AeroMACS – A Global Standard for Airport Surface Communications

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WiMAX Forum
WiMAX Increasingly Used as Solution for Vertical Markets

WiMAX Forum Membership - Providing Value and Industry Leadership

Smart Grid  Rural Broadband  High Speed Rail

Aviation  Oil & Gas  Mobile Backhaul
WiMAX – Evolving to Meet the World’s Wireless Broadband Needs

North America
- Sprint/Clearwire attract over 11M subscribers and use 3G/WiMAX/Wi-Fi devices
- Canadian Utilities using WiMAX for Smart Grid Networks, including BC Hydro
- Marathon Oil using WiMAX for Smart Field Connectivity
- US FAA Chooses WiMAX for Aviation industry Terrestrial Communications infrastructure upgrade

CALA
- WiMAX used for connectivity among ships and workers at the Panama Canal
- WiMAX network used to connect teams at the Heineken Regatta
- WiMAX connecting new Smart Cities projects in Brazil

Europe
- EUROCONTROL chooses WiMAX for Aviation industry Terrestrial Communications infrastructure upgrade
- WiMAX used in massive Smart Field deployments in Russian Oil & Gas companies, including Nizhnevartovsk

Middle East / Africa
- WiMAX used in Smart Field deployments for Oil fields in Oman
- WiMAX connecting government applications in Afghanistan, Iraq, etc.
- WiMAX used by major Int’l operators – Orange, MTN
- New Deployments in Cote d’Ivoire, Botswana, more

Asia
- UQ Communications connecting 3.6M subscribers
- KDDI – Building 100K Wi-Fi APs on WiMAX
- YTL Communications – First converged Voice and Data operator nationwide, Connect 10K schools nationwide & over 500k subs
- P1 – WiMAX/LTE coexisting networks and devices
- Global Mobile WiMAX connects 3,000 Wi-Fi APs, 800 connected buses
- Vee Time WiMAX for High Speed Rail
- WiMAX the #2 broadband technology in Pakistan
- Australian Smart Grid deployments, including SP Ausnet WiMAX to the meter
- WiMAX used for Disaster Recovery, Public Safety, High Speed Rail, Power Plant CCTV, and other uses in Taiwan
WiMAX Continues its Technological Evolution and Market Expansion
WiMAX in Multi Radio Access Technology Network Deployments

Fixed/Nomadic WiMAX

Mobile WiMAX

WiMAX Advanced

Multi-Mode Mobile WiMAX & Wi-Fi

Single Mode Mobile WiMAX

Multi-Mode Mobile WiMAX, Wi-Fi, 2G, & 3G

Mobile WiMAX / WiMAX Advanced

WiGRID

WiMAX Rel 1

WiMAX Rel 2

WiMAX Adv

LTE

Multi-Mode Mobile WiMAX, Wi-Fi, 2G, 3G, & LTE

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Technology Roadmap of WiMAX Advanced

Release 2.X
- Release 2.1
- Release 2.0
- Release 1.0

Mobile WiMAX
(based on 802.16e)

WiMAX 2
(based on 802.16m)

Additional Elements
- enhanced interworking
- other RAT

WiGRiD
(based on 802.16e)

Reference to part of 3GPP specifications

3GPP LTE/SAE standards family
- Radio
- Network
- Service
- USIM
- UE
- BS
- Codec
- Management
- TAF
- Interworking
- Testing
- Security
WiMAX Forum Focal Point for Industry

WiMAX Forum’s Role

• Define requirements and technology profiles that drive network and air interface specifications and certification

• Formal platform for Aviation Industry to collaborate with WiMAX Forum

• Promote WiMAX Technology
Collaborative Standardization Project

MOPS = Minimum Operational Performance Specification
MASPS = Minimum Aviation System Performance Specification
CRSL  = Certification Requirement Status List
PICS  = Protocol Implementation Conformance Statement
SARPS = Standards and Recommended Practices
Stewardship of the Standard within WiMAX Forum

CWG
- Create Certification Test Items
  - PCT
  - RCT
  - MIOT
  - CRSL

TWG
- System Profile
- PICS
- Acceptance at TWG

AWG
- Point of Contacts Overall Management
  - Deploy to TWG about Technical issue
  - Formal response as WMF (AWG)

Aviation Industries

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Industry Building Initiative

Traditional WiMAX Industry

AeroMACS Industry

Aviation Industry

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Benefits of Industry Collaboration

- Access to Mature Technology – over a decade in development and service
- COTS Hardware (Broad commercial availability)
- Flexible Standard – already adapted for Smart Grid (WiGRID), Backhaul (P802.16r)
- Certifiable Equipment and Devices
- Ability for industry to develop and achieve global harmonization
- Harmonized 5.1 GHz Spectrum already allocated!
Why AeroMACS?

Installation

Turn-up

Network Management

EASY, FAST AND ECONOMICAL

<table>
<thead>
<tr>
<th>Technical Values</th>
<th>Business Values</th>
<th>Certification Values</th>
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<tbody>
<tr>
<td>Broadband: 20Mb/s ~ 75 Mb/s at maximum</td>
<td>No management cost for telephone Number.</td>
<td>Certification program in process</td>
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<tr>
<td>Broad NLoS coverage: 1 ~ 3 km range</td>
<td>Low cost for installation &amp; maintenance</td>
<td>Hardware-based PKI credentialing</td>
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<tr>
<td>Data Oriented Architecture – also supports mobility</td>
<td>Simple mobile station ⇒ Easy airworthiness certificate</td>
<td>Multiple Certification Authorities</td>
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<tr>
<td>Always-on connectivity</td>
<td>Easy IOT due to standardized profile</td>
<td>Revocable and replaceable certificates</td>
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<tr>
<td>Low failure rate (QoS)</td>
<td>No legacy systems</td>
<td>Certificate Hierarchies</td>
</tr>
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Current AeroMACS Assessments

- **Cleveland Hopkins Airport** / NASA Glenn Research Center joint project
- **Daytona Airport** – Harris Corporation Trial
- **Melbourne Airport** – Harris Corporation Trial
- **Atlantic City Airport** – FAA Flexible Terminal Sensor Network program prototype network
- Airport Surface Surveillance Capability (ASSC) Program
  - Supported by Sensis Corporation
  - Prototype installed and tested at **Syracuse Hancock International Airport**
    - May 2013 – **SFO Installation**
    - **SFO is 1st of 9 sites**
- **Toulouse Airport** – SESAR / Airbus / Indra / EUROCONTROL project
WiMAX Forum Aviation Summit

- September 10-11 / Hilton Crystal City / Washington, DC
- Free to Attend
- WiMAX Forum membership not necessary
- Co-located with WiMAX Forum Member Conference
- Open to the entire Aviation community
- 2 Days of program with participation on an open session for Aviation Working Group (AWG)
- [www.wimaxforum.org/event/wimax-aviation-2013](http://www.wimaxforum.org/event/wimax-aviation-2013)
WiMAX Aviation 2013

• Topics of Discussion
  • Vision & Strategy for Airport Systems in 21st Century
  • AeroMACS Trial Deployment Roundtable
  • Availability and Readiness of Devices & Silicon for Aviation Solutions
  • Spectrum Availability
  • Core Networking and Security Requirements for AeroMACS
  • Certification for AeroMACS Equipment and Devices
  • And more…
WiMAX Aviation 2013

- Keynote Speakers
  - EUROCONTROL
  - ENRI
  - FAA
  - Hitachi
  - Honeywell
  - ICAO
  - NASA
  - SESAR

- Supported by:
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THANK YOU!

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