Supporting
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Aviation

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Civil-Military ATM Cooperation support to improving ATS Route Network and ATFM

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ICAO Trans-Regional Civil-Military Cooperation Workshop

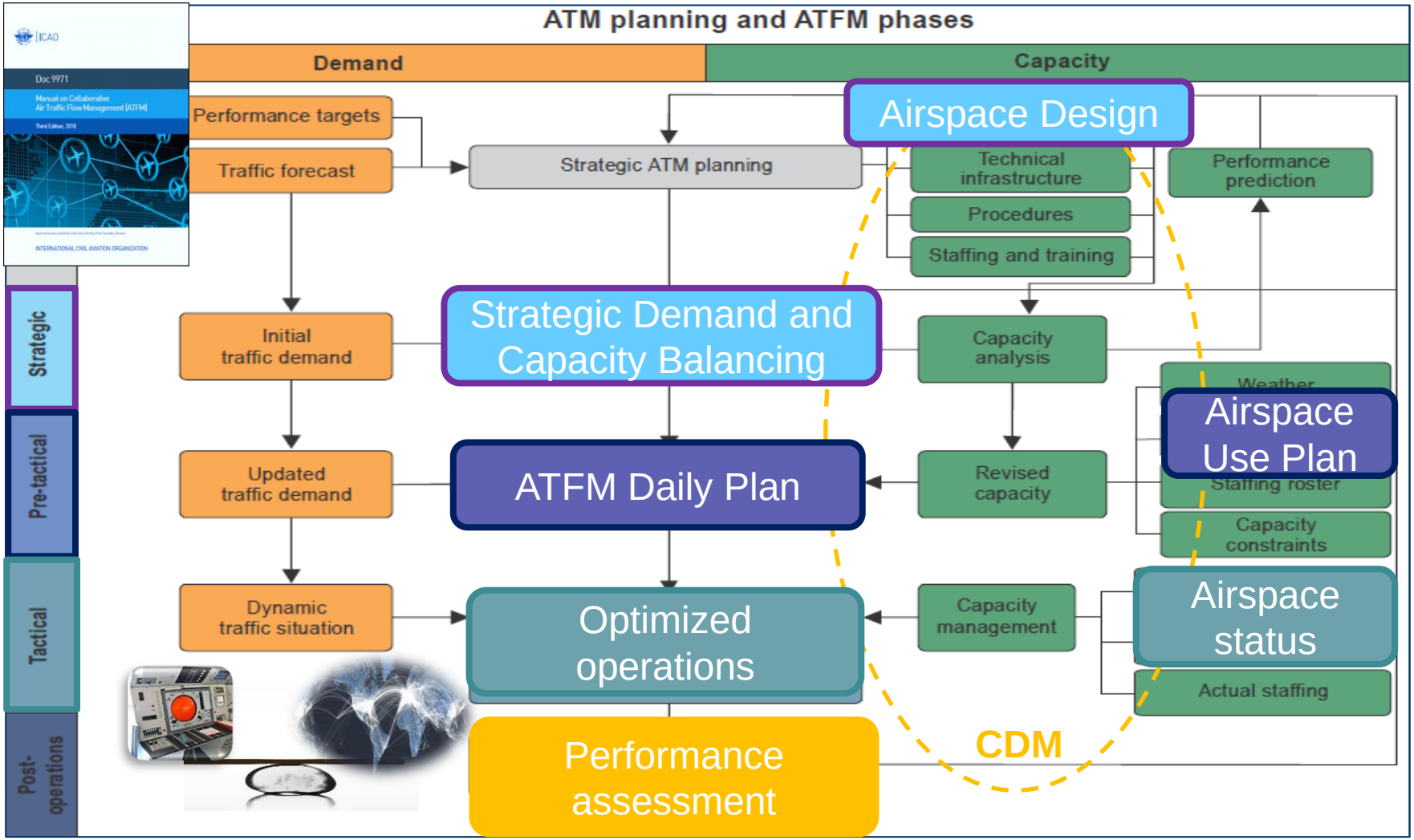
FOUNDING MEMBER SESAR JOINT UNDERTAKING

NETWORK MANAGER

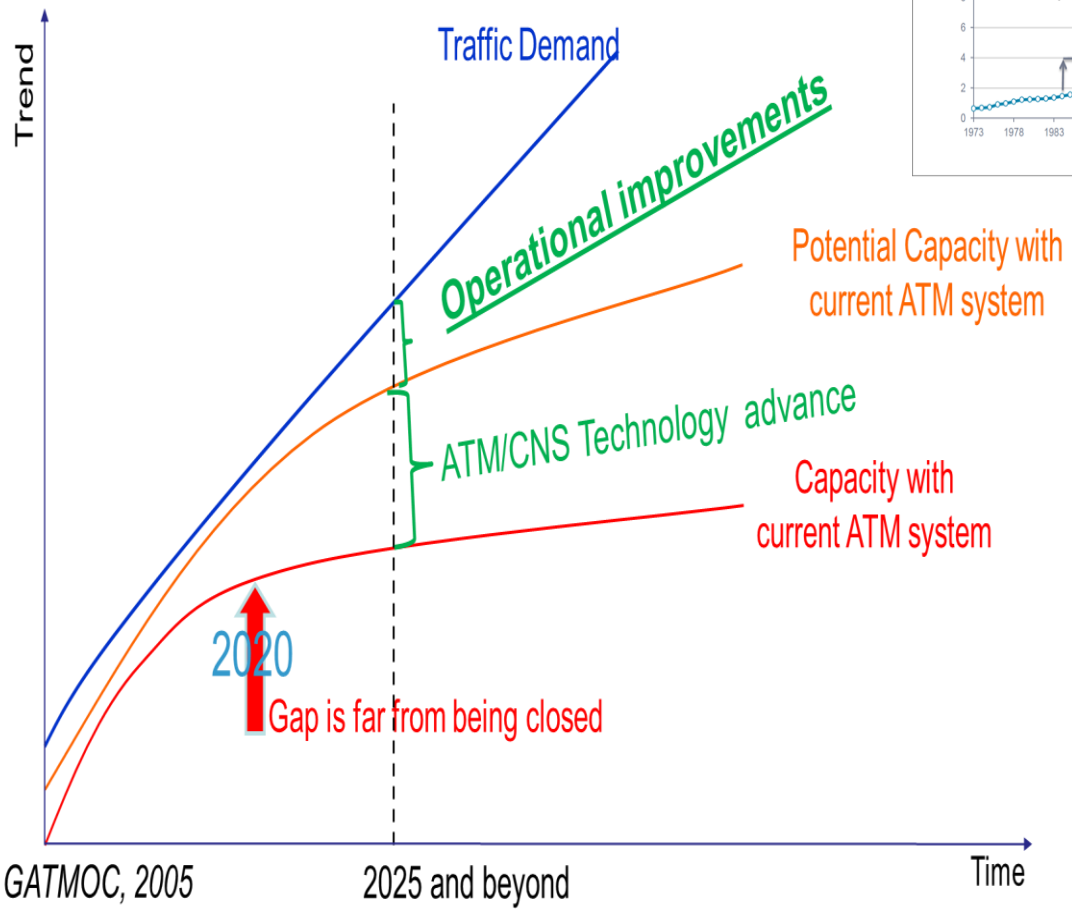
