

航空交通管理

Air Traffic Management

航空交通管理部負責為在香港飛行情報區內航行的民航機提供空中導航服務，當中包括航空交通服務，通訊、導航和監察，以及搜索和救援。為履行使命，在香港飛行情報區內提供持續可靠的導航服務，並維持航空交通高效有序的運作，本部亦肩負培訓本地航空交通管制(空管)人員、提供航空電訊服務和設計空管程序的責任。

The Air Traffic Management Division (ATMD) is responsible for the provision of air navigation services to civil aircraft operating within the Hong Kong Flight Information Region (HKFIR). The services include air traffic services, communications, navigation and surveillance as well as search and rescue. With the mission of providing reliable and sustainable air navigation services and maintaining efficient and orderly air traffic operations within HKFIR, ATMD is also responsible for the training of air traffic control (ATC) personnel, provision of aeronautical telecommunication services and the design of ATC procedures.





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對本部來說，二零一六年是充滿挑戰的一年。在經過仔細籌備後，新航空交通管理系統（航管系統）已於十一月十四日順利全面投入服務，航空交通運作正式轉由位於民航處總部的空管中心及香港國際機場的北空管指揮塔處理。除模擬培訓外，空管人員自六月起便以分階段啓用的方式，累積利用新航管系統處理實時航空交通的經驗。在推行分階段啓用期間，系統的運作時間和服務覆蓋範圍在安全、穩定和可靠的情況下循序擴展，以至包括日間和晚間的運作，以及應對良好和惡劣的天氣狀況。自全面投入運作以來的首四個月，新航管系統順利克服在二零一六年年底和二零一七年初，節日假期航空交通流量高峰期所帶來的挑戰。其間，系統平均每日處理的航班數量較上年度同期上升3.75%。

航空交通運作

在本財政年度內，航空交通管理部處理了412 223架次在香港國際機場升降的國際及本地航班，並為288 645架次飛越香港飛行情報區的航班（當中包括55 234架次往來澳門國際機場的航班）提供空管服務。與上一年度比較，在香港國際機場升降的航班數目增加了0.17%，而飛越香港的航班數目則增加了11.46%。

跑道升降容量

香港國際機場的雙跑道於年內維持每小時68架次的最高容量。

航空交通管制主任執照考試和覆核

為維持空管運作的表現和安全標準，本部的訓練及安全組為航空交通管制主任（空管主任）安排各類實務考試。年內，就塔台管制、進場管制和區域管制三個空管範疇共舉行了176次實務考試。此外，本部也向經考核及格的人員頒發助理管制員證書、空管氣象記錄員證書、在職培訓導師證書和流量管制證書。

2016 had been a very challenging year for ATMD. After conducting thorough preparations, the new Air Traffic Management System (ATMS) was successfully commissioned in full on 14 November 2016 with air traffic operations handled in the ATC Centre at CAD Headquarters and North ATC Tower at the Hong Kong International Airport (HKIA). Apart from simulator training, ATC staff was given opportunities to handle live air traffic during Phased Functional Implementation (PFI) using the new ATMS since June 2016. The operating time and scope of service of the PFI had been expanding progressively in a safe, stable and reliable manner, to cover both day and night operations as well as good and adverse weather conditions. Throughout the first four months since full commissioning, the new ATMS has successfully coped with the challenges of peak traffic demand during the holiday seasons in the end of 2016 and early 2017. The average number of daily air traffic movements handled increased by 3.75% when compared with the same period a year earlier.

AIR TRAFFIC OPERATIONS

During the financial year, ATMD handled 412 223 international and local aircraft movements at HKIA. In addition, ATMD handled 288 645 flights overflying the HKFIR (including 55 234 flights into and out of Macau International Airport). Compared with the previous year, the number of aircraft movements at HKIA and overflights increased by 0.17% and 11.46% respectively.

Runway Capacity

The handling capacity of the two runways at HKIA was maintained at a maximum of 68 movements per hour within the year.

