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**AGENDA ITEM 4: AIR NAVIGATION**

**STRENGTHENING INTERNATIONAL COLLABORATION  
FOR REMOTELY OPERATED AERODROME AIR TRAFFIC  
SERVICE (DATS) DEVELOPMENT**

(Presented by the Republic of Korea)

**INFORMATION PAPER**

**SUMMARY**

This Paper introduces Integrated Controller Working Position (iCWP) currently being deployed at Incheon Airport as the first step towards the establishment of a Remotely Operated Aerodrome Air Traffic Service (DATS) system. iCWP project applies digital tower technologies such as AI, AR, Voice Recognition, and Video Recognition into the existing control tower, integrating control data. Based on the operational experience of iCWP, we are planning to develop the Remotely Operated Aerodrome Air Traffic Service (DATS) system.

## **STRENGTHENING INTERNATIONAL COLLABORATION FOR REMOTELY OPERATED AERODROME AIR TRAFFIC SERVICE (DATS) DEVELOPMENT**

### **1. INTRODUCTION**

1.1 This Paper introduces the current status of the Republic of Korea's Integrated Controller Working Position (iCWP) development and proposes cooperation among Asia-Pacific Contracting States in the development of the Remotely Operated Aerodrome Air Traffic Service (DATS).

1.2 To ensure the safe and efficient management of aircraft operation, the Republic of Korea is formulating its National ATM Reformation and Enhancement (NARAE) plan for operations, facilities, regulations, and other related aspects in accordance with the Global Air Navigation Plan (GANP). As part of the implementation tasks, we are planning to establish a Remotely Operated Aerodrome Air Traffic Service (DATS) system that incorporates digital video and surveillance technologies, as well as Artificial Intelligence (AI) and Extended Reality (XR) technology.

*\* Note. Extended Reality (XR) refers to the combination of real and virtual environments and human-machine interactions. It is a comprehensive term encompassing various immersive and interactive technology domains, including Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR) technologies.*

1.3 As the first step in the development of the Remotely Operated Aerodrome Air Traffic Service (DATS) system, we plan to establish Integrated Controller Working Position (iCWP) utilizing digital video and surveillance technology at Incheon Airport's apron control tower by 2024.

1.4 iCWP utilizes advanced technologies such as Artificial Intelligence (AI), Augmented Reality (AR), Voice Recognition and Video Recognition to enhance the air traffic control services by supplementing visual monitoring by controllers, reducing human errors.

*\* Augmented Reality (AR) is a technology that overlays digital information onto the real world, enhancing the user's environment.*

### **2. DISCUSSION**

#### **Configuration and function of Integrated Controller Working Position (iCWP)**

2.1 The Integrated Controller Working Position (iCWP) is control support equipment which enhances visual aircraft monitoring and utilizes digital information to ensure aircraft operational safety and punctuality. An iCWP display installed on top of the existing control room console is configured with panoramic view, apron view and digital twin.

2.2 Panorama view provides a panoramic video of the entire controlled area by utilizing video feeds from 17 cameras installed on top of the control tower with stitching technology and enhances visual surveillance in low-visibility conditions through 29 thermal cameras.

- a) In addition to basic aircraft identification information, it displays gate status weather conditions, aircraft operational plans, restricted areas, etc., and provides warning messages when an aircraft enters restricted areas.
- b) Aircraft identification is primarily carried out through aircraft transponders. However, in cases where the camera identifies aircraft registration, aircraft type, airline marks, etc., using its video recognition function, the system issues warning messages of incorrect aircraft identification.
- c) In addition to regular real-time videos, the system offers an infrared mode.

Furthermore, by using AR technology, virtual outlines are displayed on aircraft, terminals, taxiways, and other airport facilities. This enables precise tracking of aircraft positions even in obscured or low visibility conditions.

- d) Pan-tilt-zoom (PTZ) cameras provide a function that rapidly zooms in and automatically tracks aircraft that require continuous observation.



2.3 To monitor the operational status of the aircraft at a gate, the system automatically switches and displays either the departure or arrival gate, as needed.

- a) It displays general information such as gate number and aircraft type, along with operational status details like departure schedule, arrival schedule, and occupancy status. It overlays Target Start Approval Time (TSAT), Target Off Block Time (TOBT), and Target Take Off Time (TTOT) data to provide air traffic controllers with rapid access to Airport-Collaborative Decision Making (A-CDM) information.
- b) By utilizing the AI video recognition function of the cameras, the system recognizes all objects within the parking stand and provides air traffic controllers with relevant details such as departure and arrival preparedness status.
- c) The system recognizes all ground service equipment individually and displays the current status of ground operations. In the future, this data will be integrated with A-CDM to improve on-time performance of aircraft.



2.4 The entire apron area of Incheon Airport is digitally transformed into a 3D model, creating a digital twin. Within this digital twin, real-time information, such as aircraft identification, location, and gate status, is displayed to support air traffic control operations.

2.5 The system monitors Hot-spot areas where aircraft taxiway and Ground Service Equipment (GSE) roads intersect with a separate video camera. In the event of a collision between aircraft and ground vehicles, alerts are provided to air traffic controllers to prevent accidents.

2.6 The system converts the voice communications between air traffic controllers and pilots into text and displays it on the screen. Moreover, in the event of any errors in the pilot's read-back, a warning is provided to the air traffic controller, thereby preventing potential miscommunication.

### **FUTURE PLAN**

2.7 Incheon Airport's iCWP project is planned in two phases. The ongoing Phase 1, which involves establishing the system for the control area of the Second Apron Control Tower, is scheduled to be completed by September 2024. Phase 2 of the project plans to expand the system to cover the entire airside and include additional functionalities applicable to the maneuvering area, such as detecting runway incursions and monitoring runway occupancy.

2.8 Based on the operational experience of iCWP utilizing digital video and surveillance technologies, we are planning to develop the Remotely Operated Aerodrome Air Traffic Service (DATS) system starting from 2025. The development of DATS includes the establishment of minimum technical standards and operational concepts to be applied to the system.

### **3. ACTION BY THE CONFERENCE**

3.1 The Conference is invited to note the information contained in this Paper.

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