▲
電子工程師定期替雷達數據系統進行維修保養。
Electronics engineer carries out maintenance work regularly for the Radar Data Formatter.

工程及系統
Engineering and Systems

工程及系統部負責規劃、統籌和提供香港航空交通管制（空管）系統、雷達、導航儀器和通訊等設備。

年內，本部繼續致力把整個空管系統維持於最高服務水平，確保有關設備運作穩定可靠，支援各項空中交通服務。二零零五年六月一日，西沙二次監察雷達數據及甚高頻通訊訊號正式投入運作。隨　這些訊號的啟用，二次監察雷達和甚高頻通訊的服務範圍現已覆蓋整個香港飛行情報區，進一步提高了飛行安全和空管運作效率。東龍洲多普勒甚高頻全向無線電信標及測距設備的更換工程合約在二零零五年十二月十六日批出。　星通訊、導航及監察 / 航空交通管理系統的發展計劃進展順利，五個系統構件已投入運作，另外四個正接受測試，以評估運作效益。由於中央技術服務合約將於二零零六年九月三十日屆滿，本部現正與各有關政府部門和決策局緊密工作，為由二零零六年十月一日起根據新合約提供的服務作好準備。

The Engineering and Systems Division is responsible for the planning, coordination and provision of air traffic control (ATC) systems, radar, navigational aids and communications equipment for Hong Kong.

During the year, the Division continued its efforts in maintaining the overall ATC System to the highest standard, thus enabling a stable and reliable equipment operation to support air traffic services. The secondary surveillance radar (SSR) data and Very High Frequency (VHF) air-ground communications signals from Xisha were put into operational use on June 1, 2005. With the availability of these signals, the Hong Kong Flight Information Region (FIR) now has full SSR and VHF communications coverage, thus further enhancing flight safety and ATC operational efficiency. The contract for the replacement of the Doppler Very High Frequency Omni-directional Radio Range and Distance Measuring Equipment (DVOR/DME) on Tung Lung Island was awarded on December 16, 2005. The Satellite-based Communications, Navigation and Surveillance/Air Traffic Management (CNS/ATM) Systems Project continued to progress in a satisfactory manner, with five system elements now in operational use and four on trials to assess their operational benefits. As the central technical services contract is due to expire on September 30, 2006, the Department is working closely with relevant government departments/bureaux

在航空流動通訊中心停止運作後，電訊組的職能有所改變，因此該組在二零零五年十月一日併入航空交通管理部，以期更善用資源。本部繼續推廣和推行嶄新資訊科技的應用，提升電腦網絡基建和設施，以配合本處和政府服務電子化的目標。

航空交通管制系統的發展

更換東龍洲多普勒甚高頻全向無線電信標及測距設備

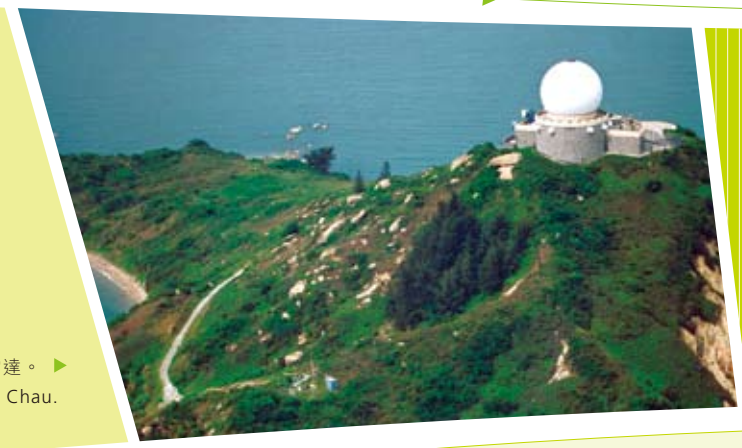
東龍洲多普勒甚高頻全向無線電信標及測距設備（信標及測距設備）的更新採購合約，在二零零五年十二月十六日批出。現有的東龍洲信標及測距設備會在二零零六年五月停止運作，以便進行各項土木工程和台站改建工程及安裝替換設備。新的信標及測距設備可望在二零零六年年底投入運作。

on the provision of replacement services commencing from October 1, 2006. With the change of role of the Telecommunications Unit following the decommissioning of the Aeronautical Mobile Centre (AMC), the Unit was transferred to the Air Traffic Management Division on October 1, 2005 for better utilisation of operational resources. The Division also continued to promote and implement new information technology (IT) applications and enhance the computer network infrastructure and facilities in line with the e-business development of CAD and the e-government objective.

