (ASM):** is the process that allows the different needs of all airspace users to be met equitably.
- **The ultimate goal of ASM:** is to achieve the most **efficient** use of the airspace based on **actual needs** and, when possible, avoiding permanent airspace segregation.
  - "Conventional" ASM
  - Flexible Use of Airspace

# What is Flexible Use of Airspace (FUA)?

- **An airspace management concept** based on the principle that airspace should not be designated as purely civil or military, but as a **continuum** in which all user requirements are **accommodated** to the greatest possible extent.
- Optimizing airspace for both civil and military operations result in nation-wide benefits, based on the principle **"as civil as possible, as military as necessary"** .

# “Conventional” vs FUA ASM

## *“Conventional”*

- Static environment
- Negative impact on system performance
- Not in line with needs (e.g. H24 activated zones)

## *FUA*

- Dynamic airspace
- Continuous process
- Meeting users need
- Avoid “wasting” airspace
- Enhance system performance

## *Do we still need “Conventional” Airspace?*

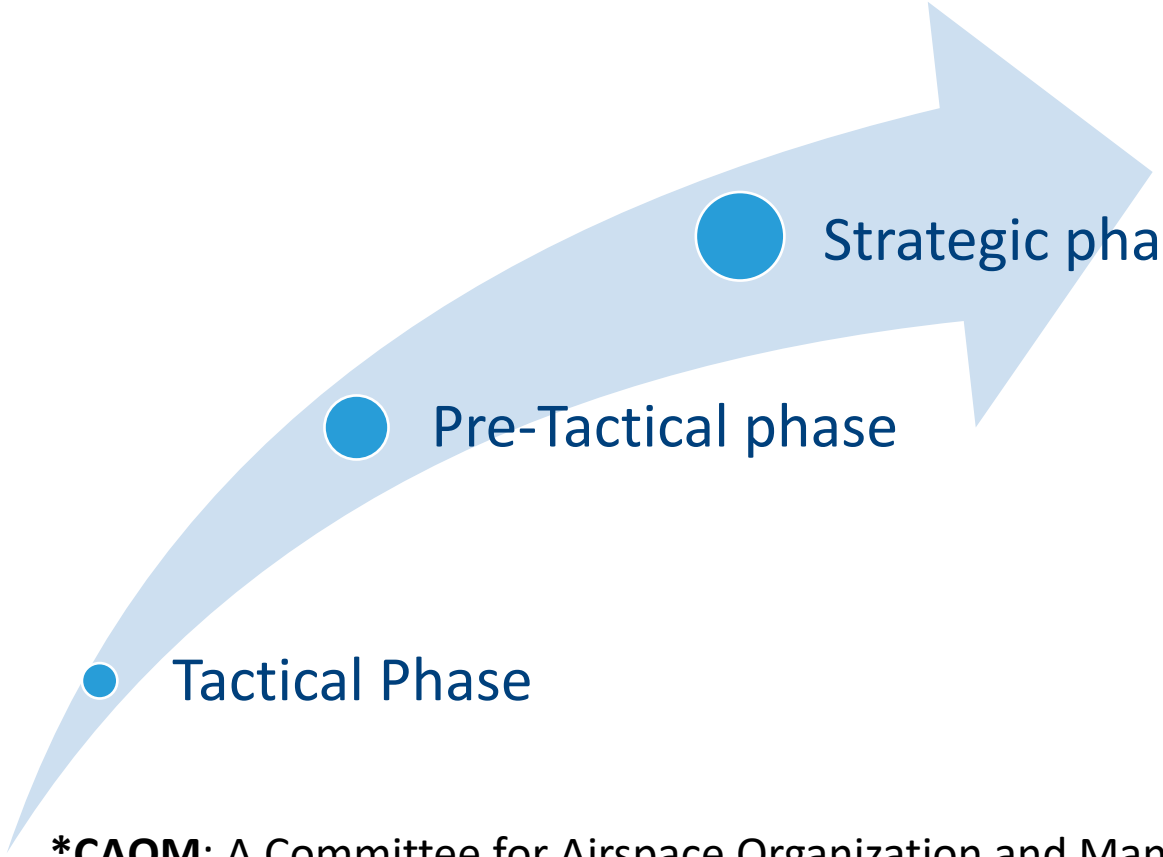
**Prohibited Area**

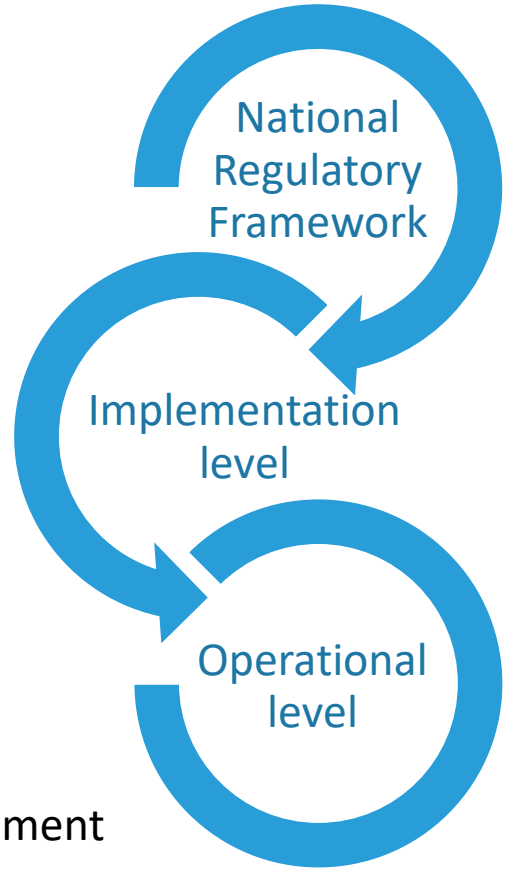
**Un-manageable Area**

**……**

# Basic Principle of FUA

Cooperation and coordination between civil and military authorities should be carried out at the **strategic, pre-tactical and tactical** phases to increase safety and airspace capacity and to improve the efficiency of aircraft operations




**High-level C/M Body** (CAOM), Policies, Rules, Airspace structures……

**Joint C/M AMC**, Processes, AUP, Publications, ……

**Civil ATS & Military Unit**, Real-time coordination……

***CAOM**: A Committee for Airspace Organization and Management

# Airspace Structures

→ *Free Route Airspace (FRA)*

- ATS Route
- Prohibited Area (P)
- Restricted Area (R)
- Danger Area (D)
- ATC Sectors
- Others

**Conventional Airspace Structure**

- ATS Route + *Conditional Route(CDR)*
- *Un-manageable Area*
- *Temporary Reserved Area (TRA)*
- *Cross-Border Area (CBA)*
- ATC Sectors
- Others

**FUA Airspace Structures**

*Note: the implementation of FUA structures is not advised in uncontrolled airspace for the safety of all airspace users.*

