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Agenda Item 4 **Transition of the AIM Subgroup, its Terms of Reference, Work Programme and Task Forces into the AIM Programme and Projects**
4.2 Project Integration for definition of metadata related to the AIM Programme

UNITED STATES (U.S.) PROGRESS IN TRANSITIONING FROM AIS TO AIM

(Presented by the United States of America)

SUMMARY

This working paper describes the United States' progress toward AIM envisioned by the Next Generation Air Transportation System (NextGen)[1] and which supports the International Civil Aviation Organization (ICAO) Roadmap for the Transition from AIS to AIM in the following areas:

a. Digital Notices to Airmen (NOTAM)
b. Life-cycle Information Management
c. AIM Business Processes - Workflow
d. Aeronautical Information Exchange Model (AIXM), Flight Information Exchange Model (FIXM), and Weather Information Exchange Model (WXXM)
e. Data Quality
f. Annex 15 (Aeronautical Information Services) Update

References:

- ICAO Roadmap for the Transition from AIS to AIM

Strategic Objectives	*This working paper is related to Strategic Objective C.*

1. Introduction

1.1 To achieve the ICAO Global Air Traffic Management Concept, which notes the role and significance of aeronautical information in support of the future air traffic management (ATM) system, the traditional product-centred provision of aeronautical information has to be replaced by a data-centric and service-oriented environment. This will enable the timely delivery of quality-assured aeronautical information throughout the ATM system. Since the 36th Assembly in 2007, which endorsed the Concept, ICAO has established the AIS-AIM Study Group (AIS-AIMSG) to develop a strategic roadmap for change and supporting material to facilitate implementation.

[1] NextGen was enacted in 2003 by Congress under Vision 100 – Century of Aviation Reauthorization Act (Pub.L. 108-176). In this initiative, the Joint Planning and Development Office (JPDO) is responsible for managing a public/private partnership to bring NextGen online by 2025. The JPDO is the central organization that coordinates the specialized efforts of the Departments of Transportation, Defense, Homeland Security, and Commerce, the Federal Aviation Administration (FAA), the National Aeronautics and Space Administration (NASA), and the White House Office of Science and Technology Policy.

2. Role of ICAO

2.1 The ICAO Secretariat is committed to leading the transition to AIM. Its role is to ensure global harmonisation, through the requisite Standards and Recommended Practices (SARPs) and other ICAO provisions to be developed and made available in a timely fashion to support AIM. The United States strongly supports and contributes to the work of the AIS-AIMSG within the context of the ICAO strategic roadmap for change. Many States are actively engaged in these activities as well.

3. Key Activities

3.1 Digital NOTAM

3.1.1 As part of NOTAM modernization, the United States is updating its NOTAM policy to be consistent with ICAO standards and recommended practices.

3.1.1.1 In 2010, the United States implemented phase 1 of the ICAO policy update which included new keywords to improve readability of the ICAO E field and corrected ICAO formatted NOTAMs from the United States. Tentative plans are to implement updated time formats consistent with ICAO recommendations for reporting NOTAM B and C fields by mid-2012.

3.1.1.2 In phase 2, the United States plans to transition to a fully ICAO-compatible policy by fall 2013.

3.1.2 The United States is developing and enhancing capabilities for automating NOTAM origination, ensuring NOTAM quality; eliminating time-consuming third party review, review which can cause nonstandard language and typographical mistakes; making possible NOTAMs displayed in native FAA and ICAO, plain language; and enabling precise filtering, sorting and querying to provide customized preflight information briefings that will increase pilot situational awareness. As of November 2010, digital NOTAM entry capability has been deployed at 10 aerodromes across the country. In the near future, digital NOTAM entry capability is planned to be deployed at the FAA 30 core aerodromes and metroplex areas. Graphical displays of aerodrome movement area construction/closures are available at select aerodromes but they are not currently created by the digital NOTAM system.

3.1.3 The U.S. Federal Aviation Administration (FAA) is working closely with the European Organisation for the Safety of Air Navigation (EUROCONTROL) on recommendations promoting the global harmonization of the digital NOTAM concept using the Aeronautical Information Exchange Model (AIXM) as a basis. Results of trials, operational tests, and business and safety case analysis demonstrate the value of the digital NOTAM concept.

3.2 Life-cycle Information Management

3.2.1 Managing information involves three steps: (1) collection of information from one or more sources; (2) management of sources to develop a consistent view of information, and (3) distribution of information and services to one or more customers. To ensure consistent, quality-assured, and timely information, ATM relies on AIM to be the authoritative source of aeronautical information. As the authoritative source, AIM must manage, monitor, and control the information chain over the life-cycle of the information. AIM must ensure the data integrity of the information being stored and exchanged, providing for security, the authenticity of the data creators, and the reliability of the data being exchanged using such data integrity technologies as CRC (cyclic redundancy check). Data integrity technology must be used in conjunction with AIXM and be part of the ICAO plan for AIXM adoption as a recommended standard.[2]

3.2.2 Although AIM is responsible for the overall information data chain, the creators, producers, and owners of the information are often outside of AIM. These accountable sources are ultimately responsible for delivering data at specified performance levels. To manage the quality of the information, AIM must maintain the lineage of information so discrepancies can be addressed with the originating source.

3.2.3 The transition from AIS to AIM requires States to reconsider the role of the AIM business within the context of the Global ATM Concept of Operations. Both the FAA and the European modernization projects are investigating the role of information management to support ATM.

