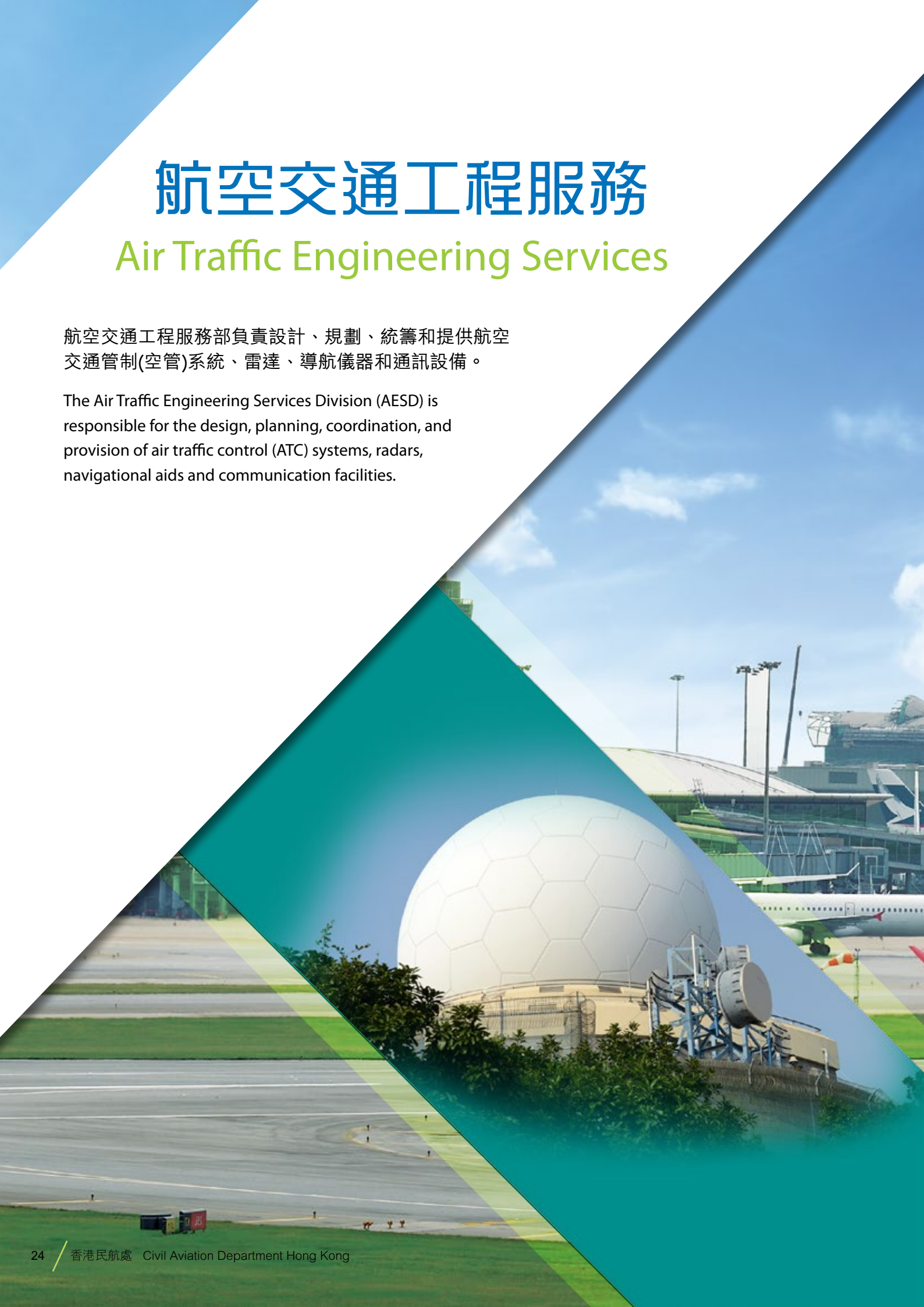
航空交通工程服務
Air Traffic Engineering Services

航空交通工程服務部負責設計、規劃、統籌和提供航空交通管制(空管)系統、雷達、導航儀器和通訊設備。

The Air Traffic Engineering Services Division (AESD) is responsible for the design, planning, coordination, and provision of air traffic control (ATC) systems, radars, navigational aids and communication facilities.