Examinations and Revalidations of Air Traffic Control Officer Ratings

The Training and Safety Section of ATMD carried out practical examinations on Air Traffic Control Officers (ATCOs) to ensure that the required performance and safety standards in ATC operations are maintained. In the year, 176 practical examinations were conducted in the three ATC streams – Aerodrome Control, Approach Control and Area Control. In addition, ATMD also issued Assistant Controller Certificates, ATC Meteorological Reporter Certificates, On-the-job Instructor Certificates and Flow Control Certificates to officers who had attained these qualifications.

招聘和培訓空管人員

招聘和培訓見習空管主任

招聘和培訓見習空管主任的工作必須審慎規劃和管理，以配合預期的航空交通增長和人手需求。由於本地就業市場欠缺具備所需資歷的空管主任，民航處通常會招聘見習空管主任，經過專門培訓後，再擢升為空管主任。

在見習空管主任的招聘程序中，合資格的申請人必須通過一系列的評估，包括才能測驗筆試、工作性格測驗和面試。通過上述各項評估的申請人會在評估中心接受更深入的認知能力測試和性格評估。

RECRUITMENT AND TRAINING OF ATC STAFF

Recruitment and Training of Student Air Traffic Control Officers (SATCOs)

The recruitment and training of ATC staff have to be carefully planned and managed to meet anticipated air traffic growth and manpower needs. As qualified ATCOs are not readily available in the local job market, individuals are normally recruited as SATCOs. After specialised training, they will progress from SATCOs to ATCOs.

During the recruitment of SATCOs, eligible candidates will go through a series of assessments including a written aptitude test, an occupational personality questionnaire and an interview. Further in-depth assessment on cognitive ability and personality traits will be conducted in the Assessment Centre for candidates who pass all the assessments mentioned.

空管主任在東空管中心使用新系統提供空管服務。

ATCOs provide ATC services with the new ATMS at the East ATC Centre.

見習空管主任的培訓需要周詳規劃，務使受訓學員的表現能達到既定的進展基準。培訓計劃由不同階段的訓練單元組成，以確保學員充分掌握所學技能後，才開始接受另一單元的培訓。各個訓練單元均包括課堂學習、利用空管雷達模擬器或塔台模擬機進行模擬訓練，以及於工作崗位接受在職培訓。受訓人員必須通過考核，才會獲准獨立工作。培訓見習空管主任成為合資格的管制員，以擔任二級空管主任的職位，一般需時六年左右。

除本地培訓外，見習空管主任也會到海外修讀基本空管課程，內容廣泛，包括空管程序、氣象、雷達操作、飛行原理等航空知識，以擴闊他們在空管運作方面的閱歷。在本財政年度內，共有九名見習空管主任完成海外基本空管課程。

截至二零一七年三月三十一日，空管主任的編制有280人，為空管主任提供支援的航空交通事務員則有118人。

The training programme of SATCOs is carefully designed and arranged to meet the established performance development benchmarks. It comprises staged training modules to ensure adequate consolidation before the next module. Each training module includes classroom lectures, practical training in the ATC Radar Simulator or Aerodrome Simulator, and on-the-job training at operational positions. After passing the validation check, the officer will be allowed to operate independently. The training of a SATCO to become a fully qualified controller at the rank of ATCO II normally takes around six years.

Apart from local training, SATCOs also attend overseas basic ATC courses. A wide coverage of aviation topics including ATC procedures, meteorology, radar operations and principles of flight will be introduced to broaden their exposure to various aspects of ATC operations. A total of nine SATCOs completed their overseas basic ATC courses in this financial year.

As at 31 March 2017, the ATCO and Air Traffic Flight Services Officer (ATFSO) (supporting staff to ATCO) establishment numbered at 280 and 118 respectively.



見習空管主任到海外修讀基本空管課程，包括飛行原理等航空知識。
A SATCO attends overseas basic ATC courses, which include principles of flight.

