Airspace Organization and Management

Asia and Pacific Regional Sub-Office

2014
CONTENTS

• Concept of Flexible Use of Airspace (FUA)
• Flexible and adaptable airspace structure
• Conditional Route (CDR) and CMAC process
• ASM and the consistency in ATM
• **Airspace Management (ASM)**: Is a *process* by which airspace options are selected and applied to meet the needs of the airspace users.

• **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.
ASM GUIDING PRINCIPLES AND STRATEGIES

• All available airspace should be managed flexibly;

• Airspace management processes should accommodate dynamic flight trajectories and provide optimum operational solutions;

• When conditions require that different types of traffic be segregated by airspace organization, the size, shape, and time regulation of that airspace should be set as to minimize the impact on operations;
ASM GUIDING PRINCIPLES AND STRATEGIES

- Airspace use should be coordinated and monitored in order to accommodate the conflicting requirements of all users and to minimize any constraints on operations;

- Airspace reservations should be planned in advance with changes made *dynamically* whenever possible. The system also needs to accommodate short-notice unplanned requirements; and

- Complexity of operations may limit the degree of flexibility.
What is Flexible Use of Airspace (FUA)?

– An airspace management concept
– A methodology of capacity management

– Key Points
  • Not owned by civil or military
  • Segregated temporarily
  • Managed dynamically
  • Contiguous volumes of airspace are not constrained by national boundaries
FUA CONCEPT CONSIDERATIONS

Communication

FUA concept considerations

Cooperation

Coordination
Question: Which one is more efficient and more effective
IMPLEMENTATION OF FUA

• The first Option
  – Allow temporary access to civilian users into military restricted and reserved airspace for optimum use of the airspace and benefit civil operations

• Another Option
  – Allow temporary access to military users into civilian restricted and reserved airspace to facilitate the training and other missions.
Question: Which one is the correct FUA Concept?

A

Military Reserved

B

Permanent Route
### Prerequisites of FUA

1. **National, high-level civil/military coordination body**
2. **Consistent collaborative national airspace planning process**
3. **Communication, negotiation, and priority rules and procedures for CMAC**
4. **Publication of procedures for activities which require airspace reservation or restriction.**
5. **Framework agreements between civil and military authorities**
6. **System of periodically review airspace needs, organization and management**
7. **Predictive and timely access to restricted or reserved airspace**
**BENEFITS of FUA**

- Reduce distance, time and fuel
  - Increase flight economy
- Enhance ATS route network and associated sectorisation
  - Increase ATC capacity
  - Reduce Air Traffic delays
- Temporary airspace reservations are more closely in line with military operational requirements
  - Better response to specific military requirements
FLEXIBLE AND ADAPTABLE AIRSPACE STRUCTURE
• Airspace Structures includes: Controlled Airspace, ATS Routes, CDRs, ATC Sectors, Danger Areas (D), Restricted Areas (R), Areas (P), Temporary Segregated Areas (TSA), Temporary Reserved Areas (TRA), Cross-Border Areas (CBA)
Flexible airspace structures are suited to temporary allocation and utilization.

These airspaces require dedicated coordination procedures for activation/de-activation.
FLEXIBLE AIRSPACE STRUCTURE

• Conditional Route (CDR)
• Temporary Reserved Area (TRA)
• Temporary Segregated Area (TSA)
• Cross-border areas (CBA)
Question: What are the differences?

- **Reserved**
  - May be allowed to transit
- **Segregated**
- **Exclusive**
  - Not allowed to transit
## TSA and TRA

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<thead>
<tr>
<th>Temporary Reserved Area (TRA)</th>
<th>Temporary Segregated Airspace (TSA)</th>
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<tr>
<td>Temporarily reserved and allocated for the specific use of a particular user</td>
<td>Temporarily segregated and allocated for the exclusive use of a particular user</td>
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<td>During a determined period of time</td>
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<td>Other traffic may be allowed to transit through under ATC clearance</td>
<td>Other traffic will not be allowed to transit through</td>
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Cross Border Area (CBA)

- TRA or TSA established for specific operational requirements over international boundaries. Established to allow military training or operational flights.
- Not constrained by national boundaries. Assist in the improvement of ATS route network.
- Political, legal, technical and operational agreements between States needed prior to establishment.
- Formal agreements prior to establishment are needed to address issues of sovereignty, defense, legality, operations, environment and SAR.
CDR AND CMAC PROCESS
Conditional Route (CDR) Concept

CDR—A non-permanent ATS route or portion thereof which can be planned and used under specified conditions.

- Through TRA, TSA or CBA
- Opening/closure results from associated military activities or purely civil needs
- Usually be established and utilized as pre-planned routing scenarios
- Permits the definition of more direct alternative routes by complementing and linking to the existing ATS route network
CDR CATEGORIES-CDR1

Permanently Planable

Applicable date, time period and FL are published in AIP

Conditional Route Cat1

TRA/TSA

X1, X2
4th Jul-4th Oct
2300-0600 UTC
Above FL290
CDR CATEGORIES-CDR1

Permanently Planable

Applicable date, time period and FL are published in AIP

Conditional Route Cat1

TRA/TSA

X1, X2
4th Jul-4th Oct
2300-0600 UTC
Above FL290
Conditional Route Cat2

CDR ARE ESTABLISHED AS FLW: X1,X2
1406042300/1406050600
ABOVE FL290

Applicable date, time period and FL are notified by NOTAM
Conditional Route Cat3

Applicable time period and FL are Notified real time

X1, X2 is available from now to 0600 UTC Above FL290
Question: Which one is correct?

A

Foreseen availability

Flight Planning possibilities

B

Foreseen availability

Flight Planning possibilities
CDR CATEGORIES

CDR1
- Expected to be available for most of the time
- Plannable in the same way as all permanent routes
- In the event of short notice unavailability, re-routing around active TSA on ATC instructions

CDR2
- Coordinated and allocated on Day to Day basis as a response to ATC capacity imbalance
- Plannable only in accordance with NOTAM
- Part of pre-defined routing scenario

CDR3
- Usable on ATC instructions only
- Use as short notice routing
Examples: CDR 1, 2 & 3

UL612 (LG) TRL SIT

CDR1:
ABOVE FL245 H24.
BELOW FL245:
MON-THU 2100-0400, FRI 1300 - MON 0400 AND
HOL 2100 THE DAY BEFORE - 0400 THE DAY AFTER.

CDR 2:
FL205-FL245 MON-THU 0400-2100 AND
FRI 0400-1300.

CDR 3:
BELOW FL205 MON-THU 0400-2100 AND FRI 0400-1300.
# Profile of UL612

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17 November 2014
Example: Multi States, Sectors, CDRs

UL15 EG SANDY MOTOX
TIME: CDR2: H24
LEVEL: CDR2: FL245 to FL460

UL15 LF MOTOX LESDO
RE-ROUTING VIA UL607 BY KOK IN CASE OF DEFENCE ACTIVITY.
LEVEL: CDR2: FL345-FL500. ODD FL

UL15 LF LESDO BEGAR
TIME: CDR1: WEEK-END AND NIGHTS. RE-ROUTING VIA LESDO-UG42-LUVAL-UN491-BEGAR IN CASE OF DEFENCE ACTIVITY.
LEVEL: CDR1: FL345-FL500 (OBAKI-BEGAR FL195-FL500), ODD FL.
CDR IN THREE LEVELS ASM

**Strategic Level 1** – Establish CDR structure and CMAC procedures

**Pre-tactical Level 2** – Pre-coordinate and Allocated at least one day before operation

**Tactical Level 3** – coordinate and utilize in Real-time
Level 1 (Strategic) CMAC Process

- Collect and validate user requirements
- Coordinate and conciliate airspace availability
- Design and validate CDR based on permanent route structure
- Publish CDR structure
Level 2 (Pre-tactical) CMAC Process

Provide info Check CDR2

Provide schedule of Training / Testing Area

Military Liaison

Accepted

Create CDR2 With Applicable time period & FL

Noted

Check info Send NOTAM

Civil ATC Unit

Military Unit

ATM Officer
Level 3 (Tactical) CMAC Process

Request Route X

Cleared Route X

Airspace is not active

Coordination

Route X

Training Area A
Question: Correct or not?

Describe the route (Fill ITEM15) with CDR3
Regard CDR1 as permanent, be careful with applicable date, time period and FL. Published in AIP.

Describe the route (Fill ITEM15) with CDR1.

AIRROUTE

MET INFO

AIRCRAFT

Dispatch Clearance List

Flight Plan

CDR1
Check NOTAM before operation, be careful with time period and FL provided by NOTAM.

Describe the route (Fill ITEM15) with CDR2.
Check AIP for available route

Available Route

Describe the route (Fill ITEM15) with permanent route

Aircraft

FPL

Met Info

AIP

Airroute

Dispatch Clearance List

CFP, MEL....

Flight Plan
ASM
AND
CONSISTENCY IN ATM
• Coordination between civil and military authorities should be carried out at the strategic, pre-tactical and tactical levels

• Consistency between ASM, ATFM and ATS should be established and maintained at three levels of ASM
Civil/military coordination and three levels ASM

Strategic Level 1 — Establishment of pre-determined airspace structures; CMAC and ASM procedures; Cross-border coordination and Separation Standards

Pre-tactical Level 2 — Day-to-day allocation of airspace according to the conditions and procedures agreed upon at level 1

Tactical Level 3 — Real-time use of airspace: activation, de-activation, real-time reallocation of airspace

National CMAC Body （Committee）

ASM Entity （Joint Cell）

ATS Units and Controlling Military Units
Interoperate of ASM/ATFM/ATS

ASM
Provide Capacity

ATFM
Balance the Capacity and Demand

ATS
Provide Separation and Manage the Workload
- Review and re-assess airspace structure
- Establish new flexible airspace structures
- Design airspace under FUA concept
- Optimize CMAC process
ATFM Operational Management

Demand

- Performance Targets
- Traffic Forecast

Traffic Forecast

Strategic ATM Planning

- Airspace Design
- Technical Infrastructure
- Procedures
- Staffing & Training
- Performance Prediction

Strategic DCB

Capacity Analysis

- Weather
- Airspace Use Plan
- Staffing Roster
- Capacity Constraints

Revised Capacity

Updated Traffic Demand

ATFM Daily Plan (ADP)

Pre-Tactical

Tactical

- Dynamic Traffic Situation
- Tactical ATFM

Tactical ATFM

- Dynamic Weather
- Special Use Airspace Status
- Actual Staffing

Optimized Operations

Capacity Management

- CDR3 Availability
- TSA/TRA/CBA Status

Post-Operations Analysis & Performance Monitoring
COLLABORATIVE DECISION MAKING (CDM)

CDM
- A tool to support ASM
- Base
  - Information exchange and data sharing
- Process
  - Brings together airlines, airports, civil and military aviation authorities
  - Facilitate decision-making
Thank You