International Civil Aviation Organization

Sixth Meeting of the Asia/Pacific Air Traffic Management Automation System Task Force (APAC ATMAS TF/6)

Bangkok, Thailand, 2 – 4 June 2025

Agenda Item 5: ATM Automation System Implementation Experience by States

5.6 Development of New Technology

INCHEON AIRPORT A-CDM RELATED ARTS DEVELOPMENT STATUS UPDATE

(Presented by Republic of Korea/Seoul Regional Office of Aviation, MOLIT)

SUMMARY

Incheon Airport has reduced ATC workload and improved the efficiency of airport resource utilization by implementing the Departure Management System (DMAN). Additionally, a convenient and safe ATC work environment has been established through the introduction of Wake Re-categorization (RECAT) alert functions and AIDC between APP and ACC.

1. INTRODUCTION

1.1 This IP will explain the development status of Incheon Airport ARTS. The development status is largely divided into three parts. First, the Departure Management System (DMAN), the implementation of RECAT display and warning functions between aircraft, and the 3-stage AIDC introduced at Incheon Airport will be described.

2. DISCUSSION

Improvement of Departure Management System (DMAN)

2.1 The core function of the Departure Management System is Pre-Departure Sequencing (PDS). PDS automatically calculates the Target Take-Off Time (TTOT) and Target Start-Up Approval Time (TSAT) by referencing each aircraft's taxi route and airspace conditions such as ATFM, as well as the Target Off-Block Time (TOBT) of each aircraft. Previously, controllers manually generated TTOT, but starting from July 2025, when A-CDM Phase 2 begins, the airport will be operated using the TTOT calculated by DMAN. This will extend the time window for managing departures from 25 minutes before EOBT to one hour before EOBT, minimizing slot wastage and increasing airport capacity.

Classification	**Phase 1**	**Phase 2**	**Phase 3**
Schedule	2017.12.7	July 2025 (planned)	2026 (planned)
Main Contents	- Introduction and stabilization - Focused departure time management	- DMAN linkage (TSAT, TTOT Improvement) - Expanded application for de-icing flights	- PBAM - Interregional ATFM linkage

Table 1. Incheon International Airport A-CDM Phase Plan

2.2 Previously, a static 2-minute separation interval was applied to departing flights. Now, by automatically applying the Minimum Departure Interval (MDI) agreed upon between the Air Traffic Control Center and the Tower, only the minimum required separation interval is applied, allowing more efficient use of the departure runway. Also, with the revision of PANS-ATM, Re-Categorization (RECAT) has been introduced to minimize slot wastage due to wake separation.

2.3 The PDS interface has been improved so that controllers can quickly and easily view the departure management information they need. For aircraft with restrictions such as MDI applied, they are displayed separately. Additionally, a highlighting function has been added in the TEFS for strips where the TOBT is in the past but Clearance has not been granted. Also, when the system automatically changes the runway assigned to a flight for departure sequence optimization, a function was added to highlight the runway field on the strip, enhancing controller convenience and efficiency.