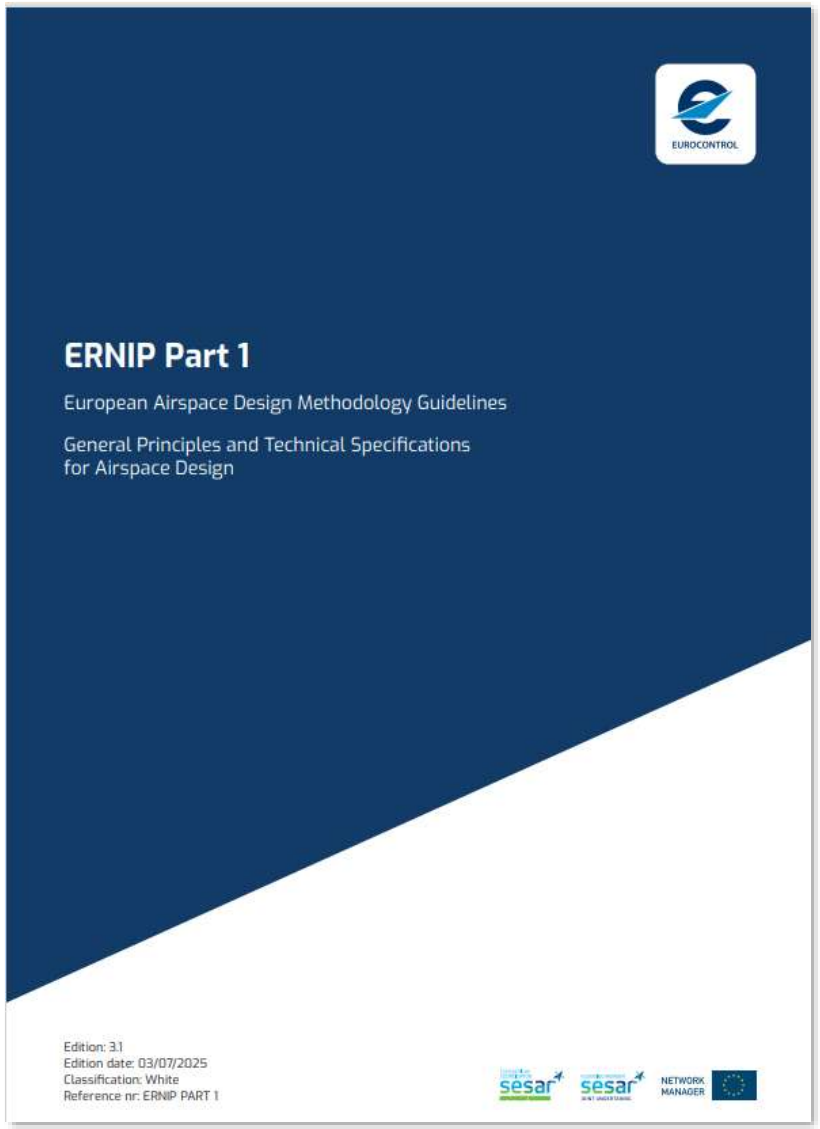
# Understand FRA

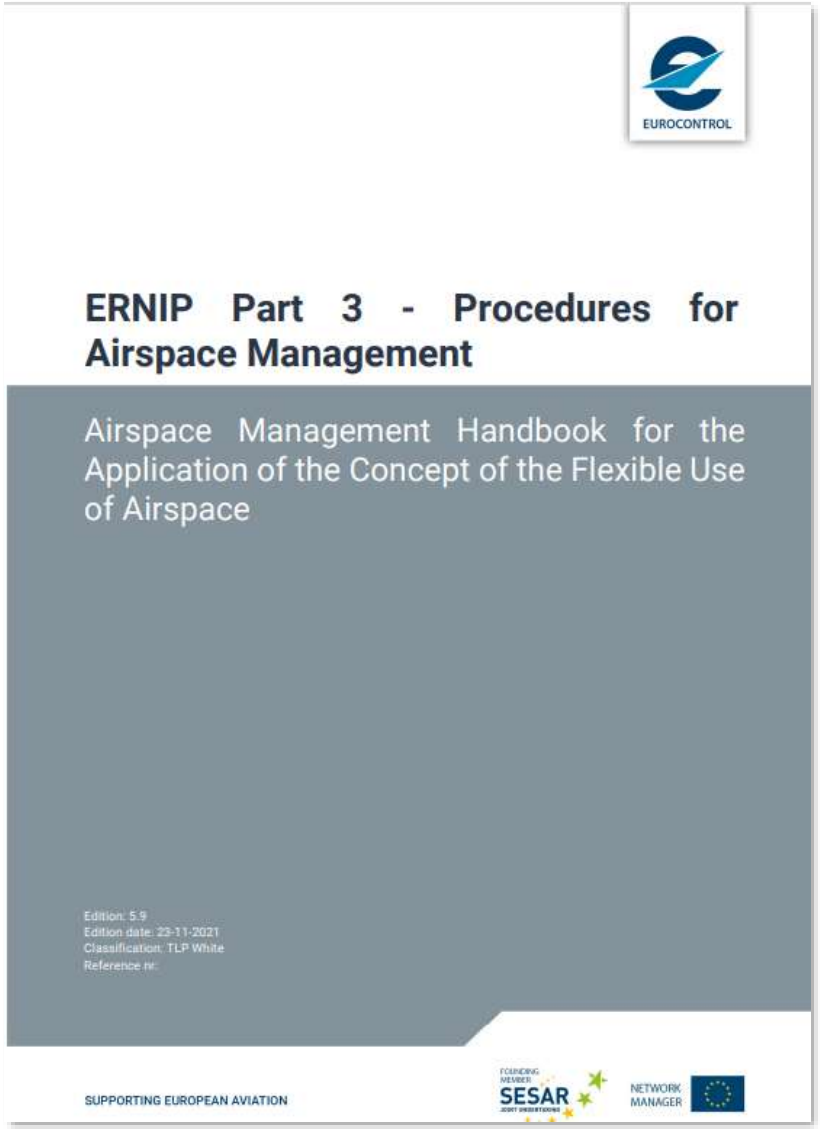
## ICAO GANP ASBU FRTO-B1/1 Free Route Airspace (FRA)

**FRA Capabilities**: FRA is a **specified volume of airspace** within which users may freely plan a route between a defined entry point and a defined exit point, with the possibility to route via intermediate (published or unpublished) waypoints, without reference to the ATS route network, **subject to airspace availability**. Within this airspace, flights remain **subject to air traffic control**. FRA enables airspace users to fly as close as possible to what they consider the **optimal trajectory** without the constraints of a fixed route network structure.

| FRA Enablers | |
|---|---|
| Procedures for FRA Airspace Design | Design and use of operational procedures. *Reference: ERNIP – Part 1* |
| ATC System Upgrade for FRA | Upgrade to ensure conformance monitoring of flights and conflict detection |
| AO Flt Planning Sys | Upgrade Computerized Flight Plan Service Providers (CFSP) system for FRA operation |
| Training | ATCO and AO training for FRA operation |
| ATFM System | Upgrade for ATFM/flight planning systems to support FRA |

