工程及系統
ENGINEERING AND SYSTEMS

工程及系統部負責設計、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，以及部門資訊科技系統。

年內，本部繼續致力維持高水平的服務、穩定可靠的空管系統，以支援各項空中交通服務。二零零六年十二月二十一日，新的東龍洲多普勒甚高頻全向無線電信標及測距設備正式投入運作，為飛機提供更準確穩定的訊號。

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

During the year, the Division continued its efforts in maintaining a high standard, stable and reliable ATC System to support air traffic services. The replacement Doppler Very High Frequency Omni-directional Radio Range and Distance Measuring Equipment (DVOR/DME) on Tung Lung Island was put into operational use on December 21, 2006 providing a more stable and accurate signal to aircraft.

本處參與二零零六年世界電信展。
CAD participates in the ITU Telecom World 2006.

由於中央技術服務合約在二零零六年九月三十日屆滿，本處在二零零六年九月批出兩份為期十年的技術服務合約，以便由二零零六年十月一日起，為機場空管系統以及扯旗山、鶴咀及畢拿山三個無線電站的通訊系統提供運作和維修服務。新舊技術服務合約過渡安排順利。

衛星通訊、導航及監察／航空交通管理系統的發展計劃進展順利，六個系統構件已投入運作，另外三個正接受測試，以評估運作效益。

本部繼續推廣及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。

由於現有空管系統的使用年期會在二零一二年屆滿，本部提出更換空管系統計劃，並將於二零零七年五月向立法會財務委員會申請撥款。

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
舊的東龍洲多普勒甚高頻全向無線電信標及測距設（信標及測距設備）已在二零零六年五月

With the expiry of the central technical services contract on September 30, 2006, two ten-year technical services contracts (TSC) were awarded in September 2006 to provide on October 1, 2006 the operation and maintenance services for ATC System at the airport and the communications systems at three Radio Stations at Victoria Peak, Cape D'Aguilar and Mount Butler. The transition to TSC was smooth and successful.

The Satellite-based Communications, Navigation and Surveillance/Air Traffic Management (CNS/ATM) Systems Project continued to progress in a satisfactory manner, with six system elements now in operational use and three on trials to assess their operational benefits.

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.

As the existing ATC systems will reach the end of their usable life around 2012, the Division initiated planning to replace the systems, and would seek funding approval from the Finance Committee of the Legislative Council in May 2007.

AIR TRAFFIC CONTROL SYSTEMS DEVELOPMENT

Replacement of Doppler VHF Omni-Directional Radio Range and Distance Measuring Equipment on Tung Lung Island
The old Doppler VHF Omni-Directional Radio Range and Distance Measuring Equipment (DVOR/DME) on Tung Lung Island were decommissioned and dismantled on May 11, 2006. Following the civil and building modification works, the equipment was installed in November. Upon completion of the commissioning flight check, the new DVOR/DME was put into operational use on December 21, 2006.

十一日停止運作,並進行拆除工作。各項土木工程和台站改建工程完成後,新設備在十一月開始安裝及進行啟用前飛行校驗,並在二零零六年十二月二十一日正式投入運作。

新航空通訊網中心

為了與鄰近航空通訊中心進行更快捷有效的航空固定電訊網通訊,本部設立配備嶄新航空電訊網設備的新航空通訊網中心,以取代舊的航空固定通訊中心。有關工程已在二零零六年五月竣工。在二零零六年五月十六至十七日,舊航空固定通訊中心的運作分兩個階段轉移至新航空通訊網中心,過程順利。

更換航空交通管制雷達模擬系統

二零零六年四月二十八日,立法會財務委員會批准撥款更換現有已老化的航空交通管制雷達模擬系統。由於設備複雜,草擬招標文件的需時較長。招標公告在二零零七年三月三十日刊登憲報,截標日期為二零零七年五月十一日。新的航空交通管制雷達模擬系統預計在二零零八年年底前投入服務。