其他職級的空管培訓

為人員提供空管專業培訓是航空交通管理部的重點任務之一。本部在年內定期舉辦多項培訓課程和在職培訓活動。

年內，本部舉辦了16項專業空管培訓課程，受訓人員從中取得多項專業空管資格，期間獲發的空管執照達20項。此外，又為150名雷達管制員舉辦雷達管制複修課程，讓他們在遇上突發情況時，例如在惡劣天氣下，或航機發生緊急事故時，也能應付裕如。本部還挑選了多名資深的空管主任接受不同範疇的進階培訓，包括安全管理系統、新式飛機操作、飛機意外調查和飛行程序設計等方面，以開拓他們的眼界，使他們勝任更專門的職務，以及承擔管理和督導責任。

新航管系統的銜接培訓

在二零一六年上半年，本部為所有空管主任和航空交通事務員提供了數項轉換培訓單元課程。培訓重點是要把新航管系統的操作程序融會貫通。完成轉換培訓後，所有參與者均須通過審核，確保他們已經準備就緒，可以參與新系統投入服務前的「新舊系統同步運作」。

本部並為所有操作人員進行新航管系統操作能力評估。評估工作於二零一六年八月底展開，並於二零一六年十一月初完成。所有空管主任和航空交通事務員均勝任新系統的操作工作。

其他培訓

除了安排內部空管培訓課程外，本部也與香港民航訓練中心合作，舉辦航空交通管理入門課程，讓業界伙伴和市民更深入了解航空交通管理的工作。課程定期舉辦，一直深受歡迎。

ATC Training for Other Ranks

One of ATMD's major tasks is the provision of professional ATC training to staff. Training courses and on-the-job training activities were conducted regularly throughout the year.

During the year, 16 professional ATC training courses were conducted, leading to the issuance of 20 ATC ratings and the attainment of various professional ATC qualifications. Radar refresher training was conducted for 150 Radar Control personnel. The refresher training aims to ensure controllers' competency in responding to unusual circumstances, such as poor weather operations and aircraft emergencies. In addition, senior ATCOs were selected to attend advanced training in Safety Management System, Operations of Modern Aircraft, Aircraft Accident Investigation, and Flight Procedures Design, etc., to broaden their horizons, and enable them to undertake more specialised duties as well as management and supervisory responsibilities.

Transition Training for New ATMS

Several modules of conversion training were conducted for all ATCOs and ATFSOs in the first half of 2016. The training focused on full application of operational procedures using the new ATMS. After the completion of the conversion training, all participants were assessed on their readiness in the participation of "shadowing operations" prior to the implementation of the new ATMS.

Assessments of competency in handling the new ATMS for all operational staff commenced in end Aug 2016 with the final assessment being completed by early Nov 2016. The results of the assessments were satisfactory.

Other Training Offered

Apart from in-house ATC training courses, ATMD also conducted an Introduction to Air Traffic Management Course in conjunction with the Hong Kong Civil Aviation Training Centre for industry partners and the public to have a better appreciation of air traffic management functions. The course is conducted regularly and has been well received.

新空管/飛程序

優化儀表進場程序的飛行高度和速度要求

要達到最高的跑道容量，在管理抵港航班方面，必須達至及持續保持飛機之間準確的進場間距。本部於年內進行了優化工作，統一不同進場程序的起始高度和進場速度標準，促進抵港航班達至最理想的排序。制訂統一進場程序標準，目的是盡量減少人手排序和安排高度的需要，藉此提升運作效率和跑道容量，並減少空管人員和飛行員的工作量。