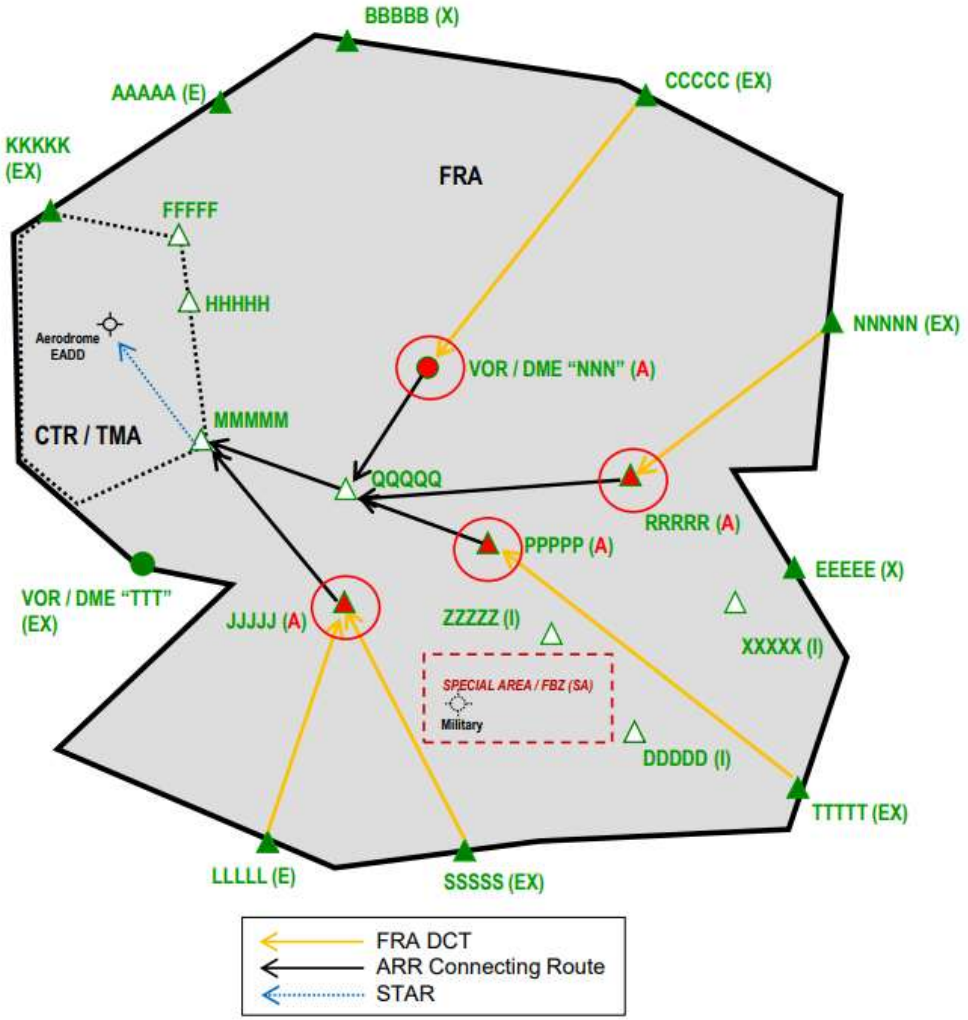
# The European Example



# Airspace Organization

- FRA forms an integral part of the overall European ATM network, interfacing vertically or laterally with adjoining fixed ATS route operations airspace.
- Airspace limitations will **remain**, and as all airspace users will have equal access to FRA, **harmonised application of the FUA Concept and Civil/Military Coordination** are taken into account in order to ensure harmonised procedures and service provision for the benefit of all the airspace users.



