Sixth Meeting of the Aerodromes Operations and Planning Sub-Group (AOP/SG/6)

Video Teleconference, 27 to 30 June 2022

Agenda Item 4: Provision of AOP in the Asia/Pacific Region

AUTONOMOUS PATROL CARS WITH VIDEO ANALYTICS AT HONG KONG INTERNATIONAL AIRPORT

(Presented by Hong Kong, China)

SUMMARY

This paper presents the successful introduction of Autonomous Patrol Cars with video analytics technology to remotely inspect physical security provisions and detect intruders around the airport perimeter at the Hong Kong International Airport.

1. INTRODUCTION

1.1 Technological developments are providing ample opportunities for effectively increasing capacity and enhancing safety, security and passenger experience. The Hong Kong International Airport (HKIA) strives to develop into a smart airport and is constantly in pursuit of innovative solutions for safe and efficient airport operations.

1.2 With the successful introduction of Autonomous Electric Tractors (AETs) into live operations for baggage conveyance in 2019 with over 100,000 km of zero-incident record, HKIA has extended the deployment of driverless technology, combining it with latest video analytics, to autonomous patrols along the airport perimeter in 2021. This paper shares HKIA's experience in the introduction of such technology into live operations.

2. DISCUSSION

Perimeter Patrols

2.1 Patrolling of the airport perimeter is carried out by airport security officers in patrol vehicles around-the-clock for intruder detection and visual inspection of physical security provisions, such as the integrity and conditions of security fence, lighting and security cameras.

2.2 To enhance the efficiency in perimeter patrolling, Autonomous Patrol Car (APC) which employs autonomous vehicle technology was developed at HKIA. APCs have been tasked with perimeter patrols along two dedicated sections of airport perimeter, as illustrated in Figure 1.

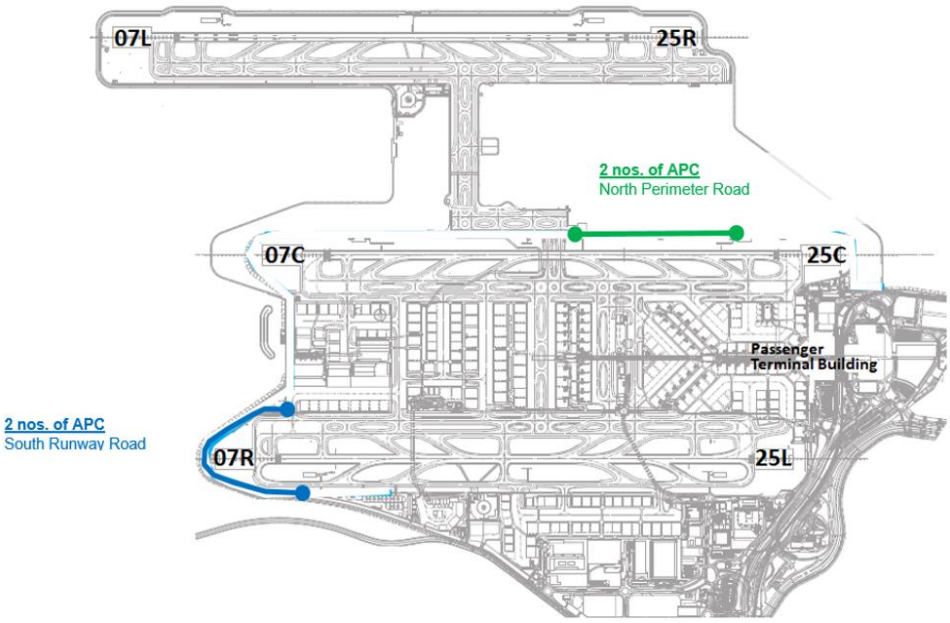

Figure 1
The patrolling of airport perimeter

Autonomous Patrol Car (APC)

2.3 The APC is entirely autonomous without a safety driver onboard. It is a modified electric vehicle that can travel up to 200 km on full charge. It operates at a speed of 10 km/h, utilizing advanced technologies to ensure safe operation. Three sensors for light detection and ranging (LiDAR) are installed to detect any obstructions in the proximity of the APC and two sets of ultra-precise Differential Global Positioning System (DGPS) to allow a location accuracy rate of about 10 cm. There is also an independent safety override system to avoid the APC running out of designated operations area.

2.4 To fulfill its patrolling duties, the APC is equipped with eight high-definition cameras with video analytic technology which scan for any potential human intrusion and detect irregularities in the perimeter security fence.

2.5 The APC is connected to a Remote Monitoring Unit (RMU) at the Integrated Airport Centre. The RMU enables live monitoring of the APC's operation and video feeds of the cameras are available to the airport security officers for further analysis and any immediate dispatch as necessary. All images and videos are recorded. If any abnormalities are detected, the APC will set off an alarm to alert the controllers of RMU for necessary resolution.

Figure 2
Autonomous Patrol Car with video analytics

2.6 Prior to the deployment of the APC in September 2021, rigorous operational trials and a comprehensive security and safety risk assessment were conducted to ensure that the safety of the aerodrome operations would not be compromised. Since March 2022, a fleet of four APCs have been deployed to two dedicated sections of the airport perimeter. The APC also helps to increase patrol frequency and maintain normal patrolling in inclement weather, such as during typhoons.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the development of driverless technology and video analytics adopted for aerodrome security;

b) share experience and lesson-learnt of different airports in the application of driverless technology and other innovative solutions; and

c) discuss any relevant matters as appropriate.

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