



VDL Mode 4

A multi-purpose data link for CNS/ATM

VHF Digital Link (VDL) Mode 4 is a VHF data link technology standardised by ICAO and ETSI, providing digital communication between mobile stations (aircraft and airport surface vehicles) and between mobile units and fixed ground stations.

The data link is designed to support CNS/ATM digital communication services, including time- and safety-critical broadcast applications as well as point-to-point communication. It is characterized by very high delivery probability from the unique self-organising TDMA function.

VDL Mode 4 protocols support ADS-B and similar applications by broadcasting short repetitive messages and adapts smoothly to increasing traffic loads.

The data link transmits digital data in a standard 25 kHz VHF communications channel and divides the communication channel into a large number of time slots. The start of each slot is an opportunity for a station to transmit.

VDL Mode 4 is built on the Self-Organising Time Division Multiple Access (STDMA) concept, in which the time slots are synchronised to UTC, and stations advertise their intention to transmit in a specified time slot by means of a reservation protocol carried in a prior transmission. For convenience, a group of contiguous time slots spanning a period of 60 seconds is termed a super-frame. Each time slot may be used by a radio transceiver (mounted on aircraft, ground vehicles or at fixed ground stations) for transmission of data.

The exact timing of the slots and planned use of them for transmissions are known to all users in range of each other, so that the data link can be used efficiently and users do not transmit simultaneously. As a result of this 'self-organising' protocol, VDL Mode 4 is capable of operating outside the coverage of a ground infrastructure and can therefore support air-air as well as ground-air data communications and applications.

In high-density airspace, a ground infrastructure may be used to manage the system and improve overall performance. Its FM modulation scheme (GFSK) gives the data link long range (200nm) at low power, including very good transmission characteristics on ground e.g. at airports.

VDL Mode 4 with its unique self-organising function enables ADS-B to be implemented in full scale, cost-efficiently for all airspace user groups and air traffic service providers.

In addition to ADS-B, VDL Mode 4 supports applications such as:

- Traffic Information Service–Broadcast (TIS-B)
- Flight Information Service–Broadcast (FIS-B)
- DGNSS augmentation–Broadcast (GIS-B)
- Point-to-point communication for Airline Operational Communication (AOC) and A-SMGCS applications