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

ACAC CNS/ATM STUDY

(Presented by the Arab Civil Aviation Commission- ACAC)

SUMMARY

This paper provides a description of the *ACAC CNS/ATM Study Update* project and the outcomes of the study.

Action by the meeting is at paragraph 3.

REFERENCES

- Final report of ACAC CNS/ATM Study – December 2016

1. INTRODUCTION

1.1 Since the previous study in 2004–2005, there have been significant changes in the global approach to Air Traffic Management (ATM) and for aviation in the Middle East. Most notably for ATM is the adoption of the International Civil Aviation Organization Global Air Navigation Plan (ICAO GANP) development of the Aviation System Block Upgrade (ASBU) approach to ATM evolution, implementation of formalised Safety Management System (SMS), and how Air Navigation Services (ANS) are provided.

1.2 The rapid growth of aviation in parts of the region is straining ATM capabilities and spurring various localised nation re-planning efforts. As a result, the Arab Civil Aviation Commission (ACAC) launched a Request for Proposals (RFPs) for a new study to get an update of the CNS/ATM status and quickly develop a new strategy to implement a more efficient modernisation of the ATM system in the region.

1.3 During the ANC meeting (ANC32) in Morocco, December 2014, the ANC's chairman, vice chairman, and secretary approached Airbus ProSky to discuss how Airbus ProSky could cooperate with them to conduct a CNS/ATM study. Airbus ProSky and Airbus Mid-East agreed that a study addressing the near-term and strategic ATM needs and requirements in the Middle East and North Africa would be extremely beneficial to the region, and further agreed to conduct such a study.

1.4 The Airbus ProSky Study Team has assessed the current state of aviation, conducted a gap analysis between the current state and future desired state, and made specific recommendations based on their findings in the gap analysis phase. The CNS/ATM Study was to be based on the Global Air Navigation Plan (GANP), Aviation System Block Upgrades (ASBUs), and relevant documents. It ensured the coverage of all ACAC Member States and considered the interaction with neighbouring areas, including Iran. The final outcome is directly linked to (1) input provided by ACAC Member

States through the use of a questionnaire, (2) extensiveness of data provided, (3) the availability of publicly accessible data, and (4) input provided by regional flight operators.

1.5 The following sections describe the objectives of the study, research methodology used in the project, schedule of deliverables, and the current status of the CNS/ATM Study.

2. DISCUSSION

2.1 Study Description and Purpose

2.1.1 The CNS/ATM Study update is a collaborative effort between ACAC, ACAC member States, and Airbus ProSky. The purpose of this Study is to develop both near-term requirements and longer term strategic needs to formulate a master plan for regional air navigation service provision through 2030. Included will be a recommended systematic process to prioritise and balance investments aiming to optimise ATM for the Arab Middle East and Northern Africa area.

2.1.2 In the period since the previous ACAC CNS-ATM Study of 2005 conducted in consultation with Sofreavia, there have been significant changes in the global approach to Air Traffic Management (ATM) and for aviation within the Arab Civil Aviation Commission (ACAC) jurisdictional domain of North Africa and the Middle East. Most notably for Air Traffic Management (ATM) is the adoption of the International Civil Aviation Organization Global Air Navigation Plan (GANP), and the development, implementation and formalisation of:

- Aviation System Block Upgrade (ASBU) approach to ATM evolution,
- Safety Management System (SMS), and
- Enhancements in how Air Navigation Services are provided.

2.1.3 There has been and continues to be unprecedented shifts and increases in both traffic flows and volume. The resulting rapid growth of aviation in parts of the region is straining ATM capabilities, and consistent and efficient air traffic service provision. This is particularly true during high-demand operations that often exceed current capacity. In those areas where the demand has not yet challenged local capabilities and services, the traffic projections through 2030 provided by ICAO and/or local Air Navigation Service Providers (ANSPs) clearly indicate that many of these areas can expect to encounter moderate or greater operational constraints within the coming years. In addition to operations being affected by demand, they are also affected by the continuous efforts to recognise and employ new technologies and capabilities that will enhance safety, efficiency, and operational predictability for service providers and flight operators. While the latter is a positive effect, the employment of new technologies and their associated operational capabilities does require a regional collaborative plan of action to better ensure harmonisation of procedures.

2.1.4 To better manage the effects of traffic and system modernisation, ACAC has initiated this update to the 2005 CNS-ATM Study to efficiently identify (1) where and when operational constraints can be expected, (2) shape their mitigating solutions, and (3) plan an effective and holistic implementation plan that includes technologies and procedures.

2.2 Study Objectives

2.2.1 While the Air Navigation Service Providers (ANSPs) and civil aviation authorities have developed strategic plans to address the growing needs of the individual States and the region at large, there are, however, substantial challenges in being able to effectively accommodate the anticipated aviation growth and service expectations of its stakeholders. These challenges can affect the region's economic growth and prominence in the global aviation environment and other ancillary economic domains such as aviation commerce and tourism.

2.2.2 The need to increase airspace capacity, provide increased access to airports, improve efficiency for both aviation system customers and ANSPs, and reduce environmental impacts while continuing to maintain, foster, and promote safety is paramount.

2.2.3 Specific objectives to be highlighted in the Regional Concepts for the year 2030 and transition from today's system include:

- Improve airspace safety and efficiency
- Improve interoperability between ANSPs to foster seamless services across borders
- Increase airspace capacity to meet future demand requirements
- Increase access to airports
- Reduce the environmental impact of increasing traffic by providing improved ATM operations

2.3 Project Schedule

2.3.1 The Initial initial schedule, called for the period of performance to commence during December 2015 and end during June–July 2016.

2.3.2 However, as the project progressed, it became apparent that time frame allocated for data collection and analysis required an extension to November 2016, for the purposes of allowing the following:

- ACAC State membership to complete and provide their data.
- Airbus ProSky team to then analyse this data and submit findings.
- ACAC program management team to collaboratively review, distribute and provide comments back to the contract team.
- ACAC program management team to present the final findings initially to
  a. ACAC executive management, followed by,
  b. the entire ACAC team during a regularly a scheduled ANC conference (planned for November 2016).

2.4 Study Status

The Study activities consist of a series of sequential activities with overlapping concurrency; these activities are:

2.4.1 Data Collection

2.4.1.1 In order to ascertain the communications, navigation, surveillance and air traffic management (CNS/ATM) capability of the ACAC region, specific State operational planning (tactical and strategic), performance and, when possible, quality of service data are required. To obtain this data, a series of two questionnaires were developed, vetted, distributed, reviewed, and transmitted through ACAC project management personnel between the Airbus ProSky contract team and the ACAC membership.

2.4.2 CNS/ATM Assessment

2.4.2.1 The CNS/ATM assessment task is to determine the current regional capabilities available to deliver operational services for the provision of safe, orderly, and efficient (predictable and repeatable) air traffic services and management by the aggregation of each individual ACAC Member State’s capabilities and abilities.

2.4.2.2 The CNS/ATM assessment utilising data received through February 2016 as well as data obtained from public web sites was presented by the Airbus ProSky contract team to the ACAC project management team on 18 March 2016 (via teleconference) and repeated (face-to-face) in summary form to the ACAC Membership on 8 April 2016 and 1 November 2016 in Rabat, Morocco.

2.4.3 GAP Analysis and Findings

2.4.3.1 The Gap analysis and its associated findings map the current capabilities derived from the CNS/ATM assessment and a comparison of those capabilities to the ICAO ASBU Blocks 0-3, regional planning documentation and the ICAO GANP to determine the ability of the regional to meet identified strategic planning.

2.4.3.2 The findings from the GAP analysis were provided to the ACAC membership on 2nd September 2016 during the GMA Summit held in Riadh-KSA, 1st November 2016 during the 35th ACAC ANC Meeting Rabat- Morocco and on 21st December 2016 in Muscat-Oman during the 55th EC Meeting. The Gap Analysis findings provided detailed information in the following operational categories:

- ANSP Interoperability
- Airspace Policy/ Procedures
- Separation Standards
- Routing
- Contingency and Growth Planning
- Civil-Military Procedural Cooperation
- Airport Policy/Procedures
- Airport Physical Infrastructure
- TFM/CDM

63 findings are identified and summarized into the following five (5) critical groups:

- Findings that are directly associated with a lack of intra & inter-facility automation capabilities that communicate flight plan and situational awareness data, and their impacts.
- Findings that indicate present equipment is not being used to its maximum effectiveness (partly due to the previous statement), thus affecting the type(s) and efficiency of the procedures being currently used.
- Findings that procedures in use are generally below the operating capabilities of the fleet.
- Findings that minimal Flexible Use of Airspace procedures are in place, or even that effective coordination is underway with civil/military stakeholders.
- Findings that traffic flow management is not centralized and is generally dependent upon static initiatives that are not supported by metrics or metrics collection.

2.4.4 Recommendations

2.4.4.1 The recommendations proposed to mitigate the gaps identified in the previous section. Recommendations are structured into two groupings: (1) specific near-/far-term recommendations, and (2) key recommendations.

