

# The Standardized Solution for the Airport Surface Communications Worldwide

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In our increasingly digitally connected world, the existing airport communications systems are greatly outdated, with infrastructure limitations that make supporting current airport traffic demands very challenging. Moreover, it is clear that these limitations will certainly not be sufficient to address future requirements. The limited data capacity of current ground communications networks places a burden on applications and their functionality.



Change is needed, and the Aeronautical Mobile Airport Communication System (AeroMACS) system represents perhaps the best available solution.

To this end, the AeroMACS profile has been selected, endorsed and adopted worldwide for over a decade to support evolving airport surface communications needs. The WiMAX Forum has been instrumental in all stages of AeroMACS' growth, from its initial launch to facilitating the development of a mobile system profile and promoting the current global expansion efforts.

## Establishment and verification - in brief

AeroMACS is a wireless broadband technology exclusively for aviation based on the IEEE 802.16 standard that supports the increasing need for data communications and information-sharing on the airport surface for both fixed and mobile applications. It is internationally standardized, globally harmonized and provides flexibility, cost-effective adoption, and a scalable model for continuing aviation industry evolution.

Established by International Civil Aviation Organization (ICAO) in 2014 and coordinated by EUROCONTROL and Federal Aviation Administration (FAA) under Action Plan 17 (AP-17) activity, AeroMACS was identified and recommended as one of the core technologies of the Future Communication Infrastructure (FCI) to support Air Traffic Management (ATM) operations. AeroMACS validation was based on extensive and systemic approach focused on technical and non-technical characteristics suitable to meet operational communications requirements for aeronautical applications based on the ICAO ATM Concept of Operations.

AeroMACS operates in the protected and licensed aviation spectrum band from 5091 MHz to 5150 MHz, designated on a worldwide basis by the International Telecommunication Union (ITU) at the World Radiocommunication Conference 2007 (WRC-07). Regulators are encouraged to publish rules for access to the Aeronautical Mobile (Route) Service (AM[R]S) spectrum band in their countries, according to ITU recommendations. Based on the expectation of high demand for AeroMACS services, additional allocation of the spectrum within the 5000 to 5030 MHz band may be considered nationally.

## An essential enabler

AeroMACS combines the vision, strategy and roadmap of the FAA Next Generation Air Transportation System (NextGen) in the US and Europe's Single European Sky ATM Research (SESAR). AeroMACS is one of the essential enablers of the global ATM

initiatives and one of the three required communication technologies under the ICAO Global Air Navigation Plan (GANP). 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.

The AeroMACS Minimum Operational Performance Standards (MOPS) and the AeroMACS Profile document have been jointly developed and approved by Radio Technical Commission for Aeronautics (RTCA) and European Civil Aviation Equipment Organization (EUROCAE). The Minimum Aviation System Performance Standards (MASPS) developed by EUROCAE describes a set of system performance requirements and outlines possible implementation options for AeroMACS. The ARINC Airlines Electronic Engineering Committee (AEEC) has unanimously approved the AeroMACS standards that will enable the system to be installed in commercial type aircraft.

## **Designed to support critical safety services and communications**

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.

AeroMACS enables ground communications to support a wide variety of applications, including both current and new applications that require more bandwidth. It 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 support the safety and regularity of flight. AeroMACS supports the safety and regularity of flight communications of aircraft operators, airport authorities and air navigation services providers (ANSPs) by providing high bandwidth and prioritized communication over a common infrastructure dedicated to critical communication in the airport surface environment. AeroMACS has demonstrated its potential; its adoption by the aviation industry has widespread implementations around the world.

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. Global AeroMACS tests have been performed since 2007, implementations are increasing year over year, and it is expected to become ubiquitous in airports and aircrafts.

## **AeroMACS projects worldwide**

Several AeroMACS projects are being contemplated or are under consideration. In some cases, installation is in progress at sites 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. Progress is global: in Portugal, an AeroMACS project expansion has been completed. In Latin America, AeroMACS projects are being evaluated, with an installation already completed in Brazil.

Looking to Asia, China has implemented AeroMACS projects in over 20 airports and has been formally authorized to install AeroMACS in an additional 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.

## **Promising the integration of multiple services into a single network**

The AeroMACS wideband communications network can enable the 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, and 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. For all these reasons, AeroMACS is the technology of choice to enable communications on the airport surface worldwide to support the safety and regularity of flight services.

## **About the WiMAX Forum and its advocacy**

The WiMAX Forum, the leading nonprofit organization that certifies and promotes the compatibility and interoperability of broadband wireless products based on Institute of Electrical and Electronics Engineers (IEEE) standard 802.16, with the cooperation of its member companies, continues to advocate worldwide about the benefits and capabilities of Aeronautical Mobile Airport Communication System (AeroMACS).

The WiMAX Forum is an industry-led, not-for-profit organization that certifies and promotes the compatibility and interoperability of broadband wireless products based upon IEEE Standard 802.16. The WiMAX Forum's primary goal is to accelerate the adoption, deployment and expansion of WiMAX, AeroMACS, and WiGRID technologies across the globe while facilitating roaming agreements, sharing best practices within our membership and certifying products. WiMAX Forum and WiGRID Certified® products are interoperable and support broadband fixed, nomadic, portable, and mobile services. The WiMAX Forum works closely with service providers and regulators to ensure that WiMAX Forum Certified systems meet customer and government requirements.