更換空管系統

現時的空管系統於一九九八年香港國際機場啟用時投入運作，至今已使用超過15年。為應付未來的航空交通需求，本處於二零零七年獲立法會撥款15.65億元更換現有的空管系統。整個新空管系統分作八份主要合約實施，當中七份合約的工作已大致如期完成。餘下的航空交通管理(航管)系統正進行最後階段的系統驗收測試。新系統須通過一連串嚴格測試，並須根據既定的國際航空安全管理標準及程序通過評審，確保運作安全、穩定可靠。待完成系統整合、試行運作，並為工程和空管人員提供足夠的技術和操作培訓後，新的航空交通管制中心(新空管中心)預計可於二零一六年投入服務。

國際民用航空組織提出的航空系統組塊升級

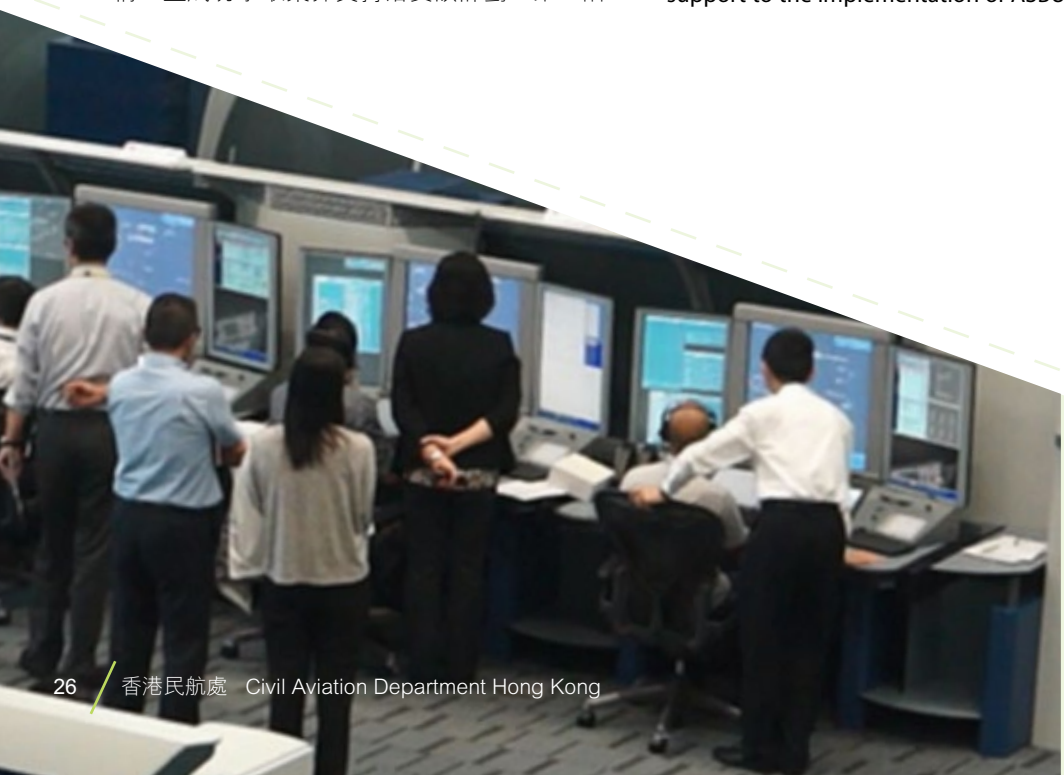
民航處按照國際民用航空組織(國際民航組織)所提出的航空系統組塊升級框架，並參考《亞太區無縫航空交通管理計劃書》訂明的優先次序，與業界共同制定策略，分階段在香港實施各個升級項目。本處自二零一三年開始舉辦簡報會，向業界介紹航空系統組塊升級計劃的詳情，並成功爭取業界支持落實該計劃。第一階

Replacement of ATC Systems

The existing ATC systems have been in use for over 15 years since the opening of Hong Kong International Airport (HKIA) in 1998. To meet the future air traffic demand, the Legislative Council approved a provision of $1.565 billion in 2007 for the replacement of the existing ATC systems. The new ATC systems are implemented through eight major system contracts, of which seven have been substantially completed as scheduled. The remaining Air Traffic Management System (ATMS) is undergoing the final stage of system acceptance tests. To ensure safety, reliability and stability, the new systems have to undergo a series of stringent tests and satisfy assessments in accordance with the established international aviation safety management standards and procedures. Upon the successful completion of system integration, trial runs, as well as adequate technical and operational training for the engineering and ATC staff, the new Air Traffic Control Centre (new ATCC) is planned to commence operation in 2016.

