# Civil/Military ATM Cooperation and Flexible Use of Airspace Webinar

*Online*

*20th-21st Nov 2024*

**This event is jointly organised with**

EU-CHINA APP · EU-ROK APP · APP EU-Japan · EU-SOUTH ASIA APP · EU-ASEAN SCOPE APP · Funded by the European Union · EASA European Union Aviation Safety Agency · EUROCONTROL · PANSA

***EU - Asia Aviation Partnership Projects (APP)***

SAFE SKIES.
SUSTAINABLE FUTURE.

# Global Guidance and APAC Regional Policy

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20 November 2024

# Presentation Overview

01 Why CMAC?

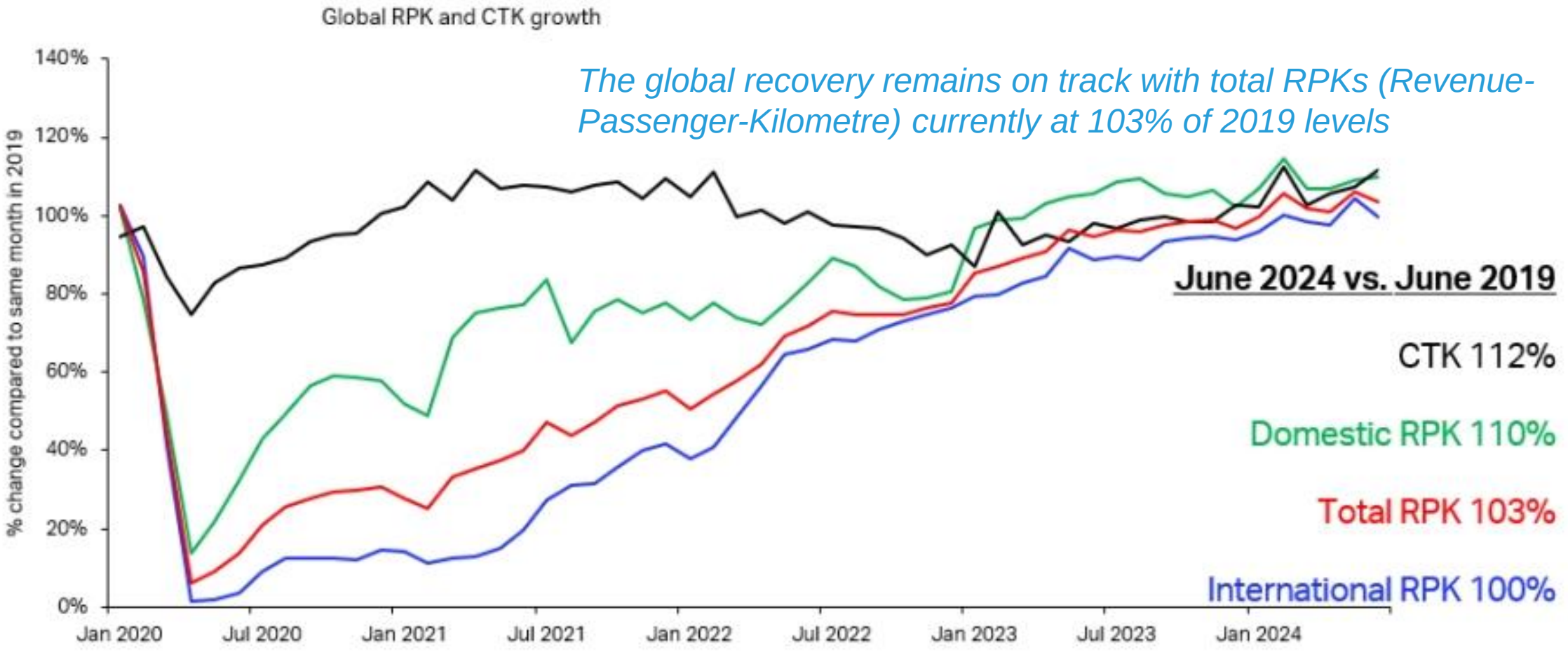
02 ICAO Regulatory Framework

03 Airspace Management & FUA

04 How to Understand FUA?

05 CMAC in APAC Region

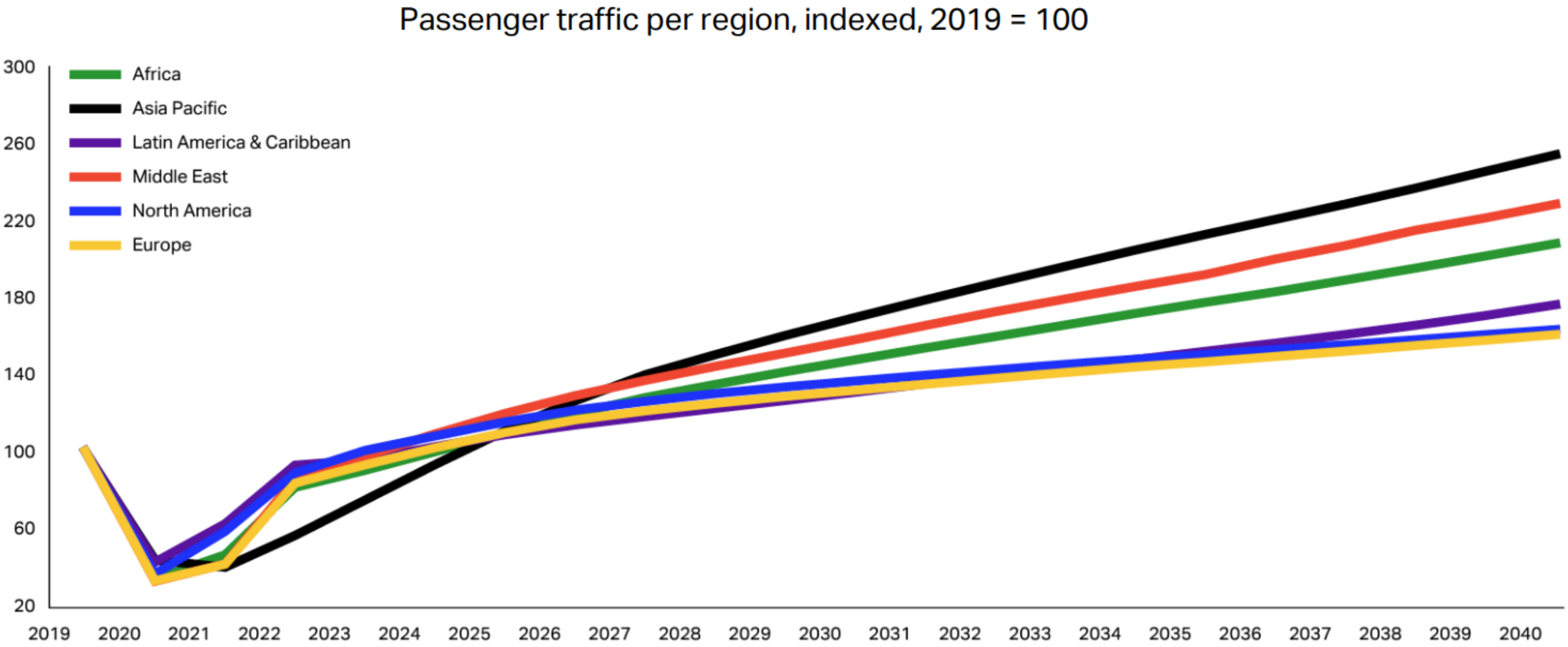
# Traffic Recovery and Growth




*The global recovery remains on track with total RPKs (Revenue-Passenger-Kilometre) currently at 103% of 2019 levels*

Source: IATA Monthly Statistics

# Traffic Recovery and Growth




Source: IATA, Tourism Economics Air Passenger Forecasts

# Requirements for Airspace

**Different Requirements for Airspace with Same Goals of Safety and Efficiency**

**Safety & Efficiency**

- Enroute step climbs
- User preferred routing
- Unrestricted climb to cruise
- No duplication or unnecessary equipage
- Constant descent to landing
- No unnecessary vectoring

# States' responsibility and obligation

## Chicago Convention Article 3

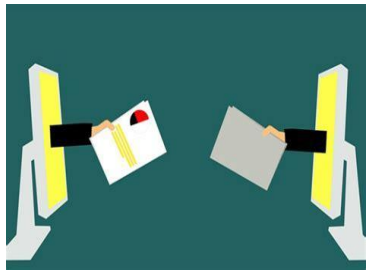
a) This Convention shall be applicable only to civil aircraft and shall not be applicable to State aircraft.

b) Aircraft used in military, customs and police services shall be deemed to be State aircraft.

c) No State aircraft of a Contracting State shall fly over the territory of another State or land thereon without authorization by special agreement or otherwise, and in accordance with the terms thereof.

**d) The ICAO Contracting States undertake, when issuing regulations for their State aircraft, that they will due regard for the safety of navigation of civil aircraft.**

# ATM System Evolution



**Network Management**

System-wide information management


**ASM** | **FPL** | **ATFM** | **Meteorology** | **Information** | **CNS**

**ANSP** | **Aircraft Operators** | **Aerodromes**

***Integration of Civil-Military ATM System***

# Why Civil-Military Cooperation in ATM?

## Growing demand vs. Finite capacity

challenges related to the management of the limited airspace available to fulfil the needs of both civil and military activities

## Balance between Safety and Efficiency

all airspace should be a usable resource, and all airspace should be managed flexibly

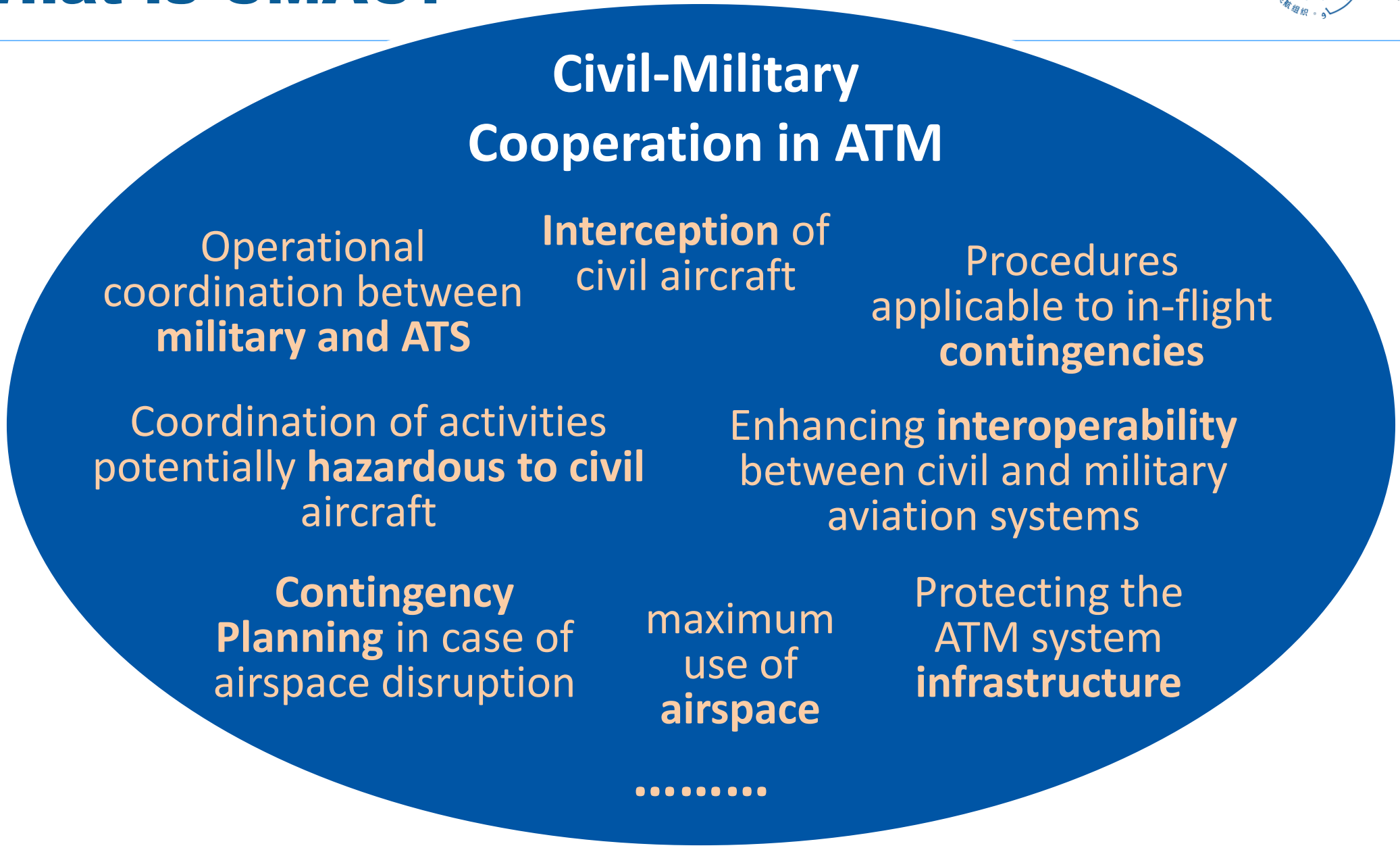

## States' responsibility and obligation

optimizing airspace for both civil and military operations results in nation-wide benefits.

## ATM System Evolution

requires global, regional and national cooperation between civil and military aviation authorities

# What is CMAC?


Civil-Military
Cooperation in ATM
Operational coordination between **military and ATS**
**Interception** of civil aircraft
Procedures applicable to in-flight **contingencies**
Coordination of activities potentially **hazardous to civil** aircraft
Enhancing **interoperability** between civil and military aviation systems
**Contingency Planning** in case of airspace disruption
maximum use of **airspace**
Protecting the ATM system **infrastructure**
.....

