

For information

Legislative Council Panel on Economic Development

**Response to the Motions passed under agenda item IV on
“Full commissioning of the new Air Traffic Management System”
at the Meeting on 13 December 2016**

Introduction

This paper sets out the Government’s consolidated response to the six motions passed under agenda item IV on “Full commissioning of the new Air Traffic Management System” at the meeting of the Legislative Council Panel on Economic Development (the Panel) on 13 December 2016.

The Performance of the New Air Traffic Management System

2. In the information papers submitted to the Panel on 28 November and 13 December 2016, we reported in detail the operations of the new Air Traffic Management System (ATMS) of the Civil Aviation Department (CAD) up to 29 November 2016 after its full commissioning. From 30 November 2016 to 16 January 2017, the new ATMS has been operating smoothly in general over the past two months since its full commissioning. During the peak air traffic flow in the last Christmas and New Year holidays (i.e. between 23 December 2016 and 2 January 2017), there was a daily average of 1 142 flight movements at the Hong Kong International Airport (HKIA), representing about a 1% increase when compared with the average of 1 133 daily flight movements at HKIA over the corresponding period a year earlier. In addition, there was a daily average of 838 overflights, representing an increase of about 13% when compared with a daily average of 739 overflights during the same period a year earlier. The new ATMS handled a total of 1 980 flights per day on average during the period, representing an increase of some 6% when compared with 1 872 total flights per day handled over the same period a year earlier. The total number of flights handled during this Christmas and New Year period also set a record level. The orderly and expeditious flow of air traffic maintained during the peak season is the best proof of the performance of the new ATMS.

3. Moreover, the HKIA set new annual records in its three air traffic categories in 2016. During the year, the HKIA welcomed 70.5 million passengers and handled 411 530 aircraft movements, representing annual growth of 2.9% and 1.4% respectively. In the meantime, cargo throughput increased by 3.2% to 4.52 million tonnes. In December 2016 alone (during which the new ATMS had been fully commissioned), aircraft movements set a new monthly record of 35 650, up 0.7% over the same month a year earlier; passenger traffic also saw a year-on-year growth of 2.8%, reaching 6.16 million. The increase of passenger traffic was mainly driven by an 11% rise in the number of local people travelling abroad over the corresponding month a year earlier, especially those travelling to Japan and Europe which registered the greatest growth. This reflected that the operations of the new ATMS had no implication on people's sentiments to outbound travel by air.

4. Regarding the teething issues of the new ATMS, the CAD has taken prompt follow-up actions, including working closely with Raytheon, the system's contractor, in order to optimise the system and operating procedures. The CAD also set up an expert panel comprising local and overseas experts in the aviation and engineering fields with the terms of appointment from 1 December 2016 to 30 November 2017. The expert panel will provide objective expert advice to the Director-General of Civil Aviation (DGCA) on the problems encountered and the necessary long-term optimisation work during the year after the full commissioning of the new ATMS; and share with the CAD international experience with a view to further optimising the performance of the system. The ATMS expert panel convened its first meeting on 16 December 2016 and the second meeting on 18 January 2017. Expert panel members will meet representatives of the Hong Kong Air Traffic Control Association and the CAD Electronics Engineers' Branch of Hong Kong Chinese Civil Servants' Association to appreciate the views and experience of them who are the major users of the new ATMS.

5. The overseas independent consultant from the United Kingdom appointed by the Transport and Housing Bureau (THB), the National Air Traffic Services (NATS), confirmed that the ATMS engineering was safe, stable and reliable. As pointed out by the NATS earlier, given the complexity of an ATMS, even with all reasonable efforts and endeavours, there could still be possibilities of having setbacks during the introduction of the new system in full. The new ATMS would need some time to optimise and fine-tune its performance and suit the unique local circumstances. The expert panel also agreed that the optimisation

process is indispensable and understandable. Any ATMS, regardless of the brand, would encounter this situation and there have been similar experiences overseas. The most important point is that, as confirmed by both the NATS and the expert panel, the CAD has established an appropriate and effective responding mechanism to cope with different teething issues, which was on par with international practice.