The International Civil Aviation Organization (ICAO) Aviation System Block Upgrades

In accordance with ICAO's Aviation System Block Upgrades (ASBU) framework and after taking into consideration the priorities stipulated in the Seamless Air Traffic Management Plan for the Asia and Pacific region, CAD collaborated successfully with the aviation industry to develop strategies for phased implementation of ASBU modules in Hong Kong. Since 2013, CAD organised briefings to the industry on the details of ASBU, and solicited the industry's support to the implementation of ASBU. An implementation plan for the first



新航管系統實地驗收測試於二零一四年第三季開始。

The Site Acceptance Test of the new ATMS commenced in the third quarter of 2014.

段升級的實施計劃書已經制定，並於二零一四年提交予國際民航組織。民航處年內繼續按照計劃書，進行相關的航空系統組塊升級工作。

phase of ASBU was formulated and submitted to ICAO in 2014. Throughout the year, CAD continued working on the relevant ASBU modules according to the implementation plan.

持續發展安全管理系統，以提供穩妥的通訊、導航及監察服務和重要的屋宇設施

年內，本部致力推廣安全意識，繼續舉辦安全訓練和推廣活動，並全力配合航空交通管理標準組對衞星通訊、導航及監察/ 航空交通管理系統、外站運作，以及技術安全事故報告和調查程序所進行的審計和視察。為達到持續改善安全管理系統整體表現的目標，本部定期進行內部審計和視察，並繼續推行在職培訓，使相關同事成為認可審計人員，積極參與內部審計和視察工作。

為空管系統定期分析安全數據和密切監察安全趨勢，是安全管理系統得以發揮成效的重要元素。年內，本部與空管系統維修服務機構共同研究安全趨勢。除了對現有通訊、導航及監察/ 航空交通管理系統的安全表現指標和目標進行定期安全趨勢檢視，以及按照檢視結果制訂有效的風險緩解措施之外，本部更把制訂現有安全表現指標和目標的程序擴展至即將投入服務的新空管系統，為日後制訂新空管系統的安全表現指標和目標，奠定良好的基礎。為加強同事對航空交通管理系統的軟件安全評估及風險管理的認識，本部於二零一五年三月安排海外專家到本處，為同事提供相關培訓。

Ongoing Development of the Safety Management System in Support of the Provision of Safe Communications, Navigation, Surveillance and Critical Building Services

Throughout the year, AESD maintained its momentum in safety promotion, and continued to organise safety training and promotion activities. Besides, the division provided full support to the Air Traffic Management Standards Office's (ATMSO) audits and inspections on the satellite-based Communications, Navigation, Surveillance/Air Traffic Management (ATM) systems, outstation operations, and technical safety occurrence reporting and investigation process. To achieve continuous improvement of the overall performance of the Safety Management System (SMS), regular internal audits or inspections were conducted. Relevant colleagues continued to take part in on-the-job training to become approved auditors, who provided active support to the internal audit and inspection work.

Regular analysis of safety data and close monitoring of safety trend are integral activities of an effective SMS. In this year, AESD conducted safety trend study in conjunction with the ATC system maintenance service providers. In addition to the regular reviews of the safety trend of Safety Performance Indicators/ Target (SPIs/SPT) for the existing Communications, Navigation, Surveillance/ ATM systems and formulating effective risk mitigating measures in accordance with the review results, the development procedures of the existing SPIs/SPT were extended as a basis for formulation of new SPIs/SPT for the new ATC systems. Furthermore, in March 2015, AESD arranged an overseas expert to provide training at the CAD headquarters to better colleagues' understanding of ATM software safety assessment and risk management.

二零一五年三月民航處舉辦了航空交通管理軟件安全評估課程，加強員工對這專業領域的認識。

In March 2015, CAD conducted ATM Software Safety Assessment Course to better colleagues' understanding in this specialised domain.

衞星通訊、導航及監察/航空交通管理系統

為遵從國際民航組織的全球空中航行計劃，民航處已開發、使用並提供以下八項與衞星通訊、導航及監察/ 航空交通管理相關的系統和服務：

(一)飛前放行指示雙向數據鏈路系統

截至二零一五年三月底，使用飛前放行指示雙向數據鏈路服務的航空公司增至73家，使用率達80%，使空管人員與飛行員之間的通訊效率獲進一步提升。

SATELLITE-BASED CNS/ATM SYSTEMS

To comply with the ICAO Global Air Navigation Plan, CAD developed and implemented eight CNS/ATM systems and services as highlighted below:

(i) Pre-Departure Clearance Two-way Datalink System

The utilisation rate of the Pre-Departure Clearance Two-way Datalink Service was up to 80% and the number of participating airlines increased to 73 as at the end of March 2015, enhancing the efficient communication between ATC staff and pilots.

