

技術及策劃 TECHNICAL & PLANNING

技術及策劃部負責規劃、統籌和提供香港國際機場的航空交通管制系統和導航設施。此外，該部負責制訂飛機噪音管理政策、監察飛機進出香港國際機場時使用航道的情况和噪音水平。該部亦為在香港飛行情報區及負責區航行的飛機提供航空通訊服務。



導航儀器對航空交通的暢順安全尤為重要。
The provision of air navigation equipment is vital to the smooth and safe operation of air traffic.

I. 前啟德航空交通管制中心

一九九八年七月六日新機場啟用後至一九九九年四月二十九日，前啟德航空交通管制中心仍保留作新航空交通管制中心的應變後援設施。

II. 新香港國際機場

新航空交通管制系統

自新機場啟用以來，新航空交通管制系統的運作穩定可靠；就如此複雜的系統而言，成績實屬驕人。

本處藉着實際經驗的累積，希望在二零零零／二零零一年逐步加強空管系統，使其能發揮更佳運作效率。

設於筆架山的進場監視雷達，屬近距離的一次雷達，曾保留作新機場後援設施。這項有28年歷史的設施於二零零零年三月一日停用。

第二條跑道

輔助飛機升降的第二類及第三類儀表着陸系統驗收後，北跑道由一九九九年四月十二日開始作緊急備用，以支援南跑道的操作。北跑道自一九九九年五月二十六日起運作，最初每日僅在上午十時至下午四時的繁忙時段開放使用，至一九九九年八月三十一日開始全日24小時運作。北跑道的運作標誌着香港國際機場邁向另一新里程，標示本港首次有兩條跑道同時運作，並且可加強香港國際機場的容量，以及使航空公司的飛機升降時段分配更具彈性。後述的情況從公布的跑道容量上升數字可見一斑；在跑道起降的飛機次數自一九九九年十月起由每小時37班次增至40班次，並自二零零零年三月起再上升至每小時45班次。現時，南跑道主要供離港飛機使用，北跑道則供抵港飛機使用。長遠來說，隨著航空交通量的增加，本處會進行研究和考慮採用雙跑道混合操作模式，即兩條跑道將各自供作飛機升降之用。

The Technical and Planning Division is responsible for the planning, coordination and provision of air traffic control (ATC) systems and air navigation equipment for the Hong Kong International Airport (HKIA). In addition, it draws up aircraft noise management policies and monitors the flight tracks and noise levels of aircraft operating to and from the HKIA. It also provides aeronautical telecommunication services to aircraft operating within the Hong Kong Flight Information Region and Area of Responsibility.

I. EX-AIR TRAFFIC CONTROL CENTRE AT KAI TAK

After the new airport opened on July 6, 1998, the ex-Kai Tak Air Traffic Control Centre was retained as a contingency backup to the new Air Traffic Control Centre until April 29, 1999.

II. NEW HONG KONG INTERNATIONAL AIRPORT

New Air Traffic Control System

Since the opening of the new airport, the new ATC systems have been performing in a stable and reliable manner - this is really a remarkable achievement for systems of such complexity.

With more working experience gained, it is intended to further enhance the ATC systems for better operational efficiency, with implementation to be conducted in phases in 2000/2001.

The Approach Surveillance Radar at Beacon Hill, a short range primary radar serving as a backup for the new airport, was decommissioned on March 1, 2000 after 28 years of service.

Second Runway

Following certification of the two sets of Instrument Landing Systems (ILS), one capable of Category II and the other capable of Category III operations, the north runway was put into contingency use as a backup for the south runway on April 12, 1999. On May 26, 1999, the north runway commenced daily operations during the peak traffic period from 10 a.m. to 4 p.m., and on August 31, 1999 it was implemented for 24-hour operations. The operation of the north runway marked another milestone for the HKIA, as it not only marked the commencement of dual runway operations in Hong Kong, but also provided extra capacity and flexibility for slot allocation to airline operators. The latter aspect was well illustrated by the increases in the



北跑道（圖片左方）的啟用標誌着機場運作邁進另一里程碑。
Commissioning of the north runway on the left of the picture marked a milestone for the airport.