Overview

- Problem statement
- Why Civil Military Coordination support?
- How to support?
- What could the Military do to enhance FUA?
- Benefits
- A-FUA

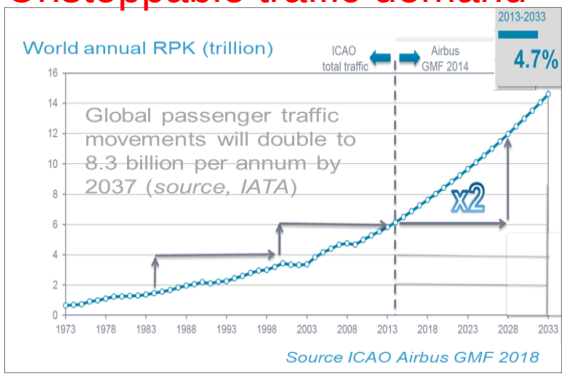
Global view on Collaborative ATFM



Civil-Military challenge

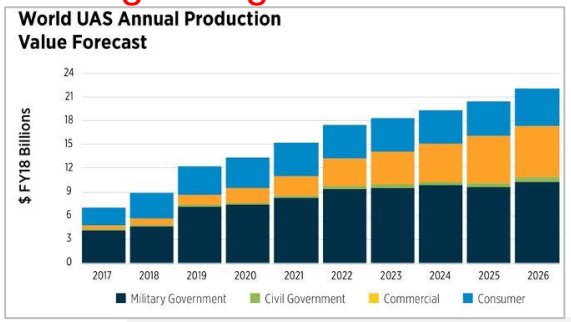


Unstoppable traffic demand



Evolving Military needs

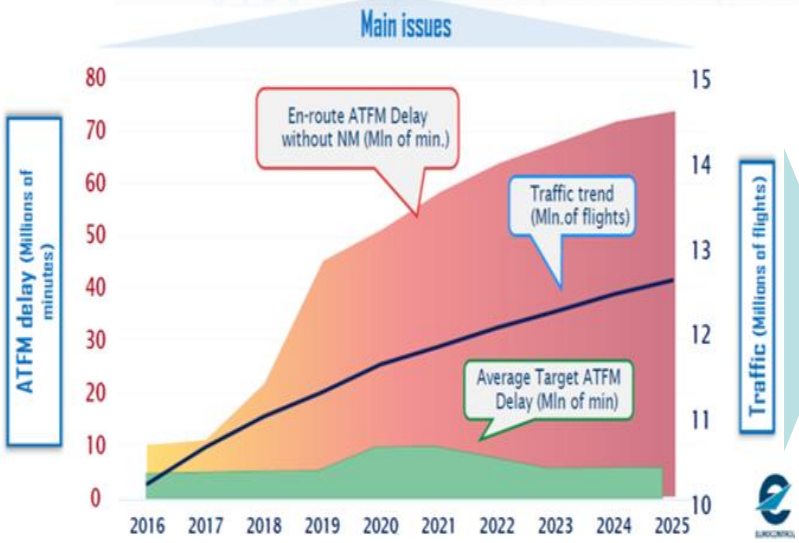
Fast growing new entrants



What are the ‘no action’ risks?