(二)航空電訊網、航空交通服務訊息處理系統、航空交通服務設施間數據通訊

香港與曼谷就兩地之間的航空電訊網和航空交通服務訊息處理系統進行了連串測試，結果令人滿意。該電訊網和訊息處理系統已於二零一四年九月投入運作，提升了兩地航空交通服務訊息交換的效率。香港將繼續按照國際民航組織亞太地區航空電訊網和航空交通服務訊息處理系統實施計劃，與其他地區進行測試。

此外，本部利用航空固定電訊網，與三亞和台北實施了24小時航空交通服務設施間數據通訊，以加強飛行安全，並提升與毗鄰空管中心的通訊運作效率。本部已與其他地區展開初步商討，研究早日實施航空交通服務設施間數據通訊的安排。

(三)先進場面活動引導和控制系統

鑑於機場環境和建築物時有變動，本部安排了供應商全面檢視先進場面活動引導和控制系統訊號的可靠度和覆蓋範圍。根據檢視報告的建議，我們正與供應商和香港機場管理局安排於興建中的中場客運廊增設外站單元機組，以增強系統訊號在機場範圍的覆蓋能力。

(四)廣播式自動相關監察系統

為配合國際民航組織於亞太地區實施廣播式自動相關監察的計劃，八個廣播式自動相關監察地面站已於二零一三年第四季投入服務，負責監察香港飛行情報區(包括低空飛行範圍)內裝有廣播式自動相關監察設備的航班。此外，民航處運用自行開發的廣播式自動相關監察數據分析系統，對超過50萬班航機上的航空電子設備進行性能監察和分析，以加強香港飛行情報區內的飛行安全。民航處現正聯同國際民航組

(ii) Aeronautical Telecommunication Network, Air Traffic Service Message Handling System and Air Traffic Service Inter-facility Data Communication

Upon satisfactory completion of a series of tests between Hong Kong and Bangkok, the new Aeronautical Telecommunication Network (ATN) and Air Traffic Services Message Handling System (AMHS) circuit between Hong Kong and Bangkok was put into operational use in September 2014, increasing effectiveness in air traffic service message exchange between the two places. Further testing with other states will be conducted in accordance with the ICAO Asia-Pacific Regional ATN and AMHS Implementation Plan.

The Air Traffic Service Inter-facility Data Communication (AIDC) over Aeronautical Fixed Telecommunication Network with Sanya and Taipei was put into 24-hour operation to enhance flight safety and operational efficiency in communication with adjacent ATC centres. AESD has also commenced early coordination with other states for the implementation of AIDC.

(iii) Advanced Surface Movement Guidance and Control System

To cater for the on-going changes of the airport environment and buildings, AESD has engaged an equipment supplier to conduct a comprehensive signal integrity and coverage study of the Advanced Surface Movement Guidance and Control System (A-SMGCS). In accordance with the recommendations of the study report, arrangement is underway with the supplier and Airport Authority Hong Kong for provision of additional A-SMGCS Remote Units at the Midfield Passenger Concourse being constructed to enhance the signal coverage performance at HKIA.

(iv) Automatic Dependent Surveillance-Broadcast System

To align with ICAO's Regional Plan for implementing Automatic Dependent Surveillance–Broadcast (ADS-B), eight ADS-B ground stations have been in service since the fourth quarter of 2013. The ground station system provides ADS-B surveillance within the Hong Kong Flight Information Region (HK FIR), including low level coverage. In addition, with the use of an in-house ADS-B data analysis system, CAD has monitored and analysed the avionics

織區域辦事處及亞太地區其他國家，共同建立數據庫，以供各方共享及加深了解曾經出現於亞太地區有關廣播式自動相關監察系統機載問題的資料。

國際民航組織廣播式自動相關監察研討會及廣播式自動相關監察系統研究和實施專責小組第13次會議，於二零一四年四月二十二至二十五日，在民航處總部順利舉行。研討會吸引了超過150名海外及本地業界代表參與，由監管機構、飛機製造商、空域使用者、設備供應商和空中航行服務提供單位的專家，交流廣播式自動相關監察的運作知識及經驗。民航處的專家代表中國香港參加了小組會議，與亞太地區其他國家的代表，討論廣播式自動相關監察的實施事宜，以及檢討過往的會議成果。國際民航組織對民航處主辦會議的安排，表示讚賞和感謝。