致力提供安全而有效率的
航空運輸系統

COMMITTED TO PROVIDE A SAFE AND
EFFICIENT AIR TRANSPORT SYSTEM



新近落成的備用航空交通管制大樓。
The new Backup Air Traffic Control Complex.

備用航空交通管制大樓

備用航空交通管制大樓設有備用航空交通管制中心、備用指揮塔和備用航空通訊中心。備用大樓位於航空交通管制大樓以北。本處於一九九九年八月九日接收備用航空交通管制大樓後，隨即開始安裝儀器。個別系統經過測試後，所有系統（包括接收備用氣象設施的資料）於一九九九年十二月成功融合。備用中心和指揮塔早期用作評估航空交通管制程序和訓練航空交通管制員。一項大規模的演習定於二零零零年四月進行，確保備用航空交通管制大樓的設施徹底通過測試，並且可在主要航空交通管制設施一旦受火警或嚴重事故影響的情況下，即時投入作應急之用。

飛機噪音監察

為加強監控東北離場及進場航道所帶來的飛機噪音，本處飛機噪音及航迹監察系統下的噪音監察站已進一步增至14個，這些監察站分別設於沙螺灣、東涌、深井、大欖涌、青衣、大圍、中環半山、北角、筲箕灣、荃灣西、青龍頭、陰澳、馬灣及渣甸山。本處已根據實地量度的飛機噪音數據製備機場首年運作的噪音等量線圖。所得結果再次證實本港所有住宅樓宇，除北大嶼山

一處面積細小及人口疏落地區（即主要為沙螺灣）外，其餘均在飛機噪音預測NEF25等量線範圍以外（而舊啟德機場則為NEF30）。縱然如此，民航處確知夜間飛行對市民的影響，因此已制訂和實施若干消減噪音措施，以減少航道範圍內或附近一帶的飛機噪音滋擾。這些措施包括在操作環境許可下，安排飛機在凌晨時分從西南面經海上降落，以及經西博寮海峽起飛。此外，噪音量較大的飛機亦不可編定在晚上十一時至早上七時期間操作。



機場客運大樓內設有介紹飛機噪音管理的資料展板。
Display boards on aircraft noise management were set up in the Passenger Terminal Building of the airport.

第二條跑道在一九九九年五月局部開放使用前，本處曾與香港機場管理局（機管局）和環境保護署（環保署）一起安排連串簡介會，向各有關區議會（包括前臨時區議會）講解第二條跑道運作後可能帶來的噪音影響。第二條跑道在一九九九年八月24小時全面運作後，本處與環保署和有關區議會緊密合作，盡量減少在新航道下居住的市民所受的飛機噪音影響。除設置電話熱線，處理市民對飛機噪音的查詢或投訴外，民航處更在一九九九年十二月在部門網頁上加入飛機噪音的資料，並在香港國際機場客運大樓裝設了資料展板，方便市民取得有關飛機噪音和航道的資料。

declared runway capacity from 37 to 40 movements per hour in October 1999 and further to 45 movements per hour in March 2000. At present, the south runway is mainly used for departures whilst the north one for arrivals. In the long term, as air traffic increases, studies will be conducted to enable the two runways to be operated in a mixed mode, i.e. both for landings and take-offs.

Backup Air Traffic Control Complex (BATCX)

The Backup Air Traffic Control Complex houses the Backup Air Traffic Control Centre, the Backup Aerodrome Control Tower and the Backup Communications Centre. The building, located to the north of the existing Air Traffic Control Complex, was constructed and handed over to CAD for equipment installation on August 9, 1999. Following testing of each of the individual system, the overall system integration was then performed, including external information fed from the backup meteorological facilities. The total system was successfully completed in December 1999. The Backup Centres and Tower were being used for air traffic control procedure evaluation and training of air traffic controllers. A full scale drill was scheduled for April 2000 to ensure the functions would be fully tested and the backup facilities in place for contingency use in case of fire or serious mishaps affecting the main ATC facilities.