6. With regard to the motion moved by Hon Michael TIEN Puk-sun which urged “the Government to conduct tender exercise for the comprehensive replacement of system by the end of 2017 if the system cannot be enhanced to a satisfactory level”, as per the expert advice mentioned above, it was possible for any new ATMS to encounter teething issues. From exchanges with other overseas Air Traffic Control (ATC) Centres, the CAD also learnt that such situation was not unique to Hong Kong as overseas centres also needed some time to adjust the system when replacing ATC systems. To replace an ATC system, from preparation to full commissioning, it often takes ten years or more. It should not be lightly contemplated and we should not rush into a decision. In the light of the stable performance of the new ATC system at present (see paragraphs 2 to 3 above), there is no ground to consider system replacement. The CAD will continue to focus on handling teething issues of the new system and putting the necessary optimisation work in place.

7. In fact, the new ATMS has been fully commissioned for two months and has experienced different weather conditions and modes of operation. Generally speaking, its operation is safe, stable and smooth. This has been publicly confirmed by the Board of Airline Representatives Hong Kong which represents over 70 airlines. The staff associations of the air traffic controllers (ATCOs) and electronic engineers also openly remarked that they had confidence in the new system.

8. In addition, in the motion moved by Hon Holden CHOW Ho-ding, the CAD was recommended to “expeditiously publish on a quarterly or an interim basis reports on the findings of progress assessment undertaken by the NATS (an independent consultant) and an expert panel set up earlier during the teething period, as well as take measures to implement the improvement recommendations put forward by NATS and the expert panel”. In the information paper submitted to the Panel for its meeting on 28 November 2016, the Government had enclosed four consultancy reports completed by the NATS on the new ATMS. The NATS is reviewing some occurrences happened after the full commissioning of the new ATMS and their reports will be made

public upon the completion of the relevant work. Moreover, the expert panel set up by the CAD plans to make a preliminary report in March or April this year, which will also be made public. The CAD will continue to make timely promulgation on the operations of the new ATMS according to the established mechanism in an open and transparent manner.

Warm Standby Period

9. Regarding the motion moved by Hon Jeremy TAM Man-ho that “the CAD should immediately reactivate the old ATMS and put it on Warm Standby Mode till 31 January 2017”, the CAD had explained to the public earlier that after careful consideration and conducting a risk assessment, the actual performance of the new ATMS was regarded as generally smooth and stable and its multiple fallback systems had never been activated. It is therefore not necessary to extend the warm standby period of the old ATMS. The press release issued by the CAD is at [Annex I](#) (*Chinese only*).

10. In fact, the THB has consulted the NATS on this issue. The NATS concurred with the CAD on the provision of a warm standby for a period of 10 days until 23 November 2016 and then followed by a cold standby. Such practice was aligned with the NATS experience and, in the NATS consideration, was proportionate to the overall risk to service provision. Taking into account the experience of the new ATMS after its full commissioning, including the handling of individual occurrences happened without the need to activate its fallback systems, let alone the consideration of reactivating the old system, the NATS did not consider it necessary, from a technical point of view, to extend the warm standby period of the old system. The extension of the warm standby period might, on the contrary, pose an additional burden on the CAD manpower resources as it required 15 to 20 additional staff members as a whole (including shift duties and leave arrangements), accounting for one-fifth of the staff concerned, which is not a wise way of manpower deployment. This could in itself potentially undermine service provision and affect other aspects of air traffic control services. NATS also noted that the effectiveness of the warm standby is likely to diminish over time as controllers and engineering staff lose familiarity with the old system. The views of the NATS are at [Annex II](#) for reference.

11. The CAD will maintain the old system in the state of cold standby for a period of time to provide an additional level of protection in

addition to the multiple fallback systems of the new system. Under the cold standby mode, the old system could be reactivated in about two hours, which was in fact not much difference with one hour under the warm standby mode, to handle real time air traffic and cope with the air traffic management need safely. The expert panel also agreed to the above arrangement.

12. As mentioned above, the smooth flow of air traffic during the peak season in the last Christmas and New Year holidays is the best proof of the performance of the new ATMS.

