SITA implements Air/Ground datalink communication services complying with ICAO standards for VHF Digital Link (VDL) Mode 2 and the Aeronautical Telecommunications Network (ATN).

**SIGNIFICANT CAPACITY INCREASE FOR AIR/GROUND DATA LINK COMMUNICATIONS**

The new VHF Digital Link Mode 2 system uses digital radios to improve the performance of VHF analog data link in the current VHF AIRCOM service. VDL Mode 2 provides a data rate of 31.5 kbit/second using a radio channel that is the same width as the channel used by the VHF analog data link system, providing a data rate of only 2.4 kbit/second.

Aircraft can be equipped with VDL Mode 2 to obtain increased speed and capacity for the existing ACARS applications supporting Flight Operations and Maintenance functions. The airline industry data link standards body defined an architecture for this called ACARS Over AVLC (AOA), where the term AVLC refers to “Aviation VHF Link Control” – the protocol used over the VHF link in the VDL Mode 2 system.

SITA supports aircraft use of VDL for ACARS through the VDL AIRCOM service – handled by SITA’s ACARS processor – making VDL usage fully transparent to the ground systems of aircraft operators or Air Navigation Service Providers (ANSPs).

This enables aircraft operators to install avionics that allow aircraft to send ACARS over VDL progressively across their fleet without the need to upgrade their ground systems.
VDL SUPPORT FOR ATN COMMUNICATIONS

The original purpose of ICAO defining VDL Mode 2 was not to provide improved performance for ACARS, but to enable the definition of a new air-ground messaging protocol within the ICAO standard for the Aeronautical Telecommunications Network (ATN). The ATN messaging service was designed to provide the integrity needed to introduce Controller Pilot Data Link Communications (CPDLC) in densely occupied airspace.

Improving the efficiency of the Air Traffic Control system and increasing the number of aircraft that can be handled

The ACARS system was designed in the 1970’s and was based on the text messaging services used at that time between telex printers. Since then, new ground data networks have been designed to link computers rather than printers.

The VDL Mode 2 and ATN systems are based on protocols used in these modern networks, providing a more efficient way of transporting computer data than ACARS.

Aircraft operators are installing ICAO standard CPDLC and ATN modules to communicate with the corresponding systems being implemented primarily by European Air Navigation Service Providers, under the Regulation (EC) No. 29/2009 – the Data Link Services Implementing Rule (DLS IR). These ANSPs have identified the use of CPDLC as a complement to voice communications, improving the efficiency of the Air Traffic Control system and increasing the number of aircraft that can be handled.

AIRCOM DATALINK BENEFITS

SITA’s AIRCOM Datalink service provides aircraft operators with a valuable means of reducing cost while improving both operational efficiency and safety by providing real-time data exchange with aircraft flight crew and systems.

With AIRCOM, airlines optimize business processes, leading to increased flight efficiency and safety through:

- Clearer and less ambiguous communication
- Fewer manual processes
- Accurate recording of block times (improved flight following and reduced crew cost)
- Engine and aircraft performance monitoring (fuel savings, detection of equipment failures, extended warranties)
- Reduced turnaround and ground times
- Enhanced passenger services

AirCOM Datalink system architecture
EXTENSIVE SET OF FEATURES

The main airline use of data link is for AOC communications (Aeronautical Operation Control) encompassing Flight Operations, Maintenance/Engineering (through position reports – "OOFI"), engine monitoring and weather services.

However, aircrew can also benefit from further applications such as Flight Plan, Loadsheet, periodic position reports (Estimated Time of Arrival) and Flight Progress.

Air Traffic Services’ use of data link is significantly increasing, resulting in an improved integrity of information received on-board, as well as a reduction in flight crew workload.

This covers:

• Departure Clearance and Oceanic Clearance delivery using text messages
• FANS-1/A CPDLC/ADS using ACARS
• ATN CPDLC/ADS using VDL Mode 2/Satellite AIRCOM over IP
• Centralized ADS Reporting Service (CADS)
• Centralized FMC Reporting Service (CFRS)
• Digital-ATIS Delivery

Cabin administration can be improved through reliable and timely communications between cabin crew and ground staff on cabin management and configuration or cabin provisioning. Airlines may also wish to provide passenger assistance services such as flight connection information, the timely provision of wheelchairs or baggage tracing.

SERVICE MONITORING AND CUSTOMER SUPPORT

SITA staff continuously monitors the service to maintain the highest quality service to airlines and ANSPs. The AIRCOM Service Help Desk is available around-the-clock to assist with service inquiries such as configuration issues.