AIR TRAFFIC CONTROL SYSTEMS DEVELOPMENT

Replacement of Doppler VHF Omni-Directional Radio Range and Distance Measuring Equipment on Tung Lung Island

The contract for the acquisition of the replacement Doppler VHF Omni-Directional Radio Range and Distance Measuring Equipment (DVOR/DME) on Tung Lung Island was awarded on December 16, 2005. The existing DVOR/DME on Tung Lung Island would be decommissioned in May 2006 to make way for the civil and building modification works and later the installation of the replacement equipment. It was expected that the new DVOR/DME would be ready for service in end 2006.



位於沙州的一次及二次監察雷達。
The PSR / SSR located at Sha Chau.

共用雷達數據和甚高頻通訊儀器

在順利完成各項技術 / 運作評估和飛行校驗後，西沙二次監察雷達數據及甚高頻地空通訊訊號已在二零零五年六月一日投入運作。隨　這些訊號的啟用，二次監察雷達和甚高頻通訊的服務範圍已覆蓋整個香港飛行情報區，進一步提高了飛行安全及香港空管運作效率。本處會與中國民用航空總局（中國民航總局）保持緊密聯繫和合作，務求高質素的二次監察雷達 / 甚高頻通訊訊號能傳送到港。

航空流動通訊中心停止運作

隨　西沙二次監察雷達和甚高頻通訊儀器在二零零五年六月一日投入運作，由航空流動通訊中心提供的服務逐漸減少。該中心的支援任務亦在二零零五年八月底告終，正式完成歷史使命，在九月一日光榮退役。中心見證了香港提供航空流動通訊服務幾近一甲子，本處特別舉行告別儀式以茲紀念。

更換航空交通管制雷達模擬系統

空管雷達模擬系統的主要功能是模擬實際的航空交通情況，評估新設計的航線和飛行程序。現有的系統已持續運作超過十年，正逐漸老化，其處理能力和功能已不能應付現時的培訓需求。本處正　手採購一套新的空管雷達模擬系統。有關申請文件已在二零零六年三月二十七日提交立法會經濟事務委員會，並在會上獲得通過。本處計劃在二零零六年四月向財務委員會申請撥款。

Sharing of Radar Data and VHF Communications Facilities

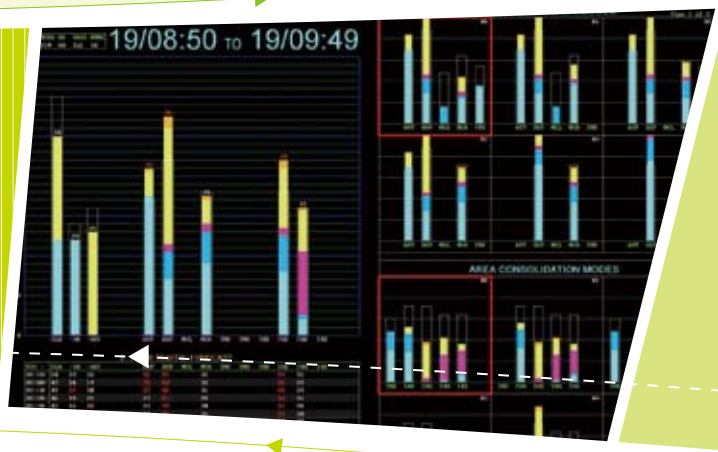
After successful technical/operational evaluations and confirmation flight inspections, the SSR data and VHF air-ground communications signals from Xisha were put into operational use on June 1, 2005. With the availability of these signals, full SSR and VHF communications coverage within the Hong Kong FIR is achieved, thus further enhancing flight safety and ATC operational efficiency of Hong Kong. The Department will maintain a close liaison and coordination with the General Administration of Civil Aviation of China (CAAC) for providing high quality and availability SSR/VHF signals.

Decommissioning of Aeronautical Mobile Centre

With the Xisha SSR and VHF communications facilities put into use on June 1, 2005, the services provided by the AMC became diminishing. Upon satisfactory completion of its back-up role in end August 2005, the AMC gloriously completed its historical task and was decommissioned on September 1, 2005, which also marked roughly the 60th Anniversary of Aeronautical Mobile Service in Hong Kong. A ceremony was organised for such event.