Human Factors

13. In the motions moved by Hon Jeremy TAM Man-ho and Hon Holden CHOW Ho-ding, concerns have been expressed on the manpower requirement of ATCOs, CAD's communication with ATCOs and other staff members, as well as the fairness of the self-assessment survey of ATCOs during the phased functional implementation (PFI) of the new ATMS. The Government's responses are set out in the ensuing paragraphs.

14. To meet the development of the HKIA and the air traffic growth in the region in the long term, the CAD will regularly review the need to recruit and train more ATCOs and will bid for additional manpower and resources through the relevant bureaux according to the Government's established procedures. During the process, we will take Members' views into consideration.

15. Moreover, the management of the CAD attaches great importance to communication with staff. Taking the implementation of the new ATMS as an example, apart from formulating a comprehensive training plan and providing additional training sessions for ATCOs, the management of the CAD encouraged ATCOs to put forward suggestions on the new system to the project team. Staff suggestions were carefully reviewed and adopted as appropriate to further enhance the efficiency of the new system. The management of the CAD values exchanges with staff and have organised more than 10 tea gatherings before the full commissioning of the new ATMS to solicit views from frontline staff in a relaxing atmosphere. The CAD will continue to maintain close communication with staff and encourage staff at all levels to reflect truly all the circumstances during the teething period of the new system.

Their views will be carefully considered in a bid to keep up the morale of this professional team.

16. As the CAD gives high regard to the readiness of ATCOs to operate the new ATMS, questionnaires were distributed to all ATCOs during the PFI to gather their self-assessment of their own readiness to operate the new ATMS. Such arrangement also encouraged them to reflect their views on how to enhance the operation of the system and whether there was a need to strengthen training in any particular aspect of their own. In fact, self-assessment on readiness on a named basis was necessary and it was also common international practice for the management to accurately assess staff readiness and, more importantly, to offer appropriate help and assistance to address the diverse needs of individual ATCOs. Before the full commissioning of the new ATMS, most of the over 180 ATCOs indicated through the self-assessment that they were ready to use the new system to handle live traffic. The remaining few controllers are either on leave or will proceed to retirement soon. Since the full commissioning of the new ATMS, ATCOs have gradually matured in operating the new system. The President of the Hong Kong Air Traffic Control Association has commented in public that ATCOs have gradually adapted to different functionalities of the new system. Objective statistics also proved that during the peak traffic flow in the last Christmas and New Year holidays, the ATCOs could use the new system in maintaining an orderly flow of air traffic and handled more flight movements over the corresponding period a year earlier. Therefore, the CAD considers that there is no need to carry out similar surveys at the moment, but will continue to understand the needs and views of ATCOs through various channels.

17. Regarding the comments alleging that some CAD staff had forced ATCOs to modify their answers in the self-assessment, both the THB and the CAD have publicly stated that if individual staff members have any misgiving that their grievances or complaints cannot be properly addressed by the established channel, they may approach the DGCA, the CAD senior management or the THB direct. On the other hand, Hon Jeremy TAM Man-ho forwarded information about the management of the CAD being suspected of threatening ATCOs to the THB on 21 December 2016. The case has been referred to the DGCA for follow up action according to the established mechanism and the DGCA will report the results to the THB. An investigation is underway. Should any misconduct be established upon proper investigation, this will be followed up by the appropriate authorities in accordance with the established mechanism.

Experiences of India and Dubai

18. The motion moved by Hon Jeremy TAM Man-ho has urged that “the CAD should learn from the relevant experiences of the aviation departments of India and Dubai, and report to this Panel whether similar problems were encountered in their systems and the solutions to these problems.” A Member stated at the meeting that the international airport at New Delhi, India, which was also a user of the Autotrac III system of Raytheon, had stopped using the system because of system failures. We believe that the ATC system failure in India mentioned by the Member refers to the incident happened in October 2016 during which the operation of the international airport at New Delhi was suspended for two to three hours due to ATC system failure. As far as we are aware and as confirmed by Raytheon, the design of Hong Kong’s Autotrac III system is not totally the same as that of New Delhi. Raytheon stated that the incident at the international airport of New Delhi was caused by overflow of an internal monitoring counter in the software. The CAD had tasked Raytheon to check the software of the system in Hong Kong and Raytheon confirmed that the said component was not used by the system in Hong Kong. Therefore, such incident will not occur in the system in Hong Kong.