# What is CMAC?

Need for States to establish a framework for ensuring adequate collaboration, cooperation and coordination between civil and military aviation stakeholders

## Collaboration

- **Strategic long-term (5-20 years)** envisioning, planning and development of future global aviation systems and operations, e.g. national plan

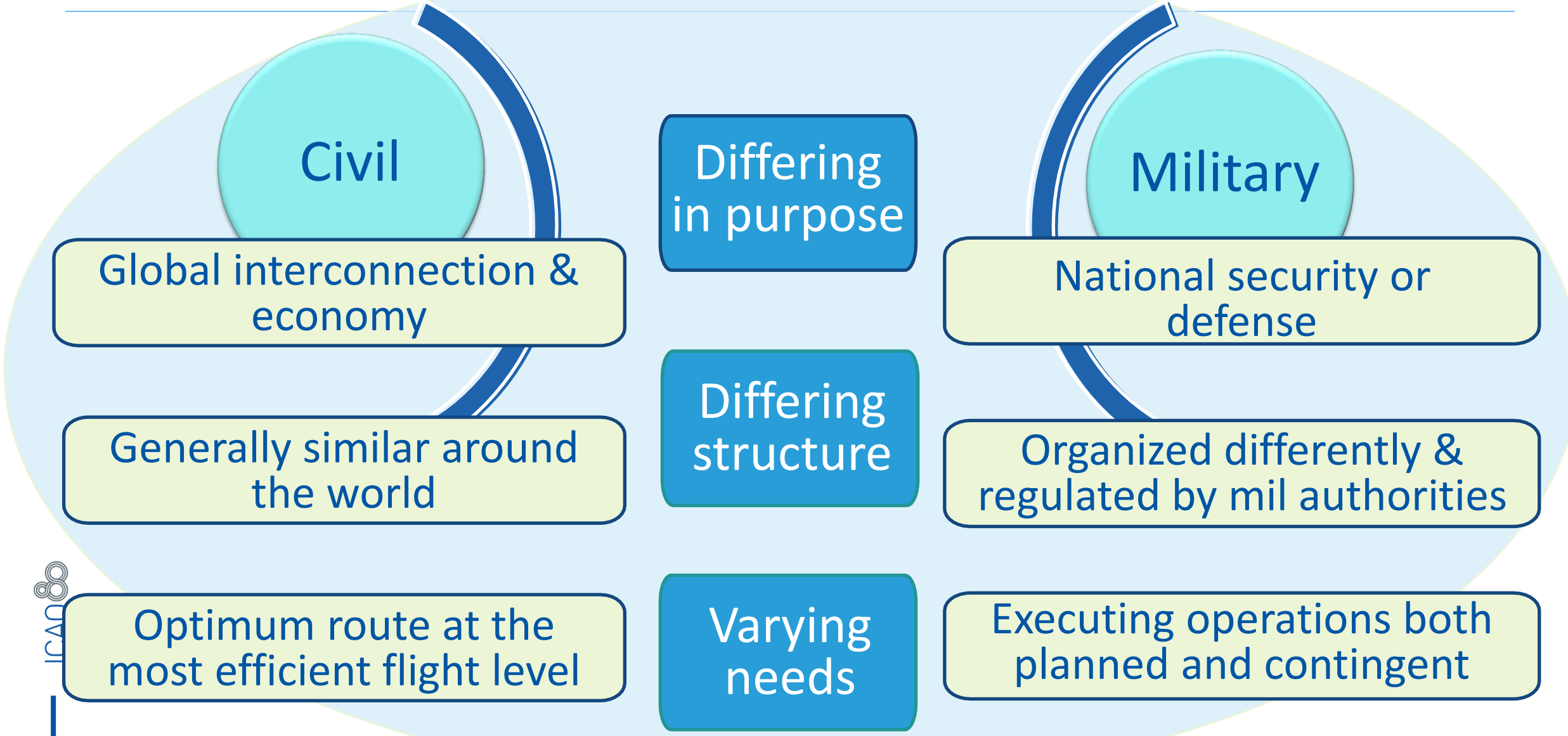
## Cooperation

- more practicable effort towards developing mutually agreeable optimized solutions to **strategic and pre-tactical** issues and challenges in the nearer time horizon, e.g. LoA

## Coordination

- the **real-time** exchanges of info and joint **tactical** decisions at the operational level, includes all the processes, procedures and actions conducted at the tactical phase

# Objectives of CMAC



# Objectives of CMAC


Mutual trust, respect, transparency and understanding

***Communication at All Levels!***

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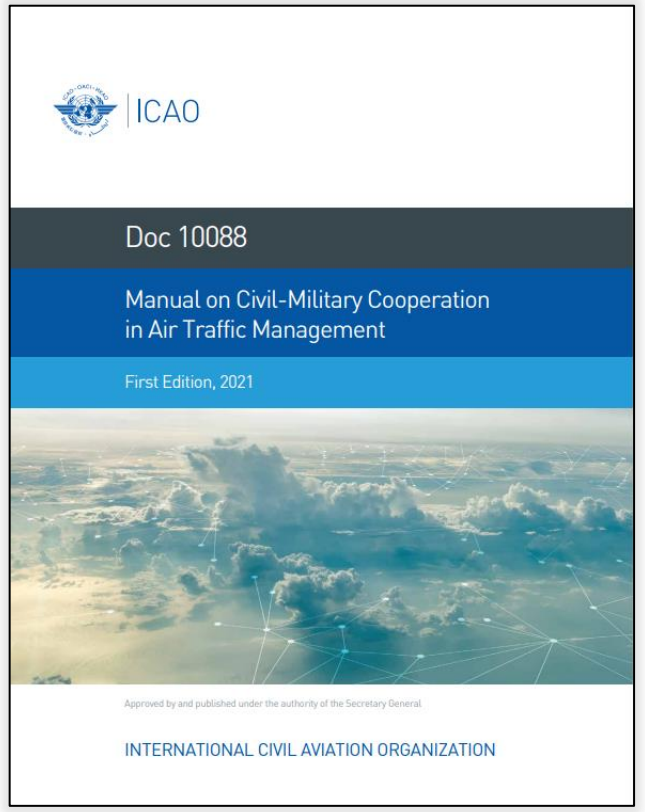
# ICAO Regulatory Framework of CMAC

- *Doc 7300—Chicago Convention*
- *Annex 2—Rules of the Air*
- *Annex 11—Air traffic Service*
- *Doc 4444—Air traffic Management & Doc 7030 — The Regional Supplementary Procedures*
- *Doc 9426— The Air Traffic Service Planning Manual*
- *Doc 9750—Global Air Navigation Plan & Doc 9854—Global Air Traffic Management Operational Concept*
- *Doc 9554—The Manual Concerning Safety Measures Relating to Military Activities Potentially Hazardous to Civil Aircraft Operations*
- *Doc 9443—Manual Concerning Interception of Civil Aircraft*
- *Doc 9985 —The Air Traffic Management Security Manual*
- *Doc 10088—Manual on Civil-Military Cooperation in Air Traffic Management*

# Manual on CMAC – Doc 10088

- **Focus**: to provide guidance to States wishing to implement or improve civil-military cooperation in ATM, for **safe and optimal** use of the airspace
- **Content**: to provide information and guidance to relevant aviation authorities on the establishment of a **framework** for civil-military cooperation and coordination to enhance and optimize the management and use of the **airspace,** and to achieve and strengthen the **trust** between civil and military.
- This manual **supersedes** Civil-Military Cooperation in Air Traffic Management (Cir. 330).



# Manual on CMAC – Doc 10088

1. A global opportunity
2. State aircraft operations and national security and defense considerations
3. Structures and implementation
4. Airspace organization and management
5. Civil/Military Interoperability
6. Civil and armed conflict, natural disasters, special activities
7. Civil-military cooperation performance measurement framework
8. ATM security
9. Air defense identification zones (ADIZs)

# ICAO and Member States' Role

## 2019 - Resolution A40-4, Appendix I
## Coordination and cooperation of civil and military air traffic

1. the common use by civil and military aviation of airspace and of certain facilities and services shall be arranged (by **Member States**)

2. the regulations and procedures established by **Member States** to govern the operation of their state aircraft over the high seas

3. the **Secretary General** shall provide guidance on best practices for civil/military coordination and cooperation

4. **Member States** may include, when appropriate, representatives of military authorities in their delegations to ICAO meetings

5. **ICAO** serves as an international forum that plays a role in facilitating improved civil/military cooperation, collaboration and the sharing of best practices.

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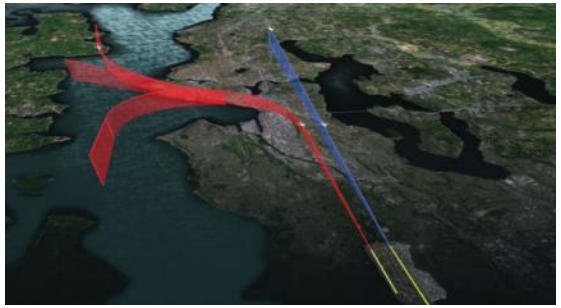
# What is Airspace Management?

- **Airspace Management (ASM):** is the process that allows the different needs of all airspace users to be met equitably.
  - "Conventional" ASM
  - Flexible Use of Airspace
- **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.



# 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” .**

# Basic Concepts

## FUA vs “Conventional” ASM

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

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

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

**Prohibited Area**

**Un-manageable Area**

**ATS Routes with no military conflict**

**……**

# Basic Concepts

# ASM/FUA Levels

1

- ***Strategic Level***—represents the **long-term, high-level** planning and support to achieve the goals of civil-military collaboration and cooperation

2

- ***Pre-tactical Level***—refers to an **intermediate preparatory planning** phase or timeframe whereby the decisions and objectives made during the strategic phase are implemented

3

- ***Tactical Level***—denotes the coordination mechanisms and exchanges between civil and military stakeholders **in real-time**

# Where to Start?

- **Establish  legal and regulatory frameworks**
  - High-level **commitment**
  - Develop frameworks for collaborative airspace **planning** policy/ strategy/agreements
  - Review the national **legal** framework
  - Develop a State **airspace policy** --- **Priorities** for airspace allocation, etc.
- **National body**
  - **CMAB:** high-level civil-military aviation cooperation policy board
  - **CAOM:** Committee for Airspace Organization and Management, established by **CMAB**
- **Liaison/cooperation structures/mechanisms**
  - pre-tactical planning, AMC etc…
  - tactical use of airspace

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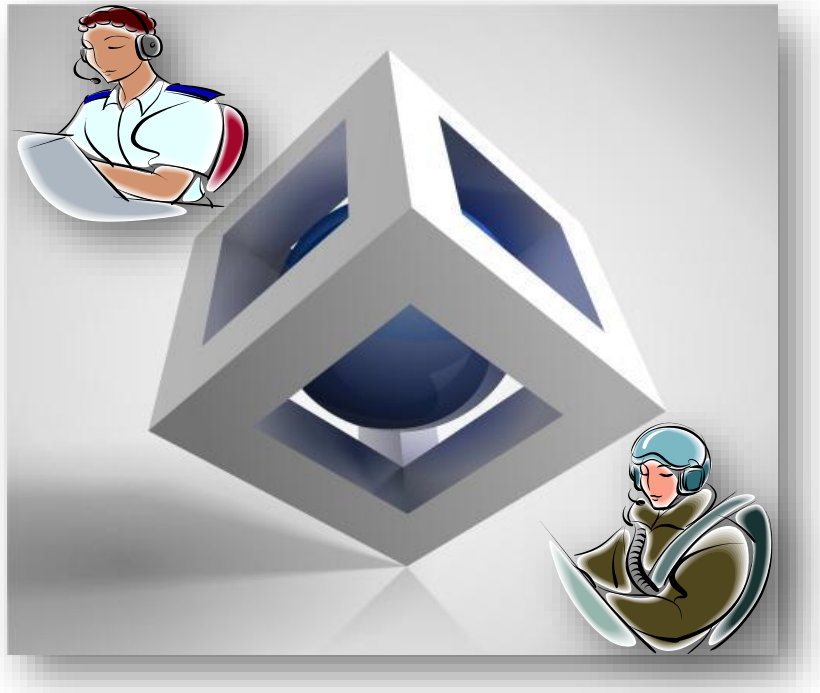
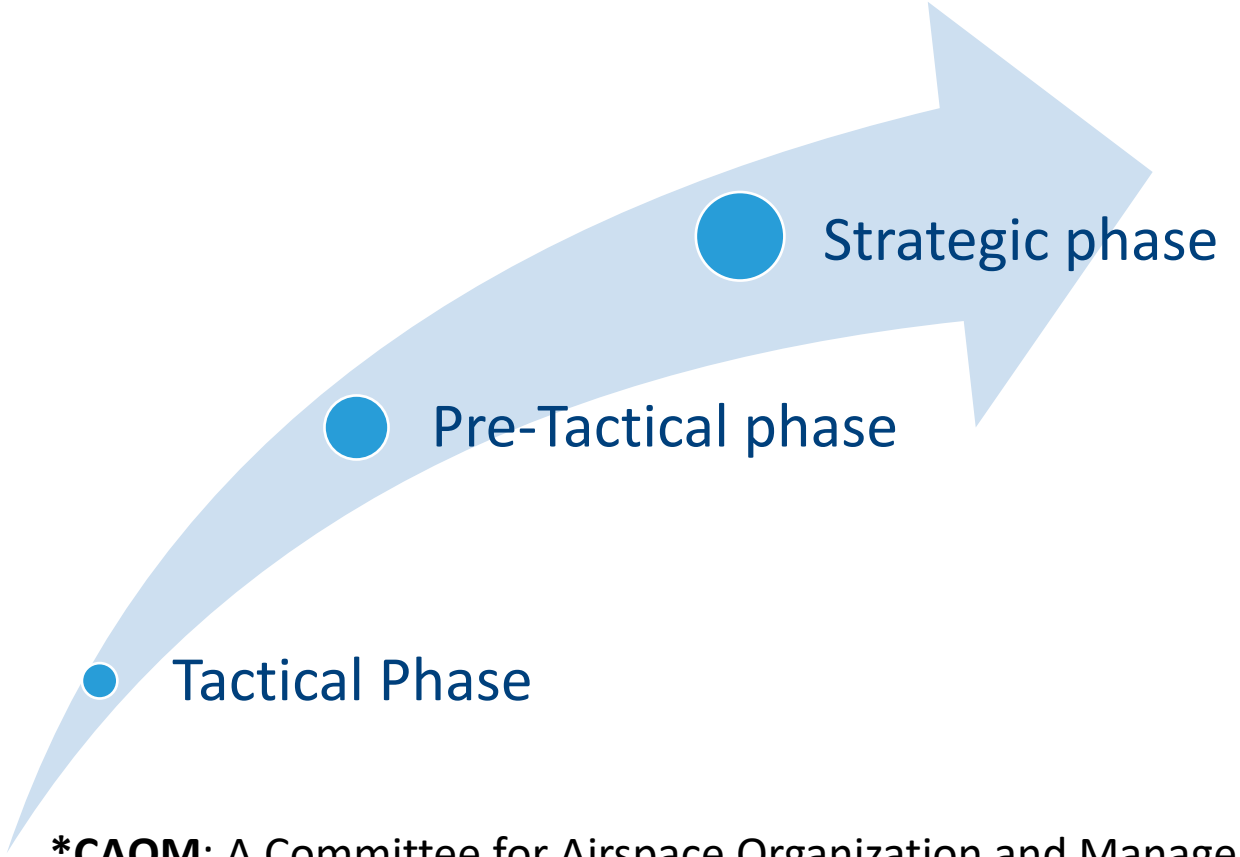
# How to Understand FUA?