A second level of support is also provided by AIRCOM Customer Support – a team of technical experts dedicated to improving airline and ANSPs’ satisfaction.

AIRBORNE EQUIPMENT

To access the AIRCOM VDL service, aircraft must be fitted with a Communications Management Unit (CMU) equipped with a digital connection to a VHF Digital Radio (VDR) transceiver. The CMU processes the airline’s ACARS applications and can be upgraded to integrate VDL and ATN functionality. The CMU automatically switches between AOA and POA according to service availability.

As an alternative to the CMU, for AIRBUS aircraft an Air Traffic Services Unit (ATSU) will require to be implemented or upgraded to support what AIRBUS refer to as the ‘FANS B’ package.

SITA VDL SERVICE COVERAGE

SITA is deploying a VDL Mode 2 service by providing a new generation of VHF Ground Stations (VGS) that offer the new service and take over the existing VHF analog data link service.

These new stations use digital radios and advanced network management software to optimize performance delivered to customers.

VGS can simultaneously support:

• VHF AIRCOM – Plain Old ACARS (POA)
• VDL AIRCOM – ACARS Over AVLC (AOA)
• ATN AIRCOM – VDL Mode 2 sub-network service

SITA is continuously deploying stations providing VDL in the airports with the highest traffic, where extra capacity is needed to maintain performance levels. VGS deployment is well under way in Europe in order to fulfill the requirements of the European Mandate on ATN/VDLm2. It will continue in countries where ATC datalink programs (e.g. US Data Comm) or AOC traffic levels require VDL deployment.

The deployment of ground stations providing the VDL service must be coordinated with local Air Navigation Service Providers, and SITA is working together with ANSPs to accelerate VDL deployment in accordance with their needs to introduce ATN CPDLC services.
AIRCOM ATN SERVICE DESCRIPTION

The SITA AIRCOM ATN Service fulfils the EC No. 29/2009 DLS IR requirements for a validated, global, and reliable ICAO compliant air-ground communication infrastructure. The SITA AIRCOM ATN Service has been selected by a number of ANSPs in Europe, enabling these to provide an ATN/CPDLC datalink service to their airline users.

In anticipation of EC No. 29/2009 DLS IR, SITA has developed a set of products and services designed to support ANSPs in complying with the applicable elements of the rule. A comprehensive ground-based infrastructure of VDLm2 radio stations fully compliant to the EUROCONTROL Link 2000+ baseline has already been deployed, along with a fully operational air-ground ATN routing facility that supports the exchange of CPDLC messages between suitably equipped aircraft and ground-based ATC centre’s.

The SITA AIRCOM ATN Service architecture is indicated below.

As part of this deployment, SITA has also launched an ATN Test Service which can be used and accessed by all SITA partners on a case by case basis depending on their requirements.

The ATN test Service is a replica of the SITA ATN Service and uses the same elements and systems as those used in the Operational environment.

ATN TEST SERVICES AT YOUR PREMISES

Following the introduction of the ATN Test Service, SITA has enhanced its offering by providing a Mobile ATN Verification and Qualification (VAQ) service. This mobile ATN test service allows the SITA technical team to visit customers and conduct a detailed ATN VAQ at their premises, provided the customer has access to a VDLm2 Ground station with the appropriate connectivity to SITA’s ATN Backbone.

This service addresses a significant increase in the demand for ATN Testing by ANSPs, Original Equipment Manufacturers (OEM) and avionics manufacturers, especially those avionics that are used by the Business Jet community. SITA has provided the necessary technical expertise to assist them in developing and enhancing their systems to cater for the needs and requirements of the EC No. 29/2009 DLS IR.

RELATED SITA PRODUCTS

- AIRCOM Datalink ACARS Services: VHF AIRCOM SATELLITE AIRCOM
- FANS and Pre-FANS Services
- Data Link Front End Processor (DL-FEP)

SITA is able to provide a complete ATN backbone service in Europe. Access to the Backbone service for Ground partners and Customers will be done through IP. It should be noted that SITA’s AIRCOM ATN service uses the IP SNDCF protocol for all new ground – ground connections.

SITA AIRCOM has deployed a number of systems and tools to allow the AIRCOM ATN Service to be fully operational with Regions that demand access to SITA’ AIRCOM ATN Service and the SITA ATN Backbone.

For further information, please visit www.sita.aero

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