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空中交通管理局
Air Traffic Management Bureau. CAAC

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

Presented by China

CONTENTS

2019-2026:
Full-phase data link air traffic services（FANS 1/A & ACARS ATS protocols）

Location
Zhengzhou
Guangzhou
Haikou
Shanghai
.....

Validation
D-FIS
emergency communications
similar call signs
dangerous weather
.....

2026:
Published <China Civil Aviation Data Link Air Traffic Services Implementation Roadmap>
Implement Scenario:Landing information delivery

The Challenge

ACC Controller Proactively Transmits

STAR	Standard Terminal Arrival Route
ARWY	Arrival Runway

>>

To Inbound Flights

Proactively deliver arrival information during cruise phase to improve safety and provide operational redundancy

Limitations of Voice Communication

~ Radio Frequency

Occupies frequency resources reducing capacity for other comms

! Human Factors

Susceptible to language barriers, stress, and communication errors

Solution: LID function based on ARINC623 protocol enables rapid, accurate, and reliable air-ground data link communication

LID Benefits

1

Reduces Communication Time

Digital transmission eliminates lengthy voice exchanges

2

Alleviates Workload

Both controllers and pilots benefit from reduced verbal coordination

3

Improves Operational Safety

Digital information reduces misunderstanding and errors

LID

Customized & Proactive Push Services

Pre-delivery of arrival information (STAR, Arrival Runway, APP, GATE)

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02 LID Function Concept and Architecture

F

Airborne FMS

Flight Management System receives information and provides feedback when necessary

