

**For Information
on 8 October 2024**

Legislative Council Panel on Economic Development

**Preparatory Work for the Commissioning of the Three-Runway System
and the Emergency Response Mechanism
of Hong Kong International Airport**

Purpose

This paper provides an update on the preparatory work for the commissioning of the Three-Runway System (“3RS”) and the emergency response mechanism of Hong Kong International Airport (“HKIA”).

Background

2. The construction of the 3RS project at HKIA comprises different components, including –

- (a) the formation of about 650 hectares of land; construction of the Third Runway¹, taxiways and aprons;
- (b) expansion of the Terminal 2 (“T2”);
- (c) construction of the T2 Concourse (“T2C”);
- (d) installation of a new automated people mover (“APM”) system and a high-speed baggage handling system (“BHS”);
- (e) reconfiguration of the Centre Runway²; and
- (f) construction of airport support infrastructure, utilities and facilities (scope of the 3RS project at Annex).

3. Airport Authority Hong Kong (“AAHK”) continues to press ahead with the remaining construction works, with the target to commission the 3RS by putting all three runways into operation in end 2024, and is working closely with the Civil Aviation Department (“CAD”), other relevant Government departments and airport stakeholders on the operational readiness, activation and transition (“ORAT”) processes. Various ORAT tasks, including subsidiary legislation amendments, readiness of Air Navigation Services (“ANS”) equipment, 3RS flight procedures, flight check, aerodrome licensing process, and coordination and familiarisation with airport stakeholders, have been completed or continue to progress as scheduled.

¹ The Third Runway was designated as the North Runway in February 2022.

² The former North Runway was re-designated as the Centre Runway in December 2021.

4. This paper presents updates on the overall progress of the preparatory work for commissioning the 3RS and the emergency response mechanism of HKIA.

Preparatory Work for Commissioning the 3RS

(a) Construction

(i) Airfield Works

5. The flight check of the reconfigured Centre Runway has been completed with satisfactory results in early September 2024, marking an important milestone of the 3RS project. Meanwhile, all supporting Government facilities, including the new Air Traffic Control Tower (“NAT”), the Airport East Fire Station and other facilities/equipment alongside the Centre Runway, have attained readiness for supporting the 3RS operation. The remaining taxiway construction/modifications are nearing completion, with airfield ground lighting (“AGL”) being installed over multiple completed sections. Construction of the final sections of the vehicular tunnel structures is underway for completion of the remaining segments of taxiways and the associated AGL system above. Architectural builder’s works and finishes, and electrical and mechanical installation works are ongoing at full steam in the completed vehicular tunnel sections and various ancillary buildings. AAHK continues to press ahead with the construction progress of these critical fronts towards the target to put all three runways into operation in end 2024 as planned.

(ii) Passenger Facilities and Associated Infrastructure

6. The construction of 3RS passenger facilities is progressing at full steam. Regarding the expanded T2, with the building envelope substantially in place, the main building achieved weather-tightness in August 2024. Building services (“BS”) and fit-out works continue to progress at full steam within the completed building structure, with priorities accorded to the remaining works at the Departures Check-in Level and the external works. Critical plants and equipment have been installed and are under testing, in pace with phased inspections and performance tests by statutory authorities. Meanwhile, the construction of new viaducts connecting the expanded T2 with the surrounding road network continues in tandem with the installation of external underground utilities.

7. As regards T2C, the concrete superstructure has been substantially completed. All prefabricated roof modules for the main concourse have been lifted in place, while those for the wings area are being lifted into their final positions. Roofing and façade installation are also advancing on multiple fronts for achieving

weather-tightness. Meanwhile, BS and fit-out works are underway at full steam at various floor levels. Off-site assembly and on-site structural works for the fixed link bridges are picking up pace in parallel.

8. Separately, the tunnel construction for the APM system and BHS is substantially completed. Manufacture and delivery of the APM system and BHS components continue to support the system installation at the expanded T2 and T2C, and the areas within the tunnel connections.

9. As reported before, all the major building and infrastructure works for the 3RS are proceeding with the target to start operating with all three runways in end 2024. As for 3RS passenger facilities, commissioning will start in phases in light of passenger traffic demand.