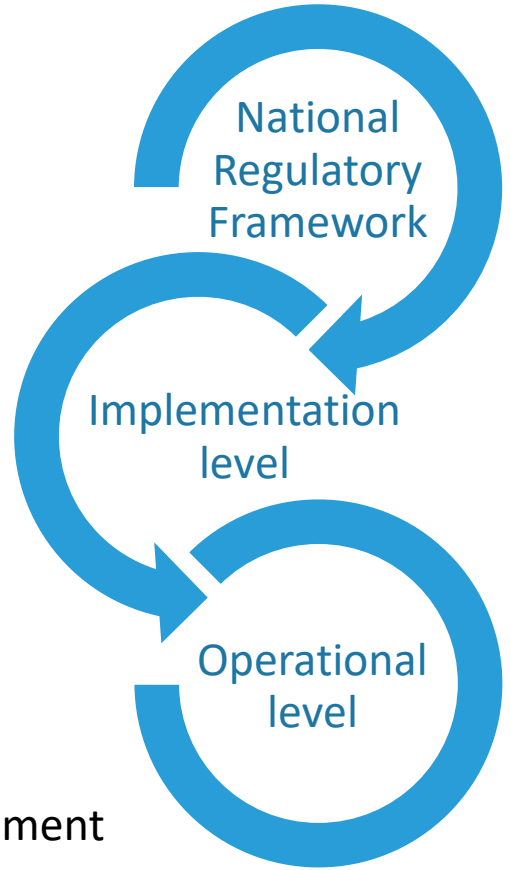
- **FUA** is an application of efficient airspace management based on **civil-military coordination** processes which are appropriate to the national needs.
- **How to understand the definition of FUA?**
  - **Dynamic** Airspace Management Process
  - Selection of airspace options by ATM community based on **actual need**
  - Civil and Military user's **requirements** to be accommodated to the greatest extent possible
  - Avoid permanent airspace segregation, any restriction or reservation should be of a **temporary** nature
  - **Improve** system performance, airspace capacity and efficiency



# Basic Principles of FUA

1 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……

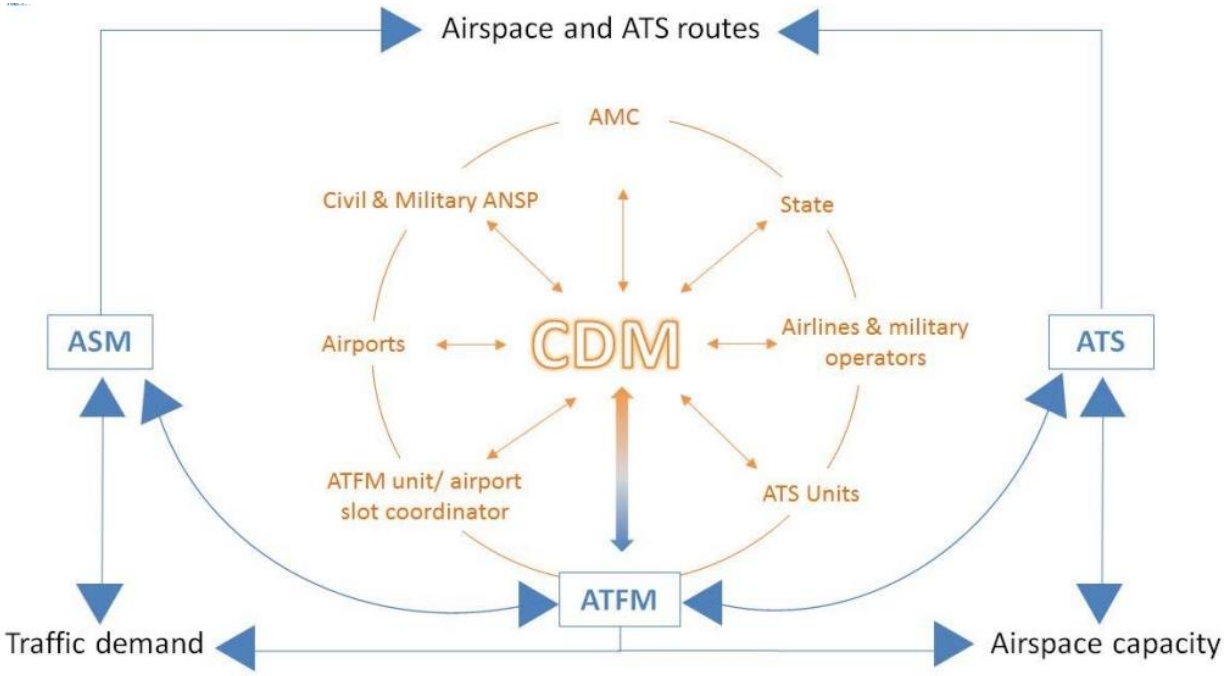
**Joint C/M AMC**, Processes, AUP, Publications, ……

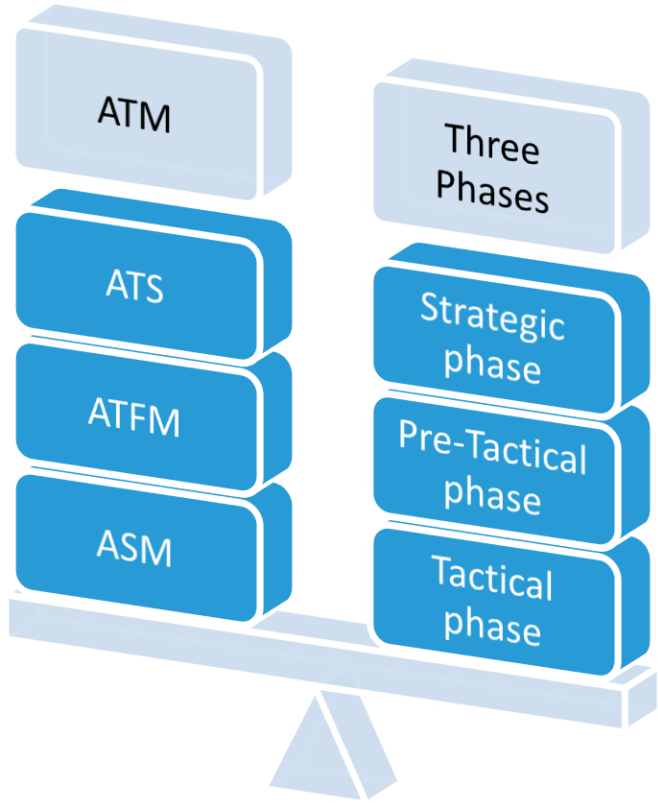
**Civil ATS & Military Unit**, Real-time coordination……

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

# Basic Principles of FUA

2 **ASM, ATFM and ATS** should be established and interact in a consistent manner, including the establishment of the necessary means to exchange information

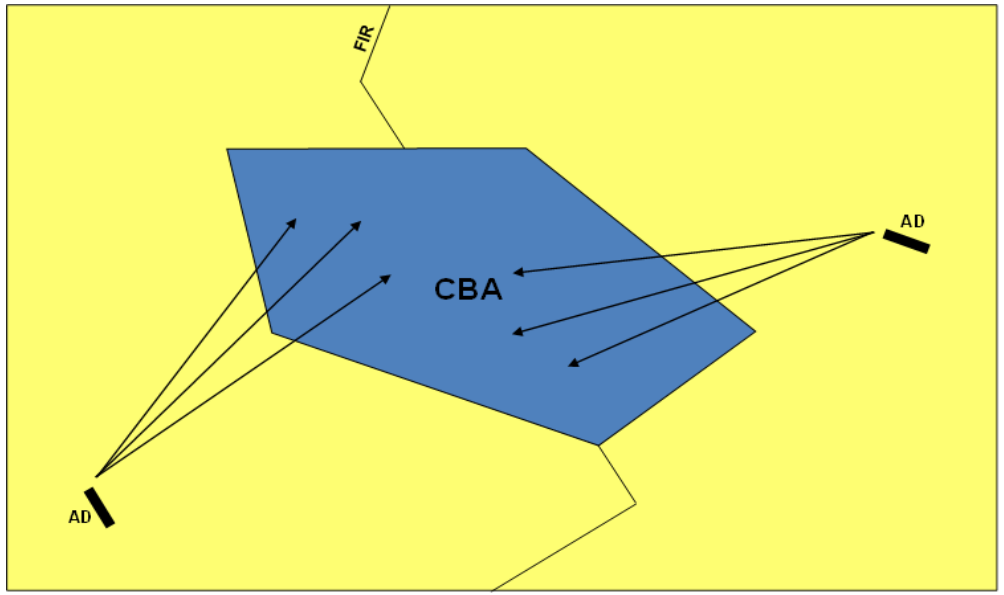



CDM: Collaborative Decision Making. A Process from which all participating parties can gain benefits through the negotiation of proposed options.

# Basic Principles of FUA

3 The FUA concept should, when possible, be applied across national borders and/or the boundaries of flight information regions (FIRs), which will require **international coordination**

# Where to Start?

- **Talk** to each other – Formally and informally
  - Reciprocal understanding
- **High-level commitment** on both sides
  - MoT, MoD, DG, Defense Generals…
  - High-level policy and guidance
- Develop **structures**: CAOM, AMC, management planning process, execution procedures, airspace structures…


# FUA Airspace Structures

- ATS Route
- ATC Sectors
- Prohibited Area (P)
- Restricted Area (R)
- Danger Area (D)
- ***Temporary Reserved Area (TRA)***
- ***Cross-Border Area (CBA)***
- ***Conditional route(CDR)***
- Others

→ ***Free Route Airspace (FRA)***

**Conventional Airspace Structure**

**FUA Airspace Structures**

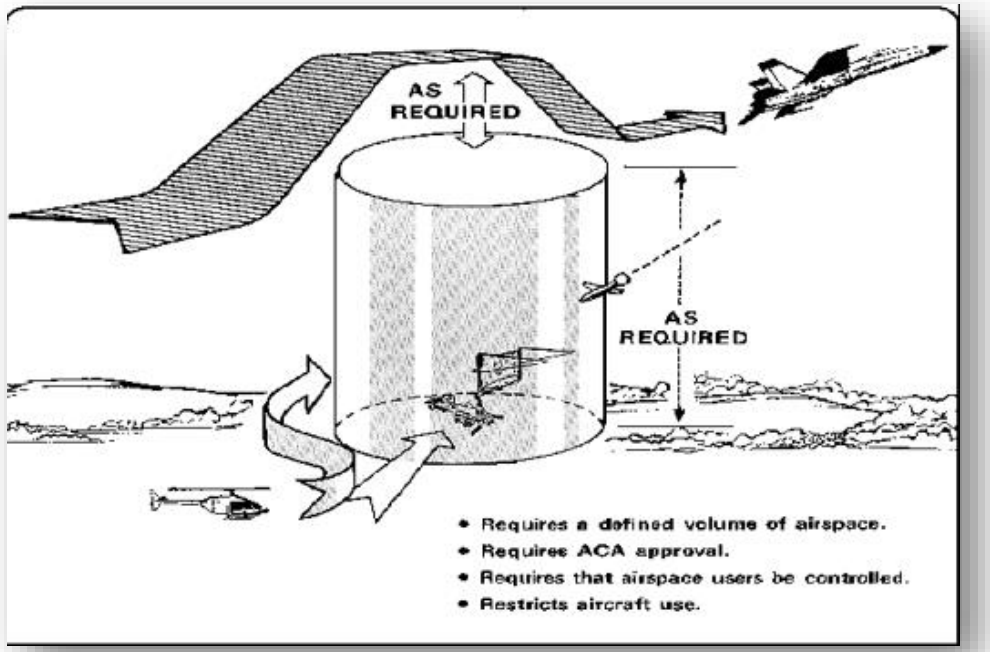
**SUA**

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

# Where to start?

## Reviewing SUA is fundamental at the strategic phase of FUA

- **Principles:**
  - Due consideration on its **effect** on civil, e.g. purpose, regularity, size, activation…
  - **Regular review** of SUA (type, dimension…) and associated processes/procedures, less than every five years
- **Review of SUA design:**
  - **safety buffers**, inside or outside the SUA (or a combination of two)
  - standardized buffers when defining **vertical and horizontal**



# Temporary Reserved Area (TSA)

## Non-FUA

Normally occupied H24

## FUA Concept

P — Prohibited → P — Prohibited

R — Restricted → TRA — Temporary Reserved Area

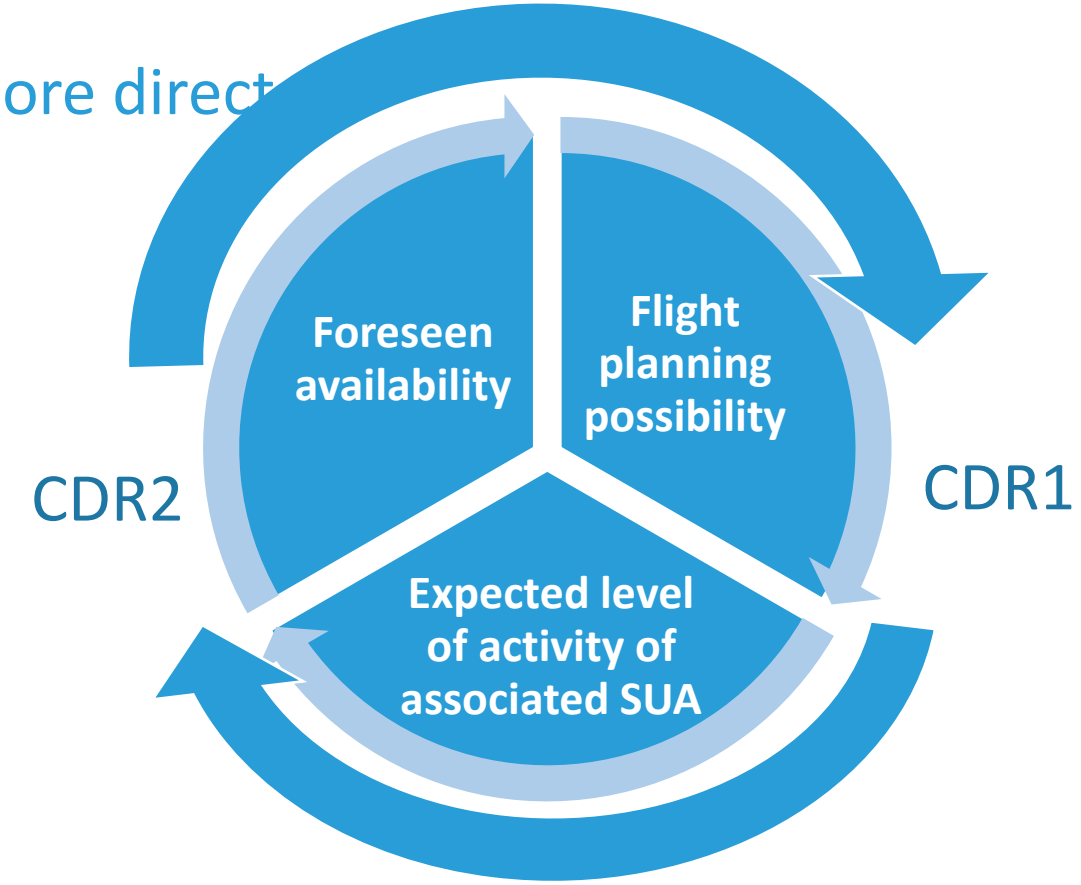
"Manageable"

D — Danger → TRA — Temporary Reserved Area

An SUA could be defined as "**manageable**" if its activation decision, in terms of airspace volume and time, is the outcome of a negotiation process at the AMC level

# Conditional routes (CDRs)

- **Definition:** A **non-permanent** ATS route or portion thereof which can be planned and used under specified conditions
  - normally through TRA and/or “manageable” SUA(D\R)
  - established at FUA strategic phase
  - linking to existing ATS route network, more direct
- **Categories**:
  - **CDR1**: permanently plannable
  - **CDR2**: non-permanently plannable
- **Properties:**
  - Categories
  - Alignment
  - route designator
  - availability for flight planning, etc.
- Published in the national **AIP**