G

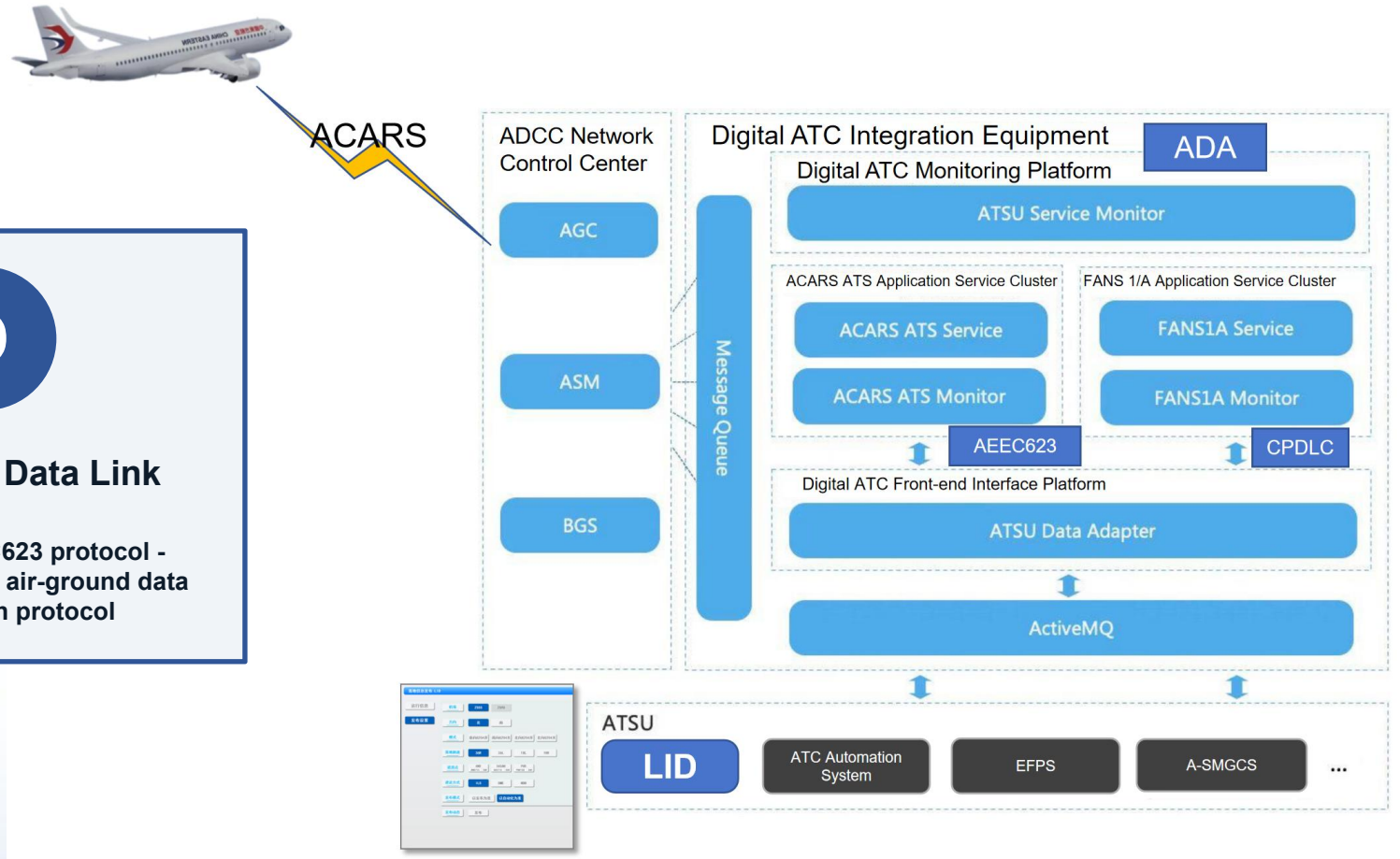
Ground Control System

Generates and transmits arrival information including STAR, Arrival Runway, Approach Type, Parking Stand