Demand growth ➡ Exponential increase in ATM complexity

- Operational and technological gaps among stakeholders
- Reluctance to adopt new ATM concepts
- Lack of communication and ineffective CDM
- ATM system not supporting tactical ATFM

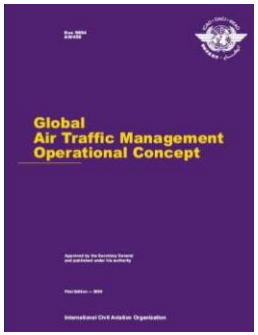


- Less operational flexibility
- ATC and coordination overload
- Higher number of airspace conflicts
- Environmental impact

Roadmap

- Short to Medium-term:

  Optimized allocation and use of resources



- Long-term:

  Performance-Based ATM

Conceptual approach

Strategic airspace design/configuration

- **Route network** development
- ATC sectorization optimization
- **Airspace availability** improvement

Airspace Organization and Management

- Optimization of trajectories & flows
- **Flexible and dynamic ASM**
- **Synchronization of ASM-ATFM-ATS processes**

INTEROPERABILITY

Airspace User Operations

- Trajectory Management
- Performance-Based Navigation
- Wide information sharing and management

Demand and Capacity balancing/ATFM

- Optimized resources management
- Planning adjusted to mitigate imbalances
- Dynamic adaptations to changes

COLLABORATIVE DECISION-MAKING

Fundaments

- **AIRSPACE CONFIGURATION:** Pre-defined and coordinated organization of ATS Route Network, Free Route Airspace, Terminal Routes, Airspace Reservations and ATC sectorization consistently managed at strategic, pre-tactical and tactical ATM levels

- **FLEXIBILITY:** The configuration of airspace structures (routes, airspace reservation, ATC sectors) is able to adapt to predicted traffic flows and workload, when and where required

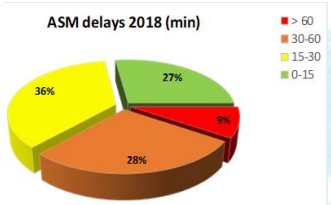
- **DYNAMICITY:** ATFM-ASM-ATS processes will operationally react to change requests as closer as possible to the time of operation to enable early ATFM solutions while allowing late revision to airspace allocation

- **OPTIMIZATION**: The planning of ATFM-ASM-ATS is based on CDM, which enables optimization of resources (staff, airspace structures) and operational requests to mitigate capacity imbalances

Operational approach

YEAR	NR_DAYS	REGULATION REASON	TOTAL DLYS 2018	TOTAL DLYS 2017
2018	315	ATC CAPACITY	7,535,784	4,442,139
2018	315	WEATHER	7,386,532	4,670,415
2018	315	ATC STAFFING	4,7[illegible]19	1,471,058
2018	315	AERODROME CAPACITY	2,686,298	2,112,081
2018	315	INDUSTRIAL ACTION (ATC)	1,109,543	694,917
2018	315	AIRSPACE MANAGEMENT	603,772	186,275
2018	315	OTHER	457,737	218,695
2018	315	SPECIAL EVENT	436,567	390,386
2018	315	EQUIPMENT (ATC)	368,331	343,845
2018	315	ENVIRONMENTAL ISSUES	124.832	144.972

Where CMAC can help?



Impact of ASM delays on total ATFM delay can be significant in certain regions and/or days

Huge increase in Europe in 2018

Strategic ATFM

CAPACITY SHORTFALLS

How CMAC can help?

OPTIMISE UTLISATION OF AVAILABLE CAPACTY

FUA/ASM level 1

- Sector Management
  - Configuration
  - No. of Sectors
- Civil/Military Coordination
- Reduce Traffic Complexity
- Review Monitoring Value
- Holding Pattern
- Balancing Arrival/ Departure Capacity
- Sector Occupancy

Pre-tactical ATFM

UTILISE OTHER AVAILABLE CAPACITY

FUA/ASM level 2

- Rerouting
  - Flows
  - Flights
- FL Management
- Advancing Traffic

Tactical ATFM

REGULATE THE DEMAND

FUA/ASM level 3

- Slot Allocation
- Constraining Airborne Traffic
- Cherry Picking

Flexible and Dynamic ASM actions to support ATFM

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Years to 1 week - ATFM Strategic Phase – ASM Level 1
High Level Airspace Policy Entity

- Improve route network design
- Optimize ATC sector configuration
- Reduce traffic complexity

- Collect & Inform about long-term airspace reservation / restriction planning (focus on large scale events)
- Establish pre-determined airspace structures and rules to flexible and dynamic allocation