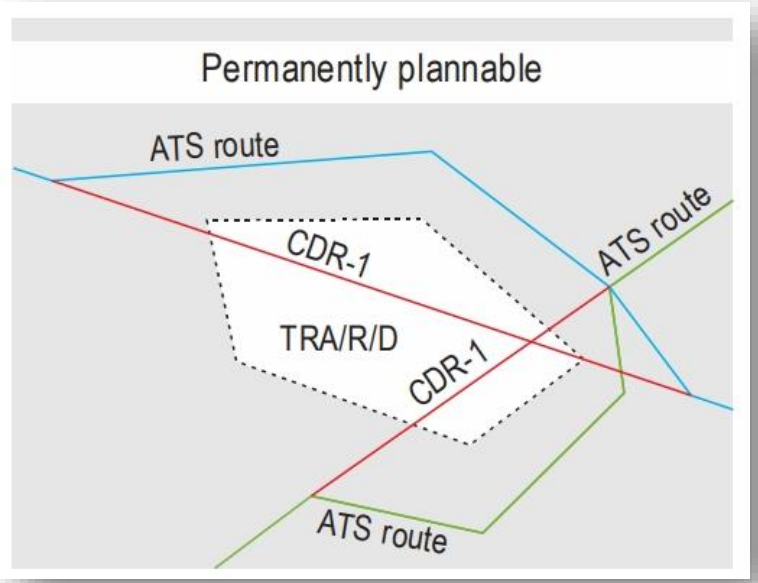


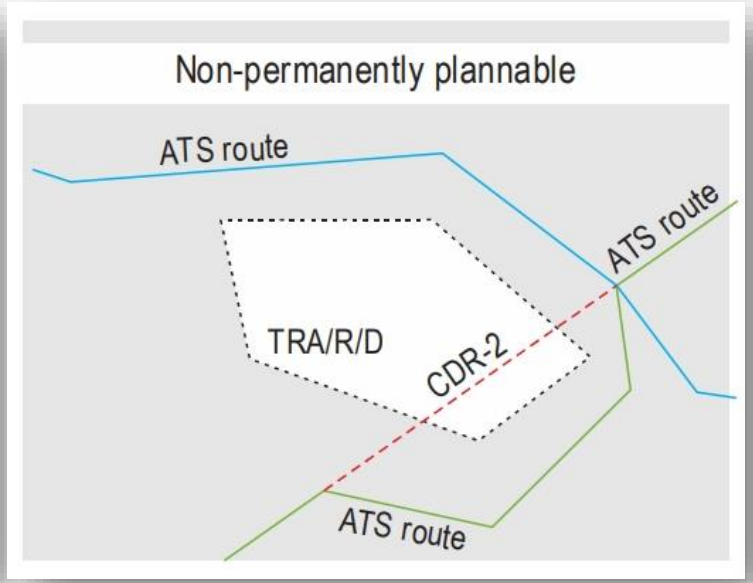
# Conditional routes (CDRs)

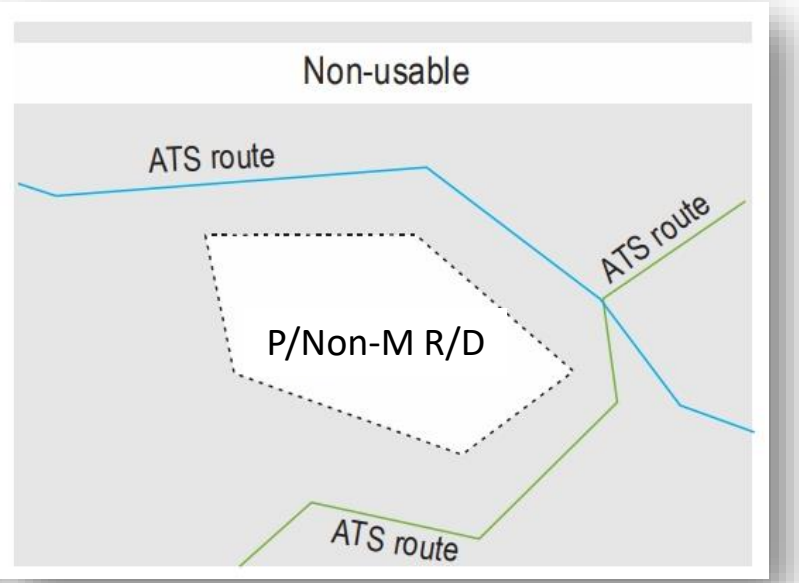
## CDRs are closely related to the associated SUA!

Establish CDR1 and/or CDR2 through TRA/ “manageable” SUA (R/D) based on the features of the associated airspace

Prohibited area and non-manageable R/D, unable to establish CDR



# FUA Strategic Phase – AIP Publications

LUFTFAHRTHANDBUCH DEUTSCHLAND
AIP GERMANY

LUFTFAHRTHANDBUCH DEUTSCHLAND
AIP GERMANY

Conditional Route - CDR

ENR 3.2-N-1
Effective: 18 APR 2024

| Route designator<br>Name of significant points<br>Coordinates | True Track | Geodesic DIST NM | Upper limits<br>Lower limits | Direction of cruising levels | Remarks | Controlling Unit |
|---|---|---|---|---|---|---|
| 1 | | | | | | |

ENR 3.2

Restricted Area - TRA

**Flugbeschränkungsgebiete**
**Restricted Areas**

| Gebietsbezeichnung<br>Seitliche Begrenzung<br>Area Designation<br>Lateral Limits | Obere/Untere Begrenzung<br>Upper/Lower Limit | Zeitliche Wirksamkeit<br>Times of Activity |
|---|---|---|
| 1 | 2 | 3 |
| **ED-R 107C (TRA-Allgäu 1)**<br>N 48 31 40 E 009 33 00 – N 48 37 30 E 009 42 07 – N 48 39 43 E 010 32 38 – N 48 21 50 E 011 00 00 – N 48 01 50 E 011 00 00 – N 47 54 39 E 010 18 35 – N 48 31 40 E 009 33 00. | FL 215<br>FL 100 | AMC manageable area<br>Mon – Thu<br>0700 (0600) – 2230 (2130)<br>Fri<br>0700 (0600) – 1600 (1500)<br>nicht während gesetzlicher Feiertage/not during public holidays |
| **FBZ ED-R 107CZ (TRA-Allgäu 1)**<br>N 48 39 55 E 009 40 29 – N 48 42 16 E 010 34 04 – N 48 22 53 E 011 03 45 – N 48 01 09 E 011 03 45 – N 47 59 39 E 011 02 24 – N 47 51 44 E 010 16 45 – N 48 30 47 E 009 29 14 – N 48 32 40 E 009 29 09 – N 48 39 55 E 009 40 29. | FL 215<br>FL 95 | For flight planning purposes only. |
| **ED-R 107W (TRA-Allgäu 1)**<br>N 48 31 40 E 009 33 00 – N 47 54 39 E 010 18 35 – N 47 53 24 E 009 33 00 – N 48 31 40 E 009 33 00. | FL 215<br>FL 100 | AMC manageable area<br>Mon – Thu<br>0700 (0600) – 2230 (2130)<br>Fri<br>0700 (0600) – 1600 (1500)<br>nicht während gesetzlicher Feiertage/not during public holidays |

CDRs are referred to as "CDR1" with the following properties:
– CDR1 are in general available for flight planning during times and under conditions published in the Ge
– The unavailability of a CDR1 (or any portion thereof) for flight plan filing purpose will be published an
daily via national AUP and European EAUP. Updates will be provided via national UUP and European EU
– Any re-routing around associated TRAs that are activated on short notice (after UUP publication) will be made on ATC instruction. This possibility for re-routing has to be considered for the calculation of fuel consumption.

CBA

**ENR 5.2**
**Militärische Übungsgebiete**
**Military exercise and training areas**

**Aktivitäten militärischer Strahlflugzeuge in Cross Border Area (CBA) in Hannover UIR und Bremen FIR**

**Allgemeines**

Im Zusammenhang mit Luftverteidigungsübungen finden in dem nachstehenden Luftraum verstärkt Flüge militärischer Strahlflugzeuge statt.

Dadurch kann es zu Einschränkungen der Verfügbarkeit des Luftraums für den Allgemeinen Luftverkehr kommen.

Die EUC SEA 1 ist ein militärisches Übungsgebiet, das nationale und/oder FIR/UIR-Grenzen überschreitet.

**Activities of Military Jet Aeroplanes in Cross Border Area (CBA) in Hannover UIR and Bremen FIR**

**General**

In connection with air defence exercises, flights of military jet aeroplanes will increasingly take place in the airspace described below.

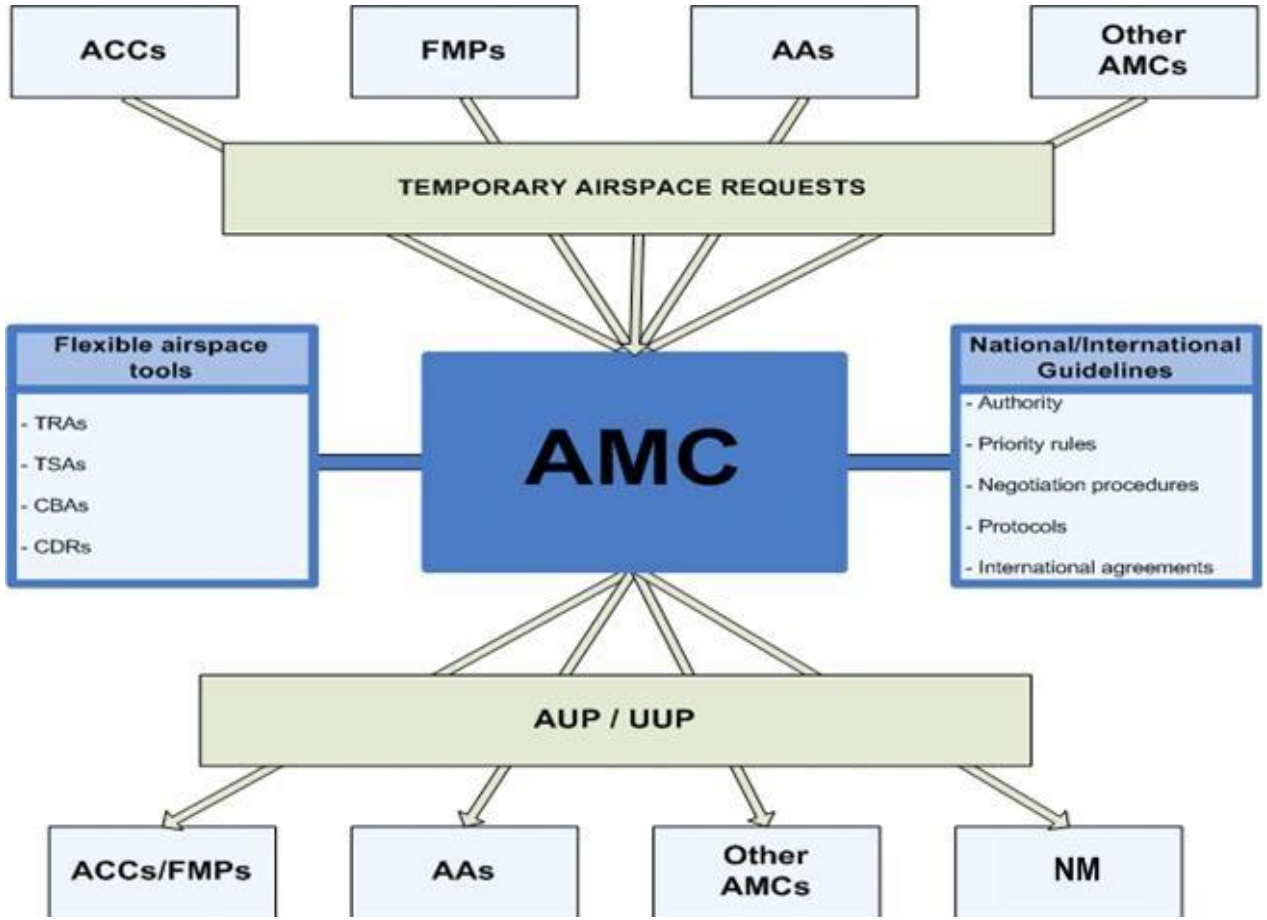
This may cause restrictions in the availability of the airspace for General Air Traffic.

The EUC SEA 1 is a military exercise area which exceeds national and/or FIR/UIR boundaries.

| Gebietsbezeichnung<br>Seitliche Begrenzung<br>Area designation<br>Lateral limits | Obere Begrenzung<br>Untere Begrenzung<br>Upper/Lower Limit | Bemerkungen<br>Remarks |
|---|---|---|
| 1 | 2 | 3 |
| **EUC SEA 1**<br>N 54 57 30 E 005 02 35 – N 54 57 30 E 006 30 00 – N 54 57 30 E 007 36 59 – N 53 54 13 E 006 55 25 – N 53 50 02 E 006 30 00 – N 53 32 30 E 004 49 39 – N 53 32 30 E 003 45 38 – N 54 57 30 E 005 02 35. | FL 660<br>FL 55 | Mon – Thu 0700 (0600) – 2300 (2200)<br>Fri 0700 (0600) – 1500 (1400)<br>Im Bedarfsfall wird die zeitliche Wirksamkeit freitags bis 1600 (1500) ausgedehnt. Dieser wird von DFS Deutsche Flugsicherung GmbH durch NOTAM bekanntgemacht./If necessary, the times of activity will be extended to Fridays until 1600 (1500). This will be announced by DFS Deutsche Flugsicherung GmbH by NOTAM. |
| **FBZ EUC SEA1Z**<br>N 55 02 27 E 004 57 23 – N 55 02 25 E 007 49 38 – N 53 50 04 E 007 01 48 – N 53 27 30 E 004 50 53 – N 53 27 26 E 003 31 48 – N 55 02 27 E 004 57 23. | FL 660<br>4500 MSL | For flight planning purposes only. |