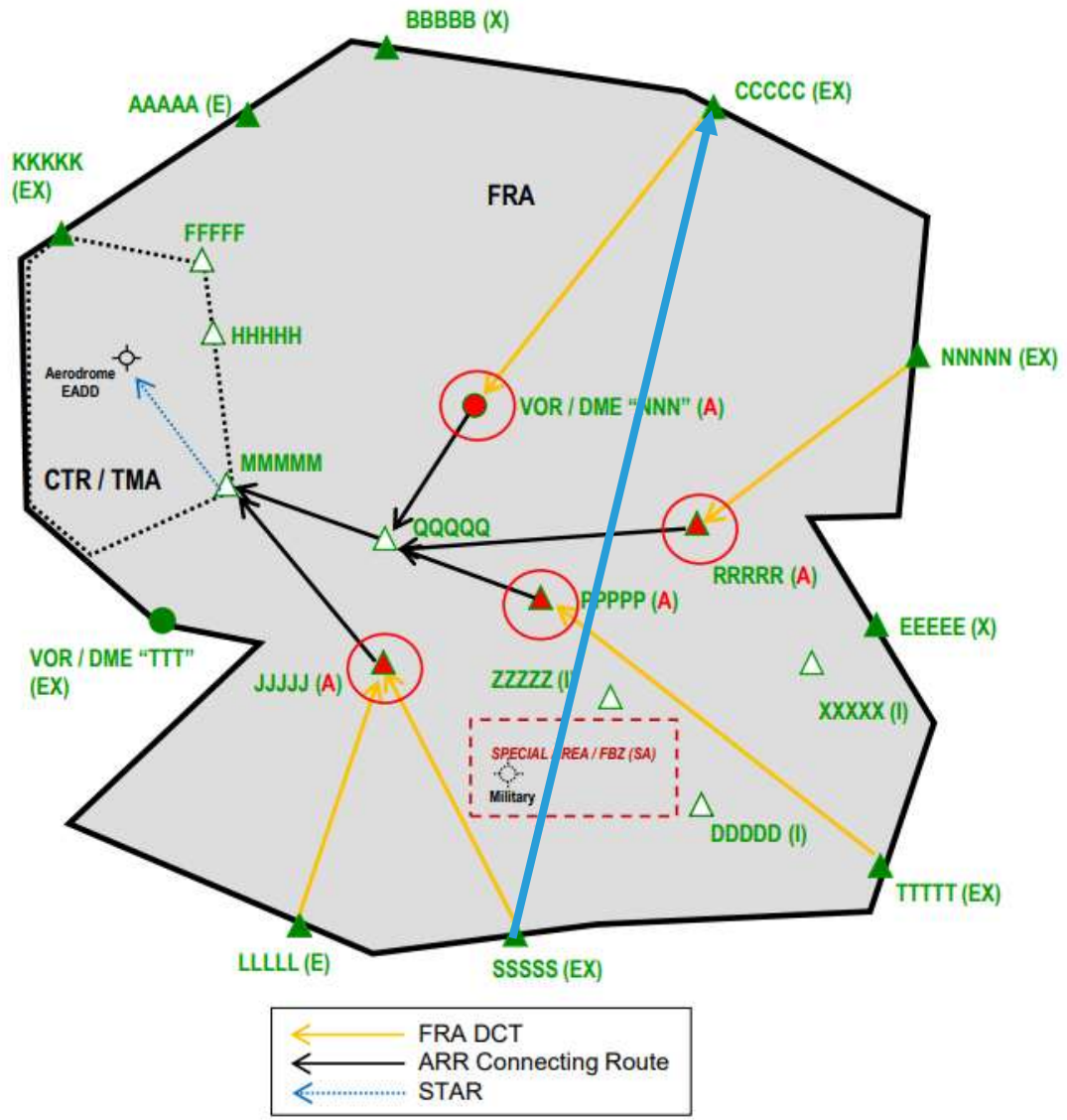
# Airspace Limitations

- Airspace limitations are permanently active (such as prohibited areas) while others are active for varying periods of time and at varying levels. (e.g. TSA and similar exercise areas).
- Active airspace limitations **are crossed or avoided** depending on the degree of coordination (including civil/military coordination) and the status of the activity in the area.

***This will remain the case in FRA.***

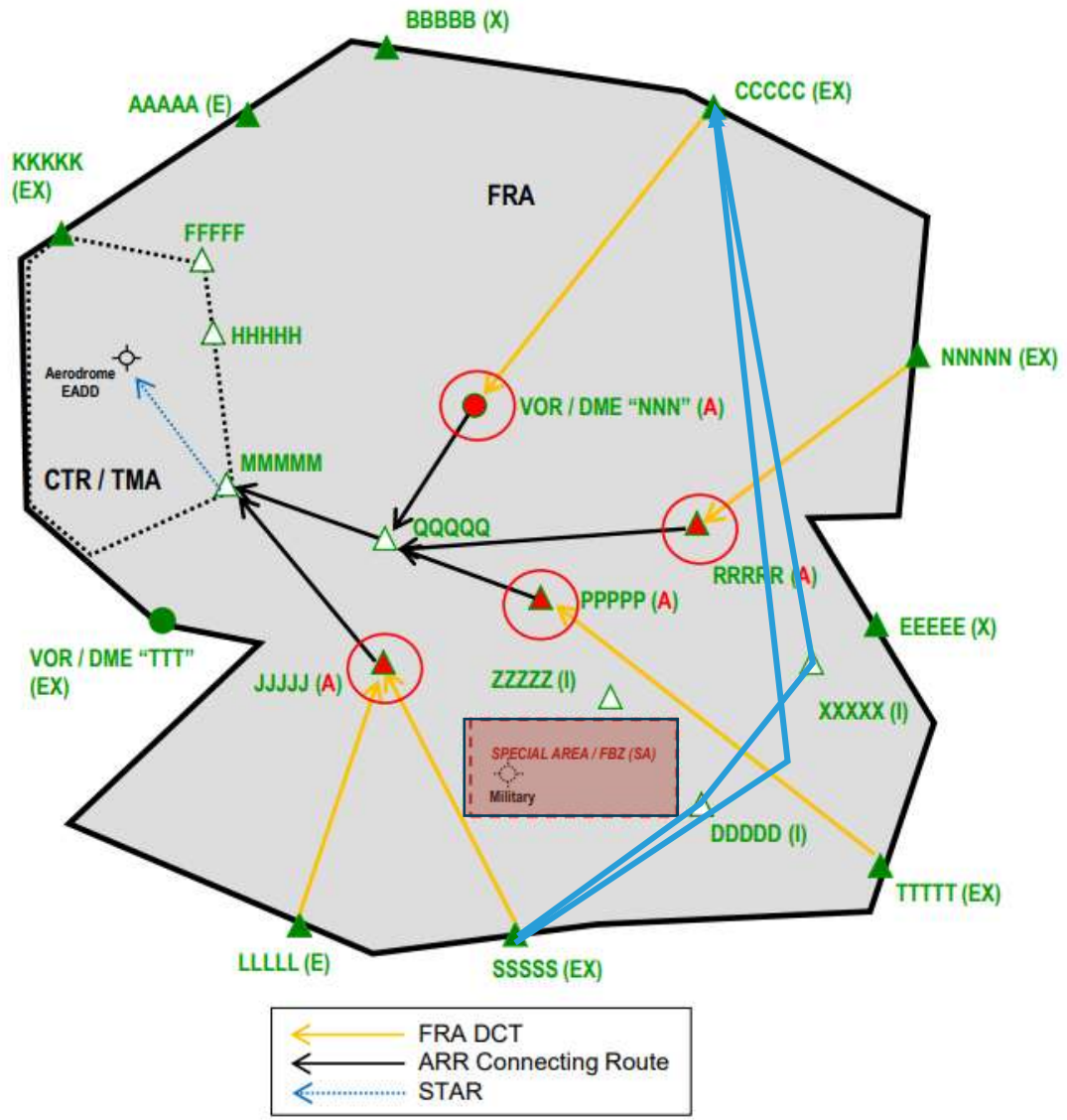
- Publication of **activation time** of airspace limitations should be considered.
- There is a potential for airspace limitations to **be reconfigured** to meet different task needs.

