

The EUROCONTROL Concept of the Flexible Use of Airspace

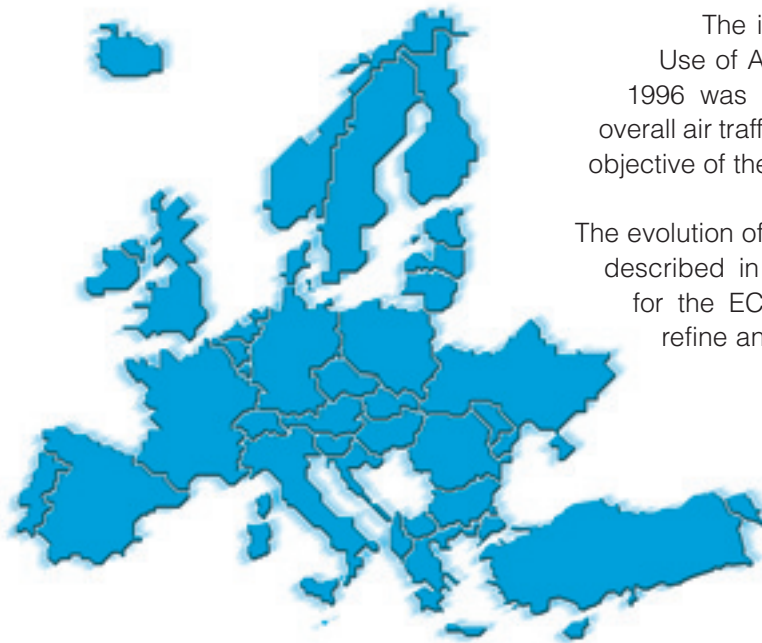


ATM 2000+ Strategy in brief ...

Within the framework of the European Civil Aviation Conference (ECAC) Institutional Strategy, the Transport Ministers launched in January 2000 a comprehensive, “gate to gate”^{*} oriented ATM Strategy for the years 2000+ as a follow-up to the ECAC En-Route and Airport Strategies for the 1990s.

A major obstacle to producing more en-route capacity is that European airspace has not yet been optimised.

One of the main areas for change highlighted in the ATM 2000+ Strategy is therefore the organisation and use of airspace with the aim of creating a continuum of airspace for ATM.



 ECAC States (38)

The introduction of the Concept of the Flexible Use of Airspace (FUA) in the ECAC area in March 1996 was aimed at increasing the capacity of the overall air traffic system in order to achieve one of the key objective of the ECAC En-Route Strategy for the 1990s.

The evolution of the FUA Concept during the next years is described in the “EUROCONTROL Airspace Strategy for the ECAC States” adopted in January 2001 to refine and complement the ATM 2000+ Strategy.

^{*} “Gate-to-Gate” involves considering and managing each flight throughout all phases of flight.
This includes pre-flight planning and post flight activities such as the calculation of the appropriate charges.

Contents

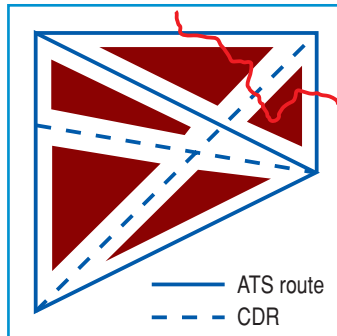
Flexible Airspace Structures	4
The Three Airspace Management Levels	5
The Concept at Level 1	6
The Concept at Level 2	7
The Airspace Use Plan	8
The Conditional Route Availability Message	9
The Concept at Level 3	10
ASM/ATS/ATFM Relationship	11
Implementation Progress	12
Benefits	13
Further Improvements	14
EUROCONTROL Airspace Strategy	15

Where implemented, the Concept of the Flexible Use of Airspace is that ...

- ... Airspace is no longer designated as either purely civil or military airspace, but considered as ONE CONTINUUM and allocated according to USER REQUIREMENTS.
- ... Any necessary airspace segregation is TEMPORARY, based on real-time usage within a specific time period.
- ... Contiguous volumes of airspace are not constrained by national boundaries.