Aircraft Noise Monitoring

To facilitate the monitoring of aircraft noise on the northeast departure flight path as well as the arrival flight paths from the northeast, the aircraft noise and flight track monitoring system was further expanded to include 14 noise monitoring terminals installed at Sha Lo Wan, Tung Chung, Sham Tseng, Tai Lam Chung, Tsing Yi, Tai Wai, Mid-levels in Central, North Point, Shau Kei Wan, West Tsuen Wan, Tsing Lung Tau, Yam O, Ma Wan and Jardines' Lookout. Based on the measured data, a noise contour map for the first year of airport operation was produced. The results re-confirmed that all residential developments in Hong Kong, except a small and sparsely populated area in North Lantau, predominantly at Sha Lo Wan, were outside the coverage of the Noise Exposure Forecast (NEF) 25 contour (as against NEF 30 for the old airport at Kai Tak). Notwithstanding this, the Department was conscious of the noise impacts that night-time aircraft operations might have on the local communities, and have developed and implemented a number of mitigation measures to reduce the noise disturbance caused by these aircraft on areas under or in the vicinity of the flight paths. The measures included arranging aircraft to approach the airport from the southwest over water and departing aircraft to route via the West Lamma Channel during small hours whenever operational conditions permitted. Noisier types of aircraft were also disallowed to have their operations scheduled between 11 p.m. and 7 a.m..



在中環量度飛機噪音水平。
Measuring aircraft noise levels in Central.

二千年電腦數位問題的工作計劃

本處早已察覺二千年電腦數位問題，以及其對空管操作的影響。為此，我們已把符合二千年數位標準的準備工作和有關的應變計劃，列為首要處理事項，並加緊監察。

在一九九九年四月國際民航組織亞太區辦事處舉行的最後一輪會議上，亞太區在航空交通管制方面的應變計劃得以制定，涉及的主要事項如下：

- 設航空交通緊急應變航線；
- 同一巡航高度的飛機之縱向間隔由10分鐘增至15分鐘；
- 盡可能使用單向路線；
- 提供緊急通訊器材，例如衛星電話、國際航空電訊公司電報網絡、獨立運作的高頻／甚高頻合成無線電，和按照個人電腦概念發展的備用訊息轉換系統等；以及



民航處二千年數位問題協管中心在除夕夜投入運作。
CAD Y2K Coordination and Control Centre in operation on the New Year Eve.

- 設立二千年數位問題全國航空交通管理中心，以便與國際民航組織亞太區二千年數位問題協調中心保持聯繫。（香港民航處因而設立了中國香港二千年數位問題航空交通管理中心，並且派遣一名職員前往曼谷，為國際民航組織亞太區二千年數位問題協調中心提供援助。）

按照上述的亞太區應變計劃，本處聯絡鄰近地區的民航當局，包括菲律賓、台灣、越南、澳門和國內等地的民航當局，與他們簽訂雙邊協議函件。此外，有關的互連通訊系統，包括

應變系統亦於一九九九年九月按照亞太區應變計劃進行測試。

香港方面，本處成立了二千年數位問題工作小組，成員組織包括各有關政府部門、機管局、本港註冊的航空公司（國泰航空有限公司、港龍航空有限公司、香港華民航空有限公司和邁特捷出租飛機有限公司）、本地直升機公司和飛機維修公司，互相緊密合作，應付有關問題。除機管局以外，所有成員組織的電腦系統已於一九九九年六月底符合二千年數位標準，而機管局的電腦系統亦於同年八月底符合二千年數位標準。此外，各有關方面已擬好應變計劃及支援措施，讓員工進行演習，以測試他們的效率，改善操作程序，以及熟習應變措施。

