International Civil Aviation Organization

ICAO **Tenth Meeting of the Air Traffic Management Sub-Group (ATM/SG/10) of APANPIRG**

Video Teleconference, 17 – 21 October 2022

Agenda Item 5:   ATM Systems (Modernisation, Seamless ATM, CNS, ATFM)

REMOTE APRON CONTROL IMPLEMENTATION IN CHINA

(Presented by China)

SUMMARY

This paper presents China's experience in the implementation of remote apron control tower technology and the trial operations of remote ATS based on visual surveillance system usage. Difficulties have also arisen due to a lack of standard recommendations and guidance materials. China will work with all the stakeholders in this field and contribute its experience and knowledge of remote apron control tower construction and operation, with a view to helping with the preparation of relative standard procedures and guidance materials.

1.   INTRODUCTION

1.1   At present, according to the ICAO initiative and in accordance with the GANP, air navigation services providers (ANSP) and the aviation authorities of many countries have commenced the process of remote tower implementation for regional aerodromes. The equipment certification and legalization of remote air traffic services (ATS) are in progress. The first review from ANSPs confirmed the capability of the equipment to provide adequate service from a remote distance from the aerodrome ATS positions. The implementation plans have thus been adopted.

1.2   ICAO has proposed the concept of "Remote Tower" technology implementation, which is reflected in the GANP as a project named "Remote ATS - ASBU B1- RATS". China has adopted the technology for both remote small-sized airports and busiest hub aerodromes.

1.3   For China, the introduction of "Remote Tower" is extremely relevant for geographically remote and inaccessible regions, where most small-sized airports provide less than ten take-off and landing operations per day. Providing remote ATS for these aerodromes from a city-based centralized site presents a sustainable and cost-effective solution and trial operations of Remote Tower have been carried out in Xinjiang province since May 2021. The Remote Tower Centre in Xinjiang is designed to provide ATS for two rural small-sized airports.

1.4   Meanwhile in the Mega-sized hub airports, due to the continuous expansion and undergoing construction, maintaining visual surveillance of the maneuvering area from an existing traditional on-site tower become more and more difficult, which jeopardizes the safety and efficiency level of local ATS.

1.5   Therefore, the air navigation plan of China supports the phased implementation and transition to remote ATS provided by remote air traffic control (ATC) positions based on the visual (video) surveillance systems usage. China's aviation industry has developed several visual (video) surveillance systems equipment for ATS purposes. Guangzhou Baiyun Airport's remote tower trial operations for apron control usage in a Mega-sized airport have been undergoing since 2021.

1.6   Guangzhou Baiyun International Airport, one of China's three major international aviation hubs, established the apron control unit in 2018. The apron control unit was initially set up on the 12th floor of the conventional control tower. There exist visual blind spots due to the constraints of the on-site working environment, therefore, surveillance equipment was installed to compensate for the blind spots.

1.7   Due to the further expansion of Guangzhou Baiyun International Airport, the construction of a remote tower is urgently needed on the agenda. The construction of a single-position remote apron tower was initially started in 2019, and the validation of the remote tower for apron control was completed in 2020. The trial operations for the remote apron control tower have been undergoing since 2021 while the conventional apron tower remains in operation as a backup to deal with abnormal situations.

1.8   In the future, experimental operations will be carried out after the trial units have gained more Remote Tower operation experience. During the experimental operation, traditional towers will no longer run as hot standby but only be backup facilities. CAAC will work closely with the trial units in order to improve the national regulatory framework for the provision of remote ATS at aerodromes. National standards and regulations will be issued by CAAC, and by then, Remote Tower systems will be certificated, and operations will be legalized.

2.   DISCUSSION

Technical Highlights of Remote Tower technology for apron control usage in Guangzhou Baiyun airport.

2.1   By integrating the previous video sources installed in the vicinity of the parking stands of the airport's security system with the video sources provided by the newly installed surveillance equipment, the remote tower surveillance system for ramp control at Baiyun Airport is established in a cost-effective way.

2.2   The visual surveillance systems consist of three-level surveillance modes supported by multiple data sources, including three sixty panorama scenes monitoring the airport maneuvering area, regional scenes monitoring the apron area adjacent to terminals, and single-target surveillance scenes monitoring the parking stands, which achieve the monitoring of the entire airport field without any blind spots, enhance the redundancy of the whole scene and meet multi-dimensional view observation needs of the remote apron control.

2.3   The remote tower for apron control utilizes the apron operation management system based on the Airport Mapping Data Base （AMDB）technology. The AMDB technology digitalizes geographic information and operational information of airport elements as structured data, including runways, taxiways, ground pavement markings, obstacles, navigation lighting systems, and taxi routes. The AMDB ground graphics provides a real-time display of aircraft location, approach and departure status, runways, and construction areas, which digitalizes the management of the apron control operation. Embedding working procedures into the intelligent management system visualizes operational warnings, flight operation services, emergency warnings, search and rescue, etc.

2.4   The remote apron tower at Guangzhou Baiyun Airport is applying a controller-working position management system, which can pre-define the display layout according to different working scenarios and can switch different scenarios with a single click of a button when needed. The working system on the position can be switched according to the apron controller's needs, improving the convenience and flexibility of the whole facility, which is quite different from the traditional tower, preventing the apron controllers from switching positions frequently.

<u>Conclusion</u>

2.5   At the present time, difficulties have arisen in the further practical use of the visual surveillance system technology due to its uncertain reliability, therefore, the remote Apron control unit still utilizes the conventional tower as a backup. ICAO Doc 9924, Aeronautical Surveillance Manual does not contain provisions defining the role and place of the visual surveillance system as a means of independent non-cooperative surveillance for ATS purposes. In PANS-ATM (Doc 4444), there is also no clear answer to the questions about what type of tools the system of visual surveillance refers to. In addition, the standards and guidance materials related to the implementation and operation are in need.

2.6   China Civil Aviation is working on the relevant guideline materials on remote tower technology. Two normative documents were drafted, "Technical Requirements for Remote Towers " and "Specifications for Remote Tower Operations Evaluation ", for recommendations. In addition, the Airport Association has also drafted two guidance materials, "Operation specification of remote apron control for large civil airport" and "Configuration and technical requirements of the remote apron control system for large civil airport", for reference, in conjunction with multiple units.

2.7   China will work with all the stakeholders in this field and contribute its experience and knowledge of Remote Tower construction and operation. It will fully and accurately define the procedures regarding the implementation and application of the instrumental visual surveillance system.

3.   ACTION BY THE MEETING

3.1   The meeting is invited to

    a)   Note the information contained in this paper.

    b)   Develop operation and technical specifications for remote tower in the Asia Pacific region

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Draft Conclusion/Decision ATM/SG/10-X: Develop operation and technical specifications for remote tower in Asia Pacific region	
What: Develop operation and technical specifications for remote tower in Asia Pacific region through the joint efforts of all stakeholders.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental √ Ops/Technical
Why: The development and progress of technology requires us to constantly update our specifications and standards to adapt to the rapid application of new technologies.	Follow-up: ☐Required from States
When: dd-Mmm-yy	Status: Draft to be adopted by Subgroup

| Who: | □Sub groups √ APAC States √ ICAO APAC RO □ICAO HQ □Other: |