1 Week to 1 Day - ATFM Pre-tactical phase – ASM Level 2
AMCs/ACCs/FMPs

- Optimize rerouting strategy
- Define early ATFM measures
- Avoid choke points

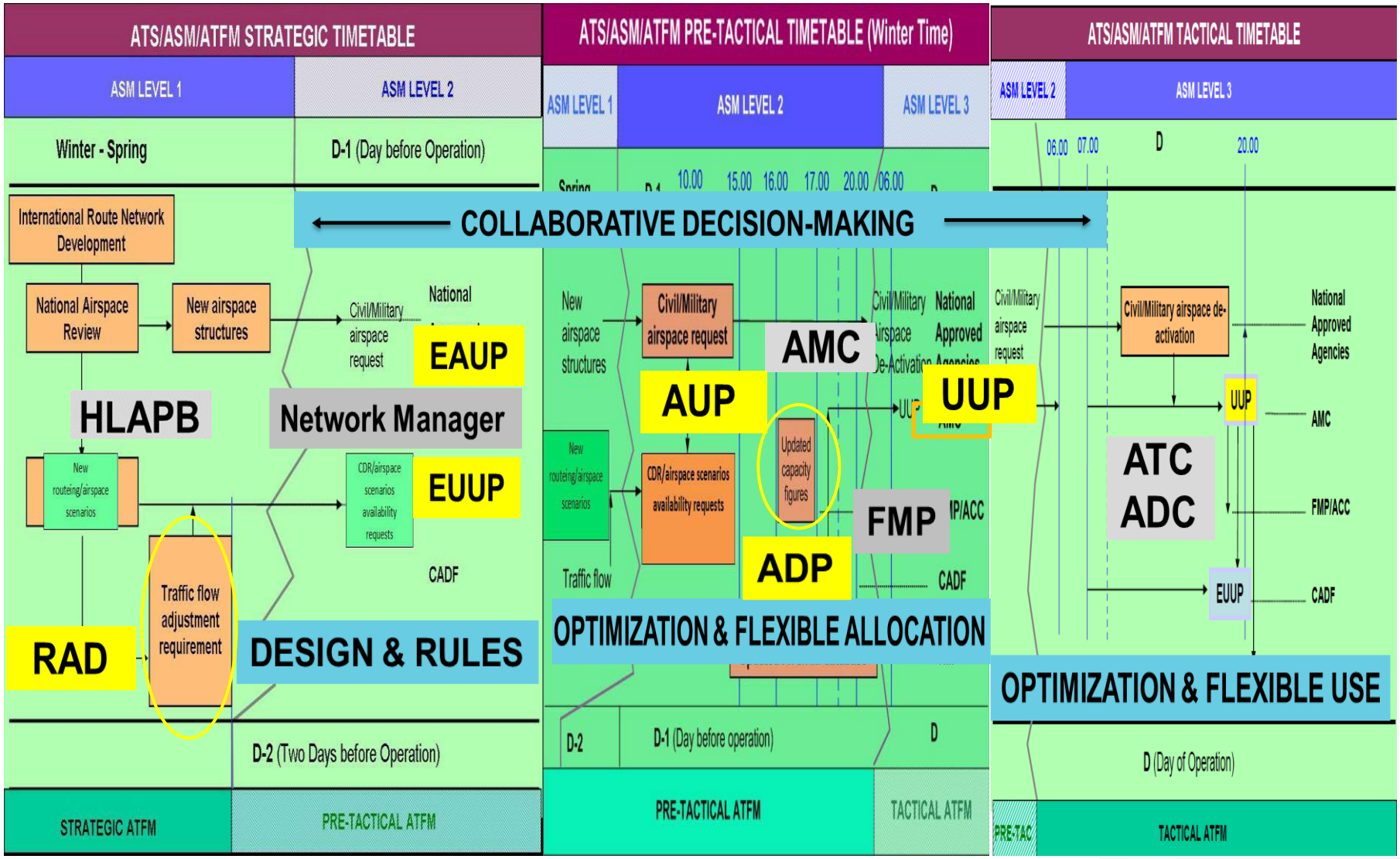
- Aggregate and analyze airspace requirements
- Allocate airspace according to actual needs
- Optimize allocation when flexibility is enabled