19. According to the CAD’s understanding with the Indian authority in last April, the international airport at New Delhi is still using the Autotrac III system. However, since a new control tower will be built at another location, a new ATMS will be procured. The Indian authority informed the CAD that the procurement exercise was not related to the performance of the Autotrac III system. The existing Autotrac III system will still be in use until the commissioning of the new control tower in 2017, when the Autotrac III system will be turned into a back-up system.

20. As to a Member’s remark about the Dubai airport, which was also a user of the Autotrac III system, ceasing using some of the functions of the system (such as the electronic flight strips (EFS)), the CAD has come to understand, through Raytheon, that the Dubai authority had planned to replace paper strips with the EFS progressively, and the ATC tower at Dubai has been using the EFS. In fact, Dubai’s EFS system was not developed by Raytheon.

21. We wish to point out that regardless of the actual situations in India and Dubai, a generalised conclusion cannot be readily drawn for

Hong Kong. Two overseas experts of the expert panel had shared their experience in regard to the EFS that it involved a significant change in work culture. It is normal and understandable for ATCOs to take a longer time to adapt. As the operational environment and work culture vary in different places, the required adaption time also varies. Staff capabilities and levels of acceptance are most crucial. In this respect, as mentioned earlier on, the Hong Kong Air Traffic Control Association has openly expressed that ATCOs are gradually adapting to various functionalities of the new ATMS.

Conclusion

22. The CAD will continue to closely monitor the performance of the new ATMS and collaborate with the contractor, expert panel and frontline staff in order to speed up the optimisation and fine-tuning process of the system. It is expected that the expert panel will make a preliminary report in March or April this year. Furthermore, the CAD will actively implement the recommendations of the expert panel and the NATS, the independent consultant of the THB, with a view to bringing further enhancements to the performance of the system.

23. The Government fully understands the community's concerns over aviation safety. Should there be any issues concerning aviation safety, it will be timely promulgated according to the established mechanism in an open and transparent manner. The CAD will also spare no effort in ensuring the safety of the new ATMS and upholding the highest level of aviation safety in a bid to maintain Hong Kong's status and reputation as a regional aviation hub.

**Transport and Housing Bureau
Civil Aviation Department
18 January 2017**

附件一

民航處處長在航空交通管理系統專家小組首次會議後會見傳媒開場發言要點(只有中文)

以下是民航處處長李天柱今日(十二月十六日)在航空交通管理系統專家小組舉行第一次會議後會見傳媒的開場發言要點:

為了檢討新航管系統過渡之後的優化工作,民航處成立了專家小組。我很感謝各位專家今日抽空出席第一次會議,除了我身旁的專業飛機工程師詹永年、香港理工大學文効忠教授和法國民航學院校長Marc Houalla外,另外兩位專家林光宇和柯冠名目前身處外地,剛才透過視像電話參加會議。

民航處向專家小組成員介紹了新系統的主要設計和功能 and 過渡期的準備安排,亦講解了新系統啟用近五個星期以來的運作情況、遇到的問題及解決方案。

首先我想說,系統合格與否以國際標準為本,我們的系統一直滿足相關要求。當然,我們會繼續精益求精。

與會專家對新系統磨合期出現的種種情況表示理解。他們亦分享了其他國家在推出新航管系統初期,都有遇到類似的情況,並分享應付方法,這些經驗極具參考價值。他們指出,鑑於新航管系統的複雜性,在運作初期出現一些特殊或不能預見的情況,是無可避免,亦可以理解。最重要是民航處有一套有效和既定的應對機制,處理不同的情況,絕對不會影響航空安全。

今次是專家小組的第一次會議,各專家對新系統有了初步的了解,未來還有很多跟進工作,進一步深入探討如何加快優化系統的工作。專家小組初步擬定了未來一年的工作綱領,並同意下月底舉行第二次會議,屆時將會邀請不同持份者,包括民航處前線員工,如空管人員和電子工程師出席,聽取他們對完善新系統的意見。我們亦會不時公布專家小組的意見及工作進度。專家小組期望可於明年三、四月提交一份初期報告。

