

**60<sup>th</sup> CONFERENCE OF  
DIRECTORS GENERAL OF CIVIL AVIATION  
ASIA AND PACIFIC REGIONS**

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**AGENDA ITEM 4:      AIR NAVIGATION**

**COLLABORATIVE ACHIEVEMENTS IN COMMISSIONING  
OF THE THREE-RUNWAY SYSTEM AT THE HONG KONG  
INTERNATIONAL AIRPORT**

(Presented by Hong Kong China)

**INFORMATION PAPER**

**SUMMARY**

The successful commissioning of the Three-Runway System (3RS) at the Hong Kong International Airport (HKIA) marks a significant milestone in the Hong Kong's aviation history. The collaborative achievements of 3RS have strengthened Hong Kong's position as an international aviation hub and HKIA's operational capacities to serve the aviation and economic developments for the Asia Pacific Regions. The project has navigated through various challenges, necessitating close cross-industry collaboration among stakeholders and engagement of community as a key success factor. This paper shares Hong Kong, China's experience in commissioning the 3RS through collaboration while ensuring the safe and efficient operations of the aerodrome remains unaffected throughout the project.

## **COLLABORATIVE ACHIEVEMENTS IN COMMISSIONING OF THE THREE-RUNWAY SYSTEM AT THE HONG KONG INTERNATIONAL AIRPORT**

### **1. INTRODUCTION**

1.1 On 28 November 2024, the HKIA successfully transitioned from an Interim Two-Runway System (I-2RS) to a Three-Runway System (3RS), marking a monumental milestone in the Hong Kong's aviation history. This mega-scale airport expansion project commenced construction in 2016 and completed in eight years. The new North Runway (i.e. the Third Runway), along with associated taxiways and facilities, were constructed north of the original airport island through reclamation and commenced operations in 2022. Following this, the Centre Runway (i.e. the former North Runway under 2RS) was closed for reconfiguration. In parallel, existing equipment and facilities were upgraded/replaced to support South Runway operations. The reconfiguration works of the Centre Runway involved resurfacing of the runway, constructing new taxiway systems, and installing new equipment and facilities to support 3RS operations.

1.2 The project has navigated through various challenges, including reclamation and constructing a new runway under the pandemic and a live-airport operation environment, reconfiguring an existing runway, building a new air traffic control (ATC) tower, designing new airspace and flight procedures, provisions of new/upgraded air navigation services (ANS) systems, conduct of drills and exercises, operations and systems transition planning and execution, etc. This paper shares Hong Kong China's experience in commissioning the 3RS through collaboration while ensuring the safe and efficient operations of the aerodrome remains unaffected throughout the project.

### **2. DISCUSSION**

#### *Infrastructure Development and ANS Provisions*

2.1 The 3RS is a highly complex airport expansion project with mega scale. Almost as huge and complex as building a new airport next to the existing one, if not more, the project covers the following major construction works:

- (a) reclaiming approximately 650 hectares of land, using innovative environmental Deep Cement Mixing and Horizontal Directional Drilling methods for minimal impact on marine environment and water quality;
- (b) building a new 3,800-metre-long North Runway and associated taxiways;
- (c) reconfiguring the Centre Runway; and
- (d) building associated airport facilities, including a 102-metre-tall new ATC tower (NAT), which is an iconic landmark of the HKIA.

2.2 Among the various stages of the 3RS project, different works were conducted in close proximity to the aerodrome with live operations. The Civil Aviation Department (CAD), as the regulator responsible for overseeing aerodrome safety and security, had worked closely with the Airport Authority Hong Kong (AAHK), the aerodrome operator and project initiator, since the project's initial stage. This collaboration ensured that construction and transition works were well planned in advance, with comprehensive risk assessments and risk mitigation measures devised and implemented for keeping risks at an acceptably low level, and the works were carried out without compromising aerodrome safety and security.

2.3 To ensure that works carried out meeting the required safety and quality standards, CAD had completed more than 550 rounds of review of submissions/drawings from AAHK, and conducted nearly 170 inspections for the new/reconfigured runways, prior to issuing the renewed aerodrome licence.

2.4 In addition to aerodrome regulator, CAD also plays the role as the ANS provider, accomplishing various complex installations of new/upgraded ANS systems at airfield and NAT to cater for expanded airfield operations. Those ANS systems have employed state-of-the-art technologies, including the Advanced Surface Movement Guidance and Control System (A-SMGCS) with more than 60 nos. remote units installed, 5 nos. Surface Movement Radars (SMRs) integrated with A-SMGCS, as well as smart Digital Tower Facilities (DTF), one of the largest-scale deployment worldwide with over 240 nos. high-resolution 4K cameras on the airfield.

2.5 Besides, six new Instrument Landing System (ILS) employing ultra-wide aperture 32-element localizer array, a new Control Tower Simulator, as well as enhancements to the existing air traffic management system and related ATC systems, were successfully commissioned, with totally 200 hours of flight check and nearly 300 approaches to the runways conducted during commissioning.

2.6 Despite under a tight 8-year implementation programme compounded by challenges such as the pandemic and construction activities under a live-airport operation environment, all construction works and ANS systems provisions were successfully completed on time and within budget, while meeting the highest safety standards. Those achievements were attributed to the seamless collaboration between CAD and AAHK, which facilitated concurrent progression in reclamation, facilities construction and ANS systems installation.

#### New Flight Procedures

2.7 To unlock the full potential of increase in air traffic movements under 3RS operations, CAD has embarked on new airspace and flight procedure design:

- (a) New airspace sectors, ATC procedures and flight procedures for 3RS operations were designed based on international standards employing the latest PBN technologies to maximize capacity while maintaining safety.
- (b) Airline operators were involved in all phases of implementation, with extensive flight simulations conducted to ensure new procedures meet safety standards while being flyable, economically viable and environmentally sustainable.
- (c) Frontline ATC controllers underwent one year of conversion training before transition, ensuring their familiarization with new procedures and working environment at NAT.

2.8 Throughout the project, CAD has maintained close cross-industry collaboration and liaison with airline operators, IATA, AAHK, ground handling agents, aviation communities and other stakeholders, through numerous meetings, working groups and briefing sessions, to ensure the new flight procedures, as well as ground taxing procedures, were well acquainted by all stakeholders.

#### Collaboration with Airport Stakeholders on Drills and Exercises

2.9 To ensure smooth transition to 3RS operations, more than 50 number of drills and exercises, familiarization and simulated aircraft crash exercise, etc., had been satisfactorily conducted under close cross-industry collaboration with all related partners and stakeholders to get familiarized with the updated operational and emergency procedures under 3RS operations, which was a pre-requisite under the safety assessment before the cutover. All the drills, exercises, briefings and operational readiness and transition planning conducted have proven to be essential and effective in ensuring a smooth and successful operations and systems transition/changeover during the 3RS commissioning and changeover from the previous I-2RS. These drills and exercises continue to take place regularly after the 3RS commissioning.

Conclusion

2.10 The successful commissioning of the 3RS heralds a new chapter in the Hong Kong's aviation history. The project has navigated through various challenges, from reclamation, construction under the pandemic and a live-airport operation environment, complex ANS systems provisions, to new airspace/flight procedures and transition/cutover, necessitating close cross-industry collaboration among stakeholders and engagement of community as a key success factor. The collaborative achievements of 3RS have not only strengthened Hong Kong's position as an international aviation hub, but also enhanced the HKIA's capacity and capability to continue to serve the aviation and economic developments for the Asia and Pacific Regions.

**3. ACTION BY THE CONFERENCE**

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

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