(iii) Project Cost

10. AAHK will continue to closely monitor the budget situation and manage the project expenditure by taking into account the cost implications due to restructured works plans for mitigating the impact of the Coronavirus Disease 2019 pandemic and the claims by contractors for the purpose of cost control. It remains AAHK's target to deliver the 3RS project within the budget of HKD141.5 billion.

(iv) Financial Arrangement

11. AAHK has substantially completed the external financing for the 3RS project and expects the debt to be stabilised at the current level. As of 30 September 2024, AAHK's total external financing was about HK\$120 billion, consisted of loans, bonds and perpetual capital securities with an overall borrowing cost of around 3.1% per annum. AAHK is currently reviewing the recovery pace, the expected operating cash flow, the future airport investment requirements, its financial strength and relevant credit ratios to balance the overall airport development needs and the deleverage pace of 3RS related liabilities through the airport construction fee and operating surplus.

(b) Preparatory Work for the Operation of the 3RS

12. In parallel with the construction works, AAHK is working closely with CAD, other Government departments and airport stakeholders on the ORAT processes for the 3RS operation in end 2024.

13. To ensure the safe and effective operation of HKIA, the Map of Airport Area and the Map of Restricted Area under the Airport Authority Ordinance (Cap. 483) (“the Maps”) have been amended by way of subsidiary legislation to reflect the changes required to cater for the latest developments in the facilities of HKIA and the 3RS operation. The amendments to the Maps took effect on 31 July 2024.

14. CAD has been collaborating with AAHK on the provision of various ANS equipment necessary to support the 3RS operation. The installation works and acceptance tests of the ANS equipment at the NAT and on the airfield to support the 3RS operation have been substantially completed. Flight check for the relevant facilities of the reconfigured Centre Runway was successfully completed in early September 2024, confirming the facilities are in compliance with the requirements of the International Civil Aviation Organization and CAD. Taking into account the results of the flight check and the operational readiness of the 3RS, CAD plans to issue an Aeronautical Information Publication Supplement in October 2024 to notify the planned commissioning of the 3RS in end 2024 to allow time for the relevant stakeholders to complete the preparatory work and ensure their operational readiness when all three runways are put into operation. Separately, CAD informed and briefed airline operators of the new flight procedures associated with the 3RS operation in June and July 2024 respectively to allow them adequate time to prepare for the 3RS operation.

15. Security sweeping was conducted in July 2024 prior to designating the reconfigured Centre Runway and the associated areas as Airport Restricted Area (“ARA”) under the Aviation Security Ordinance (Cap. 494) to facilitate the flight check. Another round of security sweeping is planned for November 2024 before designating the remaining areas as ARA for 3RS operation.

16. To fulfil CAD’s licensing requirements, AAHK has coordinated an aircraft crash and rescue exercise to be held in October 2024 in order to ensure the airport’s readiness to handle aircraft accidents on the reconfigured Centre Runway. Emergency responses from relevant Government departments, emergency response units and airport stakeholders will be activated for rescue and firefighting, casualty management, passenger facilitation and family handling, and media management.

17. Subject to the satisfactory submission of the required documentation, drawings and reports, and completion of the licensing acceptance inspections as well as the aircraft crash and rescue exercise, AAHK targets to obtain the aerodrome licence covering the operation of the existing South Runway and North Runway, and the reconfigured Centre Runway under 3RS, the associated taxiways and supporting facilities in November 2024.

18. Regular meetings of AAHK's Centre Runway and Associated Taxiway ORAT Stakeholders Task Force, with participation of CAD, other relevant Government departments, airlines, airside operators, franchisees and other stakeholders, have been convened as planned since January 2023. In these meetings, AAHK has shared the progress of construction works, key airport and airfield operation preparation and the upcoming ORAT tasks, while the stakeholders have provided updates on their activities relevant to the Stakeholders Operational Readiness Master Programme and discussed issues of common interest. In addition, various on-site familiarisation, operational drills, emergency response exercises and procedure trials are being coordinated with relevant stakeholders to take place between September and November 2024.