Flexible Airspace Structures

The Concept of the Flexible Use of Airspace is based on the potential offered by adaptable airspace structures and procedures that are especially suited to temporary allocation and utilisation:

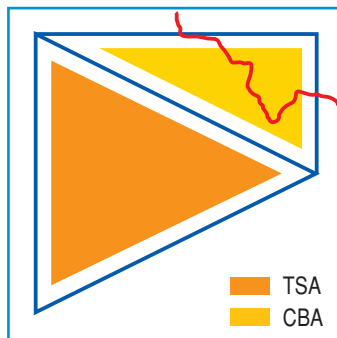


► Conditional Route (CDR)

Non-permanent ATS route or portion thereof which can be planned and used under specified conditions.

According to their foreseen availability and flight planning possibilities, CDRs can be divided into the following categories:

- Category One: Permanently Plannable CDR,
- Category Two: Non-Permanently Plannable CDR,
- Category Three: Not Plannable CDR.

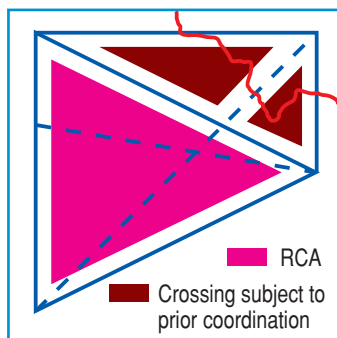


► Temporary Segregated Area (TSA)

Airspace temporary reserved and allocated for the exclusive use of specific user during a determined period of time.

► Cross-Border Area (CBA)

TSA established over international boundaries.



► Reduced Coordination Airspace (RCA)

Specified portion of airspace implemented when Operational Air Traffic (OAT) is light or has ceased and within which General Air Traffic (GAT) is permitted to operate outside the ATS route structure without requiring General Air Traffic (GAT) controllers to initiate coordination with Operational Air Traffic (OAT) controllers.

The Three Airspace Management Levels

The Three main levels of Airspace Management (ASM) correspond to civil/military coordination tasks in a distinct and close relationship. Each level has an impact on the others.

ASM level 1

**Establishment
of pre-determined
airspace structures**

Strategic Level

is the high level definition and review of the national airspace policy, taking into account national and international airspace users and ATS providers requirements.

Related tasks include the establishment of the airspace organisation, the planning and the creation of permanent and temporary airspace structures and the agreement of priorities and negotiation procedures.

ASM level 2

**Day -to-day allocation
of airspace according
to user requirements**

Pre-tactical Level

is the conduct of operational management within the framework of the structures and procedures defined at Level 1.

The Pre-Tactical tasks include the day-to-day allocation of airspace and the communication of airspace allocation data to all the parties concerned.

ASM level 3

**Real-time use of
airspace allowing
a safe OAT/GAT
separation**

Tactical Level

consists of the activation, de-activation or real-time reallocation of the airspace allocated at Level 2 and the resolution of specific airspace problems and/or individual traffic situations between Operational Air Traffic (OAT) and General Air Traffic (GAT).

Related tasks include the prompt exchange of data with or without system support between the relevant civil and military ATS units to permit the safe and expeditious conduct of both Operational Air Traffic (OAT) and General Air Traffic (GAT) flights.

The Concept at Level 1

National High-Level Airspace Policy Body

States establish permanent bodies for Strategic ASM policy, planning and coordination.

