



WORKING PAPER

TWELFTH AIR NAVIGATION CONFERENCE

Montréal, 19 to 30 November 2012

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

3.3: Service improvement through digital AIM

PERFORMANCE-BASED INFORMATION MANAGEMENT (PBIM)

(Presented by the United States)

EXECUTIVE SUMMARY

This paper provides details on performance-based information management (PBIM). The purpose of PBIM is to:

- a) accelerate the delivery of information services that supports situational awareness and global harmonization; and
- b) create an environment that facilitates a global information space based on common operational data and rules for information management among air traffic management (ATM), air traffic control (ATC), third-party service providers, and airspace users.

Action: The Conference is invited to agree on the recommendation in paragraph 5.

1. INTRODUCTION

1.1 The delivery of information services throughout the air traffic management (ATM) community is critical. The exchange of timely, high quality, secure data across borders is fundamental for future ATM service provisions. Global harmonization and adoption of common performance standards, business rules and exchange models will be required to optimize the ability to deliver seamless information services.

1.2 Currently, information and data is originated, collected, assembled, edited, formatted, stored, published (and/or distributed) and used in different stove-piped ATM subsystems. The manner in which information is managed needs to evolve to support the more integrated, complex systems of the future as envisioned by the ICAO aviation system block upgrade (ASBU) initiative.

1.3 To realize globally interoperable systems and data the aviation community needs to agree on information management principles. These principles will form the foundation for a framework that allows for information management services and products to be measured and harmonized, i.e., performance-based.

1.4 Performance-based information management (PBIM) is integral to strategic and tactical decisions supporting operations, safety and investments.

2. THE NEED FOR INFORMATION MANAGEMENT

2.1 With the crucial role of information in the development and operation of the ATM systems of the future, this paper supports:

- a) the evolution of information delivery from products to information-based services;
- b) the concept that quality management starts at data origination and continues throughout the life-cycle use of the data;
- c) that information services should be based on data and information facilitated by modern management principles (including security requirements);
- d) that information be exchanged between systems in a manner that does not require human intervention or interpretation in accordance with globally harmonized data handling processes to ensure reusability of the resulting information;
- e) the adoption of globally-standardized exchange models (aeronautical information exchange model (AIXM), weather exchange model (WXXM), flight information exchange model (FIXM), and other relevant models aligned through a common information reference model) between States and third parties;
- f) making digital aeronautical information available in a manner usable for safety-of-life applications in support of ATM operations to enable the introduction of future operational concepts, e.g. trajectory-based operations; and
- g) the ability to create a common operating picture based on common operational data and rules for information management among ATM, air traffic control (ATC), third party service providers, and airspace users.

3. INFORMATION MANAGEMENT PRINCIPLES

3.1 In order to support the harmonization of global information services and performance-based operations, the United States suggests the following as information management principles.

3.1.1 Data is a resource, and information is an asset

3.1.1.1 Data is the foundation for all information products and services. All products and services have traceability to common data.

3.1.1.2 Information is aggregated and provided by accountable, authorized information services such as system-wide information management (SWIM). SWIM provides the infrastructure for information services to aviation stakeholders.

3.1.1.3 Aggregated information is fit for the purpose of meeting ATM business requirements. Its quality should meet the performance requirements of the community as a whole.

3.1.1.4 Quality starts at the data originator. The originator is the primary entity that validates data is correct. Origination of data through its lifecycle to useful business information should be through digital mechanisms without manual intervention wherever possible.

3.1.2 Data and information are compliant with local laws and regulations

3.1.2.1 Data, information, and their exchange are secure and comply with information assurance standards such as availability, integrity, authentication, confidentiality/privacy, and non-repudiation.

3.1.2.2 A common data dictionary, vocabulary, and business rules that form the foundation for protocols, services, and product harmonization to be governed using communities of practice for each information domain.

3.1.2.3 Data is not duplicated; there should be one data originator. Duplicated data creates the potential for data to be unsynchronized. In addition, duplicate data sources add costs to the system. Any duplication should be based on a solid business requirement.

3.1.2.4 Quality management is everyone's responsibility. Mechanisms to support quality management of the data should cover the entire life-cycle from the capture of the data to the delivery of business information.

4. THE FRAMEWORK FOR PERFORMANCE-BASED INFORMATION MANAGEMENT

4.1 PBIM must be implemented through strategic planning initiatives and the monitoring/measuring of management and operations from both the implementing organizations and the regulator, which is a comparison of the planned to actual measures. In other words "did we do what we said we were going to do"? In the monitoring/comparing function, each measure must be evaluated to see if it is outside of normal parameters. Corrective measures should be taken, if necessary, to bring it back into an acceptable range. The regulator ensures that the implementing organization remains in compliance.

4.2 The components of the PBIM framework include (with associated performance measures in each area):

- a) **Business.** Describes the business mission and functions. Measures for this area may include: (a) information and data standards and practices, (b) information and data policies (as related to applicable laws and regulations); and (c) information product fees and collections (funding or revenue).
- b) **Activity.** Describes the business activities. Measures for this area may include: (a) business processes and managing and operations of information; and (b) information and data services.
- c) **Information.** Describes the data and information resources required to perform the activities. This includes measures for data and information.

- d) **Standards.** Describes the operational and technical standards used to support the business, and may include international and industry standards. Measures for this area may include: (a) information and data standards and practices.
- e) **Risk.** Describes the information safety and security requirements according to applicable laws, regulations and standards. This includes measures for safety and security.

4.3 Information management performance requirements should be derived from the actual needs of ATM service provision. Different levels of required information management performance need to be defined to support different modes of operation.

5. CONCLUSION

5.1 It is paramount ICAO supports the global application of information management principles for current and future information services. This is of utmost importance for the harmonization and interoperability between different ATM subsystems that are subject of the ASBU initiative.

5.2 Information management performance is the foundation for the success of ATM performance and is a core building block in implementing the ASBUs. A global strategy in harmonizing the performance of information management implementations will provide overall benefits in deploying the ASBUs.

5.3 The Conference is invited to:

- a) recommend the need for coordination and the global application of the information management principles (as outlined in paragraph 3.1);
- b) recommend that ICAO 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 ASBU Block 1; and
- c) encourage States and all relevant stakeholders to contribute to further development and harmonization of performance-based information management.

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