

# 善用創科方案 為天文台提升資產管理效能

## Leveraging I&T Solutions to Enhance Asset Management Efficiency for the Hong Kong Observatory

機電署積極運用創科方案，以提升資產管理效率和服務質素，包括為香港天文台(天文台)優化日常檢查工作流程，使用先進設備和系統，提升本署人員維修保養客戶資產的效能和工作安全水平。

### 度身訂造檢查器具 協助確保飛航安全

為確保飛機安全升降，天文台在香港國際機場跑道離地面數米高的位置，安裝了實時監測跑道視程和能見度的裝置，並由機電署負責定期檢查和清潔裝置的光學組件。由於檢查和清潔工作需要於夜間進行，本署人員在光線不足的環境攀爬至高空工作平台易生危險，因此機電署聯同天文台特製一套檢查和清潔器具。器具由無線微型相機、風槍、可伸縮鋁管、噴咀等組成，配合地面的測試器具，讓同事可在平地進行檢查和清潔工作。該器具經過多次改良和嚴格的實地測試，於2023年9月正式投入使用，工作成效良好。

### 智慧信號塔檢查系統 採用無人機和人工智能分析檢查

以往機電署人員檢查天文台信號塔時，需要搭建棚架進行高空工作，之後更要人手檢查數千張照片。為安全和省時起見，機電署研發了全新的智慧信號塔檢查系統。該系統由無人機和人工智能引擎組成，無人機從高空拍攝信號塔的照片後，後端系統的人工智能引擎會進行分析，識別裂縫或鏽蝕等損壞情況，並構建立體數碼模型。系統更配備攝影機和傾斜感應器，實時監控和識別信號塔的傾斜和變形情況。所有檢測數據都會上傳到雲端數據平台，以妥善記錄和監察塔身狀況。相比傳統檢查流程，新方案可節省約一半成本和九成時間，大大提升效率，並增強工作安全水平。

智慧檢查系統日後可進一步應用於其他客戶場地和設施(例如高桅燈柱、橋樑、外牆和斜坡)的日常檢查工作，從而為客戶提升資產管理效能。



由無人機、人工智能引擎和遠端監控裝置組成的智慧信號塔檢查系統。

The smart signal tower inspection system consists of drones, AI engines, and remote monitoring devices.

機電署聯同天文台為前線人員特製檢查監測裝置的器具，讓他們進行檢查和清潔工作時，無需攀爬至高空工作平台。

The EMSD collaborated with the HKO to tailor-make equipment for inspecting the surveillance devices, so that our front-line staff can perform the inspection and cleaning work without climbing up to platforms for working at height.



The EMSD has proactively adopted I&T solutions to improve asset management efficiency and service quality. One such initiative is the use of advanced equipment and systems to optimise the workflow of routine inspections for the Hong Kong Observatory (HKO), which enhances the performance in maintaining the client's assets and work safety of our staff.

### Enhancing Flight Safety with Custom-made Inspection Equipment

To ensure the safe take-offs and landings of aircraft, the HKO has installed real-time runway visual range and visibility surveillance devices, a few metres above the ground along the runways of the Hong Kong International Airport. The EMSD has been tasked with inspecting and cleaning the optical components of these devices periodically. Since these tasks need to be performed at night, it is potentially dangerous for our staff to climb up to platforms for working at height in poor lighting condition. Therefore, the EMSD and HKO jointly developed a set of custom-made inspection and cleaning equipment, which consists of a wireless micro-camera, an air blower, a telescopic aluminium tube, and a nozzle. Complemented by the testing equipment on the ground, it enables our staff to carry out the inspection and cleaning tasks at ground level. After multiple refinements and rigorous field tests, it was officially put into service in September 2023 and delivers impressive results.

### Smart Signal Tower Inspection System Using Drones and AI for Analysis and Inspection

In the past, inspecting the HKO's signal towers necessitated erecting scaffolds for our staff to work at height, and manually examining thousands of photographs afterwards. For the sake of safety and saving time, the EMSD has pioneered a smart signal tower inspection system that comprises drones and AI engines. The drones capture aerial photographs of the signal towers, which are then analysed by the AI engines of a backend system to identify defects such as cracks and corrosion and create 3D digital models. The system is even outfitted with cameras and tilt sensors to monitor and identify tilting and deformation of the signal towers in real time. All inspection data will be uploaded to a cloud data platform for proper documentation and monitoring of the tower condition. Compared with the traditional inspection workflow, this new solution reduces costs by approximately 50% and time by about 90%, significantly enhancing efficiency, and at the same time improving work safety.

The smart inspection system can be further applied to the routine inspection work at other clients' venues and facilities, such as high mast lampposts, bridges, facades, and slopes, thus enhancing asset management efficiency for our clients.