



**Agenda Item 2: Follow-up to the implementation status of the performance based navigation systems plans for the CAR and SAM Regions and to the latest amendments to the ATM- and CNS-related SARPS**

**PERFORMANCE-BASED GLOBAL AIR NAVIGATION SYSTEM  
– DEVELOPMENTS IN IMPLEMENTATION**

(Presented by the Secretariat)

**SUMMARY**

This paper provides an update on developments related to the implementation of a performance-based global air navigation system.

ICAO, guided by two Assembly resolutions (A35-15 and A36-7), continues to work towards the implementation of a performance-based global air navigation system. The realization of the vision for future ATM requires a collaborative environment with significant information content as described in the flight and flow of information for a collaborative environment (FF-ICE) concept that is, under development.

**References**

- Global Air Navigation Plan (Doc 9750);
- Global Air Traffic Management Operational Concept (Doc9854);
- Manual on Air Traffic Management System Requirements (Doc 9882);
- Manual on Global Performance of the Air Navigation System (Doc 9883);
- Assembly Resolutions in Force (as of 28 September 2007) (Doc 9902).

*ICAO Strategic Objective(s)*

*This working paper is related to Strategic Objectives  
A – Safety  
D – Efficiency*

**1. INTRODUCTION**

1.1 Since the adoption of Resolution A36-7 (*ICAO Global Planning for Safety and Efficiency*) by the ICAO Assembly, several developments have taken place related to the implementation of a global air navigation system. To facilitate the realization of a performance-based Global air navigation system, ICAO in 2008, completed the development of relevant guidance material. The documents include: a) *Global Air Traffic Management Operational Concept* (Doc 9854); b) *Air Traffic Management System Requirements* (Doc 9882); c) *Manual on Global Performance of the Air Navigation System* (Doc 9883) and d) *Revision to Global Air Navigation Plan* (Doc 9750).

## 2. IMPLEMENTATION OF A PERFORMANCE-BASED GLOBAL AIR NAVIGATION SYSTEM – AN UPDATE

2.1 *Regional and national framework:* In 2009, all planning and implementation regional planning groups (PIRGs), while adopting a regional performance framework, invited States to implement a national performance framework for air navigation systems on the basis of ICAO guidance material and aligned with the regional performance objectives, the regional air navigation plan and the Global ATM Operational Concept. The performance framework should include identification of national performance objectives taking into consideration user expectations and completion of national performance framework forms.

2.2 *Regional workshops:* Further to the adoption of performance framework by all PIRGs, a series of regional workshops were held to provide detailed guidance to States on the development of national performance frameworks for air navigation systems. Workshops covering the Asia/Pacific, Middle East, South American and Caribbean Regions were held in 2009. ICAO will be conducting similar workshops for the remaining regions (Eastern European and African Regions) during 2010.

2.3 *Performance monitoring and measurement:* Following the adoption of performance-based approach to air navigation planning and implementation by Regions/States, the next step entails performance monitoring through an established measurement strategy. This strategy should provide a set of measures in terms of performance indicators and performance metrics. While PIRGs are progressively identifying a set of regional performance indicators and metrics, States in the meantime have recognized that data collection, processing, storage and reporting for the identified regional performance metrics are fundamental to the success of performance-based approach. In review of PIRG reports, the Air Navigation Commission recently noted that it would be useful to have harmonized performance indicators and metrics among the ICAO regions so as to facilitate comparison and coordinated actions for improvements, but however acknowledged that different levels of development in the regions may lead to different indicators and metrics.

2.4 *Performance review report:* In the current practice, all PIRGs review the status of implementation of various conclusions of earlier meetings so as to assess the regional performance in enhancing the air navigation infrastructure. In addition to this, and as a part of air navigation systems performance monitoring and measurement process, it is proposed to introduce at every PIRG meeting a “regional performance review report (RPRR) for air navigation systems”. In order to facilitate a uniform approach, ICAO HQ, in consultation with Regional Offices and PIRGs, will develop by 2011 a standardized format for this RPRR.

2.5 *Flight and flow information for a collaborative environment (FF-ICE): A concept*

2.5.1 The FF-ICE concept is being developed to achieve the vision as outlined in the *Global Air Traffic Management Operational Concept* (Doc 9854). Information for a collaborative environment (ICE) is composed of multiple domains including flight and flow information (FF). The intent of FF-ICE is to define the information requirements for flow management, flight planning, and trajectory management associated with the operational concept components. Implementation of the FF-ICE concept is envisaged during the timeframe through 2025.

2.5.2 It is foreseen that with the FF-ICE, the operational environment will be performance-based and will seek to meet the eleven ATM Community expectations defined in the operational concept through its seven components. FF-ICE encompasses the flight information sharing between ATM community members and starts with the early submission of flight information by the airspace users to the ATM system and ends with the archiving of relevant information after the flight. While FF-ICE focuses on global needs for sharing flight information, it also accommodates regional and local needs.

2.5.3 The global and regional efforts are ongoing for the implementation of ICAO new flight plan format by November 2012; however, the operational concept has greater data requirements than can be supported by the existing and new flight plan system. These include sharing information system-wide, providing early intent data, management by trajectory, collaborative decision making, and high automation support requiring machine readability and unambiguous information. The FF-ICE refines the operational concept in the area of flight information management. It constitutes the necessary basis for the most advanced ATM systems and the development of 4D trajectory management.

2.5.4 While it is recognized that the transition to the FF-ICE will involve significant operational and financial considerations, there would also be consequences associated with inaction or delay. With significant growth projected in air transportation, it is necessary for early and orderly transition in order to reap the benefits of the operational concept as soon as possible.

### 3. CONCLUSION

3.1 Putting in place a performance framework requires knowledge sharing, training and some specific expertise. There would also be hardware and software requirements and analysis capabilities. Also, it is recognized that performance framework will result in a more efficient system through identified cost savings, reduction in waste of resources, more equitable charging practices, and more efficient provision of services. However, as the efforts are challenging, the aviation community is encouraged to follow a common approach toward developing and implementing a performance-based global air navigation system.

### 4. ACTION BY THE MEETING

4.1 The meeting is invited to:

- a) note the developments in the implementation of performance-based global air navigation systems; and
- b) request those States, who have not done so, to establish a mechanism for data collection, processing and storage and provide the information to the regional office for the identified regional performance metrics.