

A. Introduction

The Audit Commission ("Audit") conducted a review of the administration of the air traffic control ("ATC") and related services by the Civil Aviation Department ("CAD"), in particular the implementation progress of the Air Traffic Management System ("ATMS") contract.

Background

2. According to the Audit Report, CAD is committed to a safe, efficient and sustainable air transport system. Its primary functions are three-fold:

- (a) provision of ATC services - CAD provides ATC services and flight information to flights arriving and departing Hong Kong International Airport and aircraft overflying the 276 000 square kilometres Hong Kong Flight Information Region;
- (b) regulation of the civil aviation industry - CAD sets aviation safety and security standards, oversees the compliance by the Airport Authority, airlines and aircraft maintenance organizations with such standards, and maintains a licensing system for aviation professionals; and
- (c) investigation of aircraft accidents or serious incidents - CAD conducts the investigation of civil aircraft accidents or serious accidents that occurred in Hong Kong with the objective of preventing recurrence.

3. The air traffic (in terms of aircraft movements) handled by CAD from 1998-1999 to 2013-2014 had increased from 177 759 by 113% to 378 617 for Hong Kong International Airport and from 70 561 by 217% to 223 775 for overflying traffic. According to Airport Authority Hong Kong, the Hong Kong International Airport, if operating as a three-runway system, will be able to meet the forecast traffic demand in 2030: 97 million passengers, 8.9 million tonnes of cargo and 602 000 flight movements a year¹. The Administration affirmed of the need of a three-runway system in March 2015. Against this background, it is imperative for CAD to continue providing safe and efficient ATC and other related services.

¹ Please refer to the publication by the Airport Authority Hong Kong at the following link: <http://www.newsletter.threerunwaysystem.com/2012issue01/index.html#eng>.

The Committee's Report

4. The Committee's Report sets out the evidence gathered from witnesses. The Report is divided into the following parts:

- Introduction (Part A) (paragraphs 1 to 9);
- Procurement and implementation of the new air traffic control system project (Part B) (paragraphs 10 to 94);
- Management of the precision runway monitor project (Part C) (paragraphs 95 to 102);
- Administration of air traffic control service related charges (Part D) (paragraphs 103 to 110);
- Administration of the mandatory occurrence reporting scheme (Part E) (paragraphs 111 to 121); and
- Conclusions and recommendations (Part F) (paragraphs 122 to 124).

Public hearings

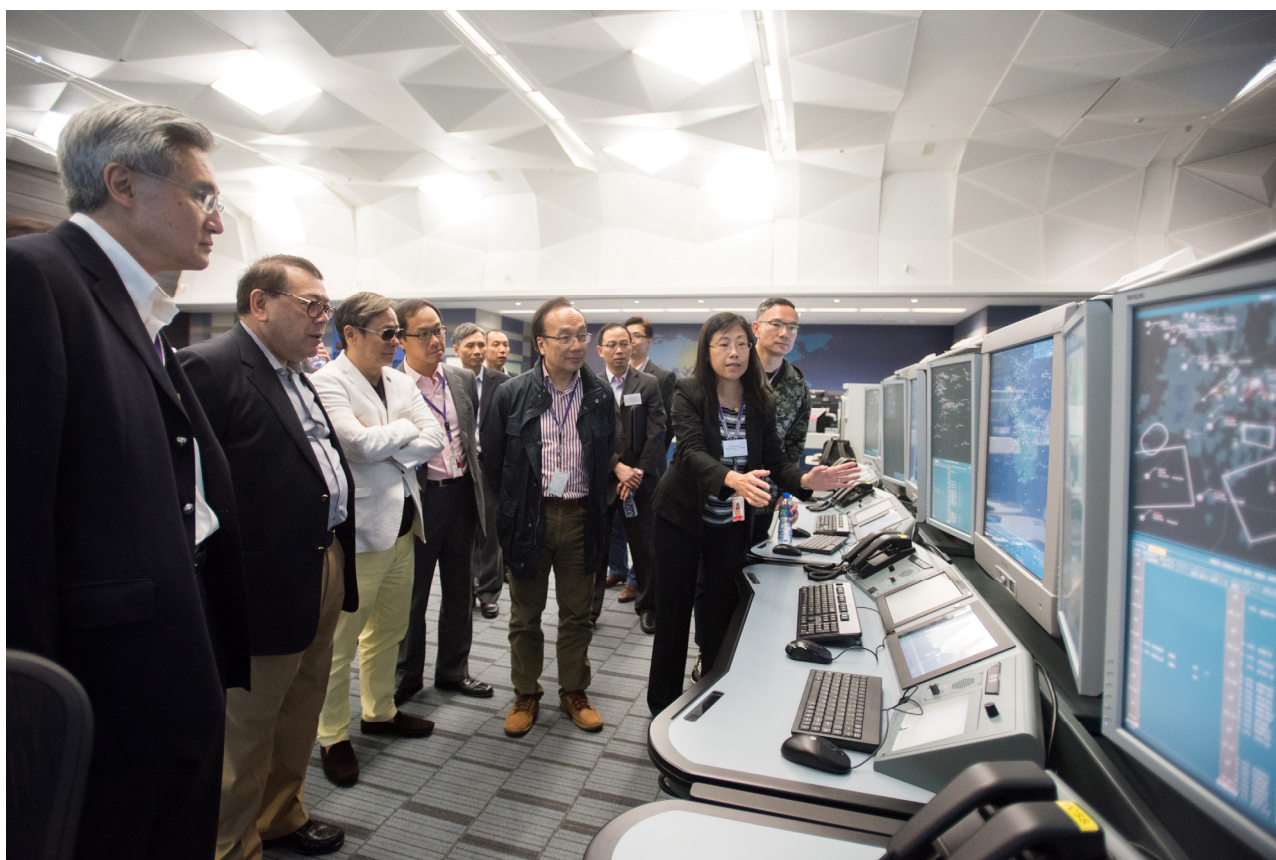
5. The Committee held a total of six public hearings from December 2014 to March 2015 to receive evidence on the findings and observations of the Director of Audit's Report ("the Audit Report").

Site visit

6. The Committee conducted a visit to CAD on 23 May 2015 to better understand the operation of the existing ATMS and the testing of the new ATMS. The Committee also visited the existing ATC centre and the new ATC building.²

² During the visit on 23 May 2015, the Committee noticed that on the sticker labels at the back of the display screens for the controller working positions at the new ATC building, it was printed "Made in USA" in English but "比利時製造" (Made in Belgium) in Chinese. CAD's attention was drawn to this irregularity.

Photograph 1



Representatives of CAD brief members of the Committee on the testing of the new ATMS during the visit on 23 May 2015

Submissions from members of the public

7. The Committee has received a number of submissions from members of the public giving views on the new ATC System project, in particular on the tendering process, tender evaluation, provisions in the Tender Document for replacement of ATMS ("Tender Document"), project implementation and the reliability of ATMS. While the Committee welcomes members of the public to give views on the subject under investigation, the Committee has followed the established practices that this Report only contains evidence obtained from witnesses at the public hearings as well as written submissions from witnesses providing supplementary information to their evidence.

Opening statement by the Secretary for Transport and Housing

8. **Professor Anthony CHEUNG, Secretary for Transport and Housing**, made an opening statement at the beginning of the Committee's public hearