



WORKING PAPER

TWELFTH AIR NAVIGATION CONFERENCE

Montréal, 19 to 30 November 2012

Agenda Item 1: Strategic issues that address the challenge of integration, interoperability and harmonization of systems in support of the concept of “One Sky” for international civil aviation

1.1: Global Air Navigation Plan (GANP) – framework for global planning

**INTEROPERABILITY BETWEEN GROUND ATM AUTOMATION SYSTEMS
– A NEED FOR GLOBAL STANDARDIZATION**

(Presented by India)

EXECUTIVE SUMMARY

This paper highlights the interoperability issues of ground ATM automation systems due to absence of globally accepted standards and the constraints faced by ANSPs due to inflexible and proprietary technical standards. The paper recommends development of global standards and benchmarking of ATM automation systems along with a roadmap.

Action: The Conference is invited to agree on the recommendations contained in paragraph 3.

1. INTRODUCTION

1.1 The ICAO 2013-2028 global air navigation capacity and efficiency plan describes the concerns about the legacy air navigation systems and procedures limiting evolution of a globally harmonized air navigation system. A different pace of emergence of technologies in aircraft avionics and ground-based CNS systems is a challenge for ANS providers to plan and implement effective solutions and systems.

1.2 The ASBU strategy and the modules define a progressive and flexible global systems engineering approach allowing all States to advance their air navigation capacities based on their specific operational requirements. Implementation of the modules will be based on the availability of the technical and operational standards, as envisaged in the methodology.

1.3 The ASBU strategy describes technology roadmaps by providing timelines that will support the communications, navigation and surveillance (CNS), information management (IM) and avionics requirements of the Global Air Navigation System. The technology road maps provide guidance on the capabilities and implementation of the technologies along with applicable ICAO Standards

2. DISCUSSION

2.1 One of the vital elements for achieving a seamless gate-to gate ATM system sharing a common set of accurate information in a timely manner is automation of ground ATM systems.

2.2 In order to achieve a close collaboration with airport operators, airspace users and the ANSP for meeting the expected performance standards, the ground ATM automation systems need to be equipped with necessary tools, be safe, efficient, cost-effective and flexible. As the world moves towards a global ATM network, the individual ATM systems will need to achieve seamless interface with each other.

2.3 Interoperability, in aviation, means a function of two or more networks, systems, components and applications working together through exchanges of information between them, without any restriction, and with the ability to use the information for technical and operational purposes. Technical standards stipulated by organizations like RTCA, EUROCAE etc., provide aviation systems with uniform engineering criteria, methods, processes and practices. Therefore developing and maintaining technical standards to a large extent facilitates interoperability of systems.

2.4 A good example of ensuring interoperability in avionics is the cooperation between Airbus and Boeing in the SESAR work programme.

2.5 Whereas ICAO has globally accepted Standards for CNS equipment, the same do not exist for ground ATM automation systems as a whole. There are some generally accepted practices in the individual components of an automation system, such as ARTAS for surveillance sensor processing systems. However, the overall architecture, functional objectives and data presentation of the ATM automation system are more or less decided by the vendors, leading to vastly different HMIs and techniques.

2.6 ANSPs are also concerned about the safety assurance and certification of ATM automation systems. Even though EUROCONTROL, RTCA have come out with guidance material for the required safety assurance, they mainly pertain to the system development and maintenance process and not necessarily on the functional objectives and interoperability with similar other systems.

2.7 The absence of standardization of ground ATM automation systems has a bearing on the following:

- a) the inability to fully integrate diverse systems in one single network causes lapses in harmonization, which is seen as the key objective of ASBU methodology;
- b) the controllers need to be trained for different HMI and are subject to learn different ways of performing same functions;
- c) trainings for maintenance engineers also become system specific and consequently lead to an inefficient use of manpower resources;
- d) the ANSP are unable to respond quickly to the changing requirements of new technologies in CNS/ATM while integrating with the similar ground ATM automation systems;
- e) ground ATM automation systems are mostly proprietary in nature and do not offer adequate flexibility at times to the ANSPs. Though the technical specifications are broadly met by the vendors, the compatibility and interoperability issues between systems operated by various ANSPs still persist; and
- f) proprietary extensions to an industry standard like ASTERIX are often encountered by ANSP, leading to interoperability issues.

2.8 One of the recommendations after the ICAO SIP Workshop on preparations to the AN-Conf/12 in Asia/Pacific highlighted the following: “ATM automation system is one key element to support many important

new function as many ASBU such as the TBO, CDM etc. It is suggested to add a related module on the subject to reflect the requirement and evolution of ATC automation systems”.

3. CONCLUSION

3.1 With the emergence of ASBU methodology which emphasises global interoperability among all the individual systems, globally accepted technical standardisation in the system architecture and interoperability of ground ATM automation systems is a prerequisite for harmonization of services.

3.2 Global benchmarking of ground ATM automation equipment and systems will be necessary for ensuring safety standards.

3.3 As ICAO has envisaged developmental roadmaps for communication, navigation, surveillance, IM and avionics, a global roadmap for ground ATM automation systems will be needed considering the growing convergence of ATM functions between ground and air.

3.4 The Conference is invited to agree to the following recommendation:

Recommendation 1/x – Interoperability between ground air traffic management automation systems

That the Conference:

- a) request ICAO to develop globally accepted technical standards for ground air traffic management automation systems;
- b) request ICAO to set up a process for evolving a global benchmarking of ground air traffic management automation equipment and systems; and
- c) request ICAO to develop a global roadmap for evolution of ground air traffic management automation systems.

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