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Agenda Item 6.2: Air Navigation Planning and Implementation

DIGITAL DATASETS:
REGULATORY APPROACH AND IMPLEMENTATION ASSESSMENT

(Presented by UAE)

SUMMARY

New Annex 15 and 1st ed. Doc. 10066 represent a paradigm shift for the role and importance of aeronautical data/information provisions as performed by a State AIS. This Information Paper (IP) describes the main outcome of UAE impact assessment covering the regulatory framework aspects and the technical challenges emerging from the new ICAO Standards and Recommended Practices (SARPS). The paper is intended to share UAE considerations on its step forward plan for implementing the digital datasets.

1. INTRODUCTION

1.1 Amendment 40 to Annex 15 represents a major restructuring of the existing Annex in order to facilitate the incorporation of new technical requirements and how to manage Aeronautical Information (AI) within a modern and technological AIM environment for paving the way to SWIM implementation.

1.2 The first edition of the Doc. 10066 “*Procedures for Air Navigation Services –Aeronautical Information Management*” (PANS-AIM) has incorporated the existing specifications in Annex 15 that were appropriate for a PANS document in order to span the gap between the guidance in Doc. 8126 “*AIS Manual*” and the Annex 15 SARPS.

1.3 The PANS-AIM is complementary to the SARPS contained in Annex 15 and Annex 4 respectively and it includes provisions in support of the transition from product-based AIS to data-centric AIM.

2. MAJOR CHALLENGES/HIGHLIGHTS

2.1 Generally, the main areas subject to Annex 15 and PANS-AIM changes are related to digital data exchanges, to Quality Indicators, to integration of modern aeronautical information products (Digital Data Sets) and to the scope of aeronautical data/information (Aeronautical Data Catalogue).

2.2 The Data Quality Specifications have been expanded by adding four (4) data characteristics i.e. timeliness, completeness, traceability and format to the existing three (3) parameters i.e. accuracy, resolution and integrity. All seven (7) parameters are defined and consolidated from other Annexes into a “one-stop shop” PANS-AIM.

2.3 The Aeronautical Information Products have been enlarged with the provision of five (5) Digital Data Sets i.e. AIP Dataset (*new*), Terrain Dataset, Obstacle Dataset, Aerodrome Mapping Dataset and Instrument Flight Procedure Dataset (*new*). The Digital Datasets represent the full move into an automated data-centric environment.

2.4 The description of the AIM data scope is contained in the Aeronautical Data Catalogue (ADC). The Catalogue provides detailed explanation on the data subjects, properties and sub-properties, the data quality requirements applicable from origination through to publication and the data types.

3. IMPLEMENTATION STRATEGY

ICAO State Letter has outlined the high-level guidance that States should follow concerning the amendment 40 to Annex 15 & new PANS-AIM respectively. The general strategy is two-folded: (1) transposition of new/modified ICAO provisions into national regulations and (2) technical assessment prior to implementation plan.

3.1 UAE AIM Regulatory Approach

3.1.1 The essential steps for UAE AIM regulatory approach comprise the following stages: (1) update of the Rules & Instructions, Civil Aviation Regulations (CAR) documents and (2) AIM national policy regarding the transition from AIS to AIM.

3.1.2 UAE AIM activity is regulated through a number of documents containing local instructions, operations requirements and AIM compliance with all regulatory obligations. The initial review showed a set of necessary updates like, for example: reconsideration of all references to ICAO docs, review the paragraphs for Data Quality Requirements, revision of NOTAM specs, adding Dataset specifications, Pre/Post-flight Information updates, re-examination of GCAA Website/Portal procedures, reconsider with SWIM the reciprocal exchange with subscribers.

3.1.3 The UAE AIM policy is contained in the Civil Aviation Advisory Publication (CAAP 54). The national plan is originated by the Regulator and it identifies the major milestones for a uniform AIM evolution across UAE.

3.1.4 The GCAA Regulator is engaged for updating the Phase 3 “Information Management” with the new steps of “Datasets”. The Regulator strategic engagement should trigger the direction of AIM operational implementation for covering high-level aspects like datasets seen as interoperability scenario, UAE SWIM services portfolio, staff planning & training, etc. Time-wise, the plan is envisaged for 2019-2021.

3.2 UAE AIM Technical Assessment

3.2.1 Data Quality Requirements (DQR)

Generally, in respect of new data quality requirements, AIM is experiencing a fundamental change. The data quality characteristics list has been not only enlarged to seven parameters, but the application guidance is now

in industry standards. The DQR focus has been directed to the prerequisite of automated system implementation as, for example, to ensure the data traceability of the performed actions.

