



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 aeronautical information management (AIM)

AERODROME MAPPING DATA BASES (AMDB)

(Presented by the Presidency of the European Union on behalf of the European Union and its Member States¹; by the other Member States of the European Civil Aviation Conference²; and by the Member States of EUROCONTROL)

EXECUTIVE SUMMARY

Aerodrome mapping data bases include aerodrome geographic information that support applications which improve the user's situational awareness or supplement surface navigation, thereby increasing safety margins and operational efficiency. These data bases are dependent on accurate, reliable and up-to-date aerodrome mapping data.

Given the wide range of air navigation applications dependent on reference quality aerodrome mapping data, the subject has been thoroughly addressed by the Aerodrome Panel and the AIS/AIM Study Group. It is deemed necessary that ICAO follows up on this work and confirms its active standardization role in this matter.

Action: The Conference is invited to agree to the recommendation in paragraph 6.

1. INTRODUCTION

1.1 As stated in the Conference agenda, implementation of collaborative decision-making between operational partners at the airport is required in order to improve situational awareness and realize substantial efficiencies in the management of surface traffic.

1.2 Indeed, a wide range of individuals – including pilots, air traffic controllers, surface vehicle operators, construction/maintenance crews, emergency/security personnel, passenger/cargo airlines and general or business aviation operations personnel – must work collaboratively to ensure safe and efficient flight operations at the aerodrome.

¹ Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and United Kingdom. All these 27 States are also Members of ECAC.

² Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Croatia, Georgia, Iceland, Moldova, Monaco, Montenegro, Norway, San Marino, Serbia, Switzerland, The former Yugoslav Republic of Macedonia, Turkey and Ukraine.

1.3 These individuals, or users, require some knowledge of the aerodrome layout. The traditional methods to get this knowledge – e.g. use of visual aids (such as airfield markings, signs, and lighting) or paper charts – have been complemented over the past few years by the use of aerodrome layout displays using digital aerodrome geo-referenced data, also known as aerodrome mapping data bases (AMDB).

2. AERODROME MAPPING DATA BASE APPLICATIONS

2.1 Aerodrome layout displays constitute the basics of the various ground and airborne applications based on the use of AMDB which all seek to improve the user's situational awareness and/or increase safety margins and efficiency during surface operations.

2.2 Electronic airport moving maps are standard today on some aircraft, for example the Onboard Airport Navigation System (OANS) on the navigation display of the A380, or the Airport Moving Map (AMM) of the Boeing 777.

2.3 New AMDB-based applications are being developed in order to enhance the safety and efficiency of aircraft surface operations. For example, Runway Overrun Prevention System (ROPS) computes realistic operational landing distances and compares them to the available landing distance in real time (accommodating external factors such as velocity and wind) and informs pilots when predicted stopping distance exceeds documented runway length. Another related application called “Brake-to-Vacate” enables the pre-selection of a landing runway and exit, thus contributing to reduced runway occupancy time. More advanced applications such as D-Taxi graphical guidance are currently subject to various R&D initiatives within programs such as SESAR and NextGen.

2.4 Figure 1 below shows how AMDB are the foundation for additional information overlays and related collaborative applications, involving both ATC and onboard systems.

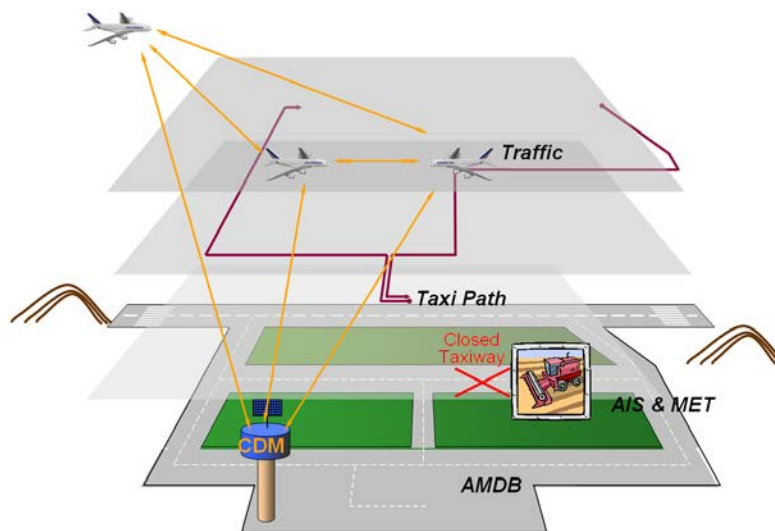


Figure 1. The AMDB as the foundation of CDM

3. AMDB STANDARDS

3.1 With the development of multiple applications using AMDB, common industry standards have been jointly developed by EUROCAE WG44 and RTCA SC193/SC217, involving both national and international organizations, including ICAO, and the concerned industry stakeholders. Such standards were the basis for more specific data base airborne embedded open formats (ARINC 816).

3.2 The industry standards are based on the application of Geographic Information Systems principles and the use of ISO 19100 standards for geographic information. This approach provides open and interoperable standardisation of AMDB data exchange, and enables interoperable application developments which will replace applications which cannot share data or functionalities with other similar systems.

4. DATA QUALITY

4.1 The performance of the applications presented in section 2 is highly dependent upon the availability and quality of the underlying AMDB.

4.2 Aeronautical data quality improvement has been thoroughly addressed through European initiatives, such as the establishment of the European AIS Data base (EAD) and European Regulation 73/2010 on Aeronautical Data Quality (ADQ).

4.3 The work done by the AIS AIM SG – such as the latest draft amendment to Annex 15 and the development of the AIM Quality Manual – also provides useful standards, recommended practices and guidance with respect to data quality processes.

4.4 The Aerodrome Panel and the AIS AIM SG have been coordinating the development of high level provisions regarding aerodrome mapping data, including data quality requirements. These provisions are built on the industry standards that define more detailed provisions regarding the contents and structure of AMDB data, as well as additional data quality requirements specific to AMDB.

5. CONCLUSION

5.1 Standardized and quality assured AMDBs are already used for improved situational awareness, and support a wide range of systems enabling safer and more efficient surface movements. New applications involving collaboration between ATC and airborne users, such as the exchange of ATC-assigned taxi routes, impose interoperability of data bases and uniform application of global and consistent standards. Such systems are applying early SWIM principles. It is deemed necessary that ICAO confirms its active leading role in this standardization framework.

6. ACTION BY THE CONFERENCE

6.1 The Conference is invited to:

- a) note the increasing range of applications based on aerodrome mapping data, including new collaborative ground-airborne systems - applying SWIM principles; and
- b) adopt the following recommendation:

Recommendation 2/x – Aerodrome mapping data bases

That ICAO:

- a) expedite the adoption of the aerodrome mapping data bases provisions jointly prepared by the Aerodrome Panel and the Aeronautical Information Service/Aeronautical Information Management (AIS/AIM) Study group; and
- b) maintain close coordination with other related aviation industry standardization activities.

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