3.3 AIM Business Processes - Workflow

3.3.1 Achieving the transition from AIS to AIM requires consideration of the business and workflow[3] aspects of AIM. The FAA is using workflow analysis to define the steps needed to deliver new products and services required by the AIS to AIM transition.

3.3.1.1 The FAA, in coordination with EUROCONTROL, is using workflow to create digital NOTAMs and to determine all possible NOTAM scenarios. This analysis includes determining the responsibility for NOTAM issuance for each NOTAM scenario, mapping elements of each NOTAM scenario to its AIXM representation, assigning Q-codes to each NOTAM scenario, translating each NOTAM from its digital representation to U.S. and ICAO plain text formats, and capturing business rules for each NOTAM scenario.

3.3.2 It is important to capture workflow for other aspects of the AIM business such as Aeronautical Information Publications (AIP) development, static data management, quality management, and service provision to ATM.

[2] See ICAO Air Navigation Commission Working Paper (C-WP/13514) 02/02/2010 on Adoption of Amendment 36 to Annex 15,

[3] A workflow consists of a sequence of operations, declared as work of a person, a group of persons, an organization of staff, or one or more simple or complex mechanisms.

3.4 AIXM, Flight Information Exchange Model (FIXM), and Weather Information Exchange Model (WXXM)

3.4.1 The AIXM developed by EUROCONTROL and the FAA, with support from the international community, uses existing and emerging information engineering standards and supports current and future aeronautical information system requirements. Its major tenets are:

- An exhaustive temporality model, including support for the temporary information contained in NOTAMs;
- Alignment with the International Organization for Standardization (ISO)[4] standards for geospatial information, including the use of the Geography Markup Language (GML);
- Support for the latest ICAO and user requirements for aeronautical data including obstacles, terrain, terminal procedures, and airport mapping databases; and
- Modularity and extensibility to support current and future aeronautical information messaging requirements and additional data attributing requirements.

3.4.2 The U.S. is using the AIXM in its system development effort and is sponsoring, along with EUROCONTROL, test beds to study the interoperability of AIXM, WXXM, and Web service standards, the most efficient use of these standards, and whether these standards need any modifications.

3.4.3 The U.S., in cooperation with EUROCONTROL, Air Services Australia, and the Japan Civil Aviation Bureau, is at the beginning stages of exploring the development of a Flight Information Exchange Model (FIXM). This concept would enable the sharing of common information elements of individual flights as filed, cleared, and flown.

3.5 Data Quality

3.5.1 The quality of aeronautical information is a significant concern for the safety, regularity, and efficiency of air navigation. AIM implements and maintains a certified Quality Management System (QMS) by following the ISO 9001:2008 Standard. ICAO Annex 15 requires (as a standard) the implementation of a QMS. ISO is recommended in Annex 15 as the international standard. The U.S. found that an ISO QMS places a standardized structure around the processes we already perform, enabling us to revise our processes as conditions and situations dictate. The end result is a system of continuous improvement. Currently, only the static data and obstruction evaluation workflows are ISO-certified. AIM plans to include the digital NOTAM and instrument procedure dataflow systems in its QMS in the near future.

3.6 Annex 15 Update

3.6.1 The FAA's AIM Group is a member of the ICAO AIS-AIMSG working to include AIM in Annex 15. It is also Rapporteur of the AIS-AIMSG ad hoc group developing AIM definitions, Amendments 37 and 38, and related guidance materials. Amendment 37 is intended to include interim standards for information management that are to be effective before full AIM capabilities. Amendment 38, being developed in parallel with Amendment 37, is to be a new edition of a restructured Annex 15 and should be fully developed in time for the planned ICAO AIM/MET Divisional Meeting to be held in 2014.

[4] The ISO is an international standards-setting body that promulgates worldwide proprietary industrial and commercial standards. The body is composed of representatives from various national standards organizations.

3.6.2 The ad hoc group developed draft AIM definitions and drafts of Amendments 37 and 38 that were presented during the Third AIS-AIMSG meeting held at Headquarters, ICAO, November 9-12, 2010. Work continued on the AIM definitions and drafts of Amendments 37 and 38 at the Fourth AIS-AIMSG meeting in Bordeaux, France, May 23-26, 2011. The guidance materials are being developed and will be completed as each draft of Amendments 37 and 38 becomes mature.

4. United States' Concerns

4.1 Despite the progress now being made in the AIS/AIM domain, the United States is concerned the limited resources available within the Air Navigation Bureau (ANB) may impede progress and create a situation where technical capabilities outpace ICAO SARPs. In voicing these concerns, the United States is also aware of the strain on resources that will be imposed by preparation for the proposed MET/AIM Divisional Meeting. The United States will fully assist ICAO to make progress; it is cognizant of the particular significance and importance of the planned divisional meeting.

5. Conclusion

5.1 Progress is being made toward the evolution and implementation of a sufficient and capable aeronautical information system, suitable to meet the needs of the present and future ATM system. The United States welcomes the leading role of ICAO in this respect. The United States recognises the challenges faced by ICAO not least in terms of resources and is willing to continue to play its full part in helping ICAO to facilitate change.

6. Recommendations

6.1 The Meeting is invited to:

a) Encourage the global adoption of the digital NOTAM based on AIXM;

b) Encourage the update of Annex 15 SARPs in time for the 2014 MET/AIM Divisional Meeting; and

c) Support the early publication of the aims, objectives, and key areas of content for the MET/AIM Divisional Meeting to allow time for research, discussion, and consultation to ensure the applicability and quality of content.

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