有立法會議員星期二在立法會經濟發展事務委員會會議上,就新系統提出了一些意見,專家小組亦有討論過。我簡單總結一下專家小組的初步意見:

第一：議員關注杜拜雖然同樣使用Autotrac III，但已暫停使用電子飛行進程單，而「改用」紙條，這樣做是因系統出現了問題。據我們同事了解，情況並不是議員所講的那樣。杜拜其實一直有計劃逐步用電子飛行進程單取代紙條。就我們所知，目前杜拜的空管指揮塔已經使用電子飛行進程單。不過，無論杜拜的現況實際如何，重要的是，我們不能單靠一件事的表徵確定內裏的因果。兩位海外專家在這議題上亦分享了他們的經驗，並表示他們的經歷證明，任何大型系統轉換或提升工作（包括由紙條轉換至電子飛行進程單）均是一項重大的工作文化改變，空管人員需要較長時間去適應。各個地方的運作環境和文化均有所不同，作出改變所需的時間亦不同，最關鍵是員工的能力和接受程度。在這方面，民航處的空管專業員工亦已經發出了聲明，強調他們已逐步適應新系統各項功能的運作。

我亦想指出，在借鑑海外經驗之餘，最重要是所有空管系統都需要經過嚴格測試，符合國際民航組織的全球性標準及當地的運作要求才會使用。香港的情況亦然。

第二：是否需要考慮再更換新系統。運房局委聘的海外獨立顧問NATS（英國國家航空交通服務有限公司）早前已確認新航管系統工程的安全、穩定和可靠，但鑑於系統的複雜性，NATS指出，即使盡了最大努力，系統全面運行初期仍有機會出現一些特殊的狀況，需要一段時間來優化和微調系統以配合本地的獨特情況。今天專家小組亦同意，這個優化過程是必然的，無論甚麼牌子的系統也不能避免。

第三：選擇warm standby（動態備用）還是cold standby（靜態備用）。航空安全絕對不容妥協，民航處決定無需延長warm standby，是根據風險評估結果，並考慮到客觀數據和實質需要，這是一個專業並以事實為本的決定。由於新系統啟用後整體運作暢順，系統亦有多重備用保障，加上空管人員現亦可以透過最近安裝的衛星導航輔助系統看到香港飛行情報區內飛機的位置及飛行資料，因此無需延長warm standby。空管經驗豐富的兩位外國專家都指出，本港的做法與其他國家大型航管系統轉換的備用安排一致。何況在cold standby的狀態下，重新啟動舊系統處理實時交通，只需大約兩小時，其實和warm standby模式所需的一小時，相差不大。Warm standby牽涉額外調配15至20人以輪班方式工作，佔相關人手的五分之一，絕非坊間所言只需三數名員工就可以應付。尤其年底是旅遊高峰期，員工已經需要取消休假以應付加班航班。我們實在不應該在無實際需要的情況下，加重空管人員的工作負擔。在人手緊絀的情況下，明智的做法是集中人手以新系統處理實時交通。

第四：聖誕新年航班高峰期的處理能力。正如我在立法會所講，雖然新系統仍處於磨合期，但每日處理的航班數量，其實已回復舊系統的節奏，最高峰的一天處理了超過1 180班航班，相當於去年聖誕、新年假期的高峰班次。我們有信心空管人員可以在聖誕、新年提供安全有序的空管服務。當然，我們已安排在航空交通流量高的日子，加派人手當值。

最後我想講，新系統投入運作後，雖然出現了一些狀況，但整體上一直表現穩定，運作暢順，這一點亦獲得代表70多間航空公司的香港航空公司代表協會確認，代表空管人員和電子工程師的協會亦表示對新系統有信心。新系統對本港航空發展非常重要，我希望大家相信這班新系統主要「用家」的意見，民航處一定會和承辦商、專家小組緊密合作，盡力加快新航管系統的優化和微調工作，令大家重拾信心。

完

2016年12月16日（星期五）

香港時間14時55分

NATS Assessment of Warm Standby Availability

1. Introduction

1.1 Following the full operation of the Air Traffic Management System (ATMS) there have been instances where the availability of flight plan associated has been impacted, with two specific occurrences having been assessed by NATS (NB 27th October and 29th November 2016), with an additional occurrence being reported on 12th December (not yet reviewed by NATS at this time).