# Case Study



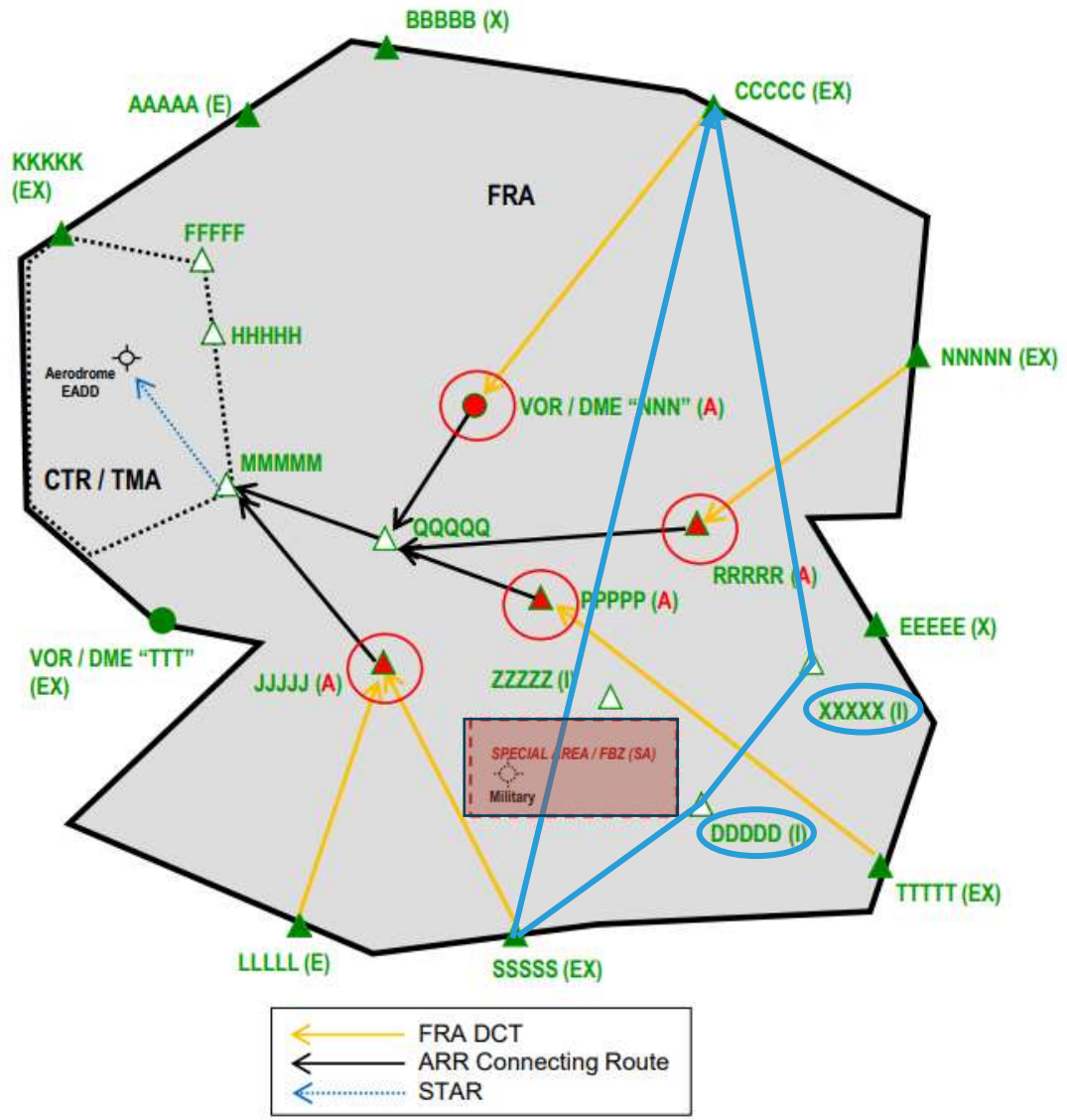

- **Scenario 1:** In areas where coordination procedures (including civil/military coordination procedures) and airspace conditions permit, the airspace users are permitted to **flight plan routings through airspace limitations**.