珠江三角洲(珠三角)地區航空交通管理計劃

為了全面落實《珠三角地區空中交通管理規劃與實施方案》(《方案》)內的優化措施，民航處一直透過三方工作組與中國民用航空局(國家民航局)和澳門民航局保持緊密聯繫，商討分階段推展各項優化措施。二零一六年五月九日，在國家民航局副局長王志清和時任運輸及房屋局局長張炳良教授見證下，內地、香港和澳門三地民航當局於香港簽署了強化合作交流機制協議，透過訂立定期會面機制，加強三方在珠三角地區空中交通管理規劃及實施方面的合作交流。

NEW ATC / FLIGHT PROCEDURES

Rationalisation of Altitude and Speed Requirements of Instrument Approach Procedures

Maximising runway capacity is critically dependent upon management of arrival flows to achieve an accurate and consistent inter-arrival spacing between aircraft. During the year, ATMD rationalised the initial approach altitudes and approach speeds for standardisation of different approach procedures to facilitate optimum arrival sequencing. Such standardisation aimed to minimise the need for sequencing manoeuvres and speed control to achieve maximum efficiency and capacity, reducing the workload of both controllers and pilots.

AIR TRAFFIC MANAGEMENT PLAN FOR THE PEARL RIVER DELTA (PRD) REGION

With the aim of full implementation of the enhancement measures as stipulated in the PRD Region Air Traffic Management Planning and Implementation Plan (the Plan), CAD has been maintaining close liaison with the Civil Aviation Administration of China (CAAC) and the Civil Aviation Authority of Macau (AACM) through the Tripartite Working Group (TWG) to discuss the phased implementation of the enhancement measures. On 9 May 2016, witnessed by the Deputy Administrator of the CAAC, Mr Wang Zhiqing, and the then Secretary for Transport and Housing, Professor Anthony Cheung Bing-leung, the civil aviation authorities of the Mainland, Hong Kong and Macau signed an agreement in Hong Kong on establishing a strengthened liaison mechanism, which put in place a regular meeting mechanism for the TWG, to enhance cooperation and exchange among the three parties on air traffic management planning and implementation in the PRD region.



《強化內地與港澳民航空管珠江三角洲地區空中交通管理規劃與實施三方合作交流機制協議》簽署儀式。

Signing ceremony of the agreement on establishing a reinforced liaison mechanism to enhance co-operation and exchange among the civil aviation authorities in the Mainland, Hong Kong and Macau on air traffic management planning and implementation in the Pearl River Delta region.



北空管指揮塔
North ATC Tower

自簽署協議後，三方舉行了多次領導層面及技術層面的會議。

為推動空管和技術專家進行更深入的技術研討，三方於二零一六年十二月的會議通過，成立空域管理技術組和流量管理技術組。年內，三方工作組一直緊密合作，推行了多項優化措施，以配合珠三角地區日益增長的航空交通流量。

內地、香港和澳門會繼續透過這個協調機制促進三方的協同合作，推展各項空域優化方案，並以安全有序的方式，逐步落實《方案》的最終目標，讓香港國際機場三跑道系統能夠發揮最大效用，以期達至每小時處理102班航班的長遠目標。

航空情報管理中心

航空情報管理中心負責向航空業界提供航空情報服務，以及為香港國際機場航班處理飛行計劃書。年內，航空情報管理中心共處理681 904份航行通告及226 138份飛行計劃書。

Since the signing of the agreement, several meetings at both high level and technical level were held.

In order to facilitate in-depth technical discussions among various experts from ATC, and technical fields, the three sides agreed in the meeting in December 2016 to establish the Airspace Management Technical Sub-group and Air Traffic Flow Management Sub-group. During the year, the three sides have been working closely on a number of enhancement measures in order to cope with increasing air traffic demand in the PRD region.

The Mainland, Hong Kong and Macau will continue promoting the synergy and foster cooperation through the tripartite coordination mechanism, in the aim of pushing forward airspace enhancement measures, and achieving the ultimate target of implementing the Plan progressively in a safe and orderly manner. This would enable the three-runway system of the HKIA to maximise its potential, and to achieve the target runway capacity of 102 air traffic movements per hour in the long run.

