



Agenda Item 6: Other business - AeroMACS

AeroMACS Enabling Safe and Secure Connectivity Worldwide

(Prepared by WiMAX Forum)

SUMMARY

Aeronautical Mobile Airport Communication System (AeroMACS) provides the wireless broadband communication capability that supports the increasing need of safe and secure communications connectivity and information sharing to critical fixed and mobile applications at the airport surface. This paper presents the latest developments, standards, implementations and how AeroMACS has been enabling improvements at airport surface operations in Brazil and around the world.

References

- WiMAX Forum Power-point presentation

1. Background

1.1 AeroMACS is a key technology to the aviation industry to improve communications on the airport surface by providing increased transmission of Air Traffic Control (ATC) and Airline Operations Communications (AOC) to relieve traffic, congestions, and delays, and to support the safety and regularity of flight. Based on the mature WiMAX standard (IEEE 802.16e), AeroMACS operates in the protected and licensed aviation spectrum band from 5091 MHz to 5150 MHz, which has been designated on a worldwide basis by the International Telecommunication Union (ITU) at the World Radiocommunication Conference in 2007.

1.2 ICAO has approved the AeroMACS Standards and Recommended Practices (SARPS) resulting in Amendment 90 to ICAO Annex 10, which has been endorsed by 192 ICAO nations and will help ensure manufacturer interoperability, global harmonization and security through certified equipment. This Amendment was effective in November 2016 and is now included in Chapter 7 of Volume III of Annex 10. ICAO has also developed the AeroMACS Technical Manual and guidance document.

1.3 AeroMACS is one of the essential enablers of the global Air Traffic Management (ATM) initiatives and one of the three required communication technologies under the ICAO elements in Global Air Navigation Plan (GANP) and Aviation System Block Upgrade (ASBU) framework, Air Traffic Management Bureau (ATMB). AeroMACS is the only wireless technology that has been validated by EUROCONTROL, Federal Aviation Administration (FAA), and International Civil Aviation Organization (ICAO) to support the safety and regularity of flight.

1.4 The AeroMACS Minimum Operational Performance Standards (MOPS) and the AeroMACS Profile document have been jointly developed and approved by RTCA and EUROCAE. The ARINC AEEC has unanimously approved the initiation of the AeroMACS Standards that will enable the system to be installed in Commercial type aircraft. The initial applications will likely be used to support the existing Electronic Flight Bags (EFB) in the cockpits.

2. Analysis

2.1 Since 2007, an AeroMACS Trial has been underway at the NASA Glenn Research Center Testbed located at the Cleveland Hopkins International Airport to enable the standard validation. More than 40 airports have already implemented AeroMACS and there are several AeroMACS projects being contemplated, under consideration and with ongoing installation around the world.

2.2 AeroMACS is in compliance with worldwide aviation standards and has been designed to support critical safety services. AeroMACS employs secure authentication, authorization and encryption functions based on the Public Key Infrastructure (PKI) to prevent unauthorized network access. It provides high speed, bandwidth, capacity, performance, scalability, reliability and security needed to address air traffic demands and the growing necessity for data communications on the airport surface. AeroMACS provides the assurance to the aviation authority, airport operators, airline carriers, aircraft owners, pilots and passengers that its products are compliant with the highest standards for operation.

2.3 AeroMACS provides the capacity and efficiency needed to sustain demand for communication between aircraft, vehicles and ground infrastructures. Its ecosystem is gaining momentum and the number of deployments is increasing. Several AeroMACS projects are being contemplated, under consideration and with installation in progress around the world. In the United States, over 10 airports have deployed AeroMACS projects and it has been confirmed to be widely implemented through the FAA Telecommunications Infrastructure (FTI) program. Though EUROCONTROL and SESAR JU, airports have undergone testing in multiple European countries. In Portugal, an AeroMACS project expansion has been completed.

2.4 China has implemented AeroMACS projects in over 21 airports and has been formally authorized to install AeroMACS in 110 airports. The Civil Aviation Authority of China is supporting the implementation of AeroMACS across the Chinese National Air System to enable D-Taxi. In Japan, AeroMACS performance has been demonstrated in Haneda and Sendai airports. AeroMACS demonstrated high-capacity data transmission and offered higher communication link security than other current aeronautical communication systems available.

2.5 In Latin America, AeroMACS projects are being evaluated with an installation completed in Rio de Janeiro, Brazil. The project with RIOgaleao and Siemens has been facilitating and optimizing management of the entire site transmitting real-time data and images to airport operators, which receives about 15 million passengers and operates over 50,000 flights a year.

2.6 The data are obtained through sensors and cameras installed in both mobile assets (passenger buses, runway operator vehicles, boarding stairs, and so on) and fixed assets (such as radars and runway sensors). The system was developed jointly by the Digital Industries and Smart Infrastructure areas at Siemens to meet the specific needs of RIOgaleao. One example of the application of this innovative solution is checking water on the runway, which is currently performed manually and reported by radio to the control tower. This communications system is susceptible to failures depending on local conditions. With AeroMACS, the vehicle used for analysis is equipped with cameras and sensors that pass detailed, real-time information to runway operators, raising the degree of reliability and safety through the data generated. Due to the operational complexity of an airport, the new system may be applied in several ways to facilitate management by the operators, such as: vehicle monitoring, passenger flow in specific areas, and increased control of aircraft on the runway, among others.

2.7 AeroMACS wideband communications network can enable sharing of graphical data and real-time video to significantly increase situational awareness, detect and minimize runway incursions, improve surface traffic movement and operations. AeroMACS offers the potential for integration of multiple services into a common broadband wireless network that also securely isolates the applications from each other. Hundreds of applications have been identified to support key operational domains, AeroMACS is able to provide airlines, air traffic control agencies, and airport authorities with the security and flexibility needed to innovate and improve air traffic management. AeroMACS is the technology of choice to enable communications on the airport surface worldwide to support the safety and regularity of flight services.

2.8 AeroMACS is cost effective, designed to reduce costs and implementation time, while enhancing profitability. Its adoption by the global aviation community reflects the need to establish a new framework for airport surface communications designed to advance the safety and regularity of flight. AeroMACS is gaining momentum with deployments in airports worldwide. The AeroMACS presentation will focus on supporting the global Aviation Community in managing profitable developments and growth, build best-in-class AeroMACS networks, and collaborate to the benefit of the industry.

3. **Suggested actions**

3.1 The Meeting is invited to analyze the information provided in this paper and Power-Point presentation, and consider AeroMACS as a key enabler to enhance safe and secure connectivity at the airport surface in the Latin America region.