19. Changeover from the current two-runway to three-runway operation is an unprecedented exercise for HKIA. To gear up for the overnight changeover which involves complex coordination of multi-discipline work fronts, including civil and ground marking works, electrical and mechanical facilities, as well as final activation and transition to updated operational systems, AAHK has compiled a detailed transition plan and tasks, with concerned contractors and services providers engaged, and contingency/backup measures devised. In addition, a Joint On-site Management Command Team will be established to oversee and command the changeover operation.

Emergency Response Mechanism of HKIA

(i) Emergency Response Mechanism

20. Given the dynamic risk landscape on airport operations, strong operational resilience and rapid contingency responses are crucial to HKIA's operation at times of emergencies and disruptions. Riding on its robust airport emergencies and crisis management framework established through the past decades of airport operations, AAHK has developed, in conformance with CAD's requirements, a comprehensive set of emergency manuals and procedures on airport operations, all of which are being reviewed in detail and refined to ensure they are in conformance with the 3RS operation. Of all the manuals and procedures, the most top-level ones are: (a) Emergency Procedures Manual ("EPM"); (b) Safety

Management System Manual (“SMSM”); and (c) Business Continuity Manual (“BCM”).

(a) *EPM*

21. The EPM, as a condition for granting an aerodrome licence, encompasses contingency plans to achieve the coordinated actions to be taken by all agencies involved in response to emergencies at HKIA, including aircraft-related emergencies, security-related emergencies, and general and public-related emergencies.

(b) *SMSM*

22. To fulfil the aerodrome licensing requirement, the SMSM stipulates the process to ensure that the potential safety risks associated with proposed new facilities or activities are identified and assessed during the planning phase of the project, and are effectively controlled and mitigated during the project implementation and commissioning phase.

(c) *BCM*

23. The BCM is developed to identify and manage potentially disruptive situations with an aim to minimising the negative effects these potential disruptions and crises may cause. It complements the EPM by covering other business continuity disruptions that may affect the operation of the airport and consists of business continuity plans for incidents related to aircraft ground servicing, passenger facilities and services, baggage and cargo handling, surface transportation, operation systems, security systems, public health issues and natural disaster response and operation recovery.

(ii) *Change management*

24. Change management is an important aspect of safe and efficient airport operations. New or previously unanticipated outcomes may arise from the introduction of new activities or changes to the existing operation environment. Correspondingly, AAHK is reviewing the existing airport operation procedures, discussing with relevant stakeholders, conducting risk assessments, and arranging familiarisation, training, trials and exercises to ensure that all operators are acquainted with the new facilities and systems, along with the new and updated operation protocol.

25. In reviewing and updating the airport operation procedures, AAHK will take into consideration not only the new operation protocol, but also past

experiences with the lessons learned from different incidents, including the two recent incidents of Members' concerns that occurred in June 2024, which are summarised below.

Freighter Multiple Hydraulic System Failure

26. On 17 June 2024 morning, a Boeing 747-400F freighter, shortly after departure from HKIA for Anchorage, made the operational decision to return to Hong Kong. After its landing at HKIA, multiple tyre burst and hydraulic system failures with the freighter were found, causing an emergency closure of the North Runway. AAHK promptly attended to the situation by initiating relevant procedures and despatching staff to the runway to coordinate the emergency response taken by the airline and its aircraft maintenance operator. The engineering team of the maintenance operator subsequently confirmed that the hydraulic system of the freighter suffered a total breakdown, which required special heavy-duty equipment for the recovery actions. All required actions had been taken as soon as possible, but owing to the extent of the breakdown, it took a longer time than first anticipated to carry out the urgent on-site repair before the freighter could be towed away, and the North Runway cleared for returning to normal operation.

27. The Air Accident Investigation Authority is investigating into the serious incident. A preliminary report has been published on 16 July 2024.

28. In parallel, AAHK conducted a detailed review of the handling procedures with a view to expediting the handling of similar incidents in future. One of the key findings concerns the availability and timely deployment of heavy-duty equipment. To this end, AAHK has purchased extra recovery equipment, including a main deck loader, a rapid response truck and two recovery jacks, to stand by at all times at strategic locations abeam the North Runway to facilitate urgent deployment. AAHK has also reviewed the operational procedures and strengthened relevant policies to ensure the speedy recovery by the airlines and the aircraft maintenance operators in all possible scenarios concerning immobilised aircraft.