AERONAUTICAL INFORMATION MANAGEMENT CENTRE

The Aeronautical Information Management Centre, which is responsible for the provision of aeronautical information service to the aviation community and processing of flight plans for flights departing from HKIA, handled 681 904 Notices to Airmen and 226 138 flight plans in the year.

電訊服務

民航處總部新航空網絡中心於二零一五年十月正式啓用。該中心安裝了先進的航空交通服務訊息處理系統和自動化的氣象情報交換系統，使航空通訊組處理的航空固定電訊網/航空電訊網資訊量在年內持續增長。此外，該中心還配備了功能強大的網絡安全工具，能為空管系統提供網絡監察和警報功能，確保系統的網絡安全。在固定航空通訊服務方面，處理的訊息達到58 289 501個，較上年度增長8.8%。至於航空氣象廣播服務的訊息方面，較上年度增長0.9%，達354 688個。

安全管理系統

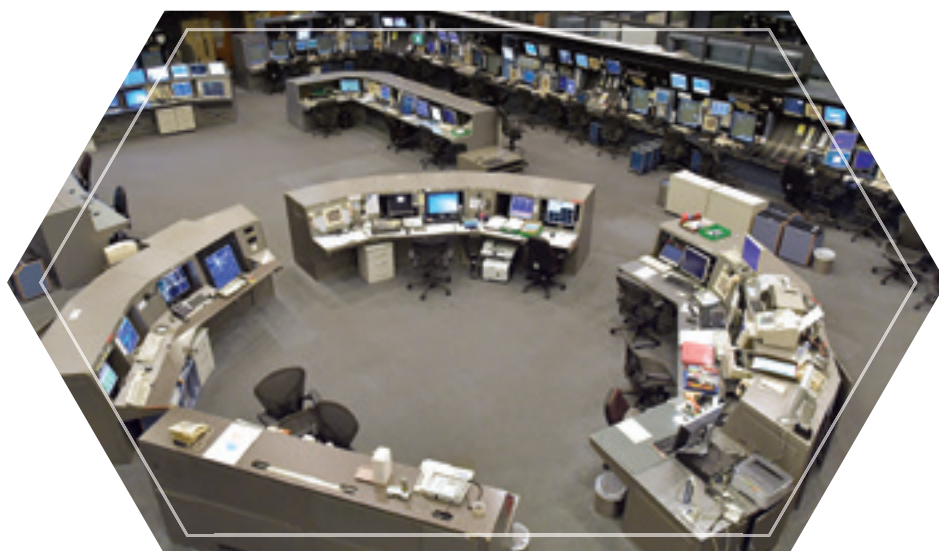
本部繼續致力推行安全管理系統，以期全面提升航空安全表現。為此，本部根據國際民用航空組織（國際民航組織）的條文和民航處的監管規定，積極推行安全風險管理和安全保證。在航管系統、儀器或程序作出重大變動前，本部會先評估安全風險和採取適當的緩解措施。就此，為配合推行新航管系統，本部在二零一六年四月至十月，共進行了19項安全風險評估。

TELECOMMUNICATIONS SERVICES

With the commissioning of the new Aeronautical Network Centre at CAD Headquarters since Oct 2015, the total number of Aeronautical Fixed Telecommunication Network/ Aeronautical Telecommunication Network messages handled by the Telecommunications Unit continued to increase in the year through the use of a newly installed state-of-the-art ATS Message Handling System and a fully automated Operational Meteorological Bulletin Exchange system. Equipped with powerful network security tools, the new centre also provides monitoring and alerting functions in safeguarding the network security of the ATC systems. On Aeronautical Fixed Service, 58 289 501 messages were handled, representing an increase of 8.8% as compared with last year. On Aeronautical Broadcast Service, the total number of weather messages broadcast to aircraft in flight amounted to 354 688, representing a 0.9% increase compared with last year.