Through this National High-Level Airspace Policy Body, the States:

- *formulate the national policy for airspace management taking into account national and international airspace users and ATS providers requirements.*

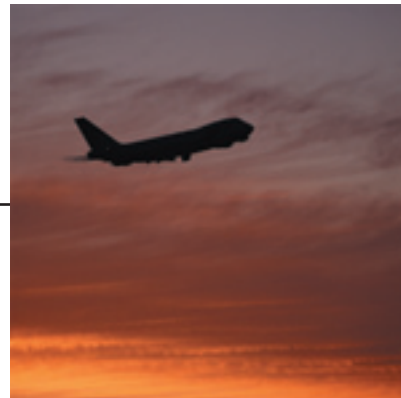
- *reassess the national airspace structure and ATS route network with the aim of planning, as far as possible, for flexible airspace structures and procedures.*

- *periodically review the national airspace needs and, where applicable, cross-border airspace utilisation.*

- *establish negotiation procedures and priority rules for airspace allocation at Level 2.*

- *review the procedures and efficiency of Level 2 and Level 3 operations.*

- *provide a continuum and transparency of operational handling at national boundaries through collaborative airspace planning and harmonised airspace management with neighbouring States.*



The Concept at Level 2

Airspace Management Cell (AMC)

States establish, whenever required, joint civil/military Airspace Management Cells (AMCs) to conduct day-to-day airspace allocation and management in close cooperation with the Central Flow Management Unit (CFMU).

The National High-Level Airspace Policy Body determines the degree of discretion and authority of the AMC in order to minimise the need for referrals to higher authority.

Sub-regional Airspace Management Cells (AMCs), could be established by two or more States, with the responsibility for pre-tactical airspace management on both sides of an international border.

Airspace Management Cells (AMCs):

- Allocate the required airspace on a day-to-day basis to the users in a decisive, timely and efficient manner.*

- Promulgate each day to all parties concerned the airspace allocation decision for the following day by transmitting an Airspace Use Plan (AUP)*

Centralised Airspace Data Function (CADF)

In order to implement the FUA Concept with efficiency, the ECAC States have recognised the need for a central pre-tactical Level 2 airspace management function, the Centralised Airspace Data Function (CADF).

The Centralised Airspace Data Function (CADF) has been established within the Central Flow Management Unit (CFMU) to:

- Collect the information from Airspace Management Cells (AMCs) and detect any lack of continuity in Conditional Routes (CDRs) arising from the different Airspace Use Plans (AUPs).*

- Compile a consolidated message on Conditional Routes (CDRs) availability within the ECAC area, Conditional Route Availability Message (CRAM), to be issued to operators for flight planning purposes.*

The Airspace Use Plan

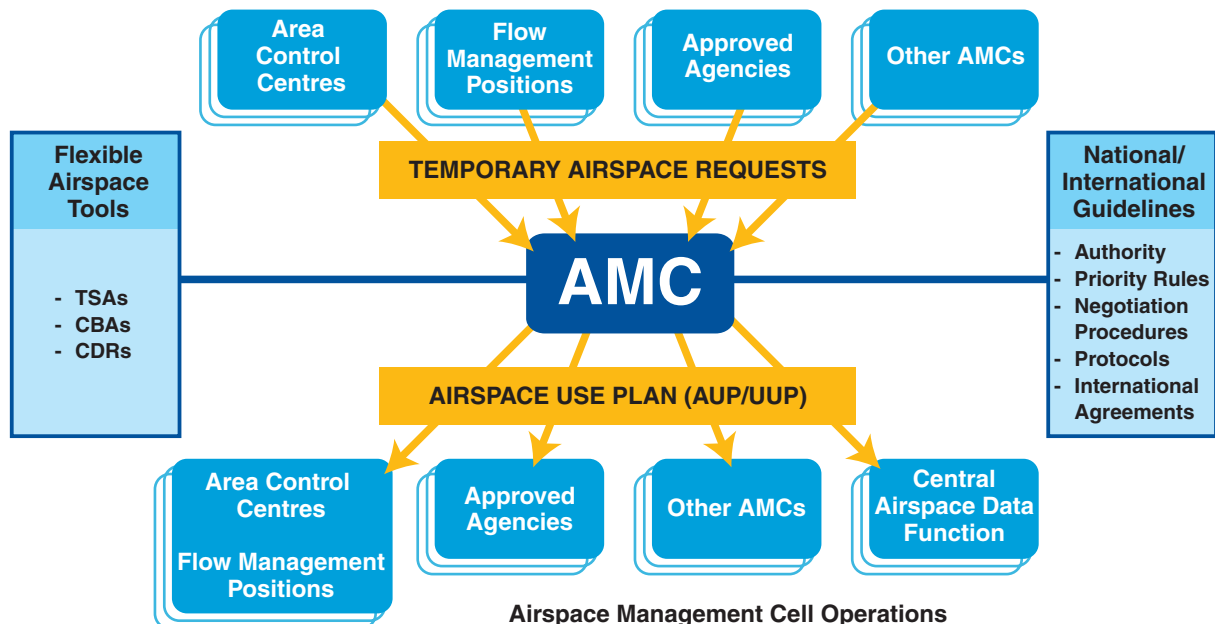
Agencies responsible for airspace activities submit their requests for the allocation of airspace or routes - Temporary Segregated Areas (TSAs) or Conditional Routes (CDRs) - to the appropriate Airspace Management Cell (AMC).