(五)抵港航機排序系統

本部使用抵港航機排序系統，以提升航班準時抵港率，善用空域，並為空管人員提供自動化的服務。隨着操作經驗不斷累積，我們在年內專注改進系統功能，以配合不斷增加的航空交通流量。

performance of more than 500 000 flights to enhance flight safety within the HK FIR. CAD has been working closely with ICAO Regional Sub-office and other Asia Pacific States on establishing an Asia Pacific Regional ADS-B Avionics Problem Report Database for sharing and better understanding of ADS-B avionics problems.

The ICAO ADS-B seminar and the Thirteenth Meeting of ADS-B Study and Implementation Task Force (ADS-B SITF/13) were successfully held at the CAD Headquarters on 22 - 25 April 2014. The seminar, attracting attendance of more than 150 overseas and local participants from the industry, provided a platform for information and experience sharing on the operational use of ADS-B among experts from regulators, airframe manufacturers, airspace users, equipment suppliers and Air Navigation Service Providers. CAD experts also attended the ADS-B SITF/13 as delegates of Hong Kong China and discussed with other Asia Pacific States the implementation of ADS-B as well as reviewing outcomes of previous meetings. The ICAO expressed its appreciation and gratitude to CAD for hosting the ADS-B SITF/13.

(v) Arrival Manager System

The Arrival Manager (AMAN) System was used to achieve a higher on-time arrival rate, more efficient use of airspace and to provide automated service to controllers. With more operational experience gained, efforts were focused on fine-tuning the system during the year so as to cope with the ever increasing air traffic growth.

國際民航組織廣播式自動相關監察研討會及廣播式自動相關監察系統研究和實施專責小組第13次會議，於二零一四年四月二十二至二十五日，在民航處總部舉行。

The ICAO ADS-B Seminar and the Thirteenth Meeting of ADS-B Study and Implementation Task Force were held at the CAD Headquarters on 22 - 25 April 2014.

(六)陸基增強系統

為使飛機進場和着陸程序更為精確，民航處正就機場安裝陸基增強系統，進行初步的選址研究。本部結合了本處和地政總署設於全港各處的全球衞星導航系統監測站所收集到的實時數據，設立全港衞星數據庫。此外，本部自二零一三年起使用電離層閃爍監測系統，並通過國際民航組織電離層研究專責小組，與周邊地區合作，共同研究亞太地區上空的電離層，對陸基增強系統性能可能產生的影響。

(七)電子飛行進程單系統

年內，電子飛行進程單系統運作暢順，有助空管人員日後在新空管中心順利過渡至以無紙方式進行空管運作。此外，綜合資訊顯示系統已經啟用。該系統可以集中顯示來自多個單位的運作資料，進一步提升控制塔的運作效率。

(八)機場協同決策

本部在二零一三年推出桌面版及手機版的機場協同決策互聯網平台。該平台一直獲業界大力支持，為日後於本港以至亞太地區進一步發展和推行協同決策機制，奠定穩固基礎。下一階段將由香港機場管理局進一步提升和擴大該平台的功能，讓機場各持份者交換航班資料，並掌握更多重要的實時訊息，從而根據資料作出穩妥周全的知情決策。

(vi) Ground-Based Augmentation System

To augment the precision of aircraft approach and landing operations, CAD has been conducting a preliminary siting study for installing a Ground-Based Augmentation System (GBAS) at HKIA. A territory-wide satellite database was established by combining the real time data collected by CAD's and Lands Department's Global Navigation Satellite System Monitoring Stations located around the territory. Moreover, CAD has commenced using an Ionospheric Scintillation System since 2013, which enabled the collaboration with neighbouring areas through the ICAO Ionospheric Studies Task Force on studying possible ionospheric effect on GBAS performance in the Asia and Pacific region.

(vii) Electronic Flight Strip System

Satisfactory operation of the Electronic Flight Strip System (EFSS) in the past year prepared tower controllers for a smooth transition to paperless operations at the new ATCC. Integrated Display Units were put into operation to integrate and display operational information from multiple sources to greatly enhance tower operational efficiency.