3.2.2 AIP Dataset

The AIP Dataset is a new requirement and one of the most challenging topics among the five sets. The “deep-dive” technical analysis has resulted in, but limited to, following challenges:

- **Cross-border data duplication** like common FIR boundary, route segments, navigational aid, terminal procedures that extend in the neighbouring State airspace. The solution would imply an authoritative or single source for data harmonization.
- **AIP Data Set or Data Sets:** The grouping of the available data sub-set is not mentioned. It should follow a certain criteria, like for example, logical grouping (all inter-related ENR or AD) or a particular mapping of AIP sections e.g. GEN 2.5/ENR 2.1/ENR 4.4/AD 2.19.
- **Delivery mechanism:** Further guidance on the delivery is not detailed e.g. manual processing, queries or (most preferably) SWIM service on AIS website and WFS interface.
- **Data Set Format:** There is no specific recommendation for an AIXM version suitable to digital datasets exchange. The integration effort for data users may be reduced if a unique AIXM version should be specified for the (AIP) Data Sets compatible with the required temporality mechanism.

3.2.3 Terrain, Obstacle and Aerodrome Mapping Datasets

For all three (3) datasets, the requirements were already defined in the “old” Annex 15 i.e. Chapter 10 “*Electronic Terrain and Obstacle Data*” and Chapter 11 “*Airport Mapping Database*” respectively. Basically, they were relocated and split between new Annex 15 as well as in the PANS-AIM.

Usually, there are no significant changes (area definition, collection surfaces, data quality requirements and product specifications) introduced by the Annex 15 and new PANS-AIM.

Among the three (3) datasets, Terrain and Aerodrome mapping information had never a “dedicated” section within the AIP i.e. not part before of the AIP section, but Obstacles only.

3.2.4 Instrument Flight Procedure Dataset

The implementation of IFP dataset should be the most demanding process for AIS among the five Datasets accomplishments. The guidance material dedicated in PANS-AIM is the shortest dedicated to all datasets.

- By structure, IFP was never, in essence, within AIS responsibilities and functions.
- AIXM 5.x model does partially cover IFP dataset elements i.e. procedure coding only. Therefore, a new AIXM extension to capture IFP dataset should be necessary.
- IFP content is a combination of charting elements required by PANS-OPS for procedure promulgation as well as Procedure Designer (specific) data, typically parameters/entry data. This type of information (free text or non-AIM related) is not “digitizable” or to a certain extent only.

4. CONCLUSIONS

Throughout the assessment, there are several technical aspects associated with digital datasets that need to be addressed for direction and clarification:

- 4.1 Most challenging topics are AIP and IFP Data Sets respectively.
- 4.2 Provision of an AIP sub-dataset is recognized, however there is no PANS-AIM guidance on the logical grouping of the subjects. A random selection would be resulting for end-user/consumers in a useless dataset.
- 4.3 IFP dataset content should also attempt to support charting generation as one of many endeavors in the effort of providing a data-driven charting solution.
- 4.4 Specific details on digital datasets delivery method from AIM (modern) perspective. The options are paper or electronic distribution only, but not digital i.e. making certain the “*full move into an automated data-centric environment*”.
- 4.5 Suitable (AIXM) dataset format in order to handle files containing information with permanent status combined with temporary data i.e. SUPPs duration of over three month duration. Additional workload, modified processes and workflow are required to be updated.

5. SUGGESTIONS

Following the initial assessment, UAE AIM and GCAA Regulator have initiated the steps for the set up of national implementation plan in regard of the digital datasets.

- 5.1 Consider the update of the UAE AIM regulatory framework (regulations, local instructions and national transition plan CAAP 54).
- 5.2 From the technical perspective, a “phased approach” i.e. a gradual implementation starting with new AIP dataset should be envisaged. Moreover, considering the novelty and complexity, an interim generation of an AIP sub-dataset (logically) grouping ENR type of features i.e. ATS Routes, Waypoints, Holdings and Nav aids should be considered.
- 5.3 Short-term: Consideration may be given to a “quick fix” i.e. creation of a manual file with required metadata based on the EUROCONTROL two-way mapping AIXM 5.1/AIP Dataset and following the coding guidance of the same document.
- 5.4 Medium term: Consider developing appropriate solution i.e. complete AIP Datasets as SWIM services;
- 5.5 Consider a “transition period” (envisaged one and half to two years) for provisions of complete eAIP in parallel with AIP and Obstacle Datasets based on an assessment (national survey/questionnaire) regarding the technical capabilities of users on handling digital datasets.

6. RECOMMENDATION

- 6.1 The meeting is invited to note the content of the Information Paper.