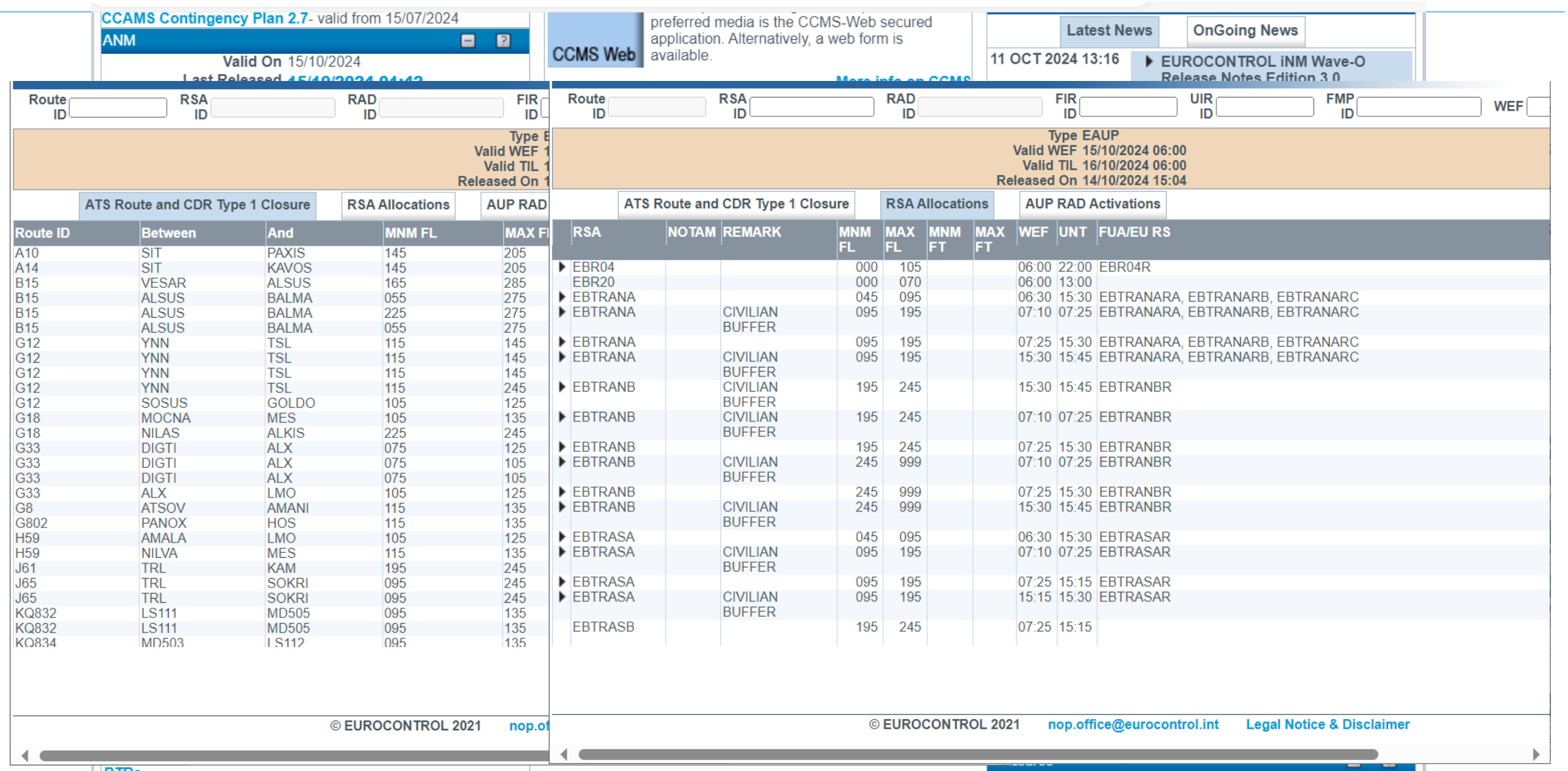
# FUA Pre-Tactical Phase - AUP / NOTAM

## Airspace Management Cell Operations




- To develop and promulgate AUP/UUP/NOTAM 1-day before operation
- Respond to specific short- notice airspace requirements and/or route optimization
- To establish a CDM process for dynamic airspace allocation at tactical phase
- Supporting system/tools for timely communication to all stakeholders

# FUA Pre-Tactical Phase - AUP / NOTAM



CCAMS Contingency Plan 2.7 - valid from 15/07/2024

ANM

Valid On 15/10/2024

CCMS Web

preferred media is the CCMS-Web secured application. Alternatively, a web form is available.

Latest News | OnGoing News

11 OCT 2024 13:16 EUROCONTROL iNM Wave-O Release Notes Edition 3.0

Route ID | RSA ID | RAD ID | FIR ID

Type E
Valid WEF 1
Valid TIL 1
Released On 1

ATS Route and CDR Type 1 Closure | RSA Allocations | AUP RAD

| Route ID | Between | And | MNM FL | MAX FL |
|---|---|---|---|---|
| A10 | SIT | PAXIS | 145 | 205 |
| A14 | SIT | KAVOS | 145 | 205 |
| B15 | VESAR | ALSUS | 165 | 285 |
| B15 | ALSUS | BALMA | 055 | 275 |
| B15 | ALSUS | BALMA | 225 | 275 |
| B15 | ALSUS | BALMA | 055 | 275 |
| G12 | YNN | TSL | 115 | 145 |
| G12 | YNN | TSL | 115 | 145 |
| G12 | YNN | TSL | 115 | 145 |
| G12 | YNN | TSL | 115 | 245 |
| G12 | SOSUS | GOLDO | 105 | 125 |
| G18 | MOCNA | MES | 105 | 135 |
| G18 | NILAS | ALKIS | 225 | 245 |
| G33 | DIGTI | ALX | 075 | 125 |
| G33 | DIGTI | ALX | 075 | 105 |
| G33 | DIGTI | ALX | 075 | 105 |
| G33 | ALX | LMO | 105 | 125 |
| G8 | ATSOV | AMANI | 115 | 135 |
| G802 | PANOX | HOS | 115 | 135 |
| H59 | AMALA | LMO | 105 | 125 |
| H59 | NILVA | MES | 115 | 135 |
| J61 | TRL | KAM | 195 | 245 |
| J65 | TRL | SOKRI | 095 | 245 |
| J65 | TRL | SOKRI | 095 | 245 |
| KQ832 | LS111 | MD505 | 095 | 135 |
| KQ832 | LS111 | MD505 | 095 | 135 |
| KQ834 | MD503 | LS112 | 095 | 135 |

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Route ID | RSA ID | RAD ID | FIR ID | UIR ID | FMP ID | WEF

Type EAUP
Valid WEF 15/10/2024 06:00
Valid TIL 16/10/2024 06:00
Released On 14/10/2024 15:04

ATS Route and CDR Type 1 Closure | RSA Allocations | AUP RAD Activations

| RSA | NOTAM | REMARK | MNM FL | MAX FL | MNM FT | MAX FT | WEF | UNT | FUA/EU RS |
|---|---|---|---|---|---|---|---|---|---|
| EBR04 | | | 000 | 105 | | | 06:00 | 22:00 | EBR04R |
| EBR20 | | | 000 | 070 | | | 06:00 | 13:00 | |
| EBTRANA | | | 045 | 095 | | | 06:30 | 15:30 | EBTRANARA, EBTRANARB, EBTRANARC |
| EBTRANA | | CIVILIAN BUFFER | 095 | 195 | | | 07:10 | 07:25 | EBTRANARA, EBTRANARB, EBTRANARC |
| EBTRANA | | | 095 | 195 | | | 07:25 | 15:30 | EBTRANARA, EBTRANARB, EBTRANARC |
| EBTRANA | | CIVILIAN BUFFER | 095 | 195 | | | 15:30 | 15:45 | EBTRANARA, EBTRANARB, EBTRANARC |
| EBTRANB | | CIVILIAN BUFFER | 195 | 245 | | | 15:30 | 15:45 | EBTRANBR |
| EBTRANB | | CIVILIAN BUFFER | 195 | 245 | | | 07:10 | 07:25 | EBTRANBR |
| EBTRANB | | | 195 | 245 | | | 07:25 | 15:30 | EBTRANBR |
| EBTRANB | | CIVILIAN BUFFER | 245 | 999 | | | 07:10 | 07:25 | EBTRANBR |
| EBTRANB | | | 245 | 999 | | | 07:25 | 15:30 | EBTRANBR |
| EBTRANB | | CIVILIAN BUFFER | 245 | 999 | | | 15:30 | 15:45 | EBTRANBR |
| EBTRASA | | | 045 | 095 | | | 06:30 | 15:30 | EBTRASAR |
| EBTRASA | | CIVILIAN BUFFER | 095 | 195 | | | 07:10 | 07:25 | EBTRASAR |
| EBTRASA | | | 095 | 195 | | | 07:25 | 15:15 | EBTRASAR |
| EBTRASA | | CIVILIAN BUFFER | 095 | 195 | | | 15:15 | 15:30 | EBTRASAR |
| EBTRASB | | | 195 | 245 | | | 07:25 | 15:15 | |

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PTRs
RAD Special Event Annex
Dynamic RAD

Access to Measures is restricted to NOP (Protected) Portal Users.
For more information on this function consult the online help through the ? button on the right of the title.

NOP Network Operations Portal (eurocontrol.int)

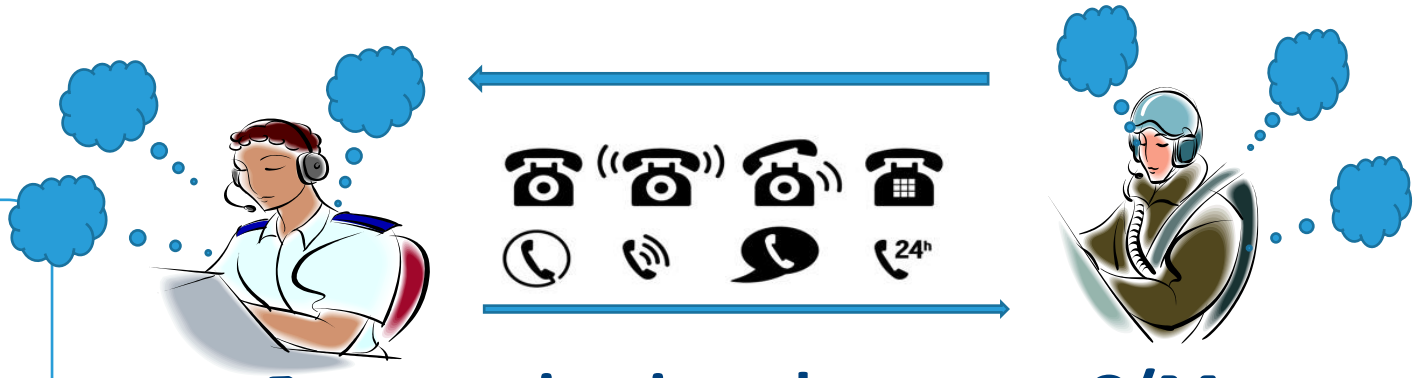
# FUA Tactical Phase - Execution

## Coordination Principles

Appropriate definition, agreement and execution of coordination procedures between C/M agencies

Readiness of appropriate procedures and protocols for unusual or unforeseen circumstance

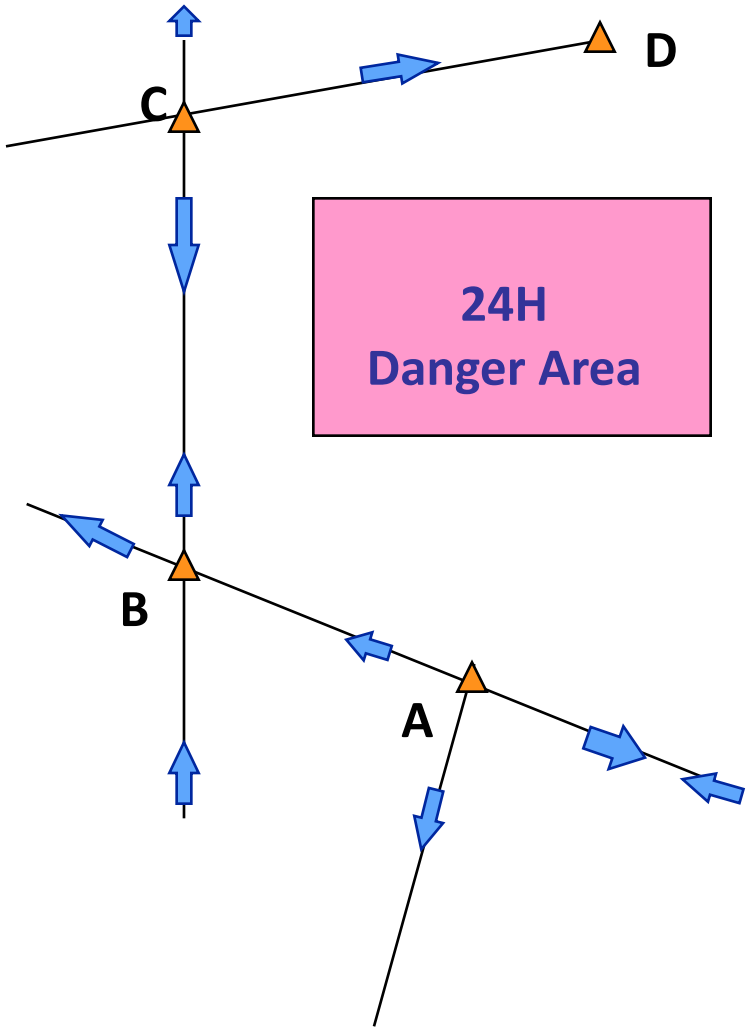
Proper written agreements enable coordination procedures and direct communication between C/M units




## Communications between C/M:

- Dedicated coordination procedures
- Reliable means of communication, Liaison/Joint working location is preferable
- Real-time access to flight data, including the intention of the controller
- Direct communication between C/M units:
  - Active mode: actions of a controller
  - Passive mode: without any action by the controllers, such as automatic dada exchange

# TRAs and CDRs Example

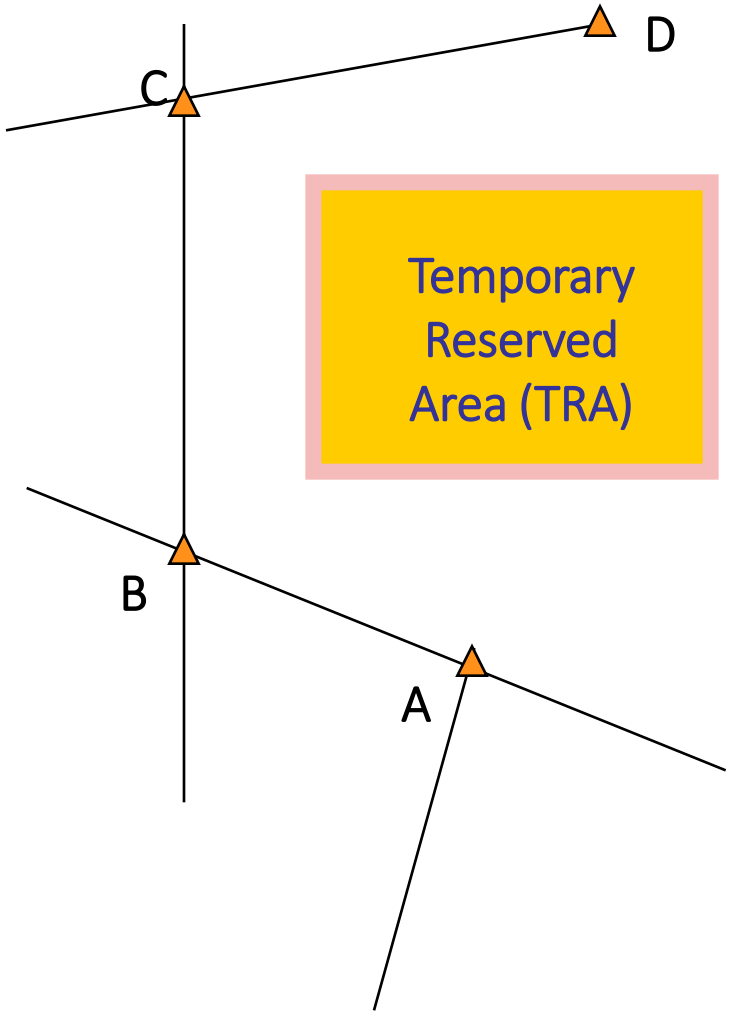



## Non-Flexible Use Situation

24H Danger Area

Only routes around the Danger Area could be used:
Decreased route capacity, bottlenecks and delay