航空交通管制設備的維修事宜

為香港空管系統提供運作及維修服務的中央技術服務合約在二零零六年九月三十日屆滿。在完成標書評審程序及獲得中央投標委員會通過評審結果後,兩份各為期十年的技術服務合約在二零零六年九月批出,為機場空管系統以及扯旗山、畢拿山及鶴咀三個無線電站的通訊設備提供運作和維修服務。過渡安排已順利完成,隨後承辦商根據兩份新合約,由二零零六年十月一日起提供技術服務,至今承辦商的表現令人滿意。

小磨刀洲上的多普勒甚高頻全向無線信標及測距設備進行定期維修。
Routine maintenance being carried out on the DVOR/DME Station in Siu Mo To.

New Aeronautical Network Centre

To enhance efficient and effective AFTN communications with adjacent Communications Centres, a new Aeronautical Network Centre (ANC) including the new Aeronautical Telecommunications Network (ATN) equipment was constructed to replace the existing Aeronautical Fixed Centre (AFC). The work was completed in May 2006. Cut-over of the operations from the ex-AFC to the new ANC was completed successfully in two phases from May 16-17, 2006.

Replacement of Air Traffic Control Radar Simulator

Funding approval to replace the existing obsolescent air traffic control radar simulator was given by the Finance Committee of the Legislative Council on April 28, 2006. Due to complexity of the equipment, a longer time was required to prepare and finalise the relevant tender document. Tender invitation was gazetted on March 30, 2007 with a closing date of May 11, 2007. It is planned that the replacement air traffic control radar simulator would be ready for service by end 2008.

ATC Equipment Maintenance

The central technical services contract providing operations and maintenance services for the Hong Kong ATC systems expired on September 30, 2006. Upon completion of tender proposals evaluation and approval by the Central Tender Board, two new 10-year technical services contracts for the provision of operations and maintenance services for ATC systems at the airport and the communications facilitates at three Radio Stations at Victoria Peak, Mount Butler and Cape

香港空管系統的安全及風險評估

各個香港空管系統的安全及風險評估,均會定期檢討。為進一步加強員工進行上述測檢的能力,本處在二零零七年一月二十二至二十六日期間,安排電子工程師修讀澳洲航空服務公司(Airservices Australia)在香港為民航處舉辦有關安全管理系統的培訓課程。

更換航空交通管制系統

為應付香港航空交通的持續增長,維持可靠高效的空管系統,以支援安全、可靠及高效的香港航空系統,本部就更換現有空管系統進行多次考察。二零零七年二月二十六日,當局就更換空管系統向立法會經濟事務委員會提交文件,建議在會上獲得通過。當局打算在二零零七年五月向立法會財務委員會申請撥款。

衛星通訊、導航及監察╱航空交通管理系統

為配合國際民用航空組織(國際民航組織)就衛星通訊、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,並詳細測試系統每個構件。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,以便早日發揮系統的功能,提升和優化香港空管服務的水平。
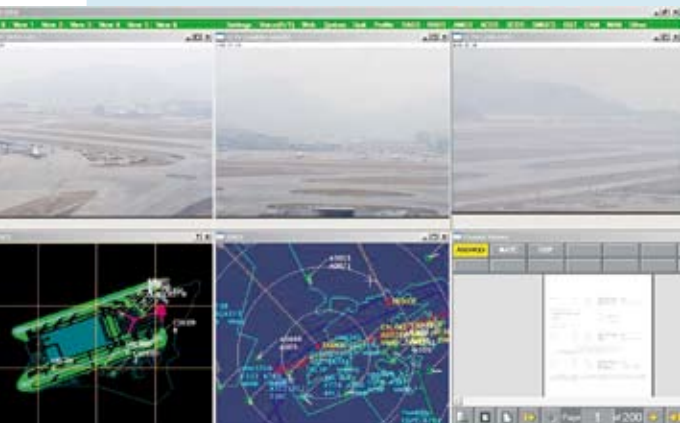
民航處的綜合資訊展示系統。
CAD Integrated Information Display System.

D'Aguilar were awarded in September 2006. After successful completion of transition-in arrangements, the technical services under the two new contracts commenced on October 1, 2006, and the performance of the contractor was satisfactory so far.