After the AMC has received, evaluated and de-conflicted the airspace requests, the notification of the airspace allocation is published in a daily Airspace Use Plan (AUP), in advance.

The Airspace Use Plans (AUPs) activate Conditional Routes (CDRs) and allocate Temporary Segregated Areas (TSAs) and Cross-Border Areas (CBAs) for specific periods of time.

If necessary, changes to pre-tactical airspace allocation is effected by AMCs through the publication of an Updated Airspace Use Plan (UUP). This Plan notifies the changes to the airspace allocation on the actual day of operations.

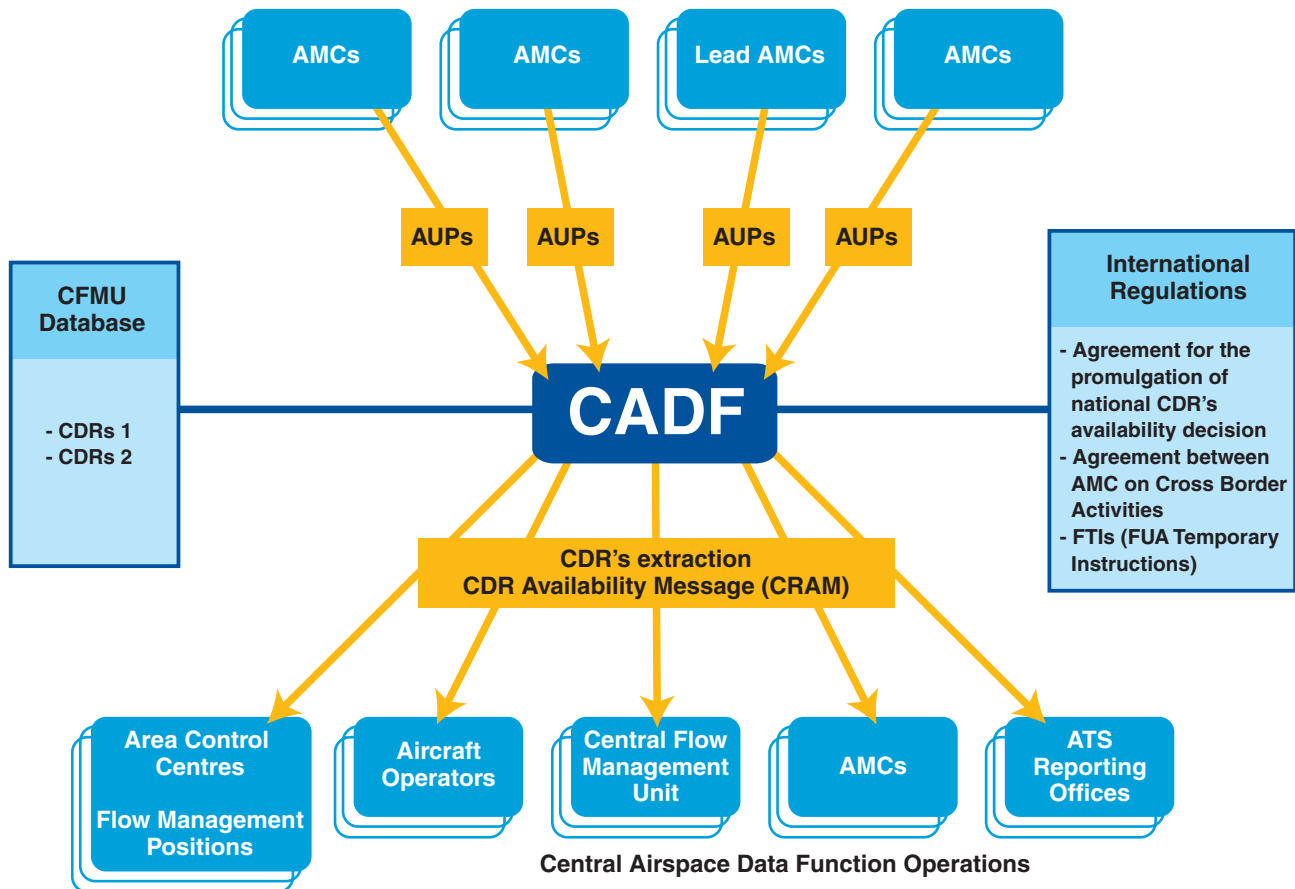
The Airspace Use Plan (AUP) and the Updated Airspace Use Plan (UUP) are published nationally and internationally in a harmonised format.