D

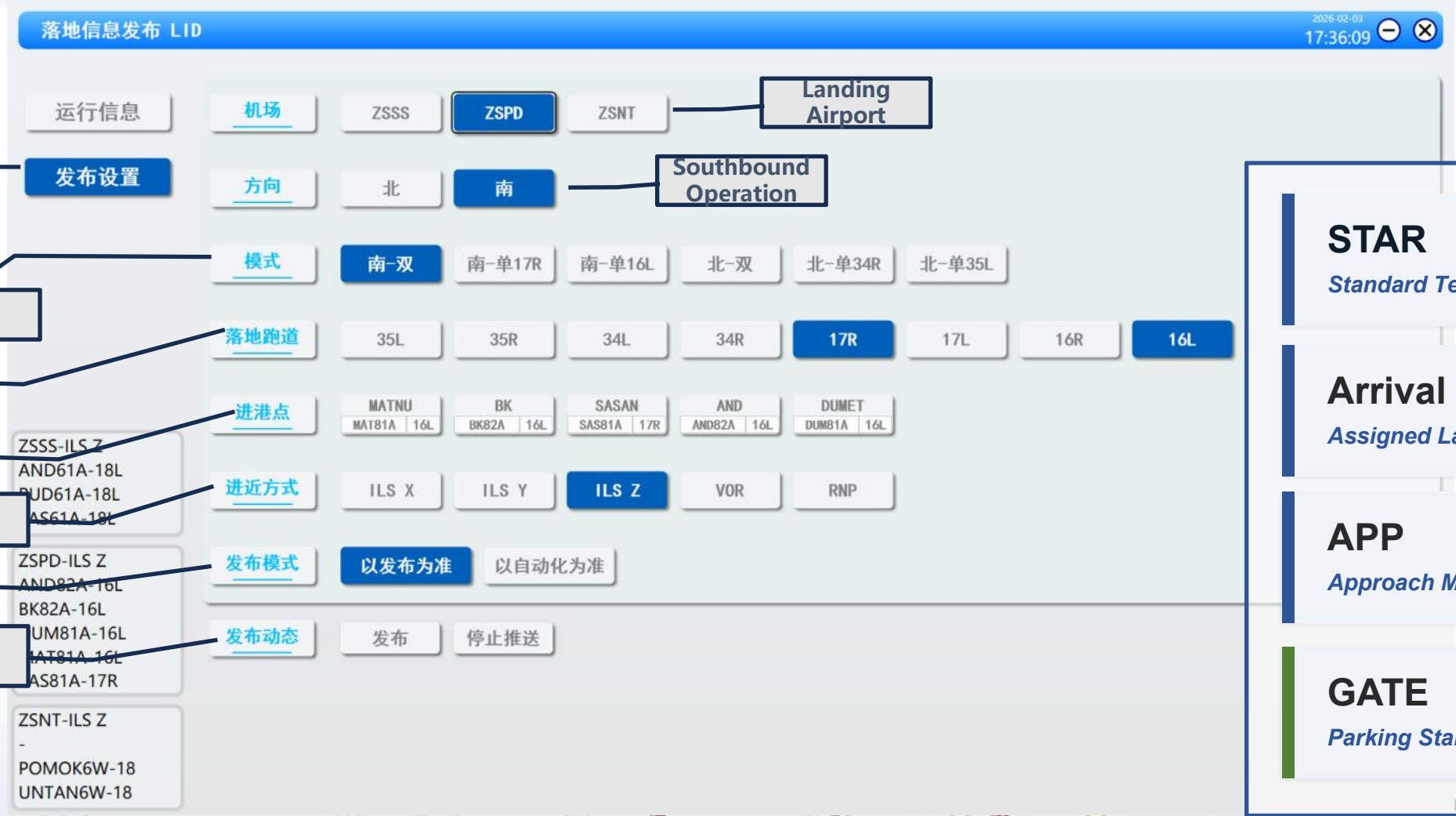
Air-Ground Data Link

Based on ARINC623 protocol - character-oriented air-ground data transmission protocol



ARINC623 Protocol: Enables rapid and accurate information transmission via data link, greatly reducing misunderstandings and errors caused by voice communication.

02 LID Function Concept and Architecture



Landing Airport

Southbound Operation

Deliver Setting

Pre-set mode

Landing Runway

Entrance Waypoint

Approach Method

Deliver Mode

Deliver Status

STAR
Standard Terminal Arrival Route

Arrival Runway
Assigned Landing Runway

APP
Approach Method

GATE
Parking Stand

02 LID Function Concept and Architecture

Example

THIS IS LID (LANDING INFORMATION DELIVER) FOR CES5102, EXPECT SAS71A ARRIVAL ILS Z APP RWY 36R TO ZSSS. PARKING POSITION: 256. ON INITIAL CONTACT SHANGHAI APPROACH, PILOT ONLY NEED TO REPORT DETAILED STAR AND RWY RECEIVED BY LID.

LID message

CALL SIGN: CES5102 STAR: SAS71A
APP: ILS Z RWY: 36R
DST: ZSSS GATE: 256

02 LID Function Concept and Architecture

3 Set Arrival Runway and Arrival Procedure

50 Minutes Before Landing

Initial Contact with Approach Control

1 Report Arrival Runway and Arrival Procedure

2 Transmit Arrival Runway and Arrival Procedure(LID)

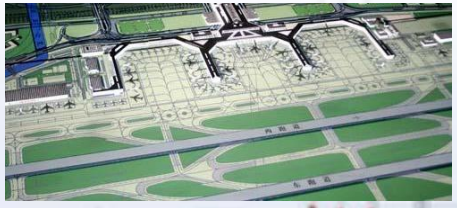
1 Obtain ELDT

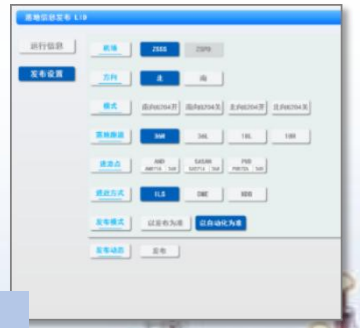
After a Certain Period Following Takeoff

