AIRTEL ATN
The Data Link Company

MODERNISING AVIATION CONNECTIVITY:

LOGON SERVICE AND ADS-C COMMON SERVICE (LACS) INTEGRATION WITH NETWORK AND AIR/GROUND SUB-NETWORKS

WHITEPAPER

LACS

www.airtel-atn.com

Executive Summary

The aviation industry is navigating a critical transition toward more efficient, harmonised Data Link services under the European Commission's CP1/AF6 mandate. To guarantee future interoperability across European airspace, ANSP's must support Automatic Dependent Surveillance-Contract (ADS-C/EPP).

A key enabler of this transformation is the interconnection of Logon and ADS-C Common Services (LACS) with the Aeronautical Telecommunication Network (ATN), using sub-networks such as VDLm2, and SATCOM to streamline communication between aircraft and air navigation service providers (ANSPs).

To address this need, Airtel has developed its CM Server (CMS) and ADS-C Server (ACS) products — purpose-built, CP1-compliant solutions for delivering LACS systems across Europe. These services are powered by Airtel's proven ATN software, with a track record of operational success with 60% of European ANSP's since 2010.

Airtel's CMS and ACS were successfully deployed in SESAR 2020 (PJ31/PJ38) and SESAR 3 HERON trials. These initiatives demonstrated how LACS can collect and distribute ADS-C data efficiently from aircraft, regardless of which ATN sub-network is used.

The LACS architecture integrates seamlessly with the ATN Backbone, enabling end-to-end CM and ADS-C communication with aircraft via VDLm2, SATCOM, and future air-ground technologies, with routing handled dynamically based on available air-ground links. Through SWIM-based interconnections, LACS also shares logon and ADS-C data with ANSPs, supporting interoperability and real-time coordination.

Key benefits

- For Airlines: Optimised climb/descent profiles, reduced flight distances, fuel savings, and lower CO_2 emissions — contributing to greener operations.
- For ANSPs: Reduced controller workload, enhanced trajectory management, and simplified Data Link integration through centralised services.
- For the Network: Lower deployment costs, higher network capacity, and improved bandwidth efficiency across ATN sub-networks.

This white paper outlines the LACS functional model, network interconnection, and real-world operational scenarios using an array of sub-networks including VDLM2 and SATCOM. It also confirms that Airtel's LACS solution is ready to meet the CP1/AF6 mandate and integrate with existing and future ATN infrastructure.

About Us

Airtel provides Air Traffic Management telecommunication software and test equipment to make aviation safer, greener, and more efficient.

Airtel is a global leader in Data Link systems. Airtel supplies operational and test Data Link solutions to Air Navigation Service Providers (ANSPs), Avionics Manufacturers, Communications Service Providers and aircraft Maintenance Repair and Overhaul organizations worldwide.

Based in Dun Laoghaire, Ireland, Airtel began as a telecommunications company, moving to Aeronautical Telecommunications in 1998. Today, Airtel's solutions enable over 11,000 aircraft to connect to the ATC network.

Data Link Benefits

- Increases flight efficiency in congested airspace.
- Saves fuel by reducing aircraft engine emissions.
- Reduced radio frequency communication, thus more availability for non-routine voice communication.
- Increases level of pilot requests which can be dealt with simultaneously.
- Reduces communication errors due to safer frequency changes.
- Contributes to greener more sustainable aircraft.
- Resulted in taxi-out time savings between 0.2 and 8.5 minutes per rerouted flight.
- Savings occurred when airlines attempted to recover from schedule delays.
- The FAA estimates that Data Link technology could produce $10 billion in savings and another $1 billion for the FAA alone, over 30 years.

Airtel in numbers

Trusted by over

60%

OF EUROPEAN ANSPS

Airtel's solutions enable over

11,000

AIRCRAFT TO CONNECT TO THE ATC NETWORK

Airtel is active in

35

COUNTRIES WORLDWIDE

Introduction

The European Commission has mandated that all Air Navigation Service Providers (ANSPs) must support ATS-B2 applications by 31st December 2027—a pivotal step in the modernisation of Europe's ATM infrastructure. This regulatory milestone is designed to drive a more efficient, reliable, and sustainable air traffic management system across the European Union.

The CP1 mandate was born out of the transition from the Pilot Common Project (PCP), which served as a testing ground for new technological and operational ATM solutions.

While the aviation sector was deeply impacted by the COVID-19 crisis, the European Commission recognised the urgent need to accelerate ATM digitalisation and environmental sustainability. After a comprehensive review of the PCP and extensive stakeholder consultation, the Common Project One (CP1) regulation was introduced. It builds on lessons learned during the PCP phase, aligning with Regulation (EU) No. 409/2013 to define mature ATM functionalities ready for synchronized Europe-wide implementation. CP1 serves as the foundation for a greener, more scalable European ATM system, with the SESAR Deployment Manager continuing to coordinate the rollout through the updated SESAR Deployment Programme.

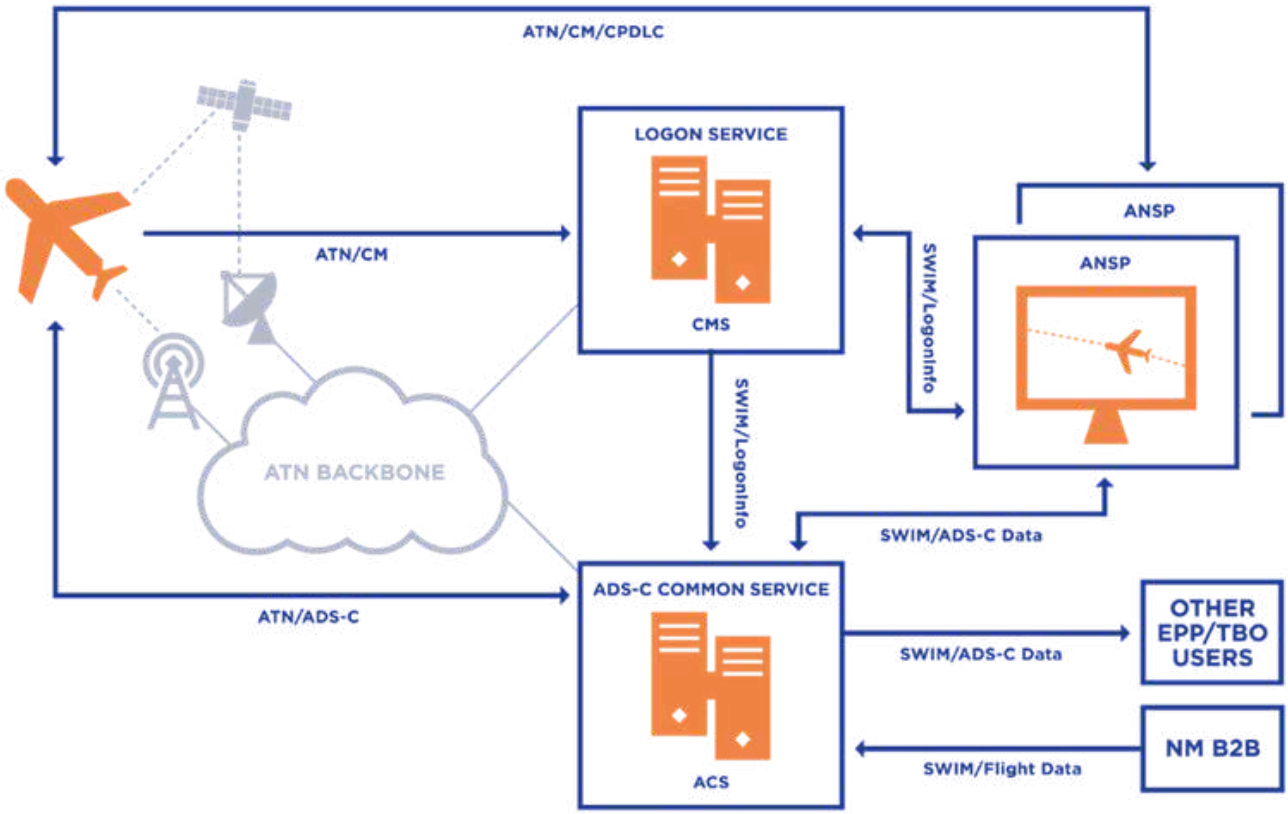
By 31 December 2027, ANSPs are required to support ATS-B2 and Extended Projected Profile (EPP) services. Airtel's LACS or Logon and ADS-C Common Service was created to assist ANSP's transition to the new mandate effectively and economically. It functions by centralising communication management acting as a unified Common CM Service and a shared ADS-C (Automatic Dependent Surveillance- Contract) Service. Linked via a SWIM interface, LACS provides seamless collection and distribution of ADS-C data from flights.