Day of operations - ATFM Tactical phase – ASM Level 3
AUs/ATCUs/ADCs

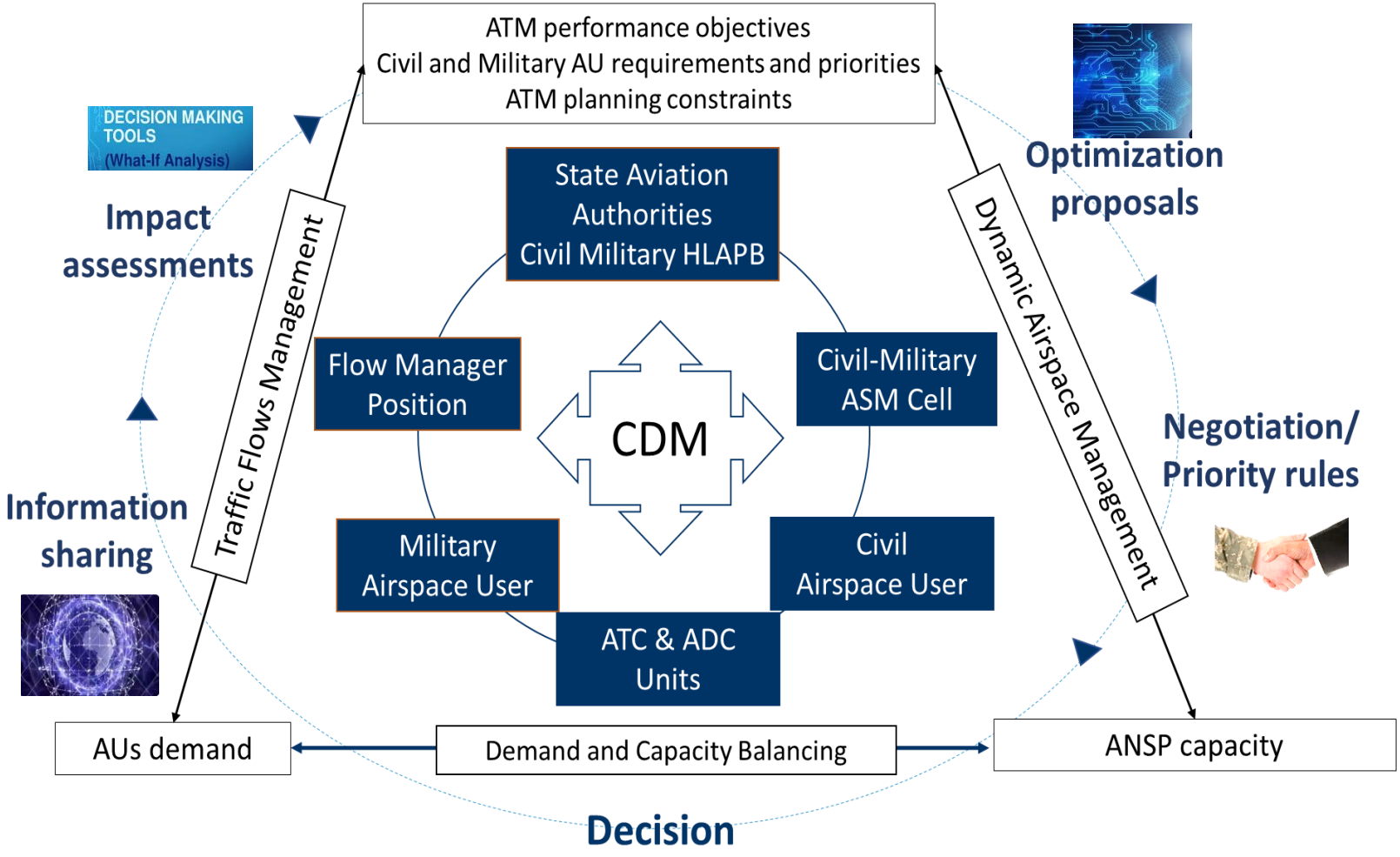
- Optimize route options
- Reroute traffic at short notice
- Apply ATFM measures

- Release (INFORM) unused or reallocate airspace
- Apply real time ad-hoc coordination measures