4 Query Confirmation and Resend Mechanism

LID is effective, follow STAR 2

Correct Arrival Runway and Arrival Procedure 3





LID

APP controller

02 LID Function Concept and Architecture

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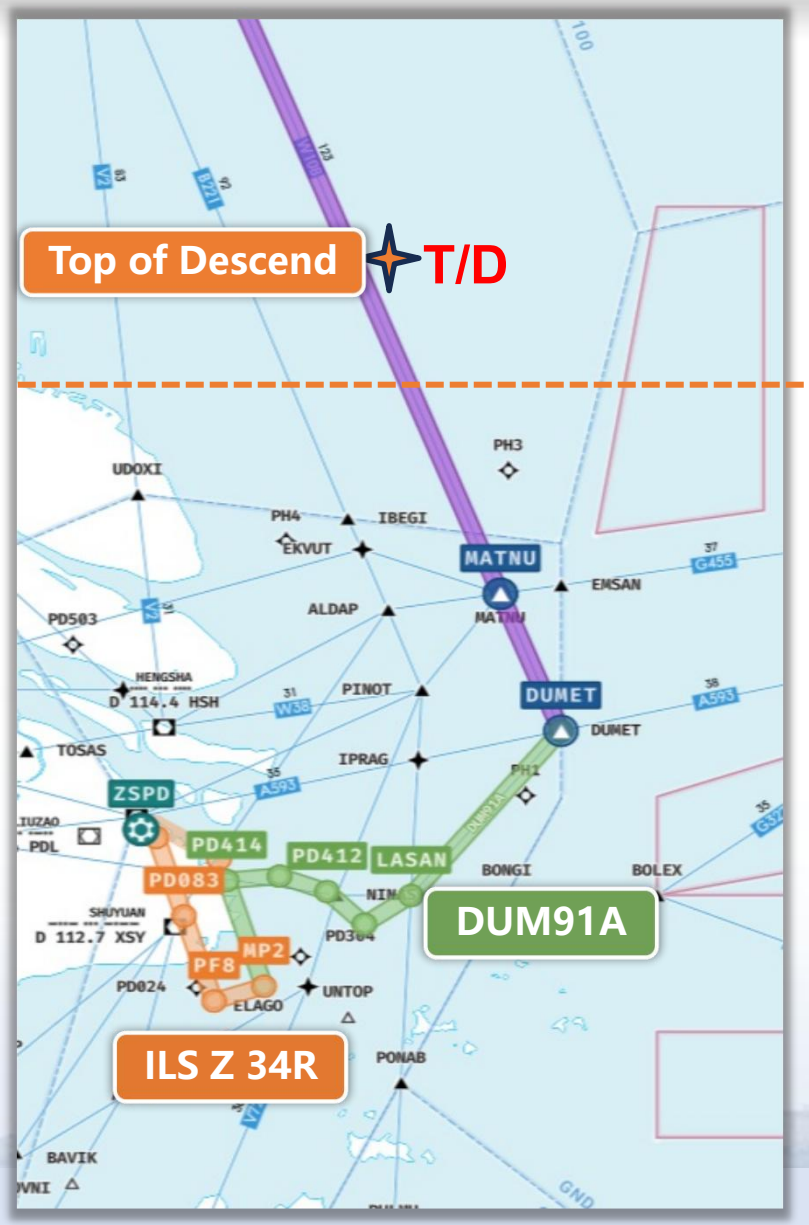

China Eastern 5602, Shanghai Control, expected DUM91A Arrival, ILS Z Approach, Runway 34R.

Roger, expected DUM91A Arrival, ILS Z Approach, Runway 34R, China Eastern 5602.

Before the top of descend point

On initial contact with approach controller

Shanghai Approach, China Eastern 5602, 6300 meters, on your frequency.

China Eastern 5602, Shanghai Approach, Radar contact, expected DUM91A Arrival, ILS Z Approach, Runway 34R.

Roger, expected DUM91A Arrival, ILS Z Approach, Runway 34R, China Eastern 5602.

China Eastern 5602, Shanghai Approach, Descend and maintain 3000 meters.

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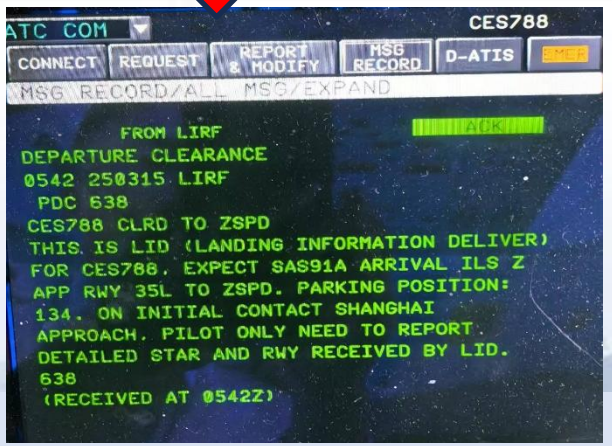
AFTER



Shanghai Approach, China Eastern 788, 6300 meters, with you, LID received, SAS91A, ILS Z Runway 35L.