(viii) Airport Collaborative Decision Making

AESD successfully launched the Airport Collaborative Decision Making (CDM) platform in both desktop and mobile versions on the Internet in 2013 with very encouraging feedback and support. The platform provided an important basis for further development and implementation of a local and regional CDM mechanism. In the next stage of development, Hong Kong Airport Authority will further enhance and extend the functions of the platform by enabling airport stakeholders to exchange flight data and acquire more real-time key messages for making informed decisions.

二零一四年九月十六日，民航處同事接受數碼電台訪問，介紹於民航處總部大樓所推行的環保節能措施。

CAD officer attended an interview at the Digital Broadcasting Corporation on 16 September 2014 for sharing green measures at the CAD Headquarters.

提升環保意識

民航處一直致力推行環保節能措施以保護環境，其中包括於民航處總部大樓安裝各種環保裝置。本部自二零一四年年初起，一直積極參與中華電力有限公司舉辦的環保節能機構嘉許計劃。該計劃是個甚受歡迎的平台，供參與者推介其實踐成功的環保措施。二零一四年九月，民航處獲頒「銀行/ 辦公室」組別中最高榮譽的「金獎」，成為首個參與該計劃並獲頒最高殊榮獎項的政府部門。這個獎項不僅為民航處帶來極大的鼓舞，而且提供了難得的機會，讓民航處與其他組別「金獎」得獎者接受電台訪問，向市民介紹本處的環保新猷。

資訊科技管理

通過妥善實施各項新的資訊科技措施和「電子政府」策略，資訊科技管理組繼續支援各分部的日常運作。年內，資訊科技管理組完成了三項大型資訊科技項目，以加強資訊科技服務和支援：

Environmental Awareness Promotion

All along, CAD has strived to implement green measures in our office to protect the environment, including introducing various environmental friendly installations to the CAD Headquarters. Since early 2014, AESD has actively participated in the CLP Power Hong Kong Limited's Green Plus Recognition Award Programme, which was a popular platform for sharing the best green practices. CAD was awarded the top honour "Gold Award" under the "Bank & Office" category in September 2014. CAD was the first government department to participate in this programme and to receive the top award. The "Gold Award" not only brought significant encouragement to CAD but also offered an opportunity for CAD to attend a radio interview with Gold Awardees from other groups to publicise our environmental-friendly initiatives.

IT MANAGEMENT

The Information Technology Management Unit (ITMU) continued to support day-to-day operations of various divisions through the effective implementation of new IT initiatives and the e-Government strategy. During the year, three major IT projects were completed for the betterment of IT service and support:

獎座頂端填滿青草的星星，象徵「金獎」得獎者實現的環保成果。

The big star at the top tip of the trophy is filled with green grass to symbolise environmental friendliness achieved by the Gold Awardees.

(一)開發和採用流動應用程式，為民航處舉辦的國際及本地航空會議(例如亞洲及太平洋區民航局局長第51次會議)的參與者提供電子流動訊息，包括最新的會議議程、討論文件及通告等，方便參與者溝通和討論。

(二)為提升資訊科技保安和加強保障資料，資訊科技管理組設計和開發了一個安全的互聯網訊息網站，為航空交通管制人員提供平台，在非辦公時間分享資訊。此外，政府資訊科技總監辦公室對本處的資訊科技基礎設施進行了網絡安全評估，結果令人滿意。

(三)為確保民航處和其他決策局及部門之間的訊息交流暢通無阻，資訊科技管理組年內提升了部門的入門網站，使民航處與其他決策局及部門之間的資訊科技系統及服務保持相互兼容。民航處為航空業界所提供的資訊服務也因而變得更為安全穩妥。

(i) A mobile application was developed and implemented to disseminate electronic mobile information, including up-to-date agenda, conference papers, announcements, etc. , to participants of international and local aviation conferences and meetings hosted by CAD (e.g. the 51st Conference of Directors General of Civil Aviation, Asia and Pacific Regions), so as to facilitate effective and timely communication and discussion.

(ii) To enhance IT security and data protection, ITMU designed and developed a secure internet website to provide a platform for air traffic control officers to share information during non-office hours. In the year under review, the OGCIO conducted a cyber security assessment on the IT infrastructure of the department with satisfactory outcomes.

(iii) To ensure smooth information exchange between CAD and other government bureaux and departments, ITMU upgraded the CAD departmental portal for maintaining interoperability between the IT systems and services of CAD and other government bureaux and departments. The robustness of the information services provided by CAD to the aviation industry was also enhanced as a result.

資訊科技管理組同事測試流動應用程式。
ITMU colleagues conduct acceptance tests for the mobile application.