# Case Study




- **Scenario 2:** In some cases, **tactical rerouting** will be given if airspace is not available for crossing.
  - The expected maximum additional length of a **tactical rerouting** shall be promulgated through national AIP.
    - it is expected that the average flight extension to be considered by aircraft operators is approximately **5NM**; in exceptional occasions **15NM**.
  - in most of the cases **radar vectors** shall be provided by ATC.

# Case Study




- **Scenario 3**: when such airspace is not available for crossing, FRA **Intermediate points** will be defined to facilitate **flight planning** clear of the airspace limitation and ensure sufficient separation from the activity.
  - The promulgation of FRA Intermediate points shall be ensured through the **national AIP**.
  - If these points are to be used only for avoidance of airspace limitations, specific conditions for the use of these points for flight planning shall be provided in the **national AIP** or **centralized data management sources** e.g. Route Availability Document (RAD) in Europe.
  - An overall standardization of **the separation from airspace limitations** will be required

# Advanced Flexible Use of Airspace

| | | |
|---|---|---|
| FRTO-B1/3 | Advanced Flexible Use of Airspace (FUA) and management of real time airspace data | Operational |

☐ Sixth edition of the GANP

**Main Purpose**

FUA and airspace mangement (ASM) need to be enhanced with collaborative airspace data sharing between all ATM actors, negotiation procedures, system support and real time ASM data integration.

**New Capabilities**

FUA procedures are enhanced by ASM data sharing between the ATM network function, ASM actors, airspace users and ATC. ASM data regarding the planning and tactical management of airspace reservations are continuously exchanged and integrated in real time between the ATM systems. Continuous exchange of ASM data between civil and military national actors will be enhanced.

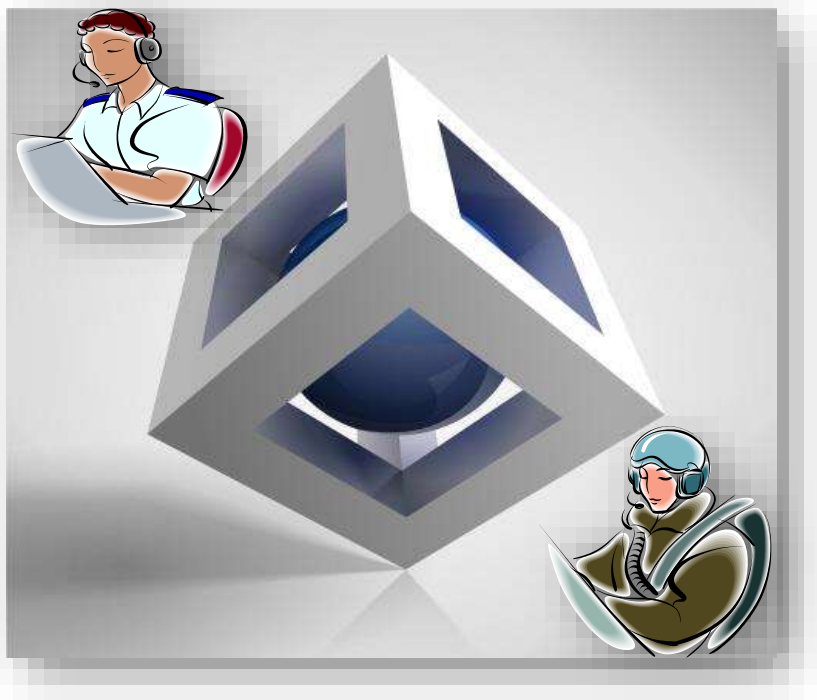
**Description**

Automated ASM systems to ensure uninterrupted data flow between ATM Network functions and the neighbouring ASM systems from the pre-tactical planning to the real time airspace status.