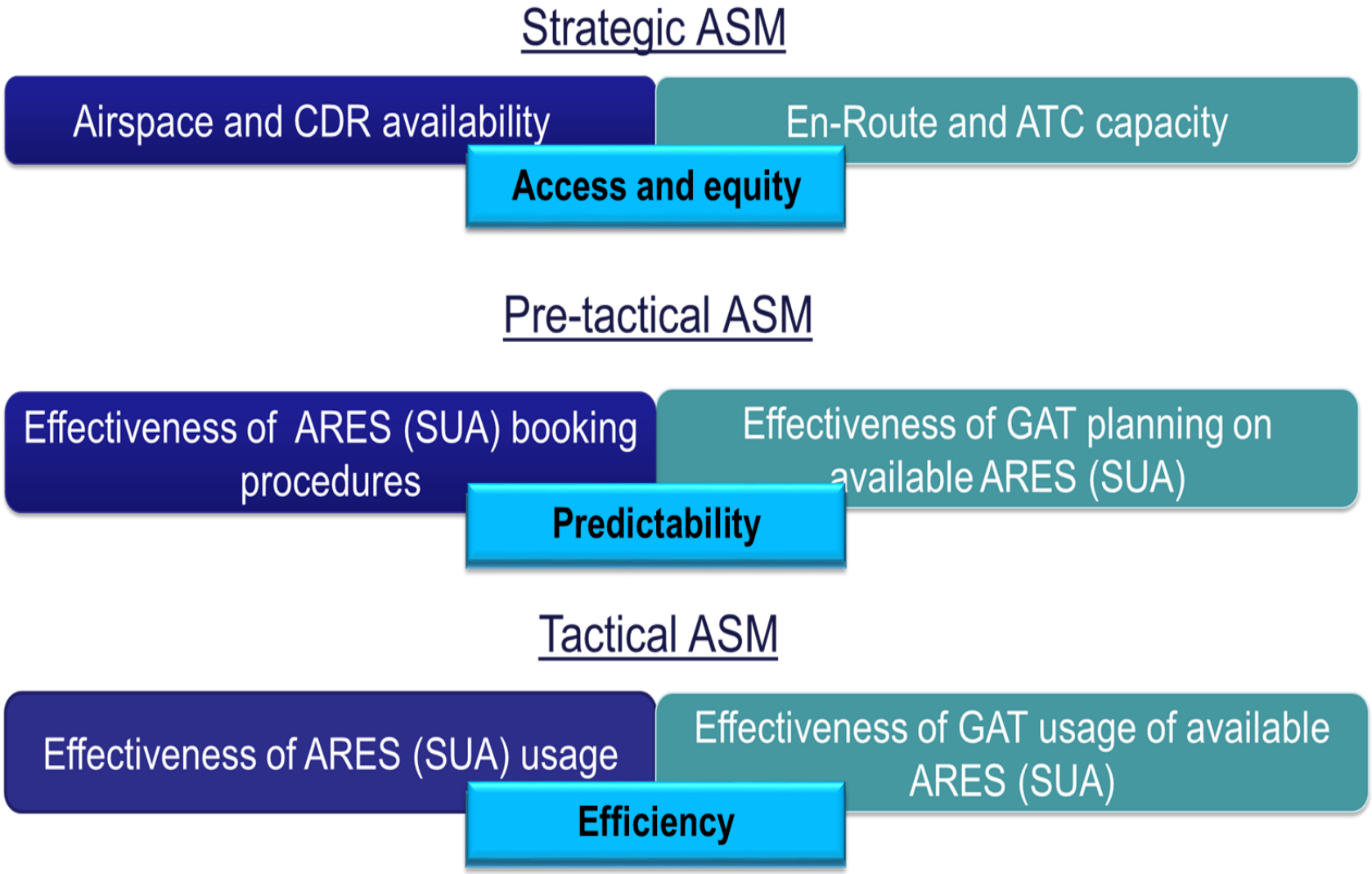
ASM – ATFM – ATS process in Europe



Civil-Military operational CDM



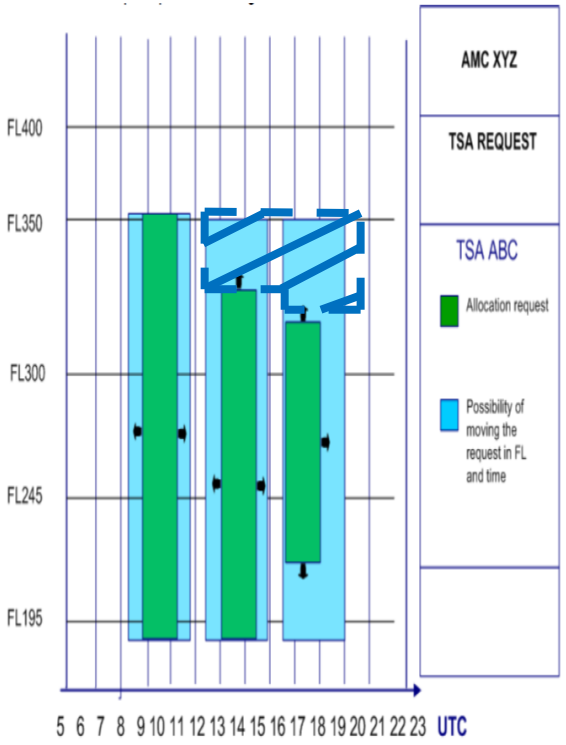
Civil-military ATM Performance monitoring



Example of European military support

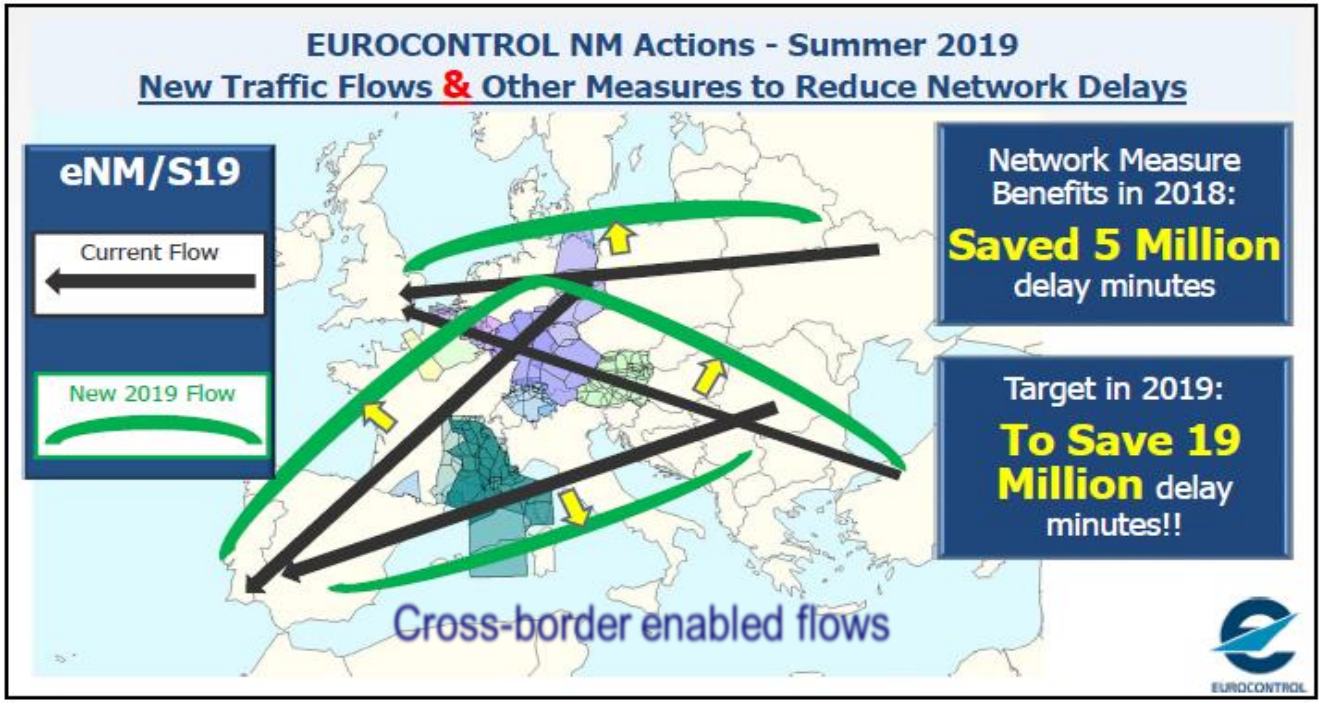
During summer 2019, the military support measures focused on:

- Keeping military Airspace Use Plan as stable as possible after delivery at D-1
- Implementing a vertical modularity whenever possible (reporting upper level limit at D-1)
- Allowing CDM between ASM and ATFM on airspa reservation/restriction adjustments to traffic needs



Improved ATFM Benefits

Civil Aviation

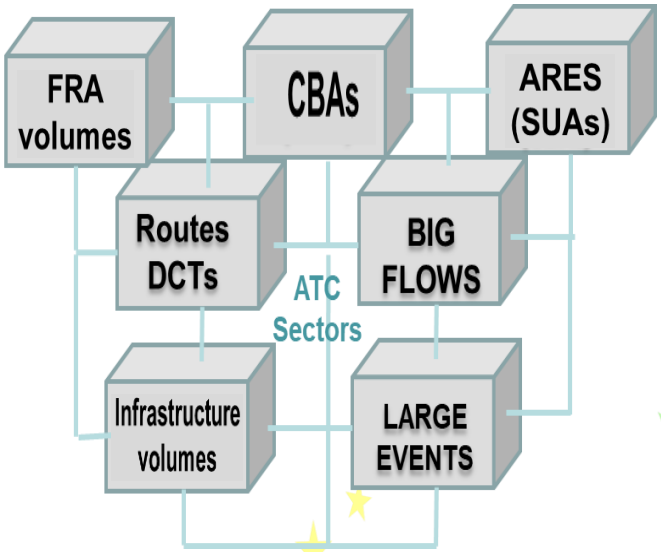


The Military "ATM must"

- Stay on Global Aviation development power curve
- Safeguard current and future requirements for access to airspace, aircraft mobility, and confidentiality

Engage actively in all stages of ATM modernization

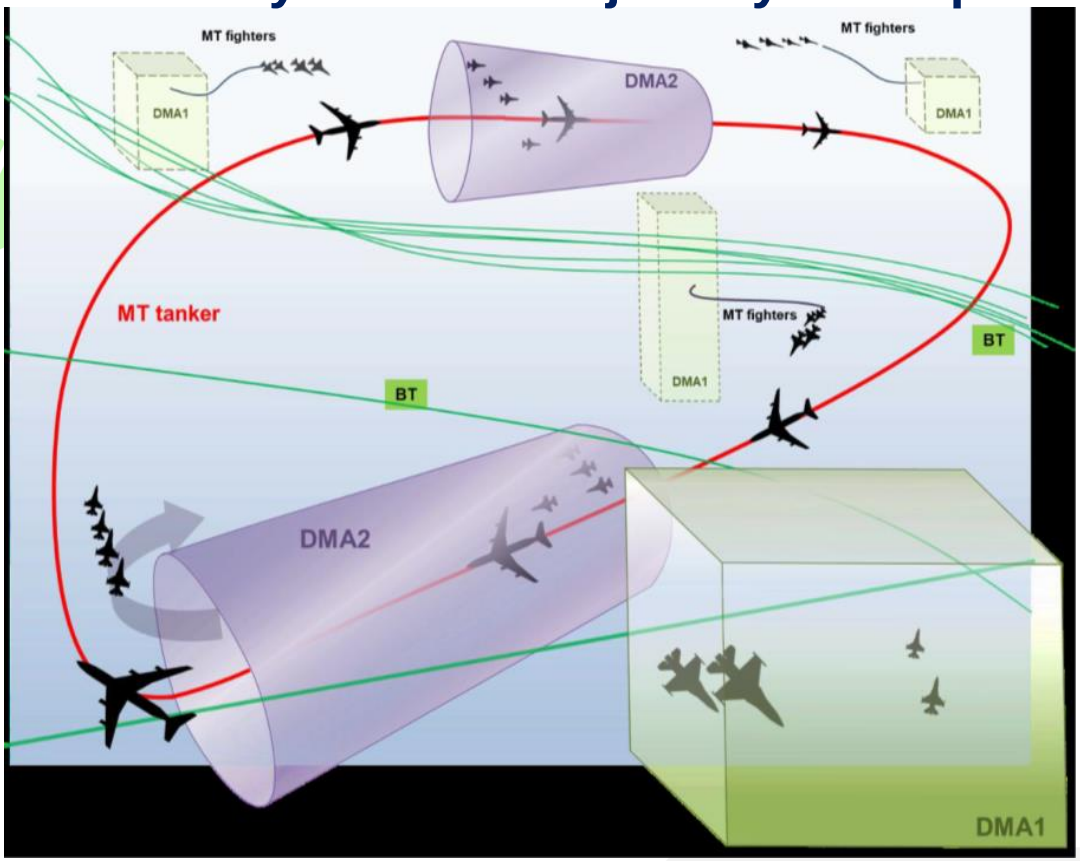
TBO / Dynamic Airspace Configuration / A-FUA