As part of the ongoing review and oversight of the implementation of ATMS, the Economic Development (ED) Panel passed a non-binding motion, requesting CAD to reactivate the "warm standby" arrangement of the old ATMS to add "additional safeguards" during the coming Xmas and New Year peak.

Under the "warm standby" mode, flight plans are input into the old system simultaneously to keep the old system active in order to serve as a convenient back-up for the new system. ATC staff would be able to switch to the old system for handling live traffic within an hour, whenever necessary. Starting from 24 November 2016, the old system was put into a "cold standby" mode where flight plans would no longer be inputted simultaneously. Under this mode, ATC staff could still activate the old system for use within two hours. Thus the warm standby **reduces** the time to the fall back to the old system by one hour.

At THB's request, this paper provides NATS' assessment on

- (i) Whether CAD's earlier decision on keeping the "warm standby" mode for ten days was in line / on par with international standard as far as aviation safety is concerned?; and
- (ii) Whether in the light of the reported incidences NATS would, from a technical and engineering perspective, recommend CAD to consider extending the "warm standby" period for the coming Xmas and New Year peak?

2. Basis of Initial 10 Day Warm Standby Decision

NATS have had similar, but not directly comparable issues, to those reported by CAD around transition of new systems and performance including Flight Data Processing functionality. These have impacted our operations, such as during and following transitions of iFACTS, New Heathrow Tower, Manchester Node installation and transition of London Terminal Control to Swanwick. In these instances, NATS have encountered teething issues, some of which have required us to both correct a system issue, and also further mitigate the risk and impact of any potential future occurrences by maintaining the availability of the previously used functionality. In these cases, the length of the mitigating actions ran for a number of weeks, and were not extended for a period of longer than a month (noting that separate arrangements are in place to provide long term contingency facilities).

As part of the decision concerning the appropriate level of fall back, NATS considers the performance of the new system, the readiness of the 'primary' contingency system, and the impact to cost and staffing of maintaining a separate warm standby. NATS note that the effectiveness of the warm standby is likely to diminish over time as controllers and engineering staff lose familiarity with the old system.

Whilst NATS experience does not map directly on to the HK ATMS transition, the initial decision to provide the warm standby for 10 days, followed by longer term availability of the system in a state

of 'cold standby' is aligned with our experience and was, in NATS consideration, proportionate to the overall risk to service provision.

2. Extending the Period of Availability of Warm Standby

The original decision to provide a warm standby for 10 days following the ATMS transition was made in the knowledge that teething problems are not unexpected, particularly for a large and highly complex system such as an air traffic management system, during the initial period after system commissioning.

The two FDP occurrences investigated by NATS (27th October and 29th November) were in line with NATS expectations of such teething problems. Whilst NATS have not at this time reviewed the FDP service interruption on the 12th December, we understand that this was of a similar nature to the failure on the 29th November.

In these instances, the main system was reported to be recovered within an hour, and therefore the use of the warm standby would not have, in all likelihood, increased the level of service availability in these specific cases. Therefore, on the basis of the observed system occurrences, it does not seem necessary to extend the period of the warm standby availability.

2. Summary

In summary NATS believes that:

- Whilst NATS experience does not map directly on to the HK ATMS transition, the initial decision to provide the warm standby for scope of 10 days, followed by longer term availability of the system in a state of 'cold standby', is aligned with our experience, and in NATS view was proportionate to the overall risk to service provision.
- The level of system occurrences experienced by CAD between initiating full transition and the date of this paper is in line with NATS expectations.
- The three occurrences that NATS is aware of have been efficiently handled by CAD without the use of the warm standby. On the basis of the reported incidents, NATS does not consider it necessary, from a technical point of view, to extend the availability of the warm standby period for an added level of confidence, noting the additional burden to CAD manpower resources, which could in itself potentially undermine service provision.