Agenda

- Current Status

- Future Communication Infrastructure (FCI)

- Thoughts on way ahead
Communications: A core enabler for Air Traffic Management (ATM)

- Cable
- Wireless
ATM COMS today: Voice and Data

A/G Communications:
- Analogue Voice: 25 and 8.33 KHz
- Data Link (CPDLC): VDL2
Drivers for change in ATM coms

- Avoid Technical Obsolescence
- Use modern telecommunication technologies

- Not Cause the Bottleneck
- Increase use of air-ground data
- Data becomes primary
Agenda

- Current Status

  - Future Communication Infrastructure (FCI)
    - Why and What?
    - ...

- Thoughts on way ahead
Efficient data communication services are required to enable the key SESAR principles.
Future COM Infrastructure

Existing Systems
- Airport surface: AeroMACS
- General terrestrial: LDACS
- Satellite: Oceanic + Continental

SPECTRUM & INTEGRATION ASPECTS
FCI in ICAO COM Roadmap (GANP)
Agenda

- Current Status

- Future Communication Infrastructure
  - Expansion of existing systems
    - Analogue Voice: 8.33 KHz below FL195
    - CPDLC : VDL2
  - ....

- Thoughts on way ahead
8.33 is needed to mitigate frequency congestion
NM RFF: Satisfaction of new frequency demands

Implement 8.33 below FL195 vs Do Nothing

- Interim 8.33
- Final 8.33

2011 2013 2015 2017 2019
VCS II IR (8.33 KHz below FL195): 2 Phases

Final Phase Challenge:
Achieve > 6000 conversions in one year
CPDLC - now
Updated DLS IR (310/15) – 2 Key Dates

Aircraft

Ground: All EU ANSPs

5th Feb 2018

5th Feb 2020
Agenda

- Current Status

- Future Communication Infrastructure
  - ...  
  - New Systems: Focus on AeroMACS
    - Current Status
    - Stakeholders
    - Why AeroMACS

- Thoughts on way ahead
AeroMACS : Summary of status (1/2)
(Aeronautical Mobile Airport Coms System)

- Wireless high capacity data link (4G) for airports (vehicles and a/c on ground, as well as fixed coms).
  - ATM, AOC and Airport communications.

- Based on commercially deployed technology (IEEE 802.16, WiMAX)

- Strategic choice for aviation:
  - Part of the wider aviation future communication (FCI) picture
  - Included in ICAO roadmap (GANP)
  - Operation in regulated spectrum (5GHz) offering protection from interference (safety and regularity of flight communications)

- Supports synergies between Airports, Airlines and ANSPs
AeroMACS: Summary of status (2/2)

- Standards are **available** and **planned**:
  - **Profile** (EUROCAE/RTCA/WiMAX Forum)
  - **MOPS** (EUROCAE/RTCA) and **MASPS** (EUROCAE)
  - **SARPS** and **Technical Manual** (ICAO)
  - **Avionics/ARINC spec** (AEEC)

- Extensive testing in Europe, US and Japan
  - Europe: Two SESAR projects with two independent prototype developments (SELEX and Thales) supporting testing and validation
    - Testing and evaluation in labs, airport and aircraft integration (SESAR1)
    - Additional testing, trials and/or demos are expected (SESAR 2020)

- Implementations are already being pursued (in US starting form ground/airport side)
AeroMACS: 3 key Stakeholders/Users

- Airlines
- Airports
- Airport and AOC
- ATC
- Video Surveillance
- Service vehicles

Data collection & sharing

ATM

Support Infrastructure (backbone)
AeroMACS implementation perspectives

- Airports (only)
- Airports and Airlines
- Airports, Airlines and ANSPs
Why is AeroMACS important for aviation?

AeroMACS is:

- the first pillar of a wider future aviation COM infrastructure strategy
- a test case for aviation in leveraging on commercial communication technologies
- a test case for pooling synergies between ANSPs, Airports & Airlines to implement a key aviation COM enabler
- a test case for handling the security issues of future aviation COM infrastructure
- expected to offer benefits....
What are the AeroMACS benefits?

- Provides higher throughput for airport surface communications
- Provides relief to the congested VHF spectrum in airports;
- Supports worldwide interoperability and integration of critical coms for ANSPs, AUs and Airports
- Can reduce overall costs (via synergies of sharing infrastructure);
- Offers increased security capabilities
- Helps to reduce airport congestion and delays and to enhance situational awareness in the airport surface
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From Development to Implementation:
Key events in the VDL2 case in Europe

PETAL trials
ECTL/MUAC
1994+

VDL2 SARPs
ICAO

Link2000+
ECTL
2001

TARGET:
VDL2 widely implemented in Europe
2015

Initial DLS IR
EU
2009

Updated DLS IR
EU
2020
Data link Implementation: Complex case!

- Large scale deployment
- Equipment availability
- Solutions for a/c integration
- Technology
  - Services
  - Networking: FANS, ATN/OSI, ATN/IPS, ...
- Physical Layer: VDL2, AeroMACS, ...
- Standardisation:
  - CPDLC, ADS-C, ...

Version: 1.0
Way Ahead

- Agree on **global COM solutions** supporting global aviation needs
- Coherent COM (and CNS) roadmaps supporting global or if required regional **business cases**
- Address **transition aspects** as early as possible
- Address **standardization** needs early and globally
- Address **all stakeholders** needs (including BusAv, GA and civil-military interoperability)
- **Weakest Link:** Avionics architecture/capabilities: Consider CNS synergies and new technologies (such as software radios, multiband antennas)
Way Ahead: 2 keywords

Harmonisation: EUROPE, US, other regions (ICAO)

Coordination: Regulators, ANSPs, Airlines, Airports, Standardization Organisations, CSPs and Industry (OEMs, supplier's, etc)
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