DMA design types of ARES (SUAs):

1 – flexible geographical location
2 – flexible location along the trajectory
3 – a moving “bubble” around the aircraft / formation

Military Mission Trajectory concept



SESAR JOINT UNDERTAKING

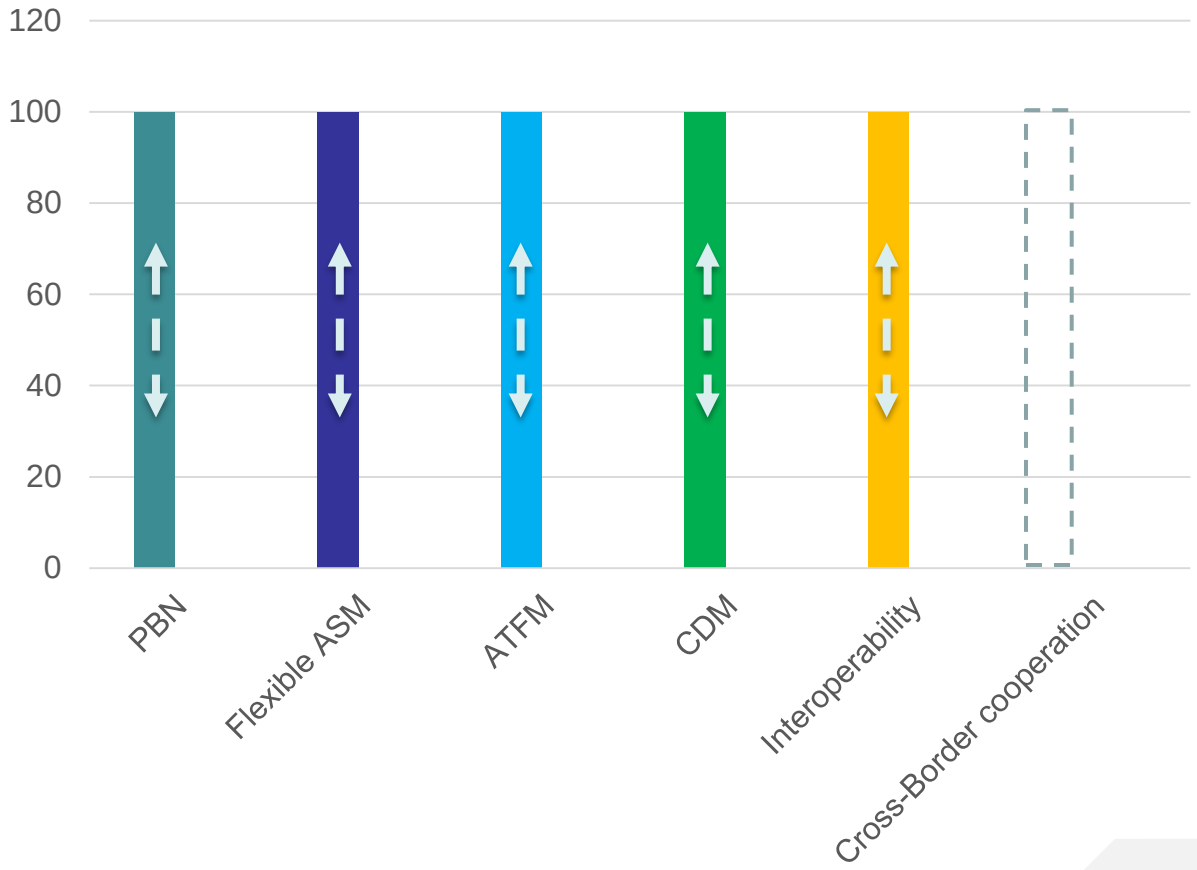
Integrated & performance - oriented Civil-Military ASM-DCB-ATC solution

Take away

- ATM system capacity optimization, a civil-military task
- Flexible and Dynamic ASM
- ASM-ATFM-ATS organized at all ATM phases
- Collaborative decision-making
- Performance monitoring
- Military active engagement in ATM developments
- Cross-border collaboration

Food for discussion

Which of the following improvements should be **the civil-military cooperation priority** to ATM system capacity improvement?



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Thank you