China Eastern 788, Shanghai Approach, LID is effective, follow STAR, descend and maintain 3000 meters.

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03 LID Main Functions and Application Status

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Ground System

Sends uplink messages with LID information

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Data Link

ACARS/ARINC623 Transmission

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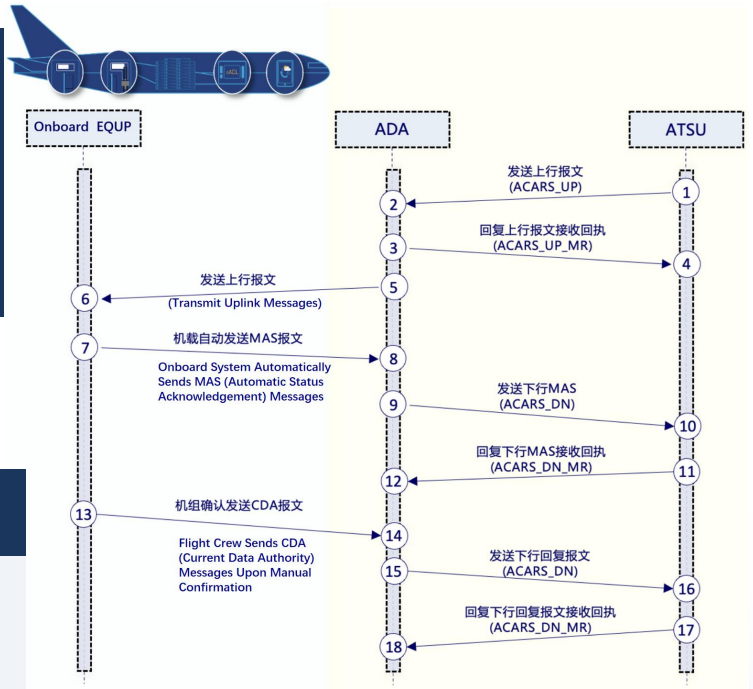
Airborne FMS

Receives and processes LID information



Message Types

MAS - Automatic Status Acknowledgement

Auto-replied by airborne equipment to indicate reception status. Sent automatically without pilot action.

CDA - Current Data Authority (Manual)

Crew manually confirms after clicking confirmation button. Helps verify crew has received and read the push content.

Data Exchange with Airborne Equipment

03 LID Main Functions and Application Status

Key Capabilities

- Request airborne equipment for current runway/STAR settings
- Compare with LID delivered
- Alerts on LID interface when data discrepancy detected
- If inconsistent, re-transmit LID message + remind pilots

Landing Information Discrepancy Alert

03 LID Main Functions and Application Status

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July 2024

Individual Flight Tests

Initial validation on single flights and aircraft types; confirmed feasibility of messages between ground-aircraft interaction

October 2024

Expanded Testing

Extended to more aircraft types; daily coverage ~460 flights with favorable feedback

11 Nov 2024

Public Trial

Publish NOTAM; covering all inbound flights landing at Pudong and Hongqiao; Add Gate information transmit function.

17 Mar 2025

Extended Coverage

Extended deployment to Nantong Airport, covering all arrival flights at airports within the jurisdiction of Shanghai Terminal Control.

Progress of LID Operational Implementation

03 LID Main Functions and Application Status

94%

Auto-response (MAS)

84%

Manual Confirm (CDA)

30%

RUNWAY/STAR

Daily Service Coverage

~1,230

Aircraft/Day (Shanghai)

~1,300

Peak Service

6.5h

VHFcommunication Time Saved/Day

CONTENTS

04 Summary and Outlook

Future Plans

- Extend LID to departure phase
  (preliminary tests conducted Sep-Oct)
- Explore functional upgrade paths for the ATM Automation System
- Other information exchange based on FFICE R2

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Thanks!

Looking forward to progress together !