Flight Information Display System ("FIDS") Incident

29. On 23 June 2024 morning, a fault in FIDS was reported, which disabled the updating of real-time flight information shown on the flight information displays at terminal, the airport website and My HKG mobile app. AAHK immediately started working with suppliers of the system trying to identify the problems and restore the system. After confirming that the "hot backup"

system³ failed to perform, AAHK immediately activated its “cold backup” system⁴ and contingency plan, which involved the provision of flight information on whiteboards temporarily as a stop-gap measure, before the “cold backup” for the FIDS was fully up and running. With the contingency measures in place, HKIA handled more than 1 000 flights (with some manageable delays and no flight cancellation) and served more than 150 000 passengers on the incident day.

30. AAHK’s post-incident review, conducted together with the suppliers of the related IT systems, found that the root cause of the incident was the coincidental occurrence of rare faults within the IT systems. The IT system suppliers recognised that the design of their systems had failed to anticipate and pre-empt these rare faults, leading to the failure of not only FIDS but also its “hot backup”. There was no evidence showing that the disruption was caused by any other activities such as configuration changes or human interferences. In addition, AAHK has reviewed the maintenance, backup, drill practice and cybersecurity control measures of all major and critical airport IT systems⁵ to ensure that they are in line with industry standards. AAHK has confirmed that the design of its IT systems can cater for the capacity and resilience needs for the increased passenger and cargo capacities under the 3RS.

31. Upon the completion of its post-incident review, AAHK has implemented the following improvement measures with regard to FIDS:

- (a) together with the IT system suppliers, AAHK has developed and implemented tailor-made solutions, including measures for enhancing the design of related IT infrastructure and replacement of software components, to fix the problems concerning FIDS;
- (b) with regard to the activation of “cold backup” system, which involved manual intervention in the operating procedures and took longer-than-expected time on the incident day, AAHK has worked with the supplier to optimise the design of and implemented such a system to significantly shorten the lead time to activate the “cold backup” system; and
- (c) to strengthen the effectiveness in dissemination of flight information, AAHK has set up an isolated system and procured mobile electronic

³ “Hot backup” refers to a parallel standby system that is intended to replace the main system seamlessly if the latter is not functioning. The existing system’s architecture design - built in with two layers of both “hot” and “cold” backup - is based on the industrial resilience standards.

⁴ “Cold backup” refers to an independent system that could be activated to replace the main system if both the main system and the “hot backup” are not functioning.

⁵ Major and critical systems include the terminal and apron operation systems, APM system, BHS, passenger information system, etc.

display boards to replace white boards as contingency displays in the terminal in the unlikely event that both “hot backup” and “cold backup” systems of FIDS are not functioning/ready for use.

32. Taking into account the experience in handling the FIDS incident, AAHK has engaged an independent consultant to conduct a comprehensive system infrastructure review for all of its major and critical IT systems to consider whether and how the system design and infrastructure could be enhanced to provide additional safeguards and increase the emergency response capability and efficiency of the systems. AAHK will work with the consultant to implement the necessary system enhancements.

(iii) Testing and commissioning

33. A complex airport operation involves hundreds of systems. To ensure that all systems work effectively in a well-coordinated manner, ample time for testing and commissioning is crucial, particularly for new systems being built and developed for the commissioning of the 3RS. For all major and critical systems, AAHK has scheduled stringent testing and commissioning procedures before launching any airport and passenger services. AAHK will also ensure that all the key system enhancements of the major and critical systems as identified in the comprehensive system infrastructure review mentioned in section (ii) above will be implemented as soon as possible and no later than end 2025.

(iv) Drills and exercises

34. Upon commissioning of the 3RS operation in end 2024, the airport’s area and scale of operation area, and the complexity of the operation will significantly increase. Relevant chapters in the EPM, SMSM and BCM on emergency responses and operation disruption management are being reviewed and enhanced as necessary. To allow speedy response within the expanded airport operation area, including runway and taxiways, extra emergency aircraft servicing equipment are being procured for staging in strategic locations, with technical crew rapid deployment plan being pre-set with aircraft maintenance and servicing companies.