# AFUA Main Goals

- Improve Planning Process
- Promote dynamicity
- Support Free Route (FRA) implementation
- Enhance ASM/ATFCM integration
- Ensure Network approach
- Enhance automation

***Dynamic trajectory operations***



# AFUA Enablers

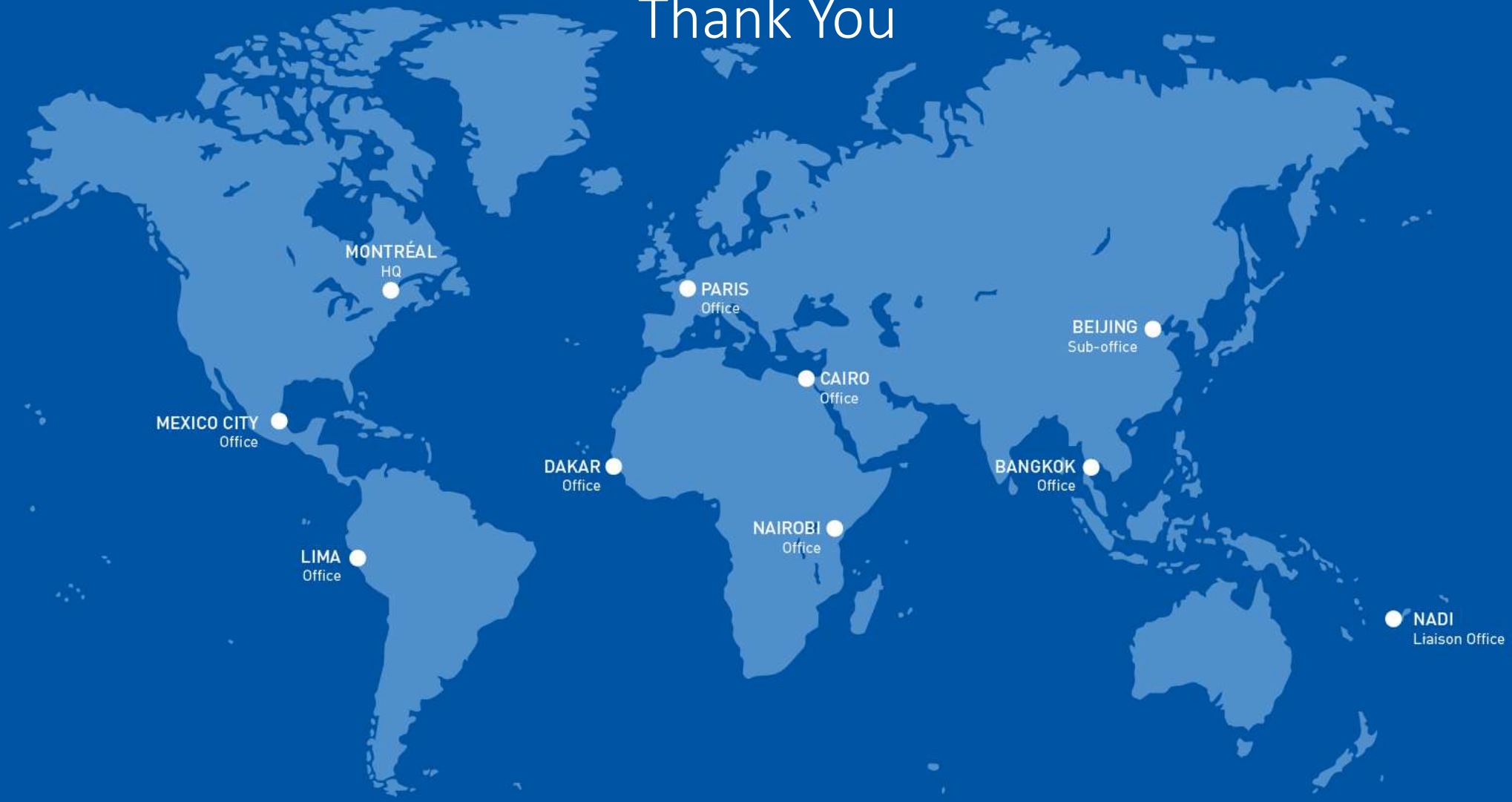
- Use of extensive **Collaborative Decision Making** (CDM) to enhance FUA
- An extensive use of **airspace configurations**
- Management by **availability** of airspace blocks, dynamic trajectory operations and free routing
- Continuous, seamless and reiterative planning resulting in a **continuous/rolling network airspace use plan** known as rolling process
- An extensive region-wide and cross-border **shared use** of reserved areas
- Better exchange of data for **common situational awareness** at any time
- A more accurate and comprehensive **performance monitoring and evaluation** at network and local levels

*Note: Please refer to **Doc 10088 Appendix B** for more information.*

# Summary

- Active airspace reservations **are crossed or avoided** depending on the level of coordination (including civil/military coordination) and the status of the activity in the area. ***This will remain the case in Free Route Airspace.***
- ASM in FRA will differ from that of the fixed ATS route network in that AOs will no longer be given information on which routes are available but will need to know which **airspace is available/not available**, so as to enable the **selection of a flight path** that will **avoid** them.
- ATC units, corresponding military authorities, airspace users and relevant stakeholders (e.g. the Network Manager) will need to know and share the **same updated information** with regard to activity of **airspace limitations**.
- Procedures shall be developed between all relevant stakeholders to ensure a **harmonized application of procedures** for the avoidance of airspace limitations.

# Thank You




Apac-rso@icao.int

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