

Aeronautical Mobile Airport Communications System



Future Communications Research Via the NASA-CLE CNS Test Bed



Advanced CNS Technologies

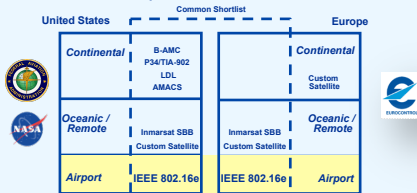
- GRC Initiates Modern Airport Communications Research
- Analyzed requirements and potential technologies for advanced networked wireless communications for airport surface applications
- Performed C-Band characterization of 5091-5150 MHz for airport applicability
- Developed airport network architecture concept

Future Communications Study

ICAO Endorsed FCS Technology Recommendations



- GRC provided the technology assessments supporting the FAA in the Future Communications Study. US and EUROCONTORL reached agreement on the use of IEEE 802.16 standard for airport surface communications.



International Spectrum Allocation

World Radiocommunication Conference Decision

- GRC provided technical analyses supporting a new AM(R)S allocation for airport surface communications in the 5091-5150 MHz Band.

Next Generation Development

New ATM Requirements – Future Communications

- Project Level and Space Act Agreements for concepts of use, requirements, and architecture for C-band airport surface wireless and L-band terrestrial en-route communication systems
- Test bed infrastructure to enable validation of aviation profile of IEEE 802.16e standard
- GRC's research supports FAA NextGen implementation decisions



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Airport Surface Communications

- Highest concentration of users in NAS
- Mobile and fixed assets/applications
- Surface modifications and hazards
- Mobile extensions of SWIM



Communications, Navigation and Surveillance (CNS) Test Bed

Government / Industry partnership for CNS technology risk mitigation, NextGen ATM concepts validation, and future service demonstrations



Over \$25M invested by NASA, FAA, Sensis, ITT, Others since 2002

- Cleveland Hopkins Airport & NASA Glenn Research Center
- Advanced surface wireless communications networks
- Remote operations from NASA control center
- Aviation Research Vehicle (ARV) emulate mobile users



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Mobile Applications of AeroMACS

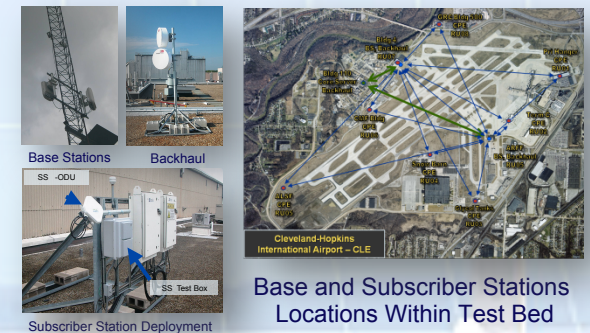
- ATC Communications with any aircraft anywhere (e.g. loading/modifying FMS via CMU with 4D trajectories)
- AOC and non-ATS voice and data (e.g. AIS, GPS updates, graphical weather, moving maps, hazards)
- Vehicles in the airport movement area (e.g. surface management, gate control, fire/safety, de-icing, snow)
- Airport ops (e.g. security, video from cockpit and cabin)

Fixed Applications of AeroMACS

- Sensor data collection/dissemination for situational awareness (e.g. MLAT/ASDE-X; ADS-B; ASR; ASSC)
- Network enabled Weather Data (e.g. WTIC, AATs)
- Cable/Telco replacement/augmentation (e.g. fiber backup, cable loop extensions, construction restoration)

AeroMACS Profile

- Based on the well-known "WiMAX" implementation of the IEEE 802.16 mobile wireless standard.



AeroMACS Standards

RTCA Special Committee (SC-223)

- Completed development of Minimum Operational Performance Standards (MOPS)

ICAO Working Group S

- Nearing Completion of Standards and Recommended Practices (SARPS)

EUROCAE Working Group 82

- Completed of Minimum Aviation System Performance Standards (MASPS)