Replacement of Air Traffic Control Radar Simulator

The existing air traffic control radar simulator, which is an essential tool for simulating ATC scenarios and evaluating the design of new air routes and flight operation procedures, has been in continuous service for more than 10 years and is becoming obsolete, with capacity and functionalities not able to support the present training requirements. Action is in hand to procure a replacement air traffic control radar simulator. A submission was made and endorsed by the Economic Services Panel of the Legislative Council in its meeting on March 27, 2006. It is intended to submit the case to the Finance Committee in April 2006.



航空交通管制流量顯示系統。
The Air Traffic Control Capacity Display System.

航空交通管制設備的維修事宜

現時的空管設備的維修服務是根據一項中央合約所提供。由於該合約在二零零六年九月三十日屆滿，本處已就新合約的相關土地徵用、更替服務及其過渡安排與有關政府部門和決策局緊密合作，確保空管設備的運作和維修在二零零六年九月以後，能夠繼續維持現時的卓越水平。設於太平山、畢拿山及鶴咀的三個山頂無線電站的技術服務供應合約，招標公告已在二零零五年十二月二日刊登憲報，在二零零六年一月十三日截標。本處現正評審有關標書，計劃在二零零六年五月批出合約。此外，本處負責主持一個跨部門督導小組會議，協調及安排外判現時在太平山、畢拿山及鶴咀無線電站的技術服務等工作。

至於空管系統技術服務新合約，招標公告已在二零零六年二月二十四日刊登憲報，截標日期為二零零六年四月七日。合約預算在二零零六年八月批出。

香港空管系統的安全及風險評估

二零零五年十月，本部檢討「對飛行安全有極大影響」和「對飛行運作有極大影響」的空管系統各項待辦的改善措施，結論是所有改善措施已經完成，除了六項改善措施將按有關系統的五年維修作業表實行。

ATC Equipment Maintenance

The ATC equipment maintenance services are currently provided under a central contract, which is due to expire on September 30, 2006. The Department has been working closely with the relevant government departments/bureaux on the site reallocation, provision of replacement services and the associated transitional arrangement so as to ensure that the current high standards of ATC equipment operations and maintenance will be maintained after September 2006. Tender invitation for the Provision of Technical Services for the three Hill-top Radio Stations at Victoria Peak, Mount Butler and Cape D'Aguilar was gazetted on December 2, 2005 and closed on January 13, 2006. The tender proposals are being evaluated. It was planned that the contract would be awarded in May 2006. The Department also chaired the Inter-departmental Steering Group Meetings on Future Arrangements for Outsourcing Technical Services currently at Victoria Peak, Mount Butler and Cape D'Aguilar Radio Stations.

As regards the replacement technical services for the Air Traffic Control Systems, tender invitation was gazetted on February 24, 2006 with a tender closing date of April 7, 2006. It was planned that the contract would be awarded in August 2006.

Safety and Risk Assessment on Hong Kong ATC Systems

A review on the outstanding improvement and enhancement measures of safety critical and operationally significant ATC systems was held in October 2005. The meeting concluded that all the improvement items were completed except for six which would be implemented in accordance with the relevant five-year maintenance schedules.

關於國際民航組織普遍安全監督審計計劃，本處已提供所需資料，以供填寫國家航空安全活動問卷和香港現有空管設備及系統的遵守情況檢查單。

本處亦正建立安全管理系統數據庫，以配合安全管理系統的實施，方便追索系統資料。

For the ICAO's Universal Safety Oversight Audit Programme, the Department had provided the necessary information for the State Aviation Activities Questionnaire (SAAQ) and Compliance Checklist (CC) for the ATC equipment and systems operating in Hong Kong.

A Safety Management System (SMS) Database is being developed to facilitate the tracking and implementation of SMS in CAD.