為協助政府匯報本港航空界二千年電腦數位的過渡情況，民航處擔當整體統籌者的角色，就本港航空界的二千年電腦數位過渡情況作出協調和報告。為此，民航處成立了二千年數位問題協調及管制中心（協管中心），以負責這方面的工作。

In collaboration with the Airport Authority Hong Kong (AAHK) and the Environmental Protection Department (EPD), a series of briefings were given to the former Provisional District Boards and District Councils to explain the possible noise impact arising from the operations of the second runway before its partial opening in May 1999. With the implementation of full 24-hour operations of the second runway in August 1999, the Department worked very closely with the EPD and District Councils to minimise the aircraft noise disturbance to residents under the new flight path. In December 1999, a CAD web page and a static display in the Passenger Terminal Building at the HKIA were set up to facilitate public access to information relating to aircraft noise and flight paths, in addition to a telephone hotline dedicated to handle inquiries or complaints from the public on aircraft noise issues.

Year 2000 (Y2K) Programme

The Department was well aware of the Y2K problem on computer systems and its impact on ATC operations. Top priority and high vigilance was exercised in preparing for Y2K compliance and the associated contingency plans.

During the last round of the meeting held under the auspices of the International Civil Aviation Organization (ICAO) Asia/Pacific Regional Office in April 1999, the region-wide ATC contingency plan was finalised and covered the following major items:

- Use of contingency air routes;
- Use of 15 instead of 10 minutes longitudinal separation between aircraft cruising at the same altitude;
- Use of unidirectional routes whenever possible;
- Provision of contingency communications facilities such as satellite phone (Satphone), SITA telex network, standalone Very High Frequency/High Frequency (VHF/HF) synthesised radio, a standby message switching system based on personal computer concept, etc.; and
- Set up of National Y2K Air Traffic Management Centre (NY2K-ATMC) to coordinate with the ICAO Regional Y2K Coordination Unit. (Hong Kong CAD set up a Hong Kong China Y2K Air Traffic Management Centre (HKC Y2K ATMC) for the purpose and sent one officer to Bangkok to assist the ICAO Regional Y2K Coordination Unit)

Contacts and liaison with the neighbouring civil aviation authorities, including Philippines, Taiwan, Vietnam, Macau and the Mainland authorities were then made with bilateral Letters of Agreement signed. In addition, inter-connecting communications systems, including the contingency ones, were tested in September 1999 in accordance with the region-wide contingency plan.



民航處同事密切監察本港民航界過渡至二月二十九日的情况。

CAD staff kept a vigilant eye on the local aviation sector's rollover to February 29.

本處為符合二千年數位標準所展開的工作計劃開支約為200萬元，主要用於提供緊急應變通訊設施及備用流動發電機。此外，本處亦從處內各部額外抽調約120名人員，負責於一九九九年十二月三十一日及二零零零年一月一日在轄下的兩個協調中心和其他中心當值，以加強該兩天內本港空管操作的人手支援。透過各有關組織的共同努力，本港民航界於本地及國際標準時間過渡新紀元均非常順利和成功。

民航處亦負責統籌本港航空界過渡二零零零年二月二十九日的有關工作。根據過渡千禧所汲取的經驗，以及預期二月二十九日所受影響會較少，因此，過渡二零零零年二月二十九日的人手安排較前縮減。結果，二月二十九日的過渡亦同樣順利，並無事故發生。

III. 邁向新里程

衛星通訊、導航及監察系統／航空交通管理系統

為遵行國際民航組織所訂的衛星通訊、導航及監察系統／航空交通管理系統全球實施計劃的有關規定，本處已於二零零零年一月設立一個專責小組，負責處理由地面系統過渡至新衛星系統的有關工作。

