L-band Digital Aeronautical Communications System (LDACS)

draft-maeurer-raw-ldacs-00

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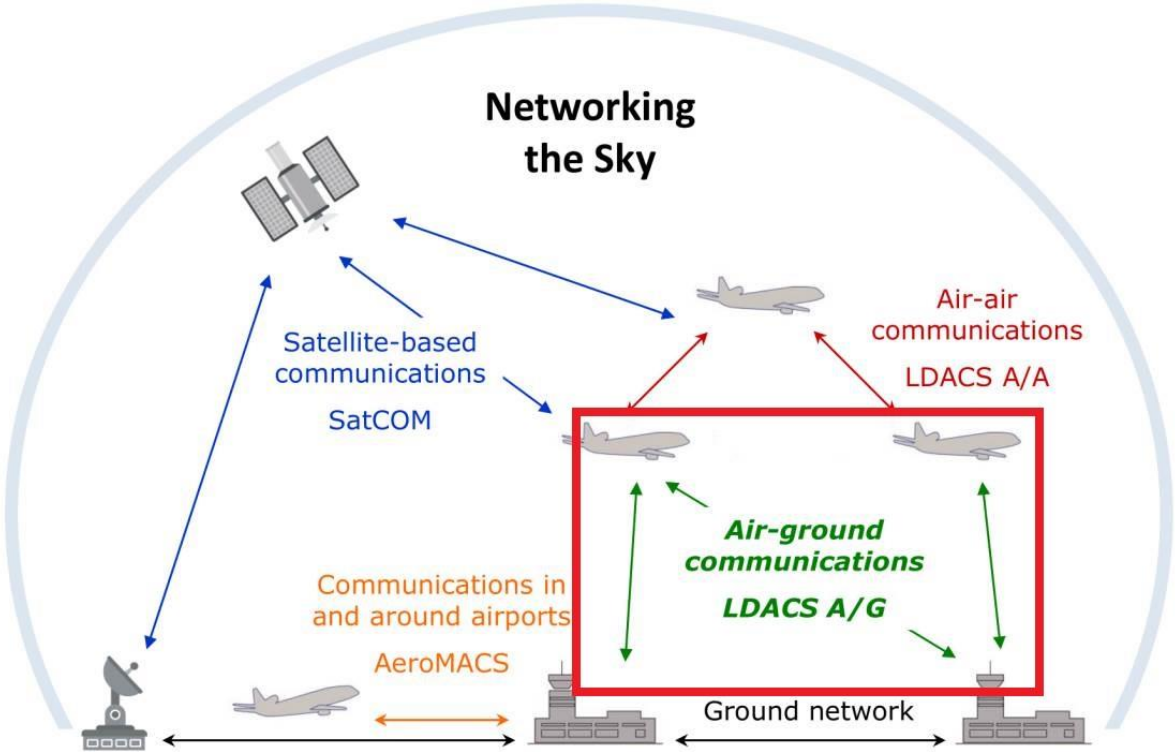
Developments in Aeronautical Communications

- (1) Civil air traffic growing +
  (2) New entrants such as UAVs
- Air traffic expected to **double** by 2040 compared to 2018
- Most **aircraft** still **using analogue voice communications today**
- **Legacy systems** in **ATM** will reach **capacity limit**
- **VHF band** is becoming **saturated** in **high density areas** of **Europe**, **US** and **Asia**

→ **We need a new broadband digital aeronautical communications systems!**



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Abstract

This document provides an overview of the architecture of the L-band Digital Aeronautical Communications System (LDACS), which provides a secure, scalable and spectrum efficient terrestrial data link for civil aviation. LDACS is a scheduled, reliable multi-application cellular broadband system with support for IPv6.

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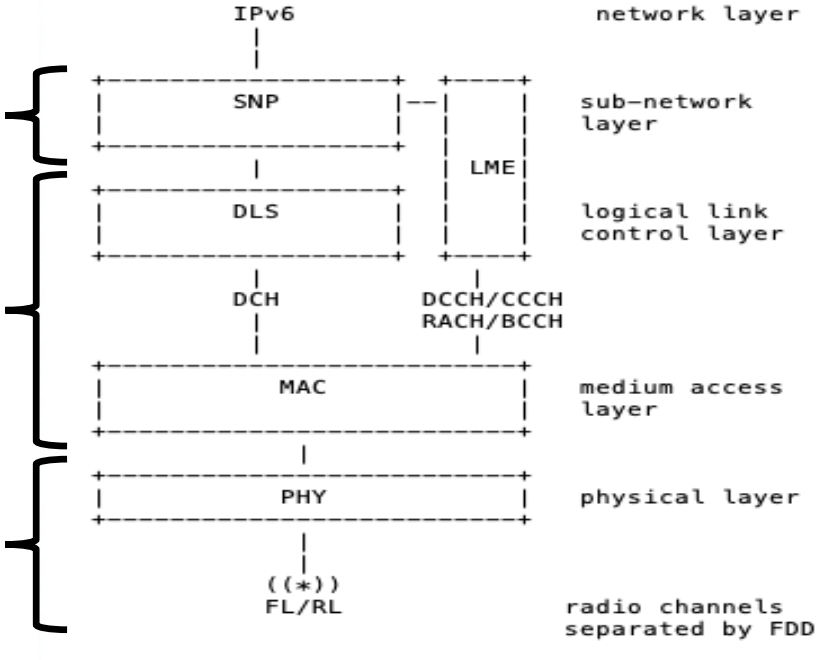
Benefits of LDACS