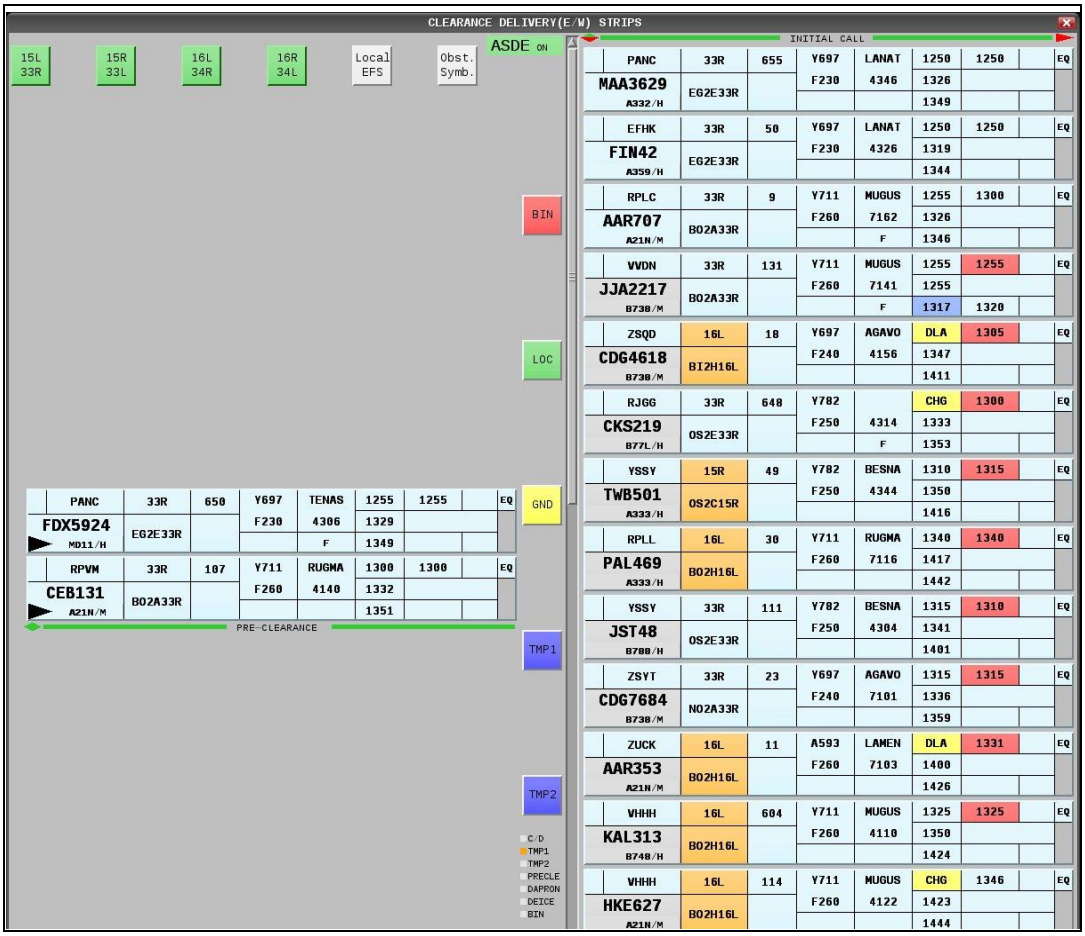

Figure 1. Electronic Strip Highlight Function

Display and Warning Function for Separation Distance Between Aircraft

2.4 In the past, in order to check the distance between aircraft on final approach, it was necessary to manually select two aircraft using the Bearing function of the SDD. However, to cope with adjustment of arrival aircraft separation and increased airspace capacity, a new function has recently been added to visually display the separation distance between aircraft at the Controller's Screen. The system automatically displays the distance between aircraft on final approach only between aircraft landing on the same runway, and displays a warning when aircraft approach within the distance designated by wake turbulence categories. This distance display and warning function can be turned on/off by the user. (Figure 2)