# TRAs and CDRs Example




Temporary Reserved Area (TRA)

Application of FUA

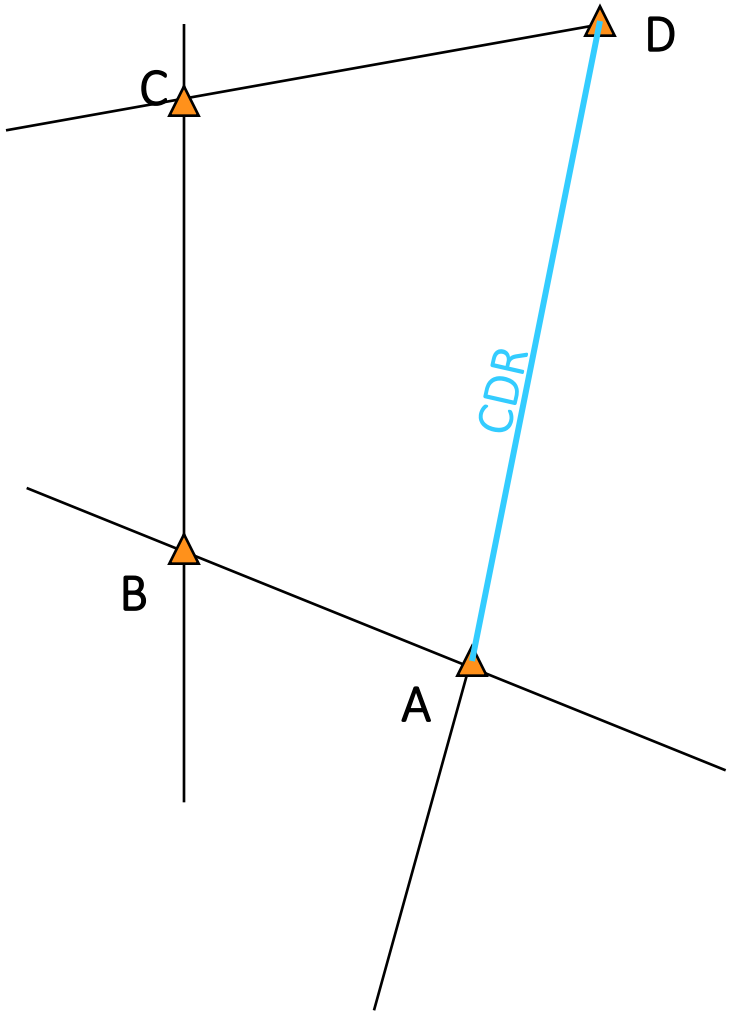
Strategic Level – Establish Temporary Reserved Area (TRAs) or Manageable Area to replace permanent Danger Area

Restricted Area - TRA

**Flugbeschränkungsgebiete**
**Restricted Areas**

| Gebietsbezeichnung<br>Seitliche Begrenzung<br>Area Designation<br>Lateral Limits | Obere/Untere Begrenzung<br>Upper/Lower Limit | Zeitliche Wirksamkeit<br>Times of Activity |
|---|---|---|
| 1 | 2 | 3 |
| **ED-R 107C (TRA-Allgäu 1)**<br>N 48 31 40 E 009 33 00 – N 48 37 30 E 009 42 07 – N 48 39 43 E 010 32 38 –<br>N 48 21 50 E 011 00 00 – N 48 01 50 E 011 00 00 – N 47 54 39 E 010 18 35 –<br>N 48 31 40 E 009 33 00. | FL 215<br>FL 100 | AMC manageable area<br>Mon – Thu<br>0700 (0600) – 2230 (2130)<br>Fri<br>0700 (0600) – 1600 (1500)<br>nicht während gesetzlicher Feiertage/not during public holidays |
| **FBZ ED-R 107CZ (TRA-Allgäu 1)**<br>N 48 39 55 E 009 40 29 – N 48 42 16 E 010 34 04 – N 48 22 53 E 011 03 45 –<br>N 48 01 09 E 011 03 45 – N 47 59 39 E 011 02 24 – N 47 51 44 E 010 16 45 –<br>N 48 30 47 E 009 29 14 – N 48 32 40 E 009 29 09 – N 48 39 55 E 009 40 29. | FL 215<br>FL 95 | For flight planning purposes only. |
| **ED-R 107W (TRA-Allgäu 1)**<br>N 48 31 40 E 009 33 00 – N 47 54 39 E 010 18 35 – N 47 53 24 E 009 33 00 –<br>N 48 31 40 E 009 33 00. | FL 215<br>FL 100 | AMC manageable area<br>Mon – Thu<br>0700 (0600) – 2230 (2130)<br>Fri<br>0700 (0600) – 1600 (1500)<br>nicht während gesetzlicher Feiertage/not during public holidays |

# TRAs and CDRs Example




Application of FUA

Strategic Level – Establish Conditional Routes (CDRs) to supplement basic ATS route network

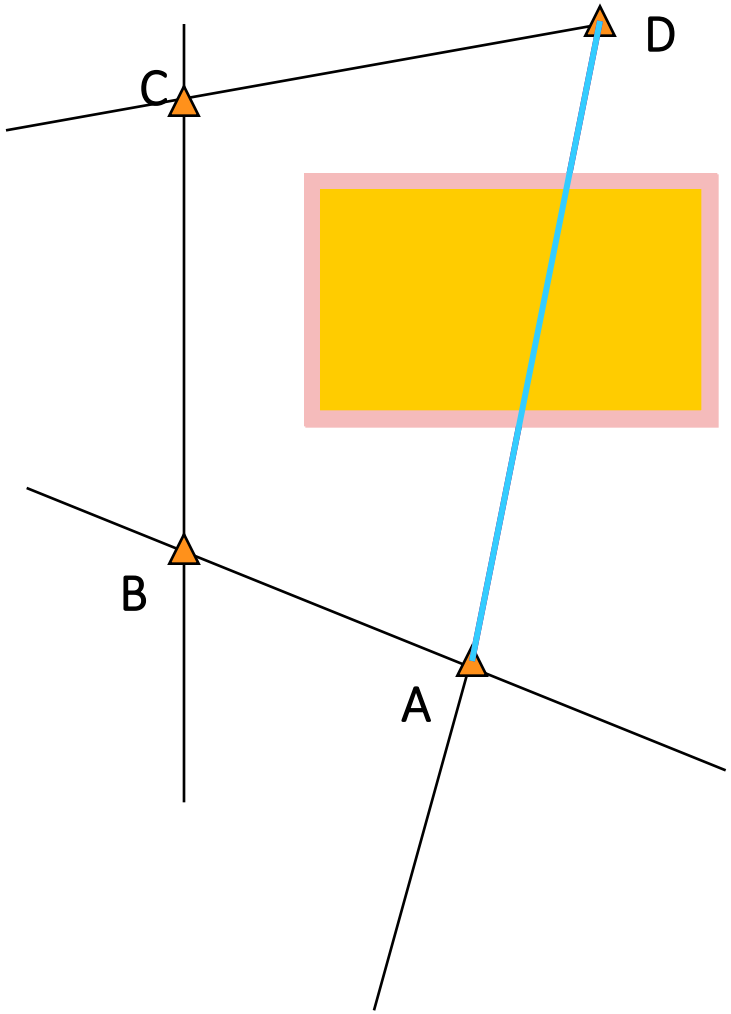
LUFTFAHRTHANDBUCH DEUTSCHLAND
AIP GERMANY

Conditional Route - CDR

ENR 3.2-N-1
Effective: 18 APR 2024

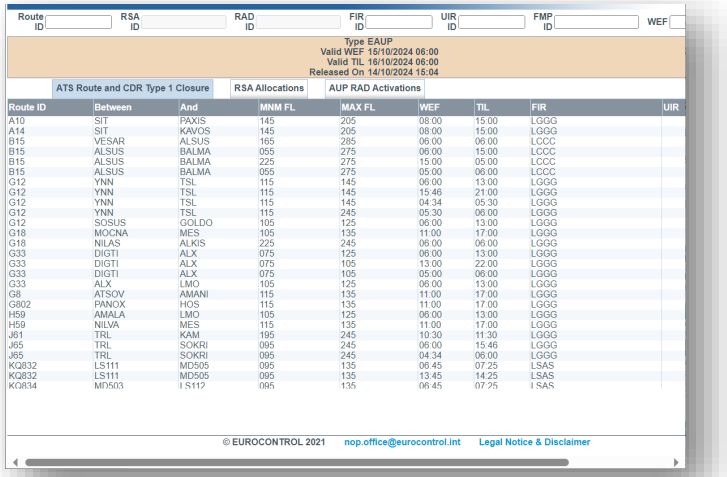
| Route designator<br>Name of significant points<br>Coordinates | True Track | Geodesic DIST NM | Upper limits<br>Lower limits | Direction of cruising levels<br>Odd | <br>Even | Remarks | Controlling Unit |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | | 6 | 7 |
| N33 | | | | | | | |
| △ RAKIT<br>N 53 10 43 E 013 54 40 | | | | | | | |
| | 006.2<br>186.3 | 23.6 | FL 660<br>FL 245 | ↑ | ↓ | CDR1<br>FL 245 – FL 265<br>H24 | BREMEN ACC<br>KARLSRUHE UAC |
| △ PADKU<br>N 53 34 11 E 013 58 59 | | | | | | | |
| | 006.3<br>186.4 | 35.6 | FL 660<br>FL 245 | ↑ | ↓ | CDR1<br>FL 245 – FL 265<br>H24 | BREMEN ACC<br>KARLSRUHE UAC |
| △ POBOX<br>N 54 09 32 E 014 05 39 | | | | | | | |
| | 003.2<br>183.2 | 40.6 | FL 285<br>FL 245 | ↑ | ↓ | CDR1<br>FL 245 – FL 285<br>H24 | BREMEN ACC<br>MALMO ACC |
| △ UMSET<br>N 54 49 59 E 014 09 31 | | | | | | | |
| | 003.2<br>183.2 | 5.0 | FL 285<br>FL 245 | ↑ | ↓ | CDR1<br>FL 245 – FL 285<br>H24 | MALMO ACC |
| △ BIKRU (FIR BDRY)<br>N 54 55 00 E 014 10 00 | | | | | | | |

# TRAs and CDRs Example




Application of FUA

Pre-tactical Level – Allocate TRAs or CDRs based on requirements of civil and military users

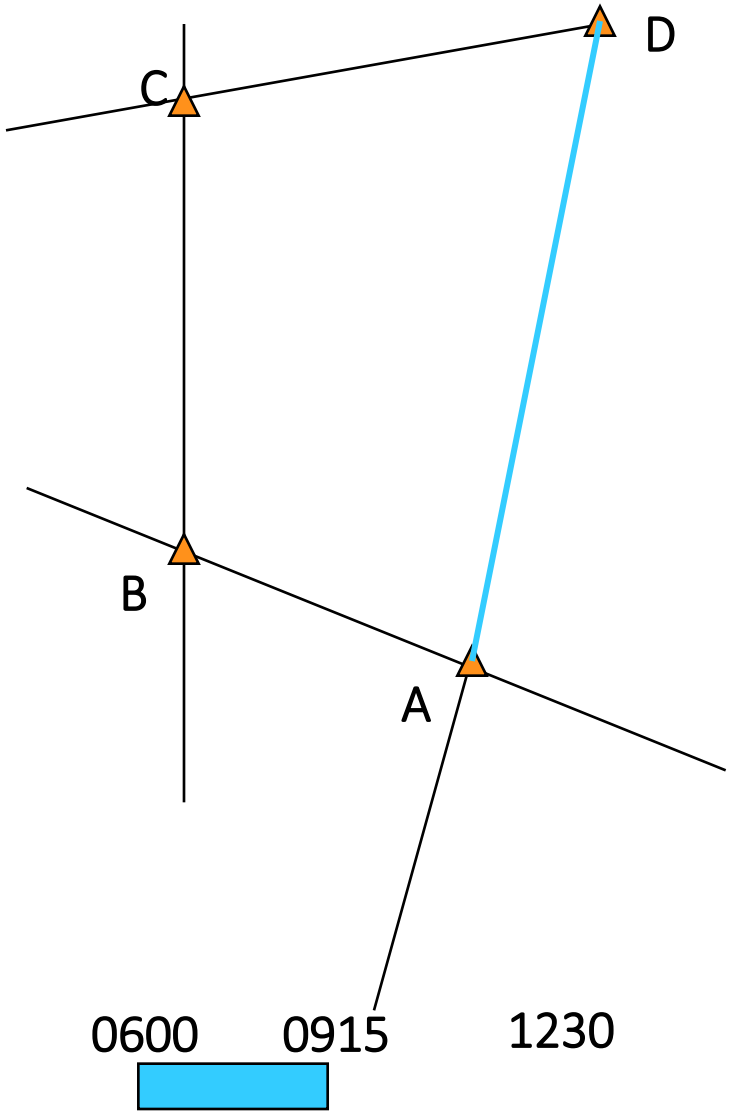

Route ID | RSA ID | RAD ID | FIR ID | UIR ID | FMP ID | WEF

Type EAUP
Valid WEF 15/10/2024 06:00
Valid TIL 16/10/2024 06:00
Released On 14/10/2024 15:04

ATS Route and CDR Type 1 Closure | RSA Allocations | AUP RAD Activations

| Route ID | Between | And | MNM FL | MAX FL | WEF | TIL | FIR | UIR |
|---|---|---|---|---|---|---|---|---|
| A10 | SIT | PAXIS | 145 | 205 | 08:00 | 15:00 | LGGG | |
| A14 | SIT | KAVOS | 145 | 205 | 08:00 | 15:00 | LGGG | |
| B15 | VESAR | ALSUS | 165 | 285 | 06:00 | 06:00 | LCCC | |
| B15 | ALSUS | BALMA | 055 | 275 | 06:00 | 15:00 | LCCC | |
| B15 | ALSUS | BALMA | 225 | 275 | 15:00 | 05:00 | LCCC | |
| B15 | ALSUS | BALMA | 055 | 275 | 05:00 | 06:00 | LCCC | |
| G12 | YNN | TSL | 115 | 145 | 06:00 | 13:00 | LGGG | |
| G12 | YNN | TSL | 115 | 145 | 15:46 | 21:00 | LGGG | |
| G12 | YNN | TSL | 115 | 145 | 04:34 | 05:30 | LGGG | |
| G12 | YNN | TSL | 115 | 245 | 05:30 | 06:00 | LGGG | |
| G12 | SOSUS | GOLDO | 105 | 125 | 06:00 | 13:00 | LGGG | |
| G18 | MOCNA | MES | 105 | 135 | 11:00 | 17:00 | LGGG | |
| G18 | NILAS | ALKIS | 225 | 245 | 06:00 | 06:00 | LGGG | |
| G33 | DIGTI | ALX | 075 | 125 | 06:00 | 13:00 | LGGG | |
| G33 | DIGTI | ALX | 075 | 105 | 13:00 | 22:00 | LGGG | |
| G33 | DIGTI | ALX | 075 | 105 | 05:00 | 06:00 | LGGG | |
| G33 | ALX | LMO | 105 | 125 | 06:00 | 13:00 | LGGG | |
| G8 | ATSOV | AMANI | 115 | 135 | 11:00 | 17:00 | LGGG | |
| G802 | PANOX | HOS | 115 | 135 | 11:00 | 17:00 | LGGG | |
| H59 | AMALA | LMO | 105 | 125 | 06:00 | 13:00 | LGGG | |
| H59 | NILVA | MES | 115 | 135 | 11:00 | 17:00 | LGGG | |
| J61 | TRL | KAM | 195 | 245 | 10:30 | 11:30 | LGGG | |
| J65 | TRL | SOKRI | 095 | 245 | 06:00 | 15:46 | LGGG | |
| J65 | TRL | SOKRI | 095 | 245 | 04:34 | 06:00 | LGGG | |
| KQ832 | LS111 | MD505 | 095 | 135 | 06:45 | 07:25 | LSAS | |
| KQ832 | LS111 | MD505 | 095 | 135 | 13:45 | 14:25 | LSAS | |
| KQ834 | MD503 | LS112 | 095 | 135 | 06:45 | 07:25 | LSAS | |