星通訊、導航及監察／航空交通管理系統

為配合國際民航組織就　星通訊、導航及監察／航空交通管理系統所訂的全球和地域實施計劃，本處繼續研究系統的最新發展情況，並詳細測試系統的每個構件。有關系統的技術和運作測試均進展順利，部分技術成熟的系統構件已經投入服務，以便早日發揮　星通訊、導航及監察／航空交通管理系統的功能，提升和優化香港空管服務的水平。

供「抵港」及「離港」航機使用的數據化自動航站情報服務、數據化遠航氣象情報服務、飛前放行指示數據鏈路服務和香港與曼谷之間的航空電訊網已推出使用，而且用量亦日見增加。現時，每月平均有 28 000 次要求提供數據化自動航站情報服務／數據化遠航氣象情報服務；平均每日有 182 架次離場飛機使用飛前放行指示數據鏈路服務，約佔香港國際機場每日離場飛機架次 49%。

SATELLITE-BASED COMMUNICATIONS, NAVIGATION AND SURVEILLANCE/AIR TRAFFIC MANAGEMENT SYSTEMS

To comply with the Global and Regional Implementation Plans of the ICAO for the Satellite-based CNS/ATM systems, studies on the latest CNS/ATM developments and detailed investigations on various elements of the CNS/ATM systems continued. Satisfactory progress was achieved on relevant technical and operational trials. Mature system elements were put into operational use to reap the benefits of early CNS/ATM applications, which can enhance and upgrade the ATC service of Hong Kong.

So far the "Arrival" and "Departure" Digital-Automatic Terminal Information Services (D-ATIS), Digital-Meteorological Information for Aircraft in Flight (D-VOLMET) service, Pre-Departure Clearance (PDC) delivery via datalink and the Hong Kong-Bangkok ATN circuit have been put into operational use. The services continued to gain popularity with a monthly average of 28 000 requests for the D-ATIS/D-VOLMET services, and a daily average of 182 departing flights using the PDC service via datalink, representing approximately 49 per cent of the daily departing flights from Hong Kong International Airport.

先進場面活動引導和控制系統測試將擴大至整個機場範圍。
A-SMGCS trials will be expanded to cover the whole airport.

空中交通服務設施間數據通訊測試

本處與廣州和海口的空中交通服務設施間數據通訊的技術測試，已先後在二零零五年七月及二零零六年二月完成。就運作測試，本處與兩地的航空交通服務當局一直保持聯繫，以期早日利用數據鏈路移交飛機的管制，減輕管制員的工作量。

航空電訊網及航空交通服務訊息處理系統測試

按照國際民航組織的亞太地區修訂計劃，航空電訊網及航空交通服務訊息處理系統須在二零零五至二零零九年間實施。香港是區內其中一個航空電訊網 / 航空交通服務訊息處理系統中樞點，自二零零四年六月開始與曼谷聯合操作航空電訊網，傳送快捷可靠的航空交通服務訊息。為了配合國際民航組織的計劃，本署年內與北京、台北及本地航空公司進一步測試航空電訊網 / 航空交通服務訊息處理系統。

先進場面活動引導和控制系統測試

由於在香港國際機場主要監視區域進行的先進場面活動引導和控制系統測試結果令人滿意，系統測試範圍將擴及整個機場，並與現有的一次地面監察雷達、二次監察雷達及機場地面照明控制系統配合使用。擴大後的系統可顯示操作區內的飛機和車輛的確實位置，識別標牌，及發出車輛擅闖跑道警報和衝突警報的功能。本處現正評審擴大系統的標書。預計下一階段測試將於二零零六年年底 / 二零零七年年初展開。

AIDC Trial

The Air Traffic Services Inter-facility Data Communication (AIDC) technical trials with Guangzhou and Haikou were completed in July 2005 and February 2006 respectively. Liaison with the ATS authorities concerned is in progress regarding the operational trials, with a view to facilitating early implementation of transfer of aircraft control via such datalink, so as to reduce the workload of the controllers.

ATN and AMHS Trials

In the revised ICAO Asia Pacific Regional Plan, Aeronautical Telecommunication Network (ATN) and ATS Message Handling System (AMHS) are to be implemented during 2005-2009. Hong Kong, being one of the ATN/AMHS backbone sites in the region, has operated the ATN circuit with Bangkok for fast and reliable delivery of aeronautical messages since June 2004. To comply with the ICAO initiative, further ATN/AMHS trials had been conducted with Beijing and Taipei as well as local airlines during the year.

A-SMGCS Trials

With satisfactory results obtained from the Advanced Surface Movement Guidance and Control System (A-SMGCS) trial on the prime surveillance area of the Hong Kong International Airport (HKIA), the trial system will be expanded to cover the whole airport, and integrate with the existing primary Surface Movement Radar, secondary surveillance radar and Airfield Ground Lighting System. The expanded system will provide correct locations and identifications for aircraft and vehicles on the maneuvering area as well as runway incursion and conflict alert functions. Evaluation on tender proposal for the system expansion was underway and the next phase of A-SMGCS trial would commence in end 2006/early 2007.