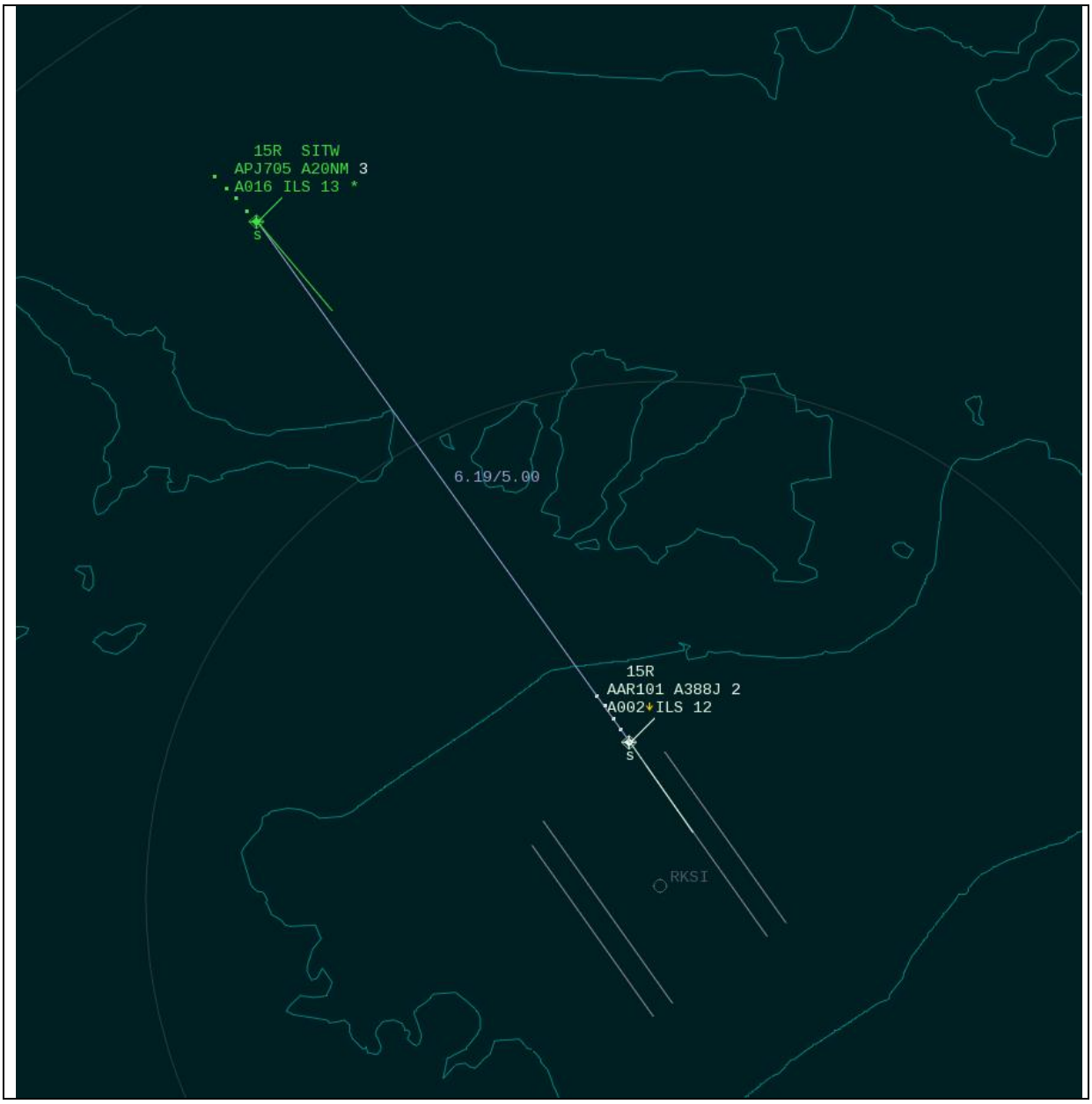

Figure 2. Auto Display of Real-Time Distance for Arrivals

Digitization of Control Transfer Through Stage 3 AIDC Operation

2.5 After the introduction of AIDC, the control transfer tasks that were previously carried out via voice communication between ACC and APP have been digitized. Among the ICAO Doc 4444 standard messages, TOC/AOC/LAM/LRM are used, and track information is exchanged to specify the aircraft for which control will be transferred. To ensure controllers are aware of AIDC progress, track colors are divided into three stages. Explaining from the APP's perspective: in Stage 1, when APP holds control, the track is displayed in green. In Stage 2, when ACC takes over control, the track changes to orange, notifying the APP controller that control has been transferred. In Stage 3, when the APP controller clicks the orange track, it turns white, completing the AIDC procedure. Through the introduction of AIDC, controller workload has been significantly reduced, and the three-stage AIDC has prevented confusion that could occur during control transfers.

Figure 3. AIDC Track 3-Stage Image

Conclusion

3.1 Incheon ARTS completed its advancement project in September 2024, and A-CDM Phase 2 will be operated from July 2025 through DMAN automation. Following that, further expansion of automation elements in the system and extension of service areas to the landside area will commence, starting the advancement operation stage of A-CDM Phase 3. Through this, Incheon will actively join the global ATMAS advancement trend and contribute to establishing a stable and efficient airport operation system.

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

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