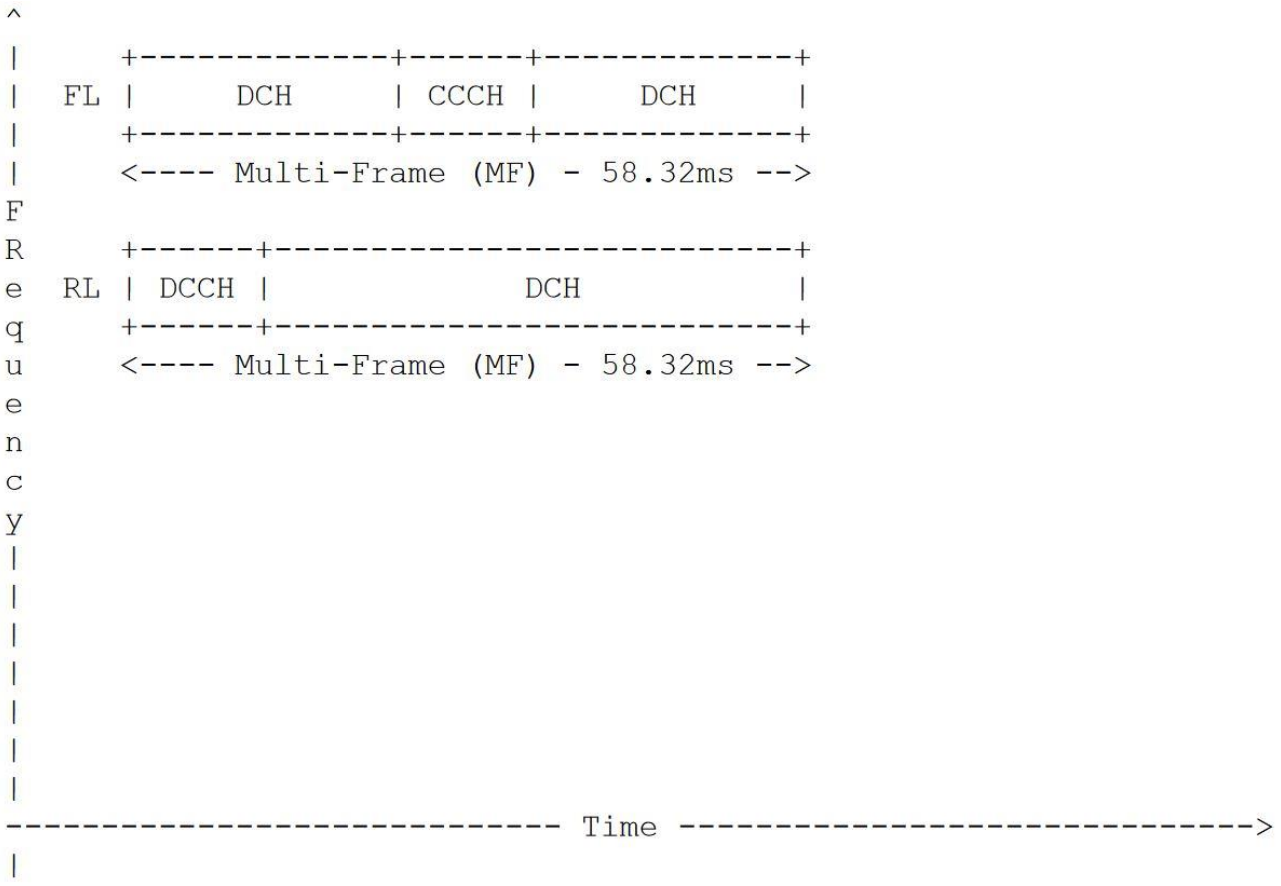
- High data rate (< 2 Mbit) 4G-like data link designed for long-range communication (<400 km) in regulated aeronautical spectrum (~ 1 GHz)
- Designed with safety-of-life use cases (i.e. air traffic management) in mind: reliability, predictability, and suitable for regulated spectrum (as required by the use case)
- Designed with IPv6 as network layer in mind; aeronautical networks shall transition from ACARS and OSI to IP network protocols
- Open standard at ICAO under development

LDACS protocol stack

Sub network link layer: LDACS sub-net management (LME); user plane cryptography (SNP)
Data link layer: resource request/reservation through centralized scheduling (MAC); priority aware; reliable through automatic retransmissions (DLS).
Physical layer: OFDMA on two FDD radio channels; 500 kHz each; hardened against aeronautical interference.



LDACS frame structure: Multi-frame



LDACS frame structure: Multi-frame & Super-frame (=4 MFs)