工程及系統部的其中一項主要職務是確保雷達設施得到妥善保養。

One of the major responsibilities of the Engineering and Systems Division is to ensure the radar equipment is properly maintained.

廣域低空空中交通監察

為了加強香港航空交通管理服務的安全和效率，本處正進行技術可行性研究，應用多邊定位技術進行廣域低空空中交通監察，以監察現有雷達監察網不能探測到的低飛飛機（包括直升機）的飛行。新系統並會用作二次監察雷達的支援設施，令空管的飛機監察能力更見可靠及全面。

抵港航機計量及序列試行

鑑於抵港航班日益增加，本處計劃進行抵港航機計量及序列試行，以達至最佳空域運用及抵港航機序列。有關試行服務的投標規格快將訂定完畢，預計於二零零六年四月招標。

全球衛星導航系統

年內，本處繼續進行在香港飛行情報區內全球星導航系統訊號的質素研究及分析。自二零零二年至今所收集的全球 星定位系統數據樣本超過 250 000 個，結果顯示在情報區內系統訊號的可用性符合國際民航組織有關航路導航和終端導航的要求。

新的區域導航離場程序的飛行校驗結果相當理想。這個以全球衛星定位系統為基礎的離場程序於二零零五年七月七日投入運作。

Wide Area Low Level Air Traffic Surveillance

To enhance the safe and efficient air traffic control services in Hong Kong, technical feasibility study was being conducted regarding the use of the multilateration technology for wide area low level air traffic surveillance, i.e. for monitoring the movements of low-flying aircraft, including helicopters, which could not be covered by existing radar surveillance network. The new system will also be used as a backup to the secondary surveillance radars, thus further enhancing the reliability and availability of aircraft surveillance by ATC.

Arrival Metering and Sequencing Trial

To cope with increasing arrival traffic, it is intended to conduct trial on arrival metering and sequencing to optimise the airspace utilisation and arrival sequence. The tender specification for the trial service was being finalised, with tender invitation scheduled to be made in April 2006.

Global Navigation Satellite System

The study and analysis on the Global Navigation Satellite System (GNSS) signal quality within the Hong Kong FIR continued over the year. Over 250 000 Global Positioning System (GPS) data samples had been collected since 2002 and the GPS signal availability was found meeting the ICAO requirements for en-route and terminal navigations.

With encouraging results on the flight check of the new RNAV departure procedures based on GPS, the departure procedures were put into operational use on July 7, 2005.

雷達系統在航空交通管制中擔當重要角色。
Radar systems play an important role in the Air Traffic Control.

資訊科技的應用

本部負責推廣處內人員更廣泛地應用資訊科技和電子貿易，以配合政府服務電子化的目標。年內，數個有助本處運作流暢的資訊科技項目投入應用，當中包括危險物品資訊系統、事故報告系統、過境導航費發單系統、圖書管理系統、綜合資訊展示系統、數據化自動航站情報服務 / 數據化遠航氣象情報服務用量統計系統等。其他研發中的新系統計有民航處統計系統、安全管理系統資料庫、無紙化考試系統等。

民航處電腦網絡 (CADNET) 及電子辦公室設施不斷改善，包括提升伺服器、採用無線局部區域網絡、流動連接 Lotus Notes 電子郵件、以電子傳真設施流動處理航空公司飛行申請，以及按資訊科技設施普及計劃，擴大電子政府服務供部門所有人員使用。本處現正增設電郵系統修復功能及多個資訊科技系統的運作復原功能。

IT APPLICATIONS

The Division is charged with the responsibility of promoting IT applications and e-business within the Department in line with the e-government objective. During the year, several new IT applications to facilitate the CAD operations had been implemented. These included the Dangerous Goods Information System, Occurrence Report System, Aeronautical Charges Billing System, Library System, Integrated Information Display System, D-ATIS/D-VOLMET Utilisation Statistics System, etc. There are also other new systems under development that include the CAD Statistics System, Safety Management System Database, Paperless Examination System, etc.

The departmental computer network (CADNET) and e-office facilities continued to be enhanced, including server upgrade, wireless LAN, mobile access to Lotus Notes e-mail, e-fax facility for mobile processing of airlines' flight applications and extension of e-government services to all staff in the department under the Accessibility Programme. Action is in hand to provide resilience e-mail and IT systems disaster recovery operations.