



## TWELFTH AIR NAVIGATION CONFERENCE

Montréal, 19 to 30 November 2012

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

**3.1: Performance improvement through the application of system-wide information management (SWIM)**

### **AVIATION SYSTEM BLOCK UPGRADE MODULES RELATING TO SYSTEM-WIDE INFORMATION MANAGEMENT (SWIM)**

(Presented by South Africa)

#### **SUMMARY**

This information paper describes South Africa's perspectives regarding the implementation of system-wide information management (SWIM) in Africa.

## 1. INTRODUCTION

1.1 South Africa, through the Air Traffic and Navigation Services Company (ATNS), is responsible for air traffic control in approximately 10% of the world's airspace. ATNS' services extend further than the familiar air traffic control service, into the provision of vitally important aeronautical information used for all flight planning purposes as well as search and rescue coordination activities. This also includes the maintenance of a reliable navigation infrastructure. Their future plans include playing a leading role in the development of air traffic (ATM) management solutions and associated services in Africa and selected international markets and also to deploy and use leading technologies for the benefit of the ATM community.

1.2 South Africa supports the aviation system block upgrades (ASBU) methodology and Recommendation 3/x (cf document AN-Conf/12-WP/7) supporting system-wide information management (SWIM) implementation.

## 2. A GLOBAL SWIM CONCEPT

2.1 The current development of SWIM concepts and solutions in different regions (CARATS in Japan, China's New Generation ATM System (CNAS), NextGen in the United States and SESAR in Europe) shows that there is an urgent need to plan and implement a **regional SWIM in Africa** which will be interoperable with the other implementation initiatives.

2.2 The SWIM governance and authority should be delegated at regional level as the system infrastructure and services will differ. The SWIM governance must ensure global interoperability between different solutions as this is the core requirement for SWIM.

2.3 South Africa, through ATNS, would add value to the community by taking the leading role in the regional governance of SWIM in Africa. ATNS is currently participating in several projects and research and development (R&D) activities regarding the implementation of SWIM within South Africa.

#### 2.4 SWIM architecture/infrastructure

2.4.1 The very small aperture terminal (VSAT) network (IVSAT, SADC VSAT/2, NAFISAT) could constitute one of the stepping-stones for the future African SWIM. The VSAT network will soon implement an IP network overlay in line with the SWIM concepts.

2.4.2 The development of air traffic services (ATS) message handling services (AMHS) by ATNS in the region to support future ground to ground communications will also contribute to consolidate an IP-based network for SWIM applications and services such as digital flight plans, Notice to Airmen (NOTAM) and meteorological data.

2.4.3 South Africa, through ATNS, is participating in the SWIM Master Class project with Eurocontrol to develop SWIM-enabled applications by making use of the European network management NOP B2B Web Services infrastructure.

2.4.4 It is intended that an IP-based network is the foundation of SWIM. The SWIM governance must ensure that secure networks with a high quality of service are operated. With the practical introduction of IPV6, the implementation of SWIM should consider the implications related to use of IP systems as a foundation and backward compatibility issues between IPV4 and IPV6.

#### 2.5 SWIM services

2.5.1 South Africa is currently implementing the transition from AIS to AIM. All relevant stakeholders in South Africa, including DOT, CAA and ATNS have identified a Roadmap to move to digital information management in a net-centric approach. This Roadmap highlights the necessary steps (i.e. change to AIXM format, eAIP, digital NOTAM) which need to take place in order to implement AIM.

2.5.2 South Africa has implemented the CAD System (Central Aeronautical Database) which is a similar technological and technical Aeronautical Information Management solution, currently used by Eurocontrol and the European ATM community (ie European Aeronautical Database – EAD). This system will provide eAIP (Electronic Aeronautical Information Publications) in South Africa.

#### 2.6 Datalink technologies

2.6.1 Datalink technologies are a critical enabler for SWIM and should be harmonised.

2.6.2 Currently South Africa uses mainly CPDLC/ADS-C over ACARS network/technology. This technology is adequate if used only in remote/Oceanic areas like today. As soon as that data-link is used in a dense traffic environment to transmit D-ATIS, Departure clearance, futures ATS/Airline messages, the ACARS network/technology will not be sufficient and there is a need to move to a better technology such as ATN over VDL mode 2 technology which allows a bigger bandwidth for data transfer.

2.6.3 South Africa is also planning a proof of concept regarding the use of ATN over VDL Mode 2 in its airspace. Once the benefits of the new technology are properly identified and demonstrated, a regional plan (AFI region) should be expanded as a way forward.

2.6.4 WIMAX/AEROMACS based on G4 technology (802.16-based standard) seems very promising in an airport environment for sharing information. However, these technologies need to be well evaluated in line with the evolution and roadmap plans of the relevant forums i.e. WIMAX forums and future

sustainability, in consideration related to system end of life implications. Security and quality of service must be well considered and demonstrated. Current communications/networks links (such as fibre-optic links) could be complemented by this alternative technology if security matters are properly addressed. It could result in several stakeholders (airports, airlines, ATS) sharing the same network to exchange information and provide different services (CDM information, surveillance data, commercial applications).

## 2.7 **Future services**

2.7.1 Using the CAD system, South Africa has the possibility (today) to provide eAIP and related services to neighbouring countries.

2.7.2 In the context of the Central Airspace Management Unit (CAMU), South Africa could rapidly implement a SWIM network in Africa providing ATFM messaging services.

2.7.3 A surveillance data network (providing radar or ADS-B data) could be implemented between South Africa and its neighbouring countries to share surveillance data information, and thus enhancing safety.

## 3. **CONCLUSION**

3.1 The Conference is invited to note the progress of South Africa in their implementation of SWIM. South Africa supports the recommendations contained in WP/7, submitted by the ICAO Secretariat.

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