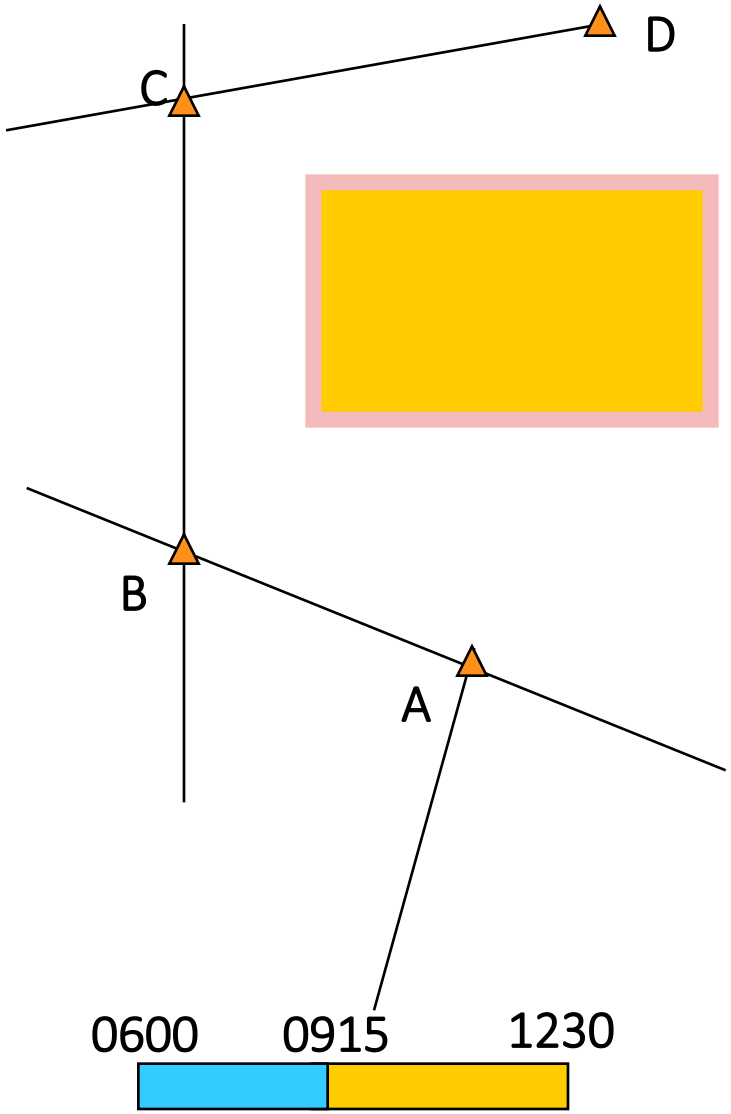
# TRAs and CDRs Example




Application of FUA

Tactical Level – On a real-time basis use available CDRs

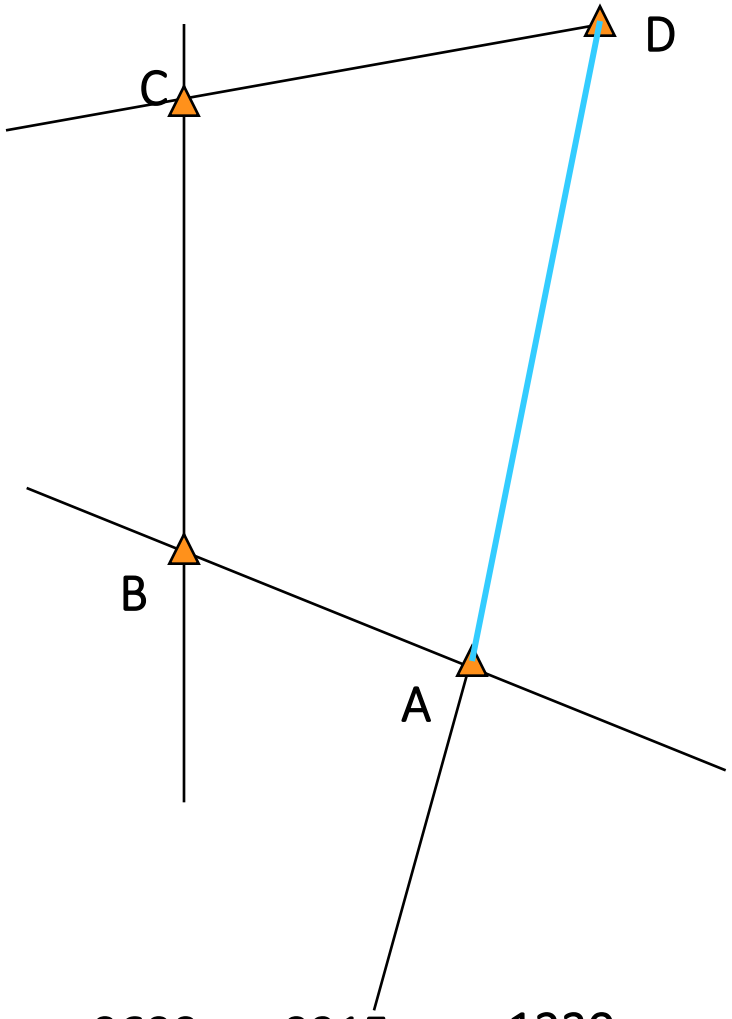
# TRAs and CDRs Example




Application of FUA

Tactical Level – On a real-time basis use available TRAs or

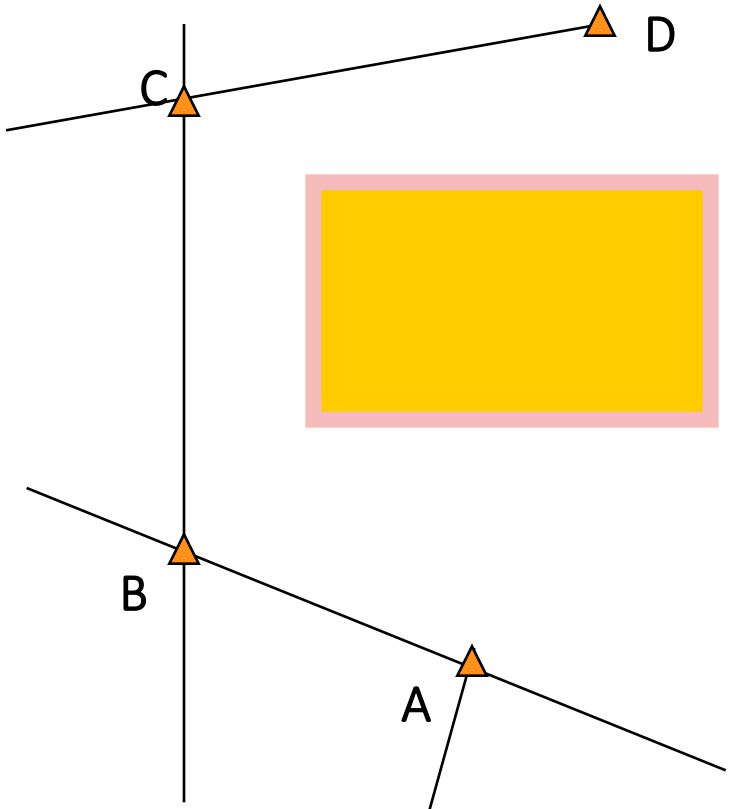
# TRAs and CDRs Example




Application of FUA

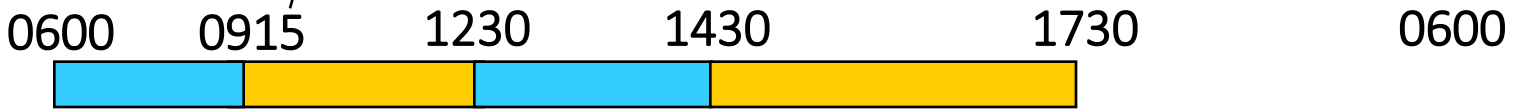
Tactical Level – On a real-time basis use available CDRs

# TRAs and CDRs Example

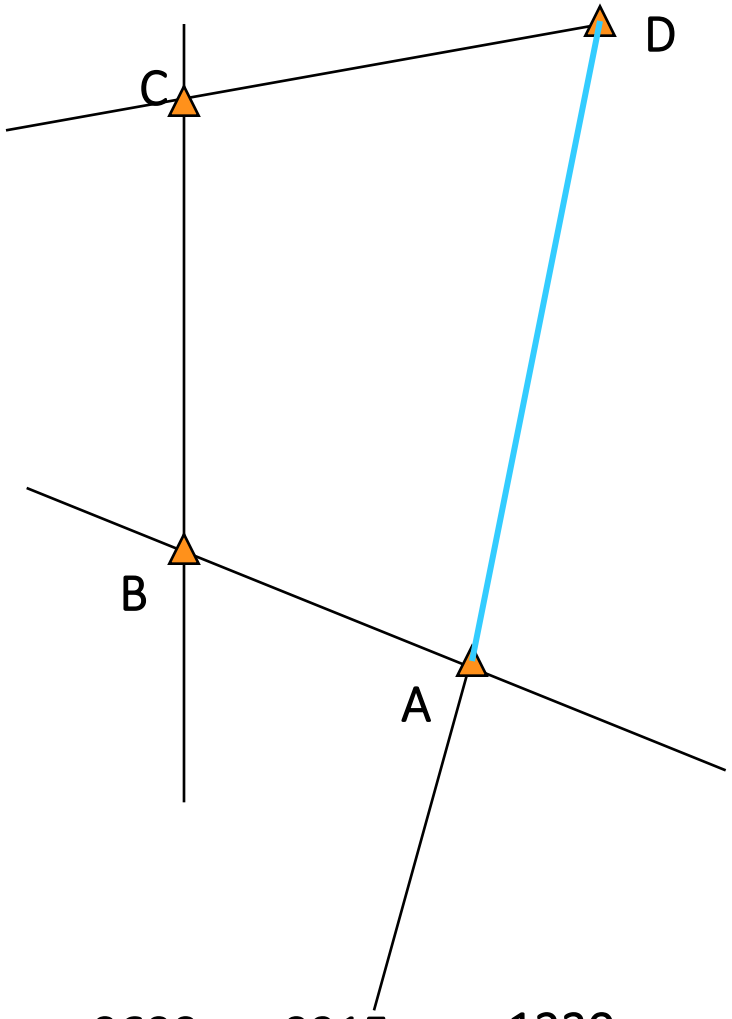



Application of FUA

Tactical Level – On a real-time basis use available TRAs or

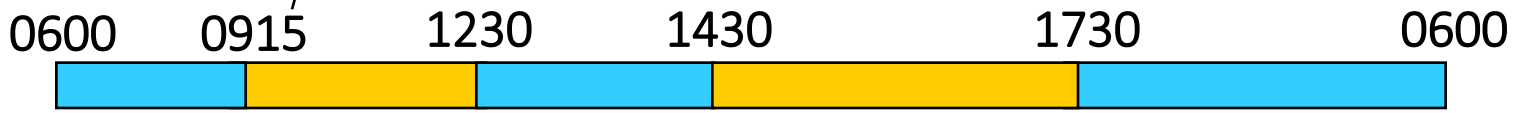


# TRAs and CDRs Example

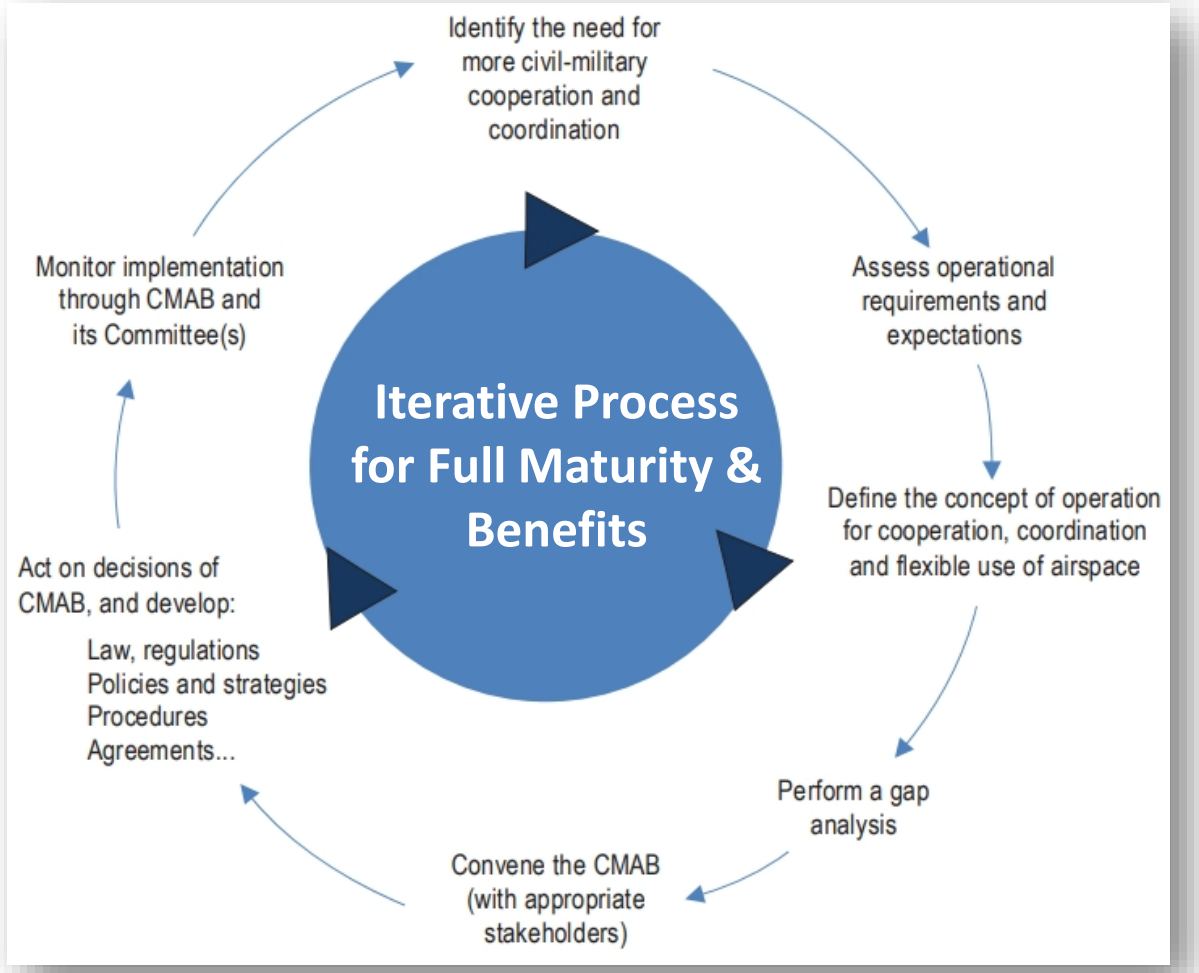



Application of FUA

Tactical Level – On a real-time basis use available CDRs



# FUA Post Operation Analysis




An example of an implementation and continuous improvement cycle

**FUA operations should be monitored and evaluated!**

- Establish mechanisms to archive data on FUA activities.
- Analyze the usage of released SUAs, CDRs, etc
- Calculate performance indicators to identify accrued benefits and areas for improvement

**Feed for review and improvement on airspace structures/procedures at Strategic Phase**

# Basic FUA vs Enhanced FUA

| BASIC FUA | Requirements for States | ENHANCED FUA |
|---|---|---|
| **Regular discussions and reviews** take place between civil and military airspace planners | Establish an **CAOM**, under the CMAB; Establish a system to periodically review airspace needs, organization and management. | +AMC |
| The e… prohi… e.g. ty… | | …ity |
| Estab… restri… | | …ctures |
| **Proce**… areas… | | …UP |
| To establish **temporary** restricted/danger areas to accommodate military operations unable confined to existing SUA | Develop **agreements** between C/M to facilitate the coordination related to FUA | +Full CDM & Three Phases Implementation |

***The Planning and Publication of Airspace Use Plan 1 Day before Operation!***

*__CMAB__: the high-level civil-military aviation cooperation policy board.