SAFETY MANAGEMENT SYSTEM (SMS)

ATMD continued putting in substantial efforts to enhance the overall aeronautical safety performance through effective implementation of its SMS. This is accomplished by proactive application of safety risk management and safety assurance in compliance with the provisions of the International Civil Aviation Organization (ICAO) and regulatory requirement of the department. Safety risk assessment is conducted and appropriate mitigation measures are introduced before any significant changes to the air traffic management systems, equipment or procedures can be implemented. In this regard, a total of 19 safety risk assessments were carried out from April to October 2016 in connection with the implementation of the new ATMS.



舊航管系統在新航管系統全面投入運作後，維持備用狀態一段時間。

The old ATMS has been in standby mode for a period of time upon commissioning of the new system.

為監察與衡量安全績效表現，本部每季編製安全績效目標報告和安全績效指標報告，並呈交予負責監管本部安全績效的單位，即航空交通管理標準組審閱。此外，為確保安全管理系統不斷改進，年內本部就各個主要職能範疇進行了三次內部安全審查。本部又繼續支援航空交通管理標準組，協助其執行監管工作。

另外，本部繼續為員工提供合適的安全管理系統培訓，推廣重視安全的文化。除空管的基本培訓和複訓單元外，本部還推行了周詳的安全管理系統培訓計劃，向所有空管人員灌輸安全管理概念。

飛航搜索和救援(搜救)工作

本部與區域和國際搜救機關保持密切聯繫，並繼續參加本地和國際搜救會議及研討會。二零一六年五月，民航處與內地救助打撈局（救撈局）簽訂合作協議，在民航處要求下，救撈局會調派設施協助搜救及打撈行動。二零一六年十一月，民航處大樓的新搜救協調中心亦隨著新航管系統的啓用而全面投入服務。此外，本部亦恆常派員參與機場和飛機緊急事故演習。

海外航空會議和研討會

本部為亞太區內具領導地位的空中導航服務提供者之一，積極參與推動區內以至全球航空交通管理發展的研討會及會議，主題包括航空交通流量管理、基於性能導航程序及機場協作決策方案。大部分會議及研討會由國際民航組織、民用空中導航服務組織和區內其他民航當局主辦。

Reports on Safety Performance Targets and Safety Performance Indicators were compiled and submitted to the regulatory office overseeing the safety performance of ATMD, i.e. the Air Traffic Management Standards Office (ATMSO), on a quarterly basis for safety performance monitoring and measurement. To ensure continuous improvement in safety performance, three internal audits were conducted in the year on different key functional areas of ATMD. In the meantime, ATMD continued to provide necessary support to the ATMSO in facilitating regulatory oversight activities.

Besides, ATMD maintained its efforts to provide staff with appropriate SMS training in order to promote safety culture. A structured SMS training programme has been put in place to supplement the basic and recurrent ATC training modules in order to instil the concept of safety management in all ATC personnel.

AERONAUTICAL SEARCH AND RESCUE (SAR)

ATMD maintained close liaison with regional and international SAR authorities and continued to participate in local and international aeronautical SAR meetings and seminars. In May 2016, CAD concluded a cooperation agreement with the Mainland Rescue and Salvage Bureau (RSB) that at CAD's request, RSB would mobilise their facilities to assist in conducting SAR or salvage operation. In connection with the implementation of the new ATMS in November 2016, the new Rescue and Coordination Centre located within the CAD Building was also successfully commissioned. ATMD also regularly attended airport and aircraft emergency drills.

OVERSEAS AERONAUTICAL MEETINGS AND CONFERENCES

Being one of the leading air navigation services providers in the Asia Pacific Region, ATMD actively participated in meetings, seminars and conferences in the region and globally, which promoted the development of air traffic management including air traffic flow management, performance based navigation procedures and airport collaborative decision making. Most of the meetings and seminars were organised by the ICAO, Civil Air Navigation Services Organisation and other civil aviation authorities within the region.