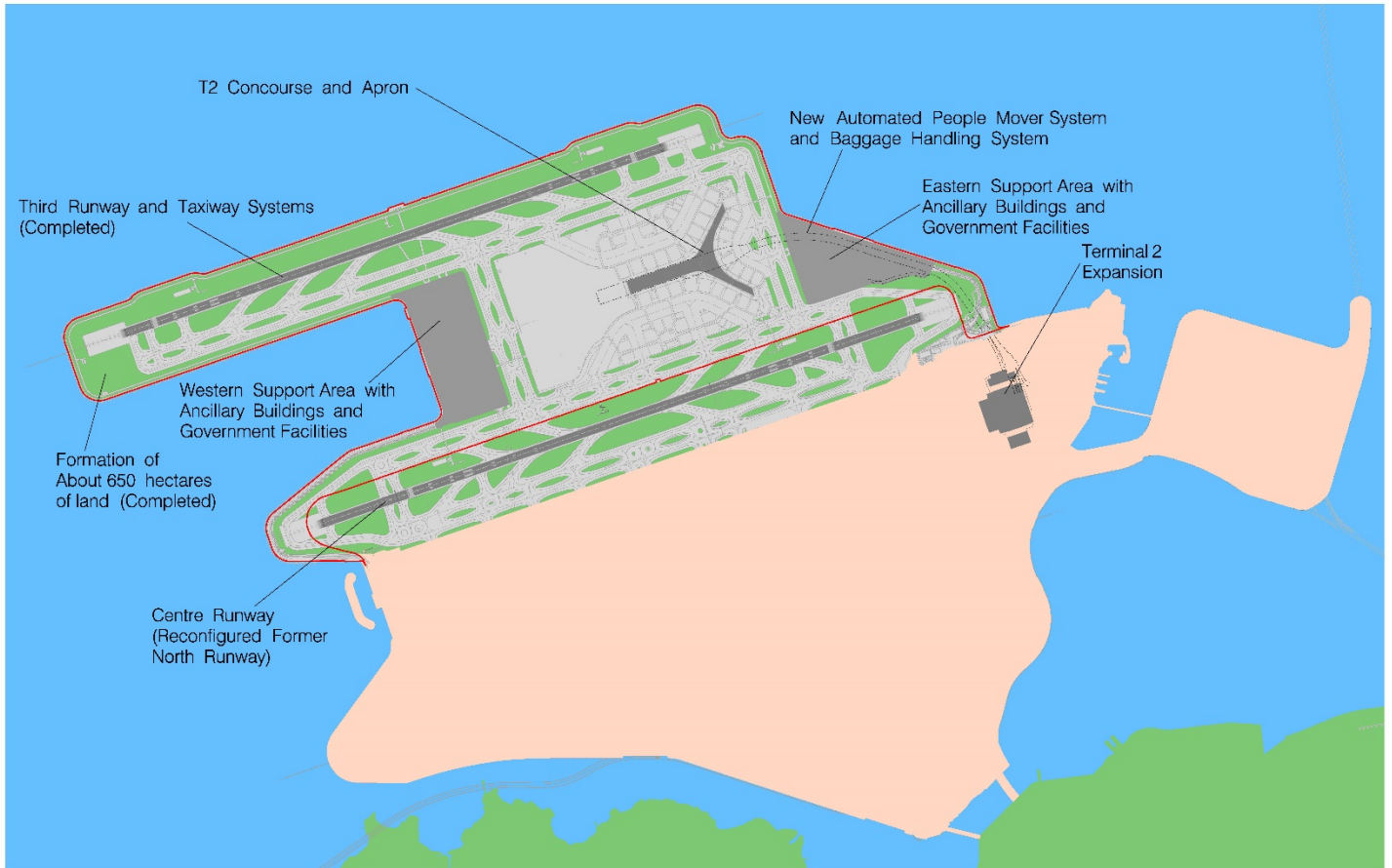
35. AAHK has scheduled over 50 drills and exercises for different teams from AAHK and all relevant business partners to get familiarised with the updated operational and emergency procedures, as well as the new equipment and facilities. These drills and exercises will take place not only before the commissioning of the 3RS, but also will continue in the following year.

Advice Sought

36. Members are invited to note the above.

**Airport Authority Hong Kong
October 2024**

Scope of the Three-Runway System Project



 **Reclamation Footprint**