Aviation Receiver Standards

SESSION 5-5 Henderson - DTV receiver performance.pptx

Presented to: Spectrum Efficiency and Receiver Standardization Workshop

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Date: 12 March 2012

Federal Aviation Administration

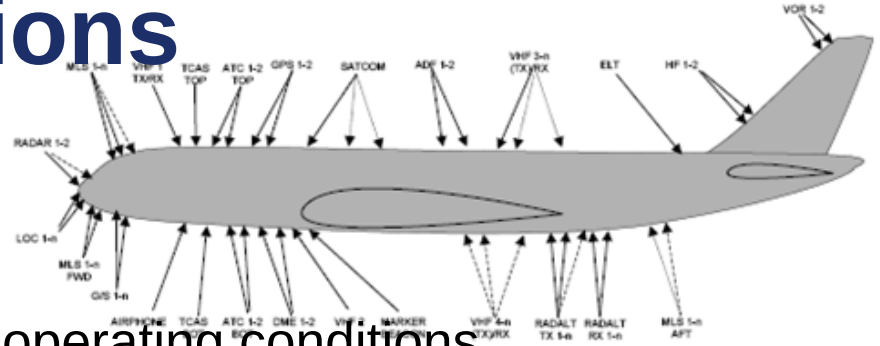
FAA Aircraft Receiver Standards

- High Frequency communication (voice and data)
- Non-Directional Beacon
- Marker Beacon
- ILS Localizer/VOR
- VHF Comm (25 kHz, 8.33 kHz, mode 2 data)
- UHF Comm
- Emergency Locator Transmitter
- ILS Glide Slope
- Universal Access Transceiver (automatic dependent surveillance – broadcast)
- Distance Measuring Equipment/TACAN
- Traffic Collision Avoidance System
- Transponder, 1090 Extended Squitter (automatic dependent surveillance – broadcast)
- Global Positioning System, Augmentations and other GNSS
- Aeronautical Mobile Satellite Systems
- Microwave Landing System
- Airport Surface Local Area Network
- Airborne Doppler Radar Navigation (multiple)
- Weather Radar
- Radio Altimeter
- Ground Proximity Warning System

Aviation Receiver Standards

- **Global Harmonization is Essential**
  - Aircraft delivered and operated globally
  - US member of International Civil Aviation Organization (ICAO)
  - Technical standards included or referenced in Annex 10 to the Convention on Civil Aviation (Chicago Convention)
- **US Regulatory Structure**
  - Aircraft Design Responsibilities
  - FAA Technical Standard Orders (TSO)
    - Provides cost-effective method for producing an article for sale for installation in aircraft
    - Requires test data and self-certification, with FAA oversight
    - Addresses design changes and production

Aviation Considerations



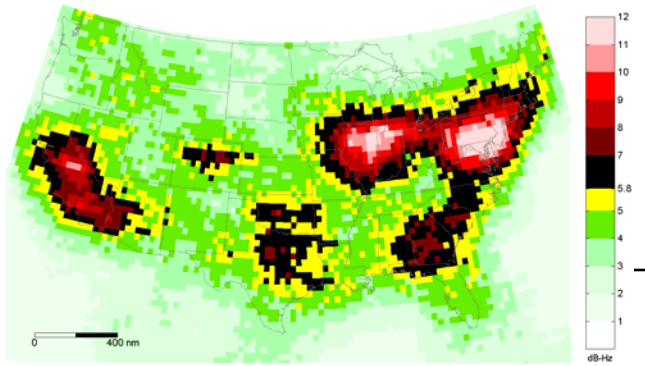
- **Performance for safety**
  - Reliability under all foreseeable operating conditions
- **Harsh environment**
  - Dynamics, temperature extremes, vibration, etc
- **Physical constraints**
  - Small unit, low-profile antenna, installation/integration
- **Electromagnetic compatibility**
  - Congested RF environment (antennas & equipment)
  - Off-aircraft RFI sources: large field of view, consider aggregate effects and various geometries

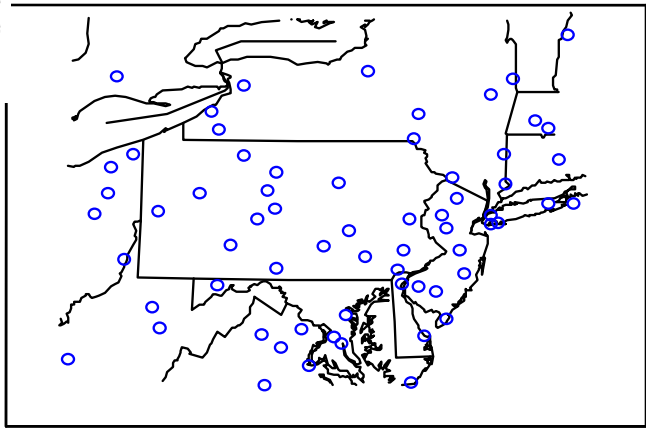
Standards Development

- **FAA Standards Development**
  - Typically invoke an industry-consensus standard (e.g., RTCA Inc or SAE International)
  - Public comment prior to adoption
- **Industry Standard**
  - Typically 18-24 months for mature technology
  - Requirements and test procedures
- **International Standard**
  - Development time varies significantly, 5 years is not uncommon
- **Development & Certification**
  - 12 – 36 months
- **Implementation**
  - Installation can be expensive (eg aircraft out of service, wiring, installation testing)
  - Typical market penetration ~10 years
  - Small market, low profitability and questionable ROI retard adoption
  - Mandates can accelerate adoption if appropriate
    - TAWS standard published Aug 1999, over half aircraft voluntarily equipped by 2000, equipage mandate effective March 2005,

Case Study: GPS L5

DME/TACAN





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