# Is FUA a Complex Process?

- **FUA complexity** is linked to the operational environment complexity
  - can be implemented at different degrees of efficiency or complexity depending on the maturity of the State's ATM environment
- **SCALABLE**: Implement what you need!
  - may be applied within the airspace of a single State
  - does not require cross-border or regional cooperation
  - can be implemented in the absence of an ATFM system
- The **full benefits** of FUA are only possible by implementing it at the tactical, pre-tactical and strategic phases

***There is no "one-size-fits-all" framework!***

# Presentation Overview

01 Why CMAC?

02 ICAO Regulatory Framework

03 Airspace Management & FUA

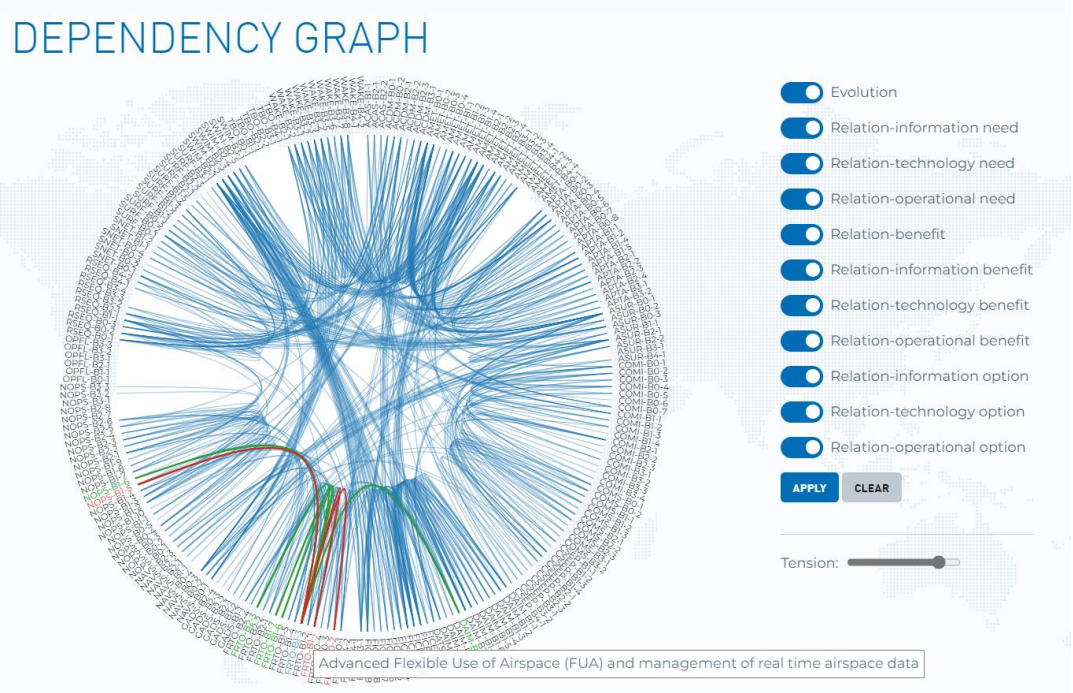
04 How to Understand FUA?

05 CMAC in APAC Region

# CMAC in GANP

**FRTO-B0/2** Airspace planning and Flexible Use of Airspace (FUA)

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




**KPI04** Filed flight plan en-route extension

**KPI05** Actual en-route extension

**KPI17** Level-off during climb

**KPI18** Level capping during cruise

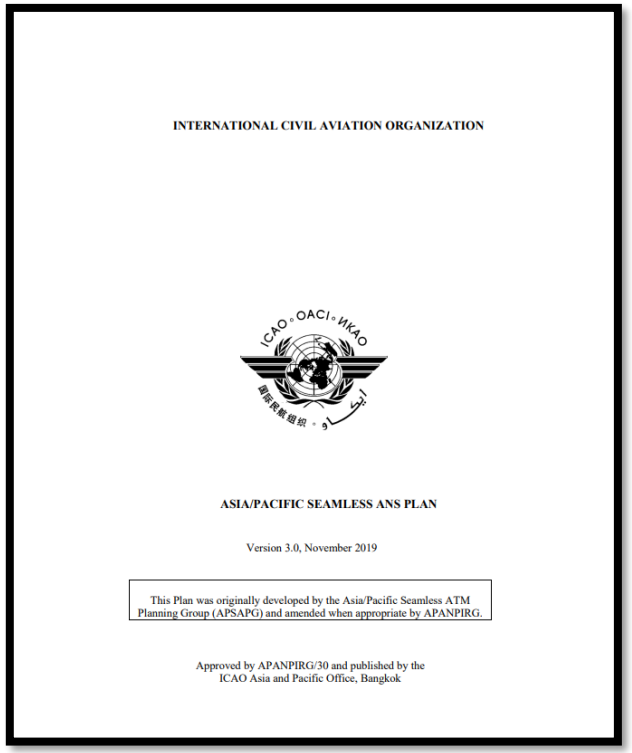
**KPI19** Level-off during descent

ASBU Elements - ICAO GANP Portal

# Asia/Pacific Seamless ANS PLAN (Ver. 3.0, Nov. 2019)

The objective of Seamless ATM is the **safe** and **interoperable** provision of **harmonized and consistent** air traffic management service provided to a flight, appropriate to the airspace category **and free of transitions** due to a change in the air navigation service provider or Flight Information Region.

**No Country Left Behind**



INTERNATIONAL CIVIL AVIATION ORGANIZATION

ASIA/PACIFIC SEAMLESS ANS PLAN

Version 3.0, November 2019

This Plan was originally developed by the Asia/Pacific Seamless ATM Planning Group (APSAPG) and amended when appropriate by APANPIRG.

Approved by APANPIRG/30 and published by the ICAO Asia and Pacific Office, Bangkok

ICAO

# CMAC in APAC

## APAC ASBU Block 0 and Block 1

- FRTO-B0/1 – 4: Direct routing, Airspace Planning and FUA, Flexible Routings, and basic conflict detection and conformance monitoring (1)
- FRTO-B1/1 – 7: Free Route Airspace, RNP routes, Advanced FUA and Airspace Management (ASM), Dynamic Sectorization, Enhanced Conflict Detection Tools and Conformance Monitoring, and Multi-Sector Planner Function (2)

## APAC Seamless Regional Elements Priority

- Civil-Military SUA management (1)
- Civil-Military strategic and tactical coordination (1)
- Civil-Military common procedures and training (2)
- Ballistic launches/space re-entry management (1)
- Civil-Military integrated systems and facilities (2)

# CMAC in APAC

## The 10 Civil-Military aspcets identified by APANPIRG

- Strategic Coordination
- Tactical Coordination
- Airspace Review
- Flexible Use of Airspace
- International Airspace
- Integrated C/M ATM System
- Joint C/M Aerodromes & Navigation Aids
- Shared C/M Data
- Common C/M Training and Procedures
- Space Vehicle Launch and Re-entry

# Previous Meetings/Workshops/Seminars

# Implementation Status - 2018

| | Civil Military use of SUA | Strategic Civil Military coordination | Tactical Civil Military coordination | Civil Military system integration | Civil Military navaids joint provision | Civil Military common training | Civil Military common procedures |
|---|---|---|---|---|---|---|---|
| | 360 | 370 | 380 | 390 | 400 | 410 | 420 |
| | B0-FRTO | Regional | Regional | Regional | Regional | Regional | Regional |
| | PRIORITY 1 | PRIORITY 1 | PRIORITY 1 | | | | |
| Australia | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Bangladesh | No data | No data | 100% | Not yet analysed | 100% | No data | 100% |
| Bhutan | Not applicable | No data | No data | Not yet analysed | Not applicable | Not yet analysed | Not yet analysed |
| Cambodia | 0% | Not applicable | 100% | Not applicable | Not applicable | Not applicable | Not applicable |
| China | Not applicable | 100% | 100% | Not applicable | Not yet analysed | No data | Not applicable |
| Democratic People's Republic of Korea | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Fiji | Not applicable | Not applicable | Not applicable | Not applicable | Not applicable | Not applicable | Not applicable |
| French Polynesia, France | 100% | 100% | 100% | Not applicable | Not applicable | Not applicable | 100% |
| Hong Kong, China | 100% | 100% | 100% | 100% | Not applicable | Not applicable | Not applicable |
| India | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Indonesia | 0% | 0% | 0% | 0% | 100% | Not applicable | 100% |
| Japan | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Lao People's Democratic Republic | No data | No data | No data | Not yet analysed | Not applicable | No data | No data |
| Macao, China | Not applicable | Not applicable | Not applicable | Not applicable | Not applicable | Not applicable | Not applicable |
| Malaysia | 100% | 100% | 100% | 100% | 100% | 100% | 100% |

# Implementation Status - 2018

| | Civil Military use of SUA | Strategic Civil Military coordination | Tactical Civil Military coordination | Civil Military system integration | Civil Military navaids joint provision | Civil Military common training | Civil Military common procedures |
|---|---|---|---|---|---|---|---|
| | 360 | 370 | 380 | 390 | 400 | 410 | 420 |
| | BO-FRTO | Regional | Regional | Regional | Regional | Regional | Regional |
| | PRIORITY 1 | PRIORITY 1 | PRIORITY 1 | | | | |
| Maldives | Not applicable | Not applicable | Not applicable | Not applicable | Not applicable | Not applicable | Not applicable |
| Mongolia | Not yet analysed | Not yet analysed | Not yet analysed | No data | Not yet analysed | No data | No data |
| Nepal | Not applicable | Not applicable | Not applicable | Not applicable | Not applicable | Not applicable | Not yet analysed |
| New Caledonia, France | Not applicable | Not applicable | Not applicable | Not applicable | Not applicable | Not applicable | Not applicable |
| New Zealand | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Pakistan | 100% | Not yet analysed | No data | Not yet analysed | 100% | 100% | Not applicable |
| Philippines | 100% | 100% | 0% | Not yet analysed | 100% | 100% | 100% |
| Republic of Korea | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Singapore | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Sri Lanka | 0% | 100% | 100% | 0% | 0% | 0% | 0% |
| Thailand | 100% | 100% | 100% | 0% | 100% | 0% | 0% |
| United States | 100% | 100% | 100% | 100% | Not applicable | Not applicable | Not applicable |
| Viet Nam | 100% | 100% | 100% | 100% | 100% | 100% | 100% |

# Comparison between 2018 and 2022

| No. | APAC CMAC Elements | 2018-100% implemented | 2022-100% implemented | 2018-0%/no data/ not yet analyzed | 2022-0%/no data/ not yet analyzed |
|---|---|---|---|---|---|
| 1 | ***Reference 360-Civil Military use of SUA*** | 16 | **21** | 5 | **2** |
| | | 57.1% | **72.4%** | 17.9% | **6.9%** |
| 2 | ***Reference 370-Strategic Civil Military Coordination*** | 16 | **19** | 6 | **3** |
| | | 57.1% | **65.5%** | 21.4% | **10.3%** |
| 3 | ***Reference 380-Tactical Civil Military Coordination*** | 17 | **20** | 6 | **3** |
| | | 60.7% | **69.0%** | 21.4% | **10.3%** |
| 4 | ***Reference 390-Civil Military system integration*** | 11 | 11 | 9 | 9 |
| | | 39.3% | 37.9% | 32.1% | 31.0% |
| 5 | ***Reference 400-Civil Military navaids joint provision*** | 14 | 14 | 4 | 5 |
| | | 50.0% | 48.3% | 14.3% | 17.2% |
| 6 | ***Reference 410-Civil Milita common training*** | 12 | **14** | 6 | **5** |
| | | 42.9% | **48.3%** | 21.4% | **17.2%** |
| 7 | ***Reference 420-Civil Military common procedures*** | 15 | **16** | 4 | 4 |
| | | 53.6% | **55.2%** | 14.3% | 13.8% |

*Note: Total States/SARs Reported: 28 in 2018 and 29 in 2022*

# Summary

Although big improvements have been achieved in ***C/M use of SUA*** exceeded 70%, and ***Strategic and Tactical C/M Coordination*** over 65%, considering the 3 items are ***priority 1,*** it is too slow and partial to reach the goals of ASBU and regional priorities in line with the target time.

There is no obvious progress in ***Civil Military system integration/Civil Military navaids joint provision*** which were both less than 50%. Considering these 2 items are ***priority 2,*** it is rather slow with reference to the goal of Seamless ANS plan.

The items of ***Civil Military common training/Civil Military common procedures*** have gained some progress but still under 60%.

The progress in the Region are of great variety with 9 States/SARs fully implemented and 6 with none implementation.

# Summary

## There Is No Unified Formular About CMAC

### REFER TO BEST PRACTICES…
### BUT DO IT IN YOUR OWN WAY


**Providing Guidance & Platform**

**Sharing Experiences**


**Learning from Others**

**Implementing in Your Own Way**

# Thank You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Pigeonhole

# Any question ?

**Please scan the QR code to access the Pigeonhole Live application :**

**Site: pigeonhole.at**

**Passcode: CMAC**