鑑於衛星通訊、導航及監察系統／航空交通管理系統的規模和複雜性，這項計劃將分三個階段進行：

研究階段 — 系統研究和分析（一九九九年至二零零四年）

測試階段 — 系統測試和評估（二零零零年至二零零七年）

實施階段 — 系統實施和過渡（二零零三年至二零一六年）

由於這項計劃涉及重大投資及需要約18年才能完成，本處先行就研究和測試兩個階段的開支向立法會財務委員會申請撥款；財委會其後於一九九九年五月七日通過批給2億3,380萬元的撥款。

本處繼而就衛星通訊、導航及監察系統／航空交通管理系統的各项組件進行詳細研究。

一九九九年五月，本處更利用甚高頻及衛星數據鏈路測試自動航站情報服務和自動氣象情報廣播的訊息發放，迄今的測試效果令人滿意。



衛星通訊、導航及監察系統－飛機過境運作部分。
CNS/ATM systems for en-route operation.

On the local scene, the Department formed a CAD Y2K Compliance Task Force, which included relevant government departments, AAHK, Hong Kong based airlines (Cathay Pacific Airways Limited (CPA), Hong Kong Dragon Airlines Limited, Air Hong Kong Limited and Metrojet Limited), local helicopter operators and aircraft maintenance service agents. All members worked closely together and achieved Y2K compliance by end June 1999, except AAHK with full Y2K compliance by end August 1999. In addition, contingency plans and backup measures were drawn up by all parties concerned, with drills conducted to test their effectiveness as well as for procedures refinement and staff familiarisation purposes.

To assist Central Government to report on the territory-wide Y2K transition status, CAD was charged with the responsibility as the overall coordinator to coordinate and report on the Y2K transition activities of the aviation sector of Hong Kong. A CAD Y2K Coordination and Control Centre (CAD Y2K CCC) was set up for such purpose.

The Department spent approximately \$2 million on the Y2K compliance programme, mainly for the provision of contingency communications facilities and backup portable power generators. About 120 additional staff from different Divisions within the Department were deployed to man the CAD Y2K CCC, the HKC Y2K ATMC and other facilities to strengthen support to Hong Kong ATC operations on December 31, 1999 and January 1, 2000. Through the excellent efforts of all parties concerned, the Y2K transitions for local and Universal Time Constant (UTC) were smooth and successful.

CAD was again charged as the Controller for the aviation sector of Hong Kong for the rollover to February 29, 2000. Based on the experience gained during the Y2K rollover and in anticipation of less impact involved, the manning for the February 29, 2000 rollover was scaled down. Again, the leap year date rollover was smooth and uneventful.

III. NEW INITIATIVES

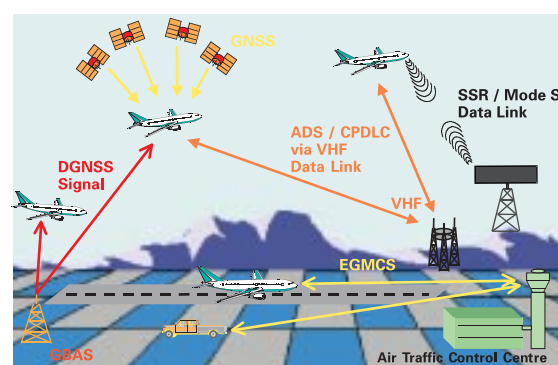
Satellite-Based Communications, Navigation and Surveillance/Air Traffic Management (CNS/ATM) Systems

To comply with the Global Implementation Plan of the ICAO for the satellite-based CNS/ATM systems, a special and dedicated project team was set up in January 2000 to work on the transition from the terrestrial-based to the new satellite-based systems.

Given the scale and complexity of the CNS/ATM systems, the project will be implemented in three phases as follows :

- Study Phase – Systems Study and Analysis (1999-2004)
- Trial Phase – CNS/ATM Trial and Evaluation (2000-2007)
- Implementation Phase – CNS/ATM Implementation and Transition (2003-2016)

Since the project will involve significant investments and take about 18 years to complete, the Department has sought funds for the Study



衛星通訊、導航及監察系統－飛機進場／
著陸運作。
CNS/ATM systems for approach/
landing operation.