Safety and Risk Assessment on Hong Kong ATC Systems

Regular reviews were conducted with respect to the safety and risk assessments on different Hong Kong ATC Systems. To further strengthen the staff competence on the subject, an in-country safety management system (SMS) training course was conducted for the CAD electronics engineers by the Airservices Australia on January 22-26, 2007.

Replacement of Air Traffic Control System

To cope with the continuous air traffic growth in Hong Kong and to maintain a reliable and efficient ATC system to support a safe, reliable and efficient air transport system in Hong Kong, investigations and visits in connection with the replacement of the existing ATC systems had been initiated. A submission for the replacement ATC systems was made and endorsed by the Economic Services Panel of the Legislative Council in its meeting on February 26, 2007. It is intended to submit the case to the Finance Committee for funding approval in May 2007.

SATELLITE-BASED COMMUNICATIONS, NAVIGATION AND SURVEILLANCE/AIR TRAFFIC MANAGEMENT (CNS/ATM) 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, the Hong Kong-Bangkok ATN circuit

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、香港與曼谷之間的航空電訊網，以及與三亞的空中交通服務設施間數據通訊已正式推出，用量亦日見增加。現時，每月平均有33 000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188 架次離港班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港班機架次的48%。

空中交通服務設施間數據通訊
香港與三亞的空中交通服務設施間數據通訊的技術測試，已在二零零六年十二月完成，測試結果令人滿意。經試驗運作一段時間後，香港與三亞的空中交通服務設施間數據通訊在二零零七年二月八日正式投入服務。另外，與廣州的同類通訊測試仍繼續進行。

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，區內國家須在二零零九年年底前推行航空電訊網及航空交通服務訊息處理系統。香港作為區內一個航空電訊網／航空交通服務訊息處理系統中樞，積極與北京、東京、台北、曼谷等鄰近地區的有關當局進行測試。為了符合國際民航組織的最新規定，本部正著手採購一套處理能力較高的航空交通服務訊息處理系統，以便進行更大型的測試。

先進場面活動引導和控制系統測試
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，因此本處在二零零六年八月十一日批出合約，將現有系統測試範圍擴大至整個機場。第一階段的系統擴大工作已在二零零七年二月完成，項目包括監視範圍擴大至整個機場，以及將系統與本處現有的一次地面監察雷達和三個二次監察雷達結合使用。本處現正評估系統表現。

位於東龍洲的新多普勒甚高頻全向無線電信標及測距儀。
New DVOR/DME on Tung Lung Island.

and Air Traffic Services Inter-facility Data Communication (AIDC) with Sanya have been put into operational use. The services continued to gain popularity with a monthly average of 33 000 requests for the D-ATIS/D-VOLMET services, and a daily average of 188 departing flights using the PDC service via datalink, representing approximately 48 per cent of the daily departing flights from Hong Kong International Airport.

Air Traffic Services Inter-facility Data Communication
The Air Traffic Services Inter-facility Data Communication (AIDC) technical trial with Sanya was completed in December 2006 with satisfactory results. After a period of operational trials, the AIDC between Hong Kong and Sanya was put into operational use on February 8, 2007. The AIDC trial with Guangzhou was on-going.

Aeronautical Telecommunication Network and ATS Message Handling System Trials
In the revised ICAO Asia Pacific Regional Plan, States in the Region should implement Aeronautical Telecommunication Network (ATN) and ATS Message Handling System (AMHS) by 2009. Hong Kong, being one of the ATN/AMHS backbone sites in the Region, has taken an active role in conducting the trials with the neighbouring

配備有先進場面活動引導和控制系統車輛定位器的機場車輛。
An airport vehicle equipped with the A-SMGCS vehicle locator.

