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TWELFTH AIR NAVIGATION CONFERENCE

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REPORT OF THE COMMITTEE TO THE CONFERENCE ON AGENDA ITEM 3

The attached report has been approved by the Committee for submission to the Plenary.

Captain John F. McCormick
Committee Chairman

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Agenda Item 3: Interoperability and data – through globally interoperable system-wide information management (SWIM)

3.1 INTRODUCTION

3.1.1 Global system-wide information management (SWIM) requires system-level information management solutions rather than individual solutions to develop an integrated air traffic management (ATM) network – a global aviation intranet.

3.1.2 Under this agenda item, the modules that support the key performance area of interoperability and data through globally interoperable SWIM were presented. These are performance improvements through the application of SWIM, service improvement through integration of all digital ATM information, and increased interoperability, efficiency and capacity through flight and flow – information for a collaborative environment (FF-ICE). The adoption of system-level solutions requires agreement on the various ground/ground and air/ground interfaces, types of data and exchange models to be utilized, quality/integrity requirements for data and consideration of commercial and national security aspects. Implementation methodologies need to be carefully considered to ensure functional, risk-managed deployment strategies across the global system.

3.1.3 Recognizing the pivotal role played by an aircraft's flight plan in the data chain, the Committee agreed to the proposals for the phased implementation of an advanced flight planning and information sharing concept known as FF-ICE.

3.1.4 Under this agenda item, the aviation system block upgrade modules that support the key performance area of interoperability and data were introduced. These comprise the following:

a) B1-31 and B2-31 – Application of system-wide information management;

b) B0-25, B1-25, B2-25 and B3-25 – Flight and flow – information for a collaborative environment; and

c) B0-30 and B1-30 – Integration of aeronautical and ATM information.

3.2 SYSTEM-WIDE INFORATION MANAGEMENT

3.2.1 Under this item, the block upgrade modules related to system-wide information management (SWIM) were presented which comprised B1-31 and B2-31 – Application of system-wide information management (SWIM).

3.2.2 The Committee reviewed the aviation system block upgrades (ASBU) modules relating to SWIM which outlined the capabilities necessary to provide for improvements in information management and to meet the increasing demands for a system-wide approach to information exchange providing a high degree of interoperability. The Committee agreed that the ASBU modules relating to SWIM formed an appropriate basis for future implementations. The Committee agreed that the risk of divergence in the development of SWIM enabled systems and capabilities would be counterproductive to ASBU implementation.

3.2.3 The Committee noted that a fundamental prerequisite for the development of information systems providing the realization of the benefits of ATM advancement, is the global agreement on SWIM concepts and the potential solutions to be implemented that will allow a high degree of interoperability and harmonization.

3.2.4 The Committee agreed that a global SWIM concept would benefit from a performance-based approach and be based on appropriate information management principles guiding its development and implementation. The Committee also observed that the development of technical standards would be best accomplished through collaboration with appropriate international standards bodies.

3.2.5 The Committee was informed that the implementation of SWIM will allow ATM community members to make informed operational decisions and anticipate possible safety problems in the use of the aviation infrastructure and in operational safety. In this context, SWIM will also facilitate the ability to share updated databases with other States in order to verify information concerning, for example, licenses, authorizations, crew medical certificates, and aircraft registration dates and airworthiness.

3.2.6 The Committee noted that in the development of technical specifications for SWIM, that collaboration and cooperation with other international standardization organizations would facilitate the development of the necessary specifications in a transparent and open manner.

3.2.7 Based on the discussions, the Committee expressed its support for the ASBU modules related to SWIM and agreed that there was a need for a global SWIM concept as the basis for further work. In consideration of the above, the Committee endorsed ASBU Modules B1-31 and agree in principle to B2-31.

3.3 FLIGHT AND FLOW – INFORMATION FOR A COLLABORATIVE ENVIRONMENT

3.3.1 Under this item, the block upgrade modules related to flight and flow – information for a collaborative environment (FF-ICE) were presented which comprised: B0-25, B1-25, B2-25 and B3-25 – improved operational performance through the introduction of FF-ICE.

3.3.2 The Committee reviewed the overall strategy, the incremental development, the technology requirements and deployment considerations related to FF-ICE and recalled that the *Global ATM Operational Concept* (Doc 9854) envisaged an integrated, harmonized and globally interoperable system for all users in all phases of flight and that FF-ICE addressed the many limitations in the current flight planning, flow management, trajectory management and information sharing processes.

3.3.3 The Committee was informed that exchange of flight and flow information would result in an integrated picture of the past, present and future ATM situation. FF-ICE would also form a cornerstone of the performance-based air navigation system and supported the need for information sharing and coordination in a CDM environment. It was noted that FF-ICE would ensure that definitions of data elements would be globally standardized.

3.3.4 The meeting was made aware that to support the FF-ICE concept; a new international standard for flight information exchange was being developed with ICAO participation. Global harmonization of FF-ICE would be realized through the use of the Flight Information exchange Model (FIXM).

3.3.5 Based on the discussions the Committee expressed its full support for the concept and agreed that there was a need for all partners to support a single concept of operations using FF-ICE.

3.3.6 The Committee recognized the need for additional ICAO provisions to support specific PBN applications, including recently developed capabilities as well as other concepts and technologies. It was further recognized that allowing such capabilities to be inserted into the ICAO flight plan form would bring benefits and enhance flight operations. How exactly such capabilities might be incorporated into the flight plan and when; the cost impact and consequences of either going forward immediately or waiting; and the concern that a new flight plan post-implementation review had, in any case, already commenced by the same ICAO body developing FF-ICE, were some of the concerns expressed, that made the Committee hesitant in endorsing a specific *Procedures for Air Navigation Services — Air Traffic Management* (PANS-ATM, Doc 4444) amendment within a short time frame. Consequently, ICAO was requested to investigate, as part of the post-implementation review of the FPL2012, proposals for the implementation of all PBN codes as well as other capabilities into the flight plan, having regard to an impact assessment including cost benefit analysis and other factors.

3.4 AERONAUTICAL INFORMATION MANAGEMENT

3.4.1 Under this item, the block upgrade modules related to service improvement through digital aeronautical information management (AIM) were presented.

3.4.2 The Committee reviewed the ASBU modules relating to integration of aeronautical and ATM information which will continue the evolution of information delivery from a paper-based, manually-transacted and product-centred approach to a digitally enabled and service-oriented approach supported by standardized formats. The Committee agreed that the need to ensure the interoperability of digital information through global agreement on the various formats and protocols required to enable the provision of digital ATM information would be further advanced by the implementation of the ASBU modules.

3.4.3 The Committee was informed that considerable progress had been made in the upgrade of information management systems allowing the exchange of digital information and data. The Committee acknowledged the importance of the development and continuing improvement of the aeronautical information exchange model (AIXM) as well as the more recent weather information exchange model (WXXM) and flight information exchange model (FIXM) in facilitating the implementation of interoperable digital information systems using harmonized formats and protocols.

3.4.4 The Committee acknowledged that NOTAM proliferation has become an issue of increasing concern. The Committee also noted the current efforts to mitigate the issues presented by NOTAM proliferation including the development of digital NOTAM. Nevertheless, the Committee concluded that the current NOTAM paradigm is based on a dated concept and that the need for increasing information integration mandated that the NOTAM system be reviewed with the aim of developing improved and modern options for the delivery of the functionalities of the current NOTAM system.

3.4.5 The Committee noted that an increasing range of applications are becoming available that utilize aerodrome mapping data and that provisions relating to aerodrome mapping data were scheduled for review by the ICAO Council at its next session.

3.4.6 Based on the discussions the Committee expressed its full support for ASBU Modules B0-30 and B1-30 and agreed that there was a need for work to review the NOTAM system and develop a

proposal for a modern approach supporting the integration of ATM operational information supporting SWIM.

3.5 On the basis of the discussions, the following recommendations were accepted by the Committee:

Recommendation 3/1 – ICAO aviation system block upgrades relating to performance improvement through the application of system-wide information management

That the Conference:

a) endorse the aviation system block upgrade module relating to performance improvement through the application of system-wide information management included in Block 1, and recommend that ICAO use it as the basis of its work programme on the subject;

b) agree in principle with the aviation system block upgrade module relating to performance improvement through the application of system-wide information management included in Block 2, as the strategic direction for this subject;

That ICAO:

c) include, following further development and editorial review, the aviation system block upgrade modules relating to performance improvement through the application of system-wide information management for inclusion in the draft Fourth Edition of the *Global Air Navigation Plan* (Doc 9750, GANP).

Recommendation 3/2 – Development of a global system-wide information management concept

That ICAO:

a) undertake further work to develop a global system-wide information management concept for air traffic management operations and related ICAO provisions that may be necessary;

b) at the appropriate time coordinate information management principles and performance-based information management;

c) perform additional work on the global implementation of those principles and framework for all air traffic management information through the development of appropriate information management/system-wide information management concepts to be ready in 2014 for subsequent system development work in Block 1 and to include in its work programme, specific activities tailored at coordinating system-wide information management deployment at a local, regional and global level;

d) update the information management/system-wide information management (IM/SWIM) working arrangements;

That States and stakeholders:

e) work together to demonstrate how system-wide information management capabilities and functions will meet the needs of the future air traffic management system.