LACS

How does it work?

Figure 1- Functional Model

Illustrates the functional model of common service operations, highlighting the associated ATN and SWIM data flows and their high-level interfaces.



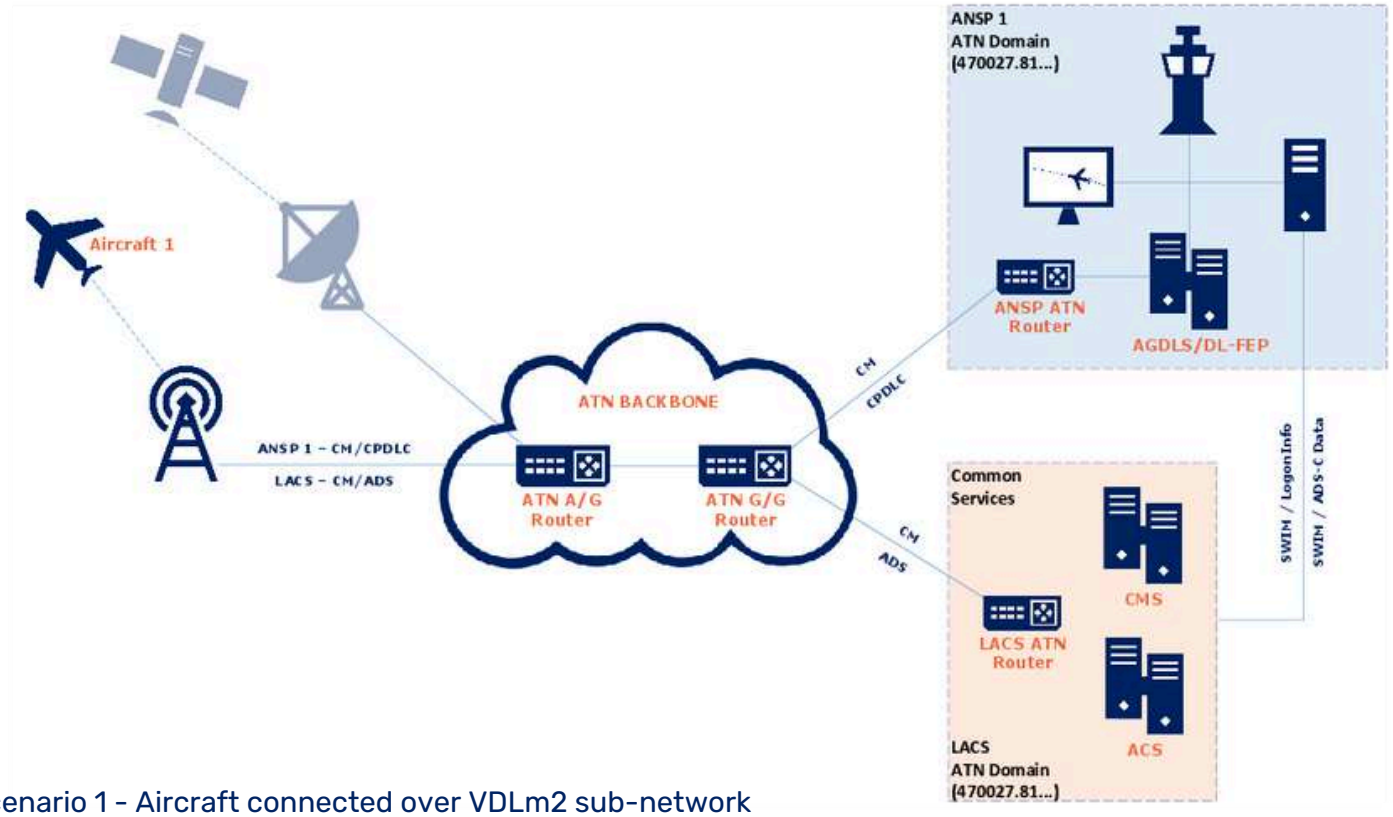
The LACS ATN connection will be like any other ANSP system, via standard ATN Ground-to-Ground (G/G) routers.