The Conditional Route Availability Message

The Airspace Use Plans (AUPs) published by the Airspace Management Cells (AMCs) are collected by the Central Airspace Data Function (CADF) that consolidates the information on available Conditional Routes. The Central Airspace Data Function (CADF) in the Central Flow Management Unit compiles a daily Conditional Route Availability Message (CRAM) which indicates the availability of Conditional Routes (CDRs) for flight planning in the ECAC States.

The Conditional Route Availability Message (CRAM) is transmitted in advance to all Airspace Users and ATS Providers concerned.



The Concept at Level 3

Enhanced Supporting Equipment for Real-Time Civil/Military Coordination

States establish enhanced supporting coordination equipment and real-time civil/military coordination procedures in order to:

- Activate, deactivate or reallocate in real-time the airspace allocated at Level 2.*
- Permit the maximum joint use of airspace by civil and military traffic in safety which reduces segregation needs.*
- Resolve specific airspace problems and traffic situations between civil and military ATS units and controllers.*
- Access to all necessary flight data including controller's intentions.*
- Fully exploit the FUA Concept at Levels 1 and 2.*



Enhanced Supporting Coordination Equipment for FPPS, FMS, CFMU

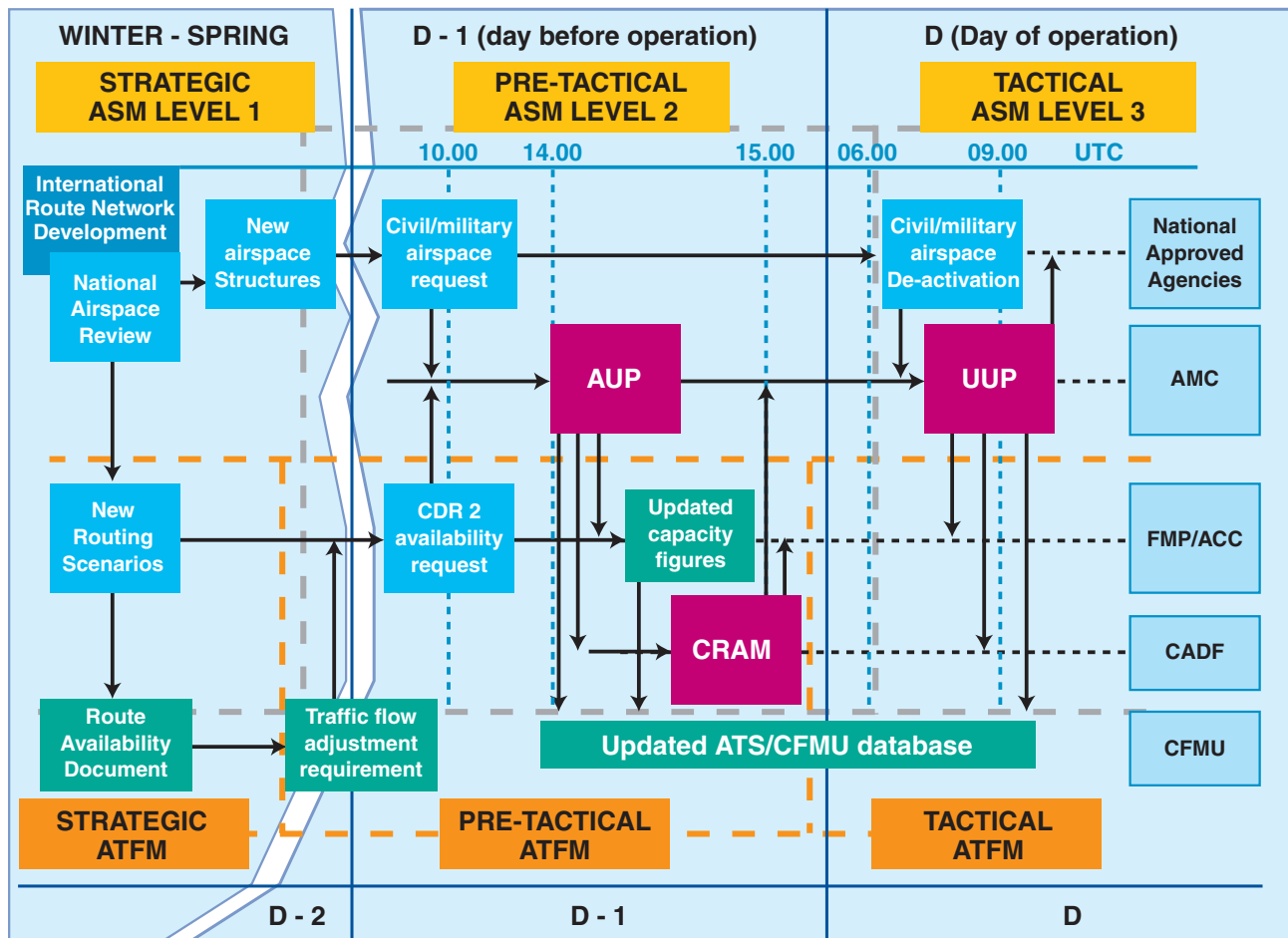
In order to maximise the potential for traffic re-routing in real-time to use those CDRs that have been made available at short notice, supporting equipment has been implemented:

- Flight Plan Processing System (FPPS) to amend control data.*
- Flight Management System (FMS) that is updated in flight by pilots in accordance with re-routings.*
- Central Flow Management Unit (CFMU) systems that use updated environment airspace and route data and revised capacity figures to adjust traffic flow and maximise traffic flow throughput.*

ASM / ATS / ATFM Relationship

As an integral part of Air Traffic Management (ATM), Airspace Management (ASM) works in close cooperation with both Air Traffic Services (ATS) and Air Traffic Flow Management (ATFM).

In order to materialise the full benefits resulting from the introduction of the Concept of the Flexible Use of Airspace, ASM, ATS and ATFM procedures and timetables have been harmonised at all the three Levels.

