



ICAO

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Navigation and Surveillance Sub-group (CNS SG/29)
of APANPIRG**

Bangkok, Thailand, 16-20 June 2025

Agenda Item 6: Aeronautical Mobile Communications Service and Aeronautical electromagnetic spectrum utilization

6.3 Update on status of datalink applications and VHF capability sharing by States

**RESEARCH AND APPLICATION OF AIR-GROUND DATA LINK-BASED LANDING
INFORMATION INTERACTION TECHNOLOGY FOR INBOUND FLIGHTS**

(Presented by China)

SUMMARY

This paper introduces the operational concept and practical application of LID (Landing Information Delivery), a pre-release function for landing information of inbound flights based on air-ground data link. The LID function enables advance transmission of Standard Terminal Arrival Routes (STAR) and Arrival Runway (ARWY) to flight crews during the cruise phase, establishing an efficient, precise, and two-way digital communication channel between pilots and ground controllers.

1 INTRODUCTION

1.1 Since 2019, China has successfully carried out flight validation of All-Phase Datalink ATC Service based on compatible FANS 1/A and ACARS ATS protocols in Zhengzhou, Guangzhou, Haikou, Shanghai and other regions. The validation covers Datalink-Flight Information System (D-FIS), emergency communication, datalink similar callsign, hazardous weather warning, etc., which will support the technical feasibility of the near-term planning goal of fully exploiting the existing system capacity of China to provide datalink emergency contact and information services in major airspace, and to explore the development path of China civil aviation datalink-voice hybrid application in the forthcoming datalink ATC service implementation roadmap.

1.2 With the rapid development of aviation, enhancing flight safety and operational efficiency remains a core industry priority. To improve safety redundancy, current procedures involve ACC control controllers manually pre-delivering STAR and ARWY to inbound flights via voice communication. However, voice-based methods suffer from high frequency occupancy and human error risks. To address this, China has developed the Landing Information Delivery (LID) system, leveraging air-ground data link technology and ARINC623 protocols to enable digital pre-release of STAR/ARWY. The system is compatible with existing air traffic control automation platforms.

2 DISCUSSION

2.1 Overview

Accurate landing information exchange between pilots and controllers is critical during final approach phases. Conventional reliance on VHF voice communication, susceptible to signal interference and linguistic ambiguities, often leads to delayed or erroneous message delivery. To mitigate this, the Landing Information Delivery (LID) system employs air-ground data link technology based on ARINC623 protocol – a character-oriented standard, enabling digital transmission of complex ATC instructions (e.g., route amendments, altitude changes) and real-time retrieval of Flight Management System (FMS) datasets, including predicted trajectories, Standard Terminal Arrival/Departure Routes (STAR/SID), and Arrival Runways (ARWY).

2.2 LID Functional Architecture

The LID system consists of three components:

- Ground Segment: ATC systems for generating and transmitting landing information;
- Airborne Segment: Flight Management System (FMS) for receiving and providing data;
- Communication Link: Air-ground data link, whose stability, real-time capability, and coverage determine overall performance.

The ground system delivers critical datasets to airborne devices via standardized uplink messages, including:

- Standard Terminal Arrival Route (STAR)
- Assigned Runway (ARWY)
- Approach Type (APP)
- Parking Gate (GATE)

2.3 LID function operation concept

The LID function is activated by the Terminal Control Center, requiring coordination with approach controllers to confirm operating modes and ensure system-wide synchronization. Controllers can monitor LID status in real time to align information delivery with operational demands.



Figure 1 LID Function-Operation Mode Release Interface

2.3.1 Data Transmission:

Landing information is digitally transmitted via air-ground data link. After departure, the LID system automatically pushes landing information to the cockpit 50 minutes in advance to ELDT.

2.3.2 Crew Action

Pilots pre-load procedures via the MCDU or FMS without requiring immediate verification with ACC control. During initial contact with approach control, they only need to inform the STAR and runway information which already inputted in MCDU or FMS.

2.3.3 Arrival Information Discrepancy Alert

The LID system proactively retrieves current settings of Arrival runways (ARWY) and Standard Terminal Arrival Routes (STAR) from airborne devices. When inconsistencies between airborne settings and LID data occur, corresponding alerts are triggered on the interface.



Figure 2 Flight information inconsistency alert in LID system

2.4 LID Pilot Implementation

To validate LID's performance and stability in real operations, the pilot program was divided into multiple test phases:

- July 2024: Tested on select China Eastern Airlines flights, confirming air-ground interaction feasibility through crew feedback.
- October 2024: Expanded to 460 daily flights across multiple airlines, with positive results.
- November 11, 2024: The pilot implementation was officially launched in accordance with published NOTAMs, covering all inbound flights arriving at ZSPD and ZSSS.
- According to statistics, 97% of the 1,080 aircraft landing at ZSSS and ZSPD airports every day can receive LID and follow the new operating procedures. Therefore, two calls with the ACC and one call with the approach are directly saved. Compared with the previous communication time, 75% of the workload is saved. The Shanghai approach reduced voice call time by 4% throughout the day.

2.5 Summary and Outlook

The pilot comprehensively validated the feasibility of the LID system utilizing air-ground data links, demonstrating successful pre-delivery of critical landing parameters including Arrival runways (ARWY), Standard Terminal Arrival Routes (STAR), approach types (APP), and gate assignments, with operational benefits confirmed by both airlines and air traffic control.

Feedbacks from the pilots are positive, and they eagerly want to promote this data service to more airports.

Furthermore, plans are underway to extend LID functionalities to departure phases through taxi path delivery and departure data verification, aiming to streamline workflows for controllers and flight crews while enhancing future airspace management efficiency.

3 ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) note the information contained in this paper; and
- b) discuss any relevant matter as appropriate.