廣域低空空中交通監察

為了研究可否採用多邊定位探測和廣播式自動相關監察技術進行廣域低空空中交通監察，以監察現有雷達監察網探測不到的低飛飛機的飛行活動，本處在二零零七年一月十六日訂購一套小型測試系統。有關測試預期在二零零七年六月展開。

抵港航機計量及序列系統

抵港航機計量及序列系統和測試支援服務的招標公告在二零零六年四月二十八日刊登憲報，並在六月十二日截標。標書評審程序已經完成，現正與中選的供應商進行標書磋商。系統試行預期在二零零八年年初展開。

全球衛星導航系統

在香港飛行情報區內全球衛星導航系統訊號的質素研究及分析，已於二零零六年十二月完成。下一階段的香港國際機場第一類衛星着陸系統運作研究，亦在二零零七年二月展開。

authorities including Beijing, Tokyo, Taipei, Bangkok etc. To meet the latest ICAO requirements, work was in hand to procure a higher capacity AMHS system for further large scale trials.

Advanced Surface Movement Guidance and Control System 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), a contract was awarded on August 11, 2006 to expand the existing trial system to cover the whole airport. Phase 1 of the expansion work for full airport surveillance and integration with the existing primary Surface Movement Radar and three secondary surveillance radars of CAD was completed in February 2007. The system was under evaluation.

Wide Area Low Level Air Traffic Surveillance (WALLATS)

To study the feasibility of using multilateration detection and Automatic Dependent Surveillance-Broadcast (ADS-B) technologies for wide area low level air traffic surveillance, i.e. for monitoring the movements of low-flying aircraft which could not be covered by existing radar surveillance network, an order was placed on January 16, 2007 for the provision of a small scale trial system. It is expected that the trial would commence in June 2007.

Arrival Metering and Sequencing (AMS) System

Tender invitation for an AMS system and trial support service was gazetted on April 28, 2006 and closed on June 12, 2006. Evaluation of tender proposals was completed and tender negotiations were underway with the selected suppliers. It is expected that the trial would commence in early 2008.

Global Navigation Satellite System

The study and analysis on the Global Navigation Satellite System (GNSS) signal quality within the Hong Kong FIR was completed in December 2006. The next phase of study on Satellite Landing System for Category I operation at the HKIA commenced in February 2007.

提升飛前放行指示系統的功能

本處計劃把現有的飛前放行指示數據鏈路服務，由單向數據鏈路提升至雙向數據鏈路，讓更多飛機使用該系統。功能提升合約在二零零六年十月二日批出。技術測試預期在二零零七年八月展開。

資訊科技的應用

本部負責推廣並支援本處人員應用資訊科技和進行電子業務，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，包括安全管理系統資料庫、乘客違規事故報告系統、機場保安質素控制資料庫等。其他研發中的新系統計有民航處統計系統、電腦輔助考試系統、網上資料發佈系統、更新民航處網站等。

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、使用高速線路連接至政府主幹網絡等。本處現正優化電郵系統（包括機密電郵系統）的抗故障能力、準備資訊科技保安風險評估、提升資訊科技系統運作復原功能等。

Enhancement of Pre-Departure Clearance System

It was planned to enhance the existing Pre-Departure Clearance (PDC) Delivery System via data link from one-way data link to two-way data link so as to allow a higher percentage of aircraft to use the system. The enhancement contract was awarded on October 2, 2006. It is expected that the technical trial would commence in August 2007.

IT APPLICATIONS

The Division is charged with the responsibility of promoting and supporting 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 Department's operations had been implemented. These included the Safety Management System Database, Unruly Passenger Incident Report System, Airport Security Quality Control Database, etc. There are also other new systems under development that include the new CAD Statistics System, Computer-based Examination System, Web-based Information Dissemination System and revamping of CAD website.

The departmental computer network (CADNET) and e-office facilities continued to be enhanced, including server upgrade, use of higher speed connections to the government backbone network (GNET). Action is in hand to provide further upgrade of the email systems, including the Confidential Mail System, for resilience operation, IT security risk assessment, IT systems disaster recovery operations, etc.

本處代表在十一月參與香港與內地航空通訊專家組第二十八次會議。
CAD representatives attend the 28th Task Force Meeting on Aeronautical Radio Communications in November.