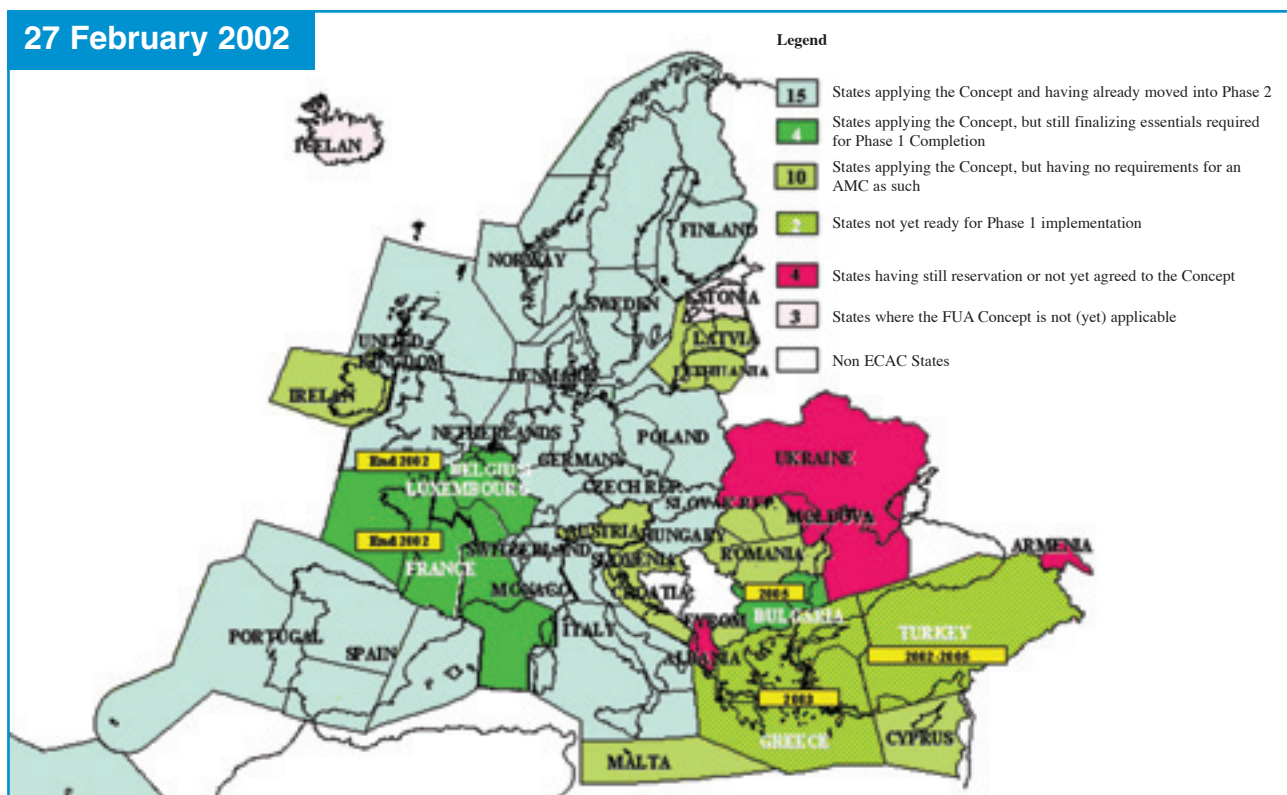


Implementation Progress

The Plan for Implementation of the Concept of the Flexible Use of Airspace has been phased, taking into account state's airspace complexity, identified bottlenecks and specific national requirements.

Starting in March 1996, Phase 1 has been meant to progressively establish flexible airspace structures and procedures and to set-up, where necessary, Airspace Management Cells. Phase 2 has featured, as from April 1998, the widespread application of the Concept.

The States have agreed to regularly report the current situation of the Flexible Use of Airspace implementation and their national plans for the introduction and/or application of the Concept.



Assessment of the Flexible Use of Airspace (FUA) Implementation by the ECAC States

Benefits

The Implementation of the Concept of the Flexible Use of Airspace has already benefited both civil and military aviation with:

- *flight economy offered through a reduction in distance, time and fuel;*
- *the establishment of enhanced Air Traffic Services (ATS) route network and associated sectorisation providing:*
 - *an increase in Air Traffic Control (ATC) capacity;*
 - *a reduction in delays to General Air Traffic;*
- *more efficient ways to separate Operational and General Air Traffic;*
- *enhanced real-time civil/military coordination;*
- *a reduction in airspace segregation needs;*
- *the definition and use of Temporary Segregated Areas that are more closely in line with military operational requirements and more generally that better respond to specific military requirements in tactical phase.*



Further Improvements

In order to facilitate the implementation of the EUROCONTROL Airspace Strategy for the ECAC States, strategic actions called Operational Improvements (OIs) have been identified and divided into seven main Directions for Change [A to G].

Direction for Change [B] deals with the improvement of airspace management and civil/military coordination. Improvements include the expansion of the FUA Concept throughout Europe, the movement of ASM processes closer to the time of operations, more dynamic airspace management and, finally, greater coordination between neighbouring States. This will lead to a common approach to airspace planning and management to ensure the harmonisation and continuity of European airspace.

2000

OI-1B: Enhancement of the real-time civil/military coordination in providing adequate system support and ensuring proper dissemination of current flight plans. This OI has been closed with the publication of a Closing Report in 2002.

2003

OI-2B: National Collaborative/Integrated Airspace Planning in accommodating shared use of airspace within a State between all users groups.

2005

OI-3B: Extend FUA to Lower Airspace and to Terminal Airspace.

2005

OI-5B1: Collaborative Airspace Planning with neighbouring States including international agreement for cross-border operations.

2006

OI-4B1: Extend FUA with Dynamic Airspace Management to respond in real-time to changing situation in traffic flows and to short-term changes of users' intentions.

2006

OI-4B2: Harmonise OAT/GAT handling to ensure that the principles, rules and procedures can be commonly applied to the maximum possible extent within the ECAC airspace.

2008

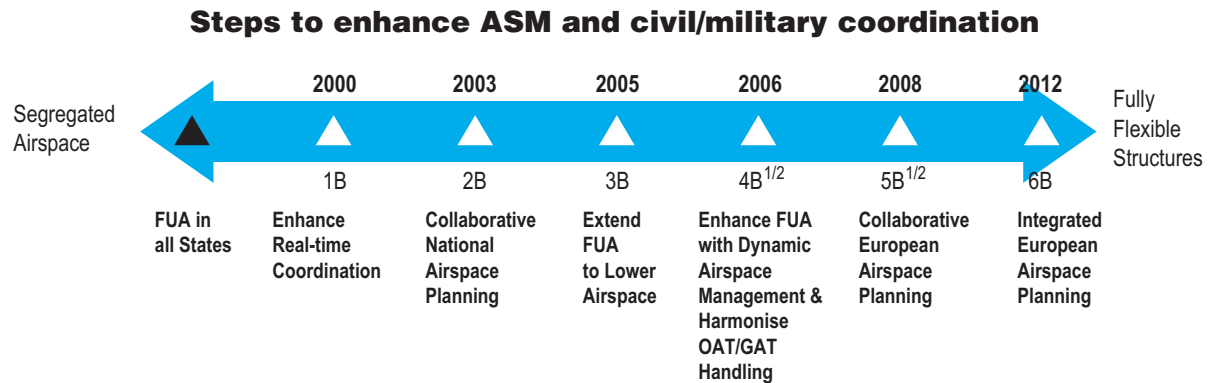
OI-5B2: Collaborative European Airspace Planning.

2012

OI-6B: Integrated European Airspace Planning.

EUROCONTROL Airspace Strategy for the ECAC States

As one of the key principles of the EUROCONTROL Airspace Strategy for the ECAC States, the Flexible Use of Airspace (FUA) Concept will evolve to further enhance the Civil/Military Coordination and to harmonise the National and International Airspace Management procedures in order to progressively move towards a uniform airspace organisation leading to one single continuum of airspace “ONE SKY” for all the ECAC Region.



Reference Documents

Please note that all FUA Reference Material, are available on the EUROCONTROL Web Site:
<http://www.eurocontrol.int/eatmp/fua/index.html>