As ATN End Systems, CMS and ACS are capable of exchanging Data Link application messages—including Context Management (CM) and ADS-C messages—with aircraft connected via the VDLm2 and SATCOM air-ground sub-networks.

In a situation where multiple air-ground communication links are available, message routing is managed in accordance with the current dual-link implementation.

Scenario 1- Aircraft connected to VDLm2 only

Scenario 1 presents a scenario where the aircraft is connected solely to the VDLm2 sub-network. The diagram highlights the possible paths for various types of traffic and applications.



Scenario 1 - Aircraft connected over VDLm2 sub-network

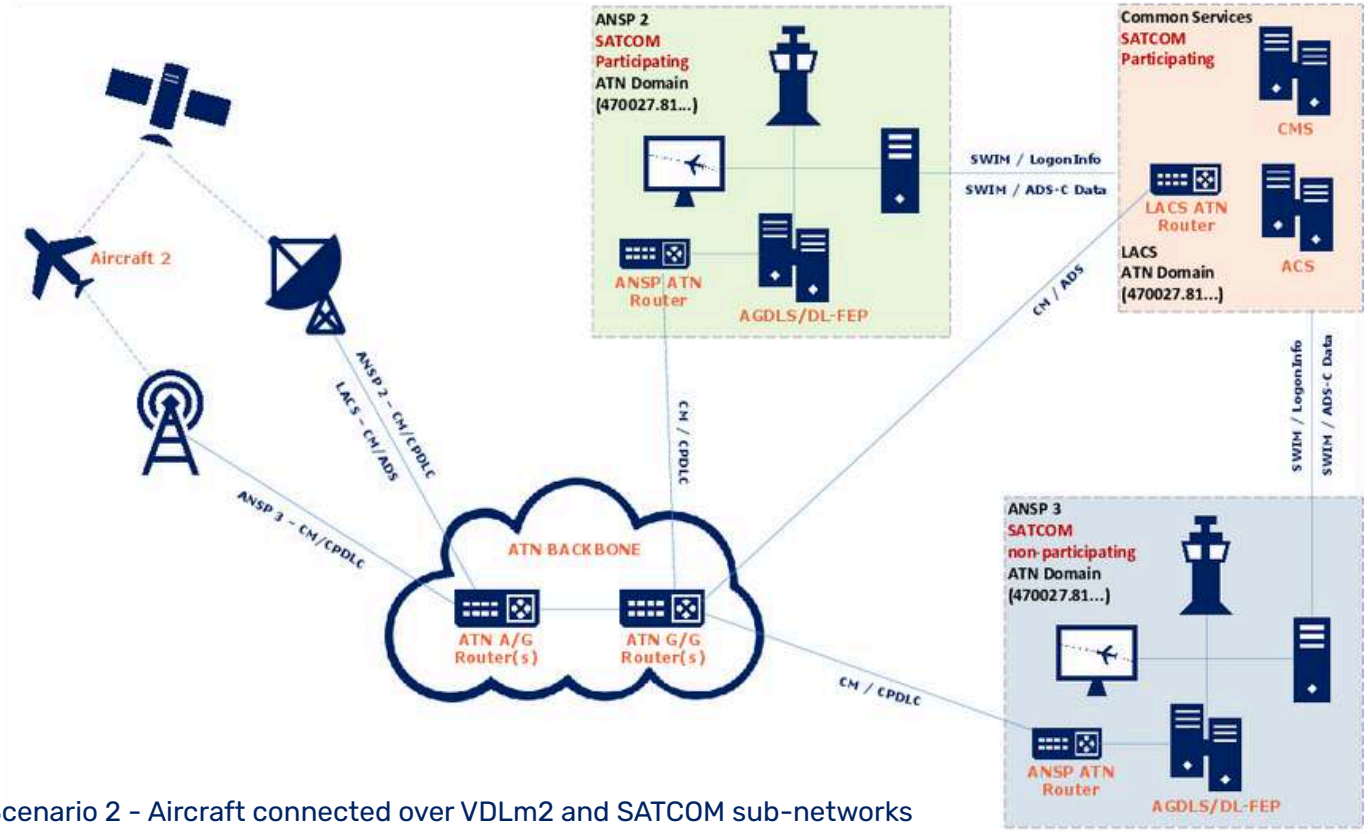
Below is a summary for the operational communications flows with ANSP 1 and LACS:

- **Aircraft 1** connects to VDLm2 sub-network.
- **Aircraft 1** perform CM Logon to ANSP 1 (or CM Server as well).
- **ANSP 1** shares Logon-Info with LACS (or vice versa) over SWIM.
- **ANSP 1** (CDA) establishes CPDLC connection with Aircraft 1.
- **LACS** establishes ADS-C contracts with Aircraft 1 (VDLm2).
- **ANSP 1** receives ADS-C data from LACS over SWIM.

The routing decision to forward the traffic to the VDLm2 sub-network is the responsibility of the ATN Backbone.

Scenario 2 - Aircraft Connected to VDLm2 and SATCOM

The below graphic depicts a scenario in which the aircraft is connected to both the VDLm2 and SATCOM sub-networks, with SATCOM configured as the preferred link. The diagram highlights the possible paths for various types of traffic and applications.



Scenario 2 - Aircraft connected over VDLm2 and SATCOM sub-networks

The following is a summary of the operational communication flows with ANSP 2, ANSP 3 and LACS:

- **Aircraft 2** connects to SATCOM and VDLm2 sub-networks.
- **Aircraft 2** performs CM Logon to ANSP 2 participating to Iris (via SATCOM).
- **ANSP 2** (CDA) establishes CPDLC connection with Aircraft 2 (via SATCOM).
- **ANSP 2** shares Logon-Info with LACS over SWIM.
- **LACS** establishes ADS-C contracts with Aircraft 2 (via SATCOM as LACS is a participating ANSP).
- **ANSP 2** and ANSP 3 receives ADS-C data from LACS over SWIM.
- **ANSP 2** (CDA) initiates the transfer to ANSP 3 (via OLDI). ANSP3 is SATCOM non-participating and can use only the VDLm2 link.
- **ANSP 3** establishes CPDLC connection (NDA) with Aircraft 2 (via VDLm2).
- **Aircraft 2** sends CPDLC downlink traffic to ANSP 3 via VDLm2 (after ANSP 3 becomes CDA).
- **Aircraft 2** continues to send ADS-C downlink traffic to LACS via Satcom.

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Airtel's LACS is Ready

Airtel's LACS is ready to meet the CP1/AF6 mandate. It's a strategic investment designed to lower ATM and operational overhead and future-proof infrastructure for the evolving SWIM-based air traffic systems. It's the ideal option for achieving CP1 readiness- boosting digitalisation, operational efficiency and environmental performance.

This white paper presents how it is going to connect to the ATN network.

- **LACS** exchanges CM/ADS-C messages with aircraft connected to the VDLm2 and/or SATCOM networks .

- **LACS** shares CM and ADS-C data with all connected ANSPs via the SWIM network.

Note: This document does not evaluate or assume the capacity or performance of the VDLm2 network for ADS-C/EPP traffic. It is limited to describing the architectural and functional aspects of LACS connectivity within the ATN network.

LACS

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