2.4.4.2 Specific near-/far-term recommendations are framed into two time periods: Near-term (NT) recommendations and Far-term (FT) recommendations. For the purposes of this study, the recommendation periods are defined in a manner that takes the available data and its fidelity, and mirrors it to an ASBU Blocks combination. This combination takes the ASBU Blocks 0 and 1 and sequentially merges their activity periods of 2013–2018 into the near-term recommendations period, and then sequentially merges the ASBU Blocks 2 and 3 and similarly sequentially merges their activity periods of 2023–2028+ into the far-term recommendations period.

71 recommendations are identified and summarized into the following four (4) critical groups:

- Develop airspace, route structures and procedures that support advanced aircraft capabilities and a transition to regional PBN implementation.
- Achieve as close to one hundred percent as possible interoperability among adjacent facilities in information, data, and communications exchanges by creating interfaces where none exist and maximizing those that do exist.
- Ensure the equipment and capabilities present today are being utilized to the maximum extent possible, and controllers are trained and understand their equipment's operational capabilities and the methods available to them to personally provide effective service delivery.
- All facilities should adapt the principals of traffic flow management, and these principals should be incorporated into all ATC personnel training curriculums and responsibilities. (Systems Thinking)

2.4.5 Key Recommendations

2.4.5.1 Twelve (12) Key recommendations are identified as areas where timely and focused attention is warranted as at **Appendix A**. These key recommendations represent aspects across the entire operational domain to include air traffic services (ACC/APC), airports, policy and procedures, equipment and infrastructure, new technologies and operators.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) take note of this working paper;

b) endorse the key recommendations stemming from the ACAC CNS/ATM Study; and

c) request ACAC member states, with the support of the ICAO MID, IATA and AACO, to take advantage of the outcomes of the ACAC CNS/ATM Study and pursue its implementation.

APPENDIX A

KEY RECOMMENDATIONS

#	Key Recommendations
1	Encourage standardisation and uniformity in the development and application of air traffic procedures wherever possible. (All PIAs)
2	Increase frequency and span of communications between adjacent FIRs. Focus on improving the capabilities and efficiency of operations within the region and between adjacent facilities. (PIA-3)
3	Continue to move toward creating, strengthening and revising existing agreements between adjacent FIRs. These agreements should incorporate; Holding responsibilities and procedures, TFM techniques (e.g., off-loading traffic to lower density routes when tracks threaten to become saturated, dynamic airspace procedures). (PIA-3)
4	Develop airspace plans to transition to a Performance-Based Navigation (PBN) airspace environment. Where plans have been or are being developed continue towards implementation. (PIA-1) [This is both a near-term and far-term recommendation]
5	To increase airspace capacity and efficiency, we recommend all States develop concepts and implementation strategies for: • Dynamic Airspace Management procedures to strategically mitigate airspace design, traffic volume, or other operational constraints affecting efficiency and safety. • Flexible Use of Airspace plans that will result in the transition to integrated civil-military airspace management.
6	Identify locations where space-based ADS-B can be used to supplement current ground-based surveillance to enable full airspace surveillance and develop a concept of operations (ConOps) for its use.
7	At High- and Medium-activity aerodromes increase airport throughput via application of diverging departure heading separation procedures for both same runway and parallel runways. (Policy and Training)
8	Where high activity exists, establish Air Traffic Flow Management (ATFM) as a core function with dedicated operational personnel within FIRs. Establish as an additional duty, ATFM procedures within FIRs of lower traffic density. Incorporate ATFM procedures into all ATC training programmes. (PIA-3)
9	Establish metrics that can assist in capturing current performance data such as sector and runway capacity, delay statistics (i.e. minutes of-ground delay, taxi time, airborne holding, diversions reroutes, MIT / MINIT), which can aid in determining the cost/benefit of new procedure development and equipment acquisition. (PIA 1,3)
10	Reduce static ATC restrictions, such as those embedded in agreements and standard operating procedures, with more strategic and tactical traffic flow management initiatives, i.e. MIT and restrictions ‘regardless of altitude’, or multiple routes ‘as one’. (PIA 1,3)
11	Establish Collaborative Decision Making (CDM) capabilities and processes for exchanging strategic and tactical information and to enable decision making between the ANSPs and stakeholders. (PIA-3)

#	Key Recommendations
12	In anticipation of changes to the homogenous areas based on forecasted traffic levels develop and empower multi-national ANSP work groups from the affected areas to identify and design changes in procedures and airspace that are necessary to accommodate the flows of traffic. Design characteristics would include: • Equipment and automation requirements • Effect on local operations • Coordination and communication with tier 2 and 3 facilities • Strategic and tactical planning documentation changes • Identification of regional support to affected ANSPs • Greater involvement and coordination with regional stakeholder support organisations (i.e., ACAC, flight operators)

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