Recommendation 3/3 – Development of ICAO provisions relating to system-wide information management

That:

a) under the leadership of ICAO, develop detailed technical specifications for system-wide information management in close collaboration with the aviation community;

b) detailed technical specifications for system-wide information management should be open and rely on generic international standards to the extent possible; and

c) ICAO undertake work to identify the security standards and bandwidth requirements for system-wide information management.

Recommendation 3/4 – State and industry and industry support of system-wide information management

That:

a) industry support the transition towards system-wide information management by providing appropriate systems supporting automation and the exchange of all relevant air traffic management data in a globally standardized manner; and

b) States and all relevant stakeholders contribute to further development and harmonization of performance-based information management.

Recommendation 3/5 – Operational performance through flight and flow – information for a collaborative environment

That the Conference:

a) endorse the aviation system block upgrade module relating to flight and flow – information for a collaborative environment included in Block 1, and recommend that ICAO use it as the basis of its work programme on the subject;

b) agree in principle with the aviation system block upgrade module relating to flight and flow – information for a collaborative environment included in Blocks 2 and 3, as the strategic direction for this subject;

That ICAO:

c) include, following further development and editorial review, the aviation system block upgrade modules relating to flight and flow – information for a collaborative environment for inclusion in the draft Fourth Edition of the *Global Air Navigation Plan* (Doc 9750, GANP);

d) investigate, as part of the post-implementation review of the FPL2012, proposals for the implementation of all performance-based navigation codes and other capabilities into the flight plan, having regard to an impact assessment including cost benefit analysis and other factors;

e) convene a symposium, as soon as possible, where interested partners would develop an end-to-end advanced system demonstrations of new air traffic management concepts to support a common understanding of concepts such as SWIM, FF-ICE trajectory-based operations and collaborative decision-making;

That States:

f) and industry work through ICAO to mature the flight and flow – information for a collaborative environment concept;

g) support the development of a flight information exchange model;

h) according to their operational needs, implement the aviation system block upgrade modules relating to improved operational performance through flight and flow – information for a collaborative environment included in Block 0.

Recommendation 3/6 – ICAO aviation system block upgrades relating to service improvement through aeronautical information management as well as digital air traffic management information

That the Conference:

a) endorse the aviation system block upgrade module relating to service improvement through the integration of digital air traffic management information included in Block 1 and recommend that ICAO use it as the basis of its work programme on the subject;

That ICAO:

b) include, following further development and editorial review, the aviation system block upgrade modules relating to service improvement through digital aeronautical information management as well as integration of digital air traffic management information in the draft in the draft Fourth Edition of the *Global Air Navigation Plan* (Doc 9750, GANP);

That States:

c) according to their operational needs, implement the aviation system block upgrade module relating to service improvement through digital aeronautical information management included in Block 0.

Recommendation 3/7 – ICAO provisions relating to service improvement through aeronautical information management as well as digital air traffic management information

That ICAO:

a) expedite the development of relevant Standards facilitating the transition of aeronautical information service to aeronautical information management and the implementation of system-wide information management taking into account the work accomplished in State programmes; and

b) as a matter of urgency, to translate and make available the necessary Standards and guidance material to facilitate the global transition from aeronautical information service to aeronautical information management.

Recommendation 3/8 – State actions relating to service improvement through aeronautical information management as well as digital air traffic management information

That States:

a) accelerate transition from aeronautical information service to aeronautical information management by implementing a fully automated digital aeronautical data chain;

b) implement necessary processes to ensure the quality of aeronautical data and information from the origin to the end users;

c) engage in intraregional and interregional cooperation for an expeditious transition from aeronautical information service (AIS) to aeronautical information management (AIM) in a harmonized manner and to using digital data exchange and consider regional or subregional AIS databases as an enabler for the transition from AIS to AIM; and

d) review their NOTAM publication procedures, provide appropriate guidance to NOTAM originators and ensure adequate oversight of the NOTAM publication process is conducted.

Recommendation 3/9 – Review of NOTAM system and development of options for replacement

That ICAO initiate a review of the current NOTAM system, building further on the digital NOTAM activities, including the development of options for a replacement system that would enable web-based applications and compliant with the system-wide information management principles that are being developed for the air traffic management system.

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