為進一步推展上述計劃，由民航處領導的香港衛星通訊、導航及監察系統／航空交通管理系統委員會於二零零零年三月成立，其他成員來自國際民航運輸協會、國際航空公司飛行員協會、國泰航空公司、香港天文台和電訊服務機構。該委員會負責商議、檢討和統籌關於研究、測試以至實施本港衛星通訊、導航和監察系統／航空交通管理系統的各有關事宜。未來數年將有更多新系統進行測試。



航空流動通訊中心。
Aeronautical Mobile Centre.

IV. 電訊服務

電訊組負責提供固定航空通訊、流動航空通訊、航空氣象廣播和搜查及拯救行動通訊等服務。

為使電腦系統順利過渡千禧和其他關鍵日子，電訊組制訂和實施了若干應變計劃，並在該等日子加派人手當值。結果，所有重要日子均順利過渡，電訊組提供的服務並無受到任何影響。

自備用航空交通管制大樓內的備用航空通訊中心於一九九九年十二月可供使用

以來，本處一直安排該中心作職員培訓和演習之用，有關訓練和演習將於二零零零年四月完結。

固定航空通訊服務概況

	一九九九／二零零零年	一九九八／一九九九年	變動率
處理電報總量	17 602 802	16 378 401	+6.96

流動航空通訊服務概況

	一九九九／二零零零年	一九九八／一九九九年	變動率
與航機聯絡次數	310 892	276 265	+11.14

有關增長主要是因亞太區經濟改善導致航空交通量穩定上升所致。

航空氣象廣播服務概況

在氣象廣播服務方面，電訊組年內為航機提供共198 735次氣象報告，較去年微升1.76%。

and Trial Phases initially, and funding approval of \$233.8 million was given by the Legislative Council Finance Committee on May 7, 1999.

Detailed investigation work on the various elements of the CNS/ATM systems has commenced. Operational trials on the transmission of Automatic Terminal Information Service (ATIS) and Automatic Volmet Broadcasting Service (AVBS) information via VHF and satellite datalinks were conducted in May 1999, with favourable responses received so far.

To further facilitate the progress of the project, a Hong Kong CNS/ATM Committee was set up in March 2000. Chaired by CAD, the Committee comprises representatives from the International Air Transport Association (IATA), International Federation of Air Line Pilots' Associations (IFALPA), CPA, Hong Kong Observatory and telecommunications services providers. It discusses, reviews and coordinates various issues relating to the study, trial and subsequent implementation of the CNS/ATM systems in Hong Kong. More new systems will be put on trial in the coming years.

IV. TELECOMMUNICATIONS SERVICES

The Telecommunications Unit is responsible for the provision of aeronautical fixed, mobile and broadcasting services as well as communications for search and rescue.

In connection with the rollover of the computer systems to the new millennium and other critical dates, relevant contingency plans and additional manning arrangements were formulated and put in place. All the rollover activities were conducted smoothly without any degradation to the services provided by the Telecommunications Unit.

Since the availability of the Backup Communications Centre in the BATCX in December 1999, staff training and drills were arranged and these would be completed in April 2000.



航空固定通訊中心。
Aeronautical Fixed Centre.

Aeronautical Fixed Service

	1999/2000	1998/1999	% change
Messages handled	17 602 802	16 378 401	+6.96

Aeronautical Mobile Service

	1999/2000	1998/1999	% change
Aircraft contacts	310 892	276 265	+11.14

The increases were due to the steady growth in air traffic because of the economic upturn in the Asia Pacific region.

Aeronautical Broadcast Service

The broadcast service provided a total of 198 735 weather messages to aircraft in flight. This figure was 1.76 per cent higher than the previous year.