International Civil Aviation Organization

**Middle East Air Navigation Planning and
 Implementation Regional Group**

**Sixteenth Meeting (MIDANPIRG/16)
(Kuwait, 13 – 16 February 2017)**

Agenda Item 5.2.2:   Specific air navigation issues

COOPERATION COUNCIL FOR THE ARAB STATES OF THE GULF (GCC)
UPPER FIR PROJECT

*(***Presented on behalf of GCC States***)*

SUMMARY
The aim of this paper is to provide an update on the GCC's Upper FIR project and to seek the support of ICAO Member States and participant organization. Action by the meeting is at paragraph 5.

1. **INTRODUCTION**

1.1   The GCC Member States are planning to establish a common Upper Flight Information Region (GCC UFIR) in response to the recommendation of the GCC Air Navigation Committee (GCC ANC). This initiative is based on the establishment of a common block of airspace, which will cover the airspace at and above FL290 in the upper airspaces of the participating GCC States.

The GCC ANC's long-term aim is to:

- Develop a fully integrated Air Traffic Management (ATM) system in the GCC States;

- Enhance aviation safety and expand airspace capacity in the GCC States;

- Accommodate high growth in air traffic movements in the region; and

- Standardise Air Traffic Services (ATS) operation in the participating GCC Member States.

2. **CONTEXT OF THE STUDY**

2.1   The main objective of the study is to develop the technical, operational and financial requirements for the definition, planning and implementation of an FIR in the upper airspace of the GCC States. These points need to be achieved while maintaining airspace sovereignty of the GCC States.

The study is based on two operational scenarios:

- An Initial Scenario (2020) that focuses on arrangements that increase interoperability and seek to harmonise existing service provision. The arrangements need to be implementable and enable the delivery of benefits in the short term. This scenario considers the broadest definition of a UFIR and seeks to identify opportunities for developing common standards, operational concepts and improving operational and technical interoperability and, where appropriate, the standardisation of supporting functions. The progressive implementation of this scenario into operation will be a critical first step and enabler to providing the 'seamless' airspace envisaged by the GCC.

- A Target Scenario (2025) builds on the initial operational scenario to provide the GCC with a credible route to increasingly harmonised airspace, ATM/CNS infrastructure, seamless operations and delivery of ATS, and the supporting institutional, legal and non-technical arrangements.

2.2   The study considers operational, technical, and institutional and other organisational and functional arrangements for each scenario and, by comparing the scenarios to existing arrangements, will develop an implementation plan and roadmap for the initial operational scenario and a transition plan to the target operational scenario. The study also assesses the costs and benefits of the proposed measures to support any subsequent business cases necessary at the GCC or State level.

3.   PROGRESS TO DATE

3.1   The progress on the work in individual Work Packages (WPs) to date is summarised in **Error! Reference source not found.**.

	WP	Progress
WP1	Data collection	The team developed a set of stakeholder surveys and disseminated them among the relevant national stakeholders through the GCC UFIR Task Force (TF) Focal Points. The international organisations, namely AACO, ACAC, CANSO ME, IATA AME, and ICAO MID, were also contacted and provided their answers to the shared surveys.
		After receiving initial responses to the stakeholder surveys, a set of workshops was held in November and December in all six GCC States and with all the relevant local stakeholders, i.e. national regulators, military, home airlines and ANSPs.
		The updated surveys based on the discussions at the workshops were then disseminated to the attendees for their final review and also to provide additional required information and data, as agreed at the workshops.
		Subsequently, the team finalised the D1.1 Data Collection Report, as the single deliverable for WP1. The final version of the report was shared with the UFIR TF at the beginning of March 2016.

WP		Progress
WP2	Scenario definition and gap analysis	Based on the information gathered in WP1, the team defined a Baseline Scenario, using 2015 flight data. Subsequently, the future scenarios were defined, utilising a framework that breaks down the scenarios into individual arrangements (Operational, Technical, Institutional), components, subcomponents, and High Level Concept Elements (HLCEs). This was performed for both the Initial and Target Scenario. An initial definition of the future operational scenarios, including a gap analysis against the baseline scenario, was then performed and shared with the UFIR TF. The final and agreed version of the deliverable was submitted at the end of May 2016. A summary of the outcomes of WP2 is provided in Section 4 of this document.
WP3	Operational concept, requirements and ATM standardisation requirements	The team is currently developing the final draft of the report that will address the operational requirements for each HLCE in this element. In parallel, the team is performing an analysis of quantifiable benefits through the fast-time simulation exercise, modelling the Baseline Scenario (with 'do nothing' traffic projections in 2020 and 2025), Initial and Target Scenario.
WP4	Technical requirements and specification	The team is currently finalising the report and the technical requirements for each HLCE in this element.
WP5	Institutional, organisational and supporting functions	The team is currently finalising the report and the institutional requirements for each HLCE in this element.
WP6	Implementation plan and roadmap	The work has not started yet, as these WPs will be based on the outcomes of WP3-5.
WP7	Cost estimates and cost-benefit analysis	
WP8	Recommendations, summary report and presentation	

4.   **FUTURE OPERATIONAL SCENARIOS**

4.1   This section provides overview of the future high-level operational scenarios for the GCC UFIR (Initial and Target Scenario), as defined in WP2. The scenarios may evolve as the detailed assessment of the operational, technical and institutional requirements develops (through the work in WP3-5).

4.2   It is important to note that the scenarios do not represent an exhaustive description of the future aviation operations in the GCC area. Instead, they should be used to paint the picture of the future operation at two distinctive points in time (in 2020 for the Initial Scenario and 2025 for the Target Scenario) and to communicate the vision of the UFIR TF.

4.3   An overview of the proposed initiatives and changes, broken down into operational and technical arrangements is shown in Figures 1-2. The future scenarios were developed to be implementable, but challenging at the same time, and reflect a series of consultations with the UFIR TF (in WP1-2) as well as wider stakeholders (WP1). They represent a plausible image of the future and, as such, should be used for the definition of future sub-regional initiatives up to 2025, as further defined in WP3-5.

5.   **ACTION BY THE MEETING**

5.1   The meeting is invited to:

a)   take note of the contents of this Working Paper; and

b)   encourage Adjacent Member States and organization to support the GCC UFIR project throughout the project life cycle

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Figure 1: Overview of the main operational elements of the future scenarios for the GCC UFIR

| | 2015 | Initial scenario | 2020 | Target scenario | 2025 |

Operational Arrangements

Airspace Organisation
- GCC UFIR formally established, comprising State Sectors defined by the FIRs with common base level
- An optimised fixed route network with new routes, RNAV 5 and 1, and the initial implementation of FUA, CDOs and CCOs

- GCC UFIR operated as a homogenous block of airspace
- A dynamic UFIR route network with RNP1 and RNAV 1 priority routes, FUA elements, CDOs/CCOs, and initial FRA

Airspace Management
- A collaborative airspace planning environment
- Harmonised separation minima in priority sectors
- Optimised sectorisation to accommodate main traffic flows
- A GCC-wide business continuity and ATM Contingency Plan, a GCC Contingency Cell established

- A common airspace planning and coordination function
- Harmonised separation minima across the UFIR
- Flexible sectorisation to accommodate main traffic flows, with dynamic vertical and optimised horizontal sector boundaries
- The GCC Contingency Cell will coordinate the contingency operations to assure continuity of service

Demand and Capacity Balancing
- An interoperable IFPS for en-route and TMA operations
- Initial CDM measures to balance demand and capacity in priority areas, A-CDM for capacity-constrained airports
- FMP's in each GCC State, coordinating flow measures with the other FMPs within the GCC

- A fully evolved CDM to manage flows of traffic at the UFIR level and between regions, A-CDM for all international airports
- A GCC-wide ATFM, interoperable with neighbouring regions

Traffic Synchro-nisation
- Harmonised cross-boundary arrangements between adjacent State Sectors with restrictions minimised to essential operational requirements

- Harmonised cross-boundary airspace design and cross-boundary sectorisation based on bilateral agreements

Airspace User Operations
- A GCC AMC for pre-tactical airspace management in priority restricted areas, with limited sectorisation of restricted areas and revised activation times

- FUA strategic, pre-tactical and tactical level civil/military airspace management at the UFIR level, with sectorisation of restricted areas

Conflict Mngt.
- Harmonised deployment and use of conflict management tools

- Improved and harmonised conflict management tools to support cross-border operations, enhanced through ADD

ATM Service Delivery Management
- UFIR ATS delivered to a consistent standard and quality
- A UFIR ATM Manual containing a common description of operational procedures

- UFIR ATS delivered to a consistent standard and quality
- Individual GCC ANSP ATM manuals consistent with the GCC UFIR ATM Manual

Information Services
- GCC States AIS/AIM function ensures interoperability and data sharing, with harmonised access and types of data
- MET data shared among the GCC States through the integration of OPMET into the UFIR operations
- Common procedures for SAR coordination

- All GCC States have completed the transition to AIM
- MET data shared among the GCC States through the integration of OPMET into the UFIR operations
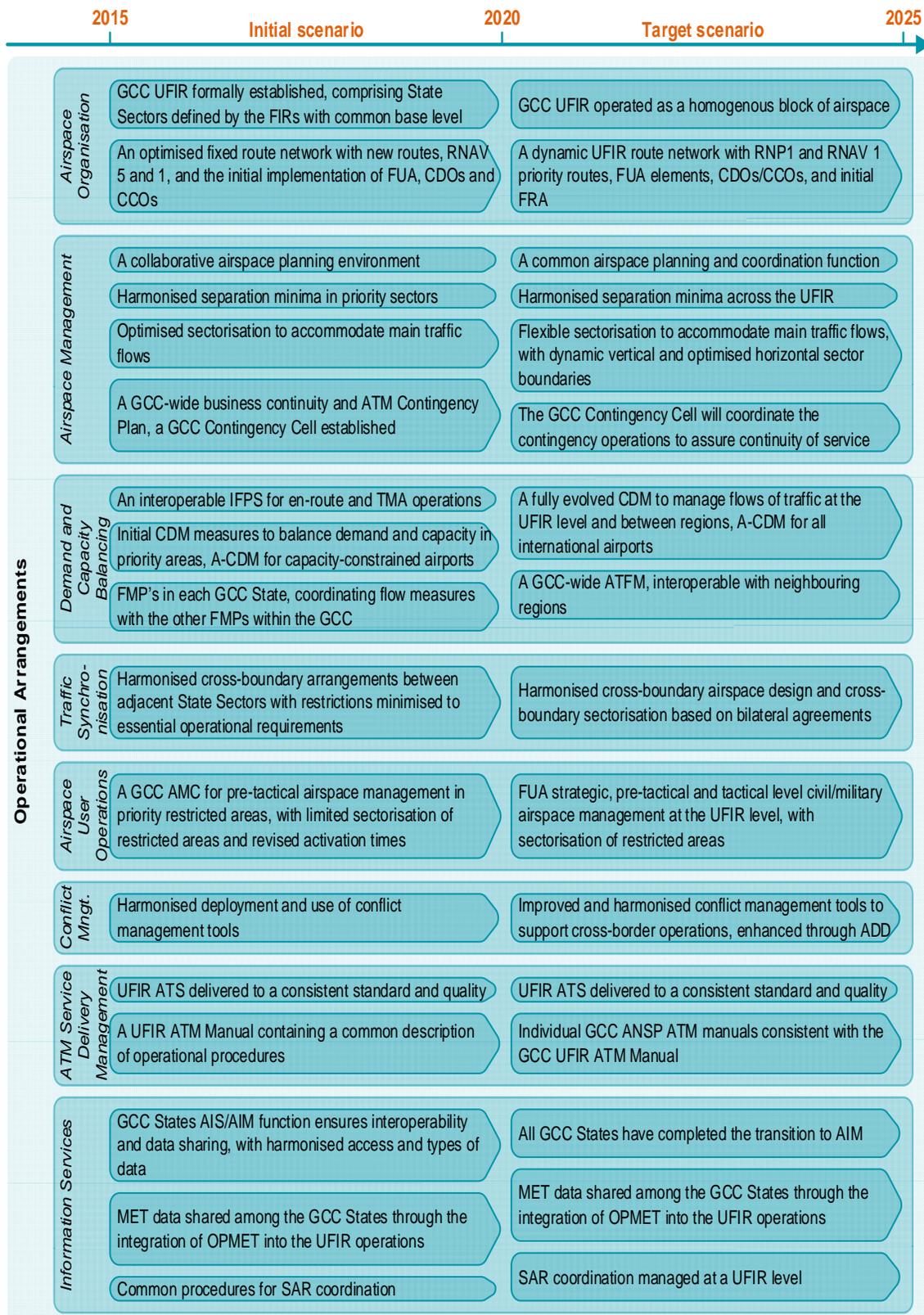- SAR coordination managed at a UFIR level

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Figure 2: Overview of the main technical elements of the future scenarios for the GCC UFIR

	2015 — Initial scenario — 2020	Target scenario — 2025

Technical Arrangements

Communication

Initial scenario	Target scenario
Datalink introduced with selected ACCs and airlines, with defined common minimum level of functionality and service	Datalink deployed where operationally required to lower the controllers' workload and increase the level of safety and capacity
AMHS deployment coordinated and harmonised at the GCC level, SYSCO OLDI function fully interoperable and standardised among the GCC States	The harmonised AMHS function delivered over IP, the initial implementation of SWIM with first operational services
The communication infrastructure will meet the requirements of the GCC UFIR, with initial harmonisation of the contingency measures	The communication infrastructure will meet the requirements of the GCC UFIR, with fully harmonised contingency

Navigation

Initial scenario	Target scenario
DVOR/DMEs used as contingency means only	All DVORs phased out for en-route operations
DMEs support RNAV operations	DME infrastructure facilitates RNAV 1 on the priority air routes
GNSS navigation gradually implemented to support PBN, harmonised GPMS infrastructure installed and operated	GNSS as the primary means of navigation on the RNP 1, RNAV 1 and RNAV 5 routes.
Satellite navigation progressively implemented as the primary navigation infrastructure, with initial harmonisation of the contingency measures	The navigation infrastructure will be harmonised at the GCC level, with fully harmonised contingency

Surveillance

Initial scenario	Target scenario
Enhanced surveillance coverage to support harmonised separation minima in priority sectors	Enhanced surveillance coverage to support standardised separation minima across the UFIR airspace
GCC-wide cross-boundary sharing of surveillance data to improve coverage and increase efficiency and capacity	An optimised and harmonised surveillance infrastructure across the UFIR
Improved PSR/SSR infrastructure to provide the same level of service across the GCC UFIR	Harmonised PSR/SSR infrastructure to provide seamless airspace coverage in the GCC UFIR
ADS-B introduced in the priority areas	ADS-B used increasingly within the UFIR airspace
WAM introduced in the priority areas	WAM used increasingly within the UFIR airspace
Harmonised surveillance infrastructure to increase efficiency and effectiveness of operations, with initial harmonisation of the contingency measures	Optimised surveillance infrastructure at the GCC level for better cost-efficiency, with fully harmonised contingency

Automation

Initial scenario	Target scenario
ATC systems with increased functionality and the level of interoperability necessary to support the UFIR implementation, AMAN established for key international airports, initial implementation of XMAN in priority areas	Fully interoperable ATC systems, optimised capacity and reduced delays through the implementation of AMAN at all the international airports, sequencing for all the required GCC UFIR en-route sectors through XMAN
A centralised IFPS implemented at GCC level, FMP in each GCC State to regulate traffic in the UFIR and coordinate flow measures with other FMPs	A technical solution to provide ATFM at a UFIR level
The latest AIXM standard in all GCC States, the quality and type of available data delivered to the same standard, GCC States publish information through eAIP	A common GCC AIXM database to assure the consistency of quality and content of all the national databases, all the eAIPs will have harmonised and standardised content