AeroMACS – A Global Standard for Airport Surface Communications

Declan Byrne
President
WiMAX Forum
WiMAX Increasingly Used as Solution for Vertical Markets

WiMAX Verticals
WiMAX Forum Membership - Providing Value and Industry Leadership

Smart Grid
Rural Broadband
Aviation
Oil & Gas
High Speed Rail
Mobile Backhaul
Global Proliferation of IEEE 802.16 Technology Across Vertical Markets

**North America**
- Canadian Utilities using WiMAX for Smart Grid Networks, including BC Hydro
- Inmarsat operates WiMAX network in Gulf of Mexico to connect Oil Platforms and Ships
- City of Houston deploys WiMAX Smart Metering Network, expands use to city government
- Marathon Oil using WiMAX for Smart Field Connectivity
- Northern Michigan University connects students, K-12 and emergency services with WiMAX

**Europe**
- WiMAX used in massive Smart Field deployments in Russian Oil & Gas companies, including Nizhnevartovsk
- WiGRID deployment in UK for Western Power Distribution
- WiMAX used in select Smart Grid networks

**Middle East / Africa**
- WiMAX used in Smart Field deployments for Oil fields in Oman
- WiMAX connecting government applications in Afghanistan, Iraq, etc.
- New Deployments in Cote d'Ivoire, Botswana, more
- WiMAX being used to connect banks and ATMs across the continent

**Asia**
- UQ Communications connecting 4M+ subscribers
- UQ Communications trials WiMAX Smart Grid for Kyushu Power and Electric – 7 million smart meters
- KDDI – Building 100K Wi-Fi APs on WiMAX
- YTL Communications – First converged Voice and Data operator nationwide, Connect 10K schools nationwide & over 500k subs
- Global Mobile WiMAX connects 3,000 Wi-Fi APs, 800 connected buses across Taipei
- Vee Time uses WiMAX for High Speed Rail in Taiwan
- 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

**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
WiMAX Forum acts as a focal point for industry interest in WiMAX

**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
- Validate Certification Test
  - 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

Copyright 2013 WiMAX Forum. All rights reserved
## International Industry Support

<table>
<thead>
<tr>
<th>Category</th>
<th>RTCA SC-223</th>
<th>EUROCAE WG-82</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ANSPs</strong></td>
<td>FAA</td>
<td>AENA, DSNA, DFS</td>
</tr>
<tr>
<td><strong>Industry</strong></td>
<td>HARRIS, ITT-EXELIS, ROCKWELL-COLLINS, HONEYWELL, HITACHI</td>
<td>SELEX, INDRA, AT4WIRELESS, THALES, COBHAM, SAAB</td>
</tr>
<tr>
<td><strong>Airframe Manufacturer</strong></td>
<td>BOEING</td>
<td>AIRBUS</td>
</tr>
<tr>
<td><strong>International Organisations</strong></td>
<td>EUROCONTROL</td>
<td>EUROCONTROL</td>
</tr>
<tr>
<td><strong>Research Institutes</strong></td>
<td>ENRI, MITRE, NASA</td>
<td>DLR</td>
</tr>
</tbody>
</table>
## Standards Development Status

| Profile Document | • Completed and Approved by RTCA PMC Sept 2011.  
  • On-going revision to incorporate changes resulting from MOPS Validation – except final release with MOPS in July, 2013. |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MOPS             | • Final Draft Completed by RTCA SC-223/EUROCAE WG-82  
  • Submitted to RTCA/EUROCAE FRAC April 2013.  
  • Final Recommendations and Comments (FRAC) review around the end of June 2013.  
  • Program Management Committee (PMC) Approval September 2013. |
  • Final SARPS Scheduled Dec 2013  
  • SARPS/TM Validation at Toulouse AeroMACS Testbed FY13-14. |
| AEEC Standards Development | • Airlines Electronic Engineering Committee (AEEC) status pending |
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**

**Turnup**

**Network Management**

**EASY, FAST AND ECONOMICAL**

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

Copyright 2013 WiMAX Forum. All rights reserved
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

- Tuesday, September 10\textsuperscript{th} 2013 in Washington, DC
- Free to Attend
- WiMAX Forum membership not necessary
- Co-located with WiMAX Forum Member Conference
- All-day discussion of \textit{the business} of AeroMACS
- Open to the entire Aviation community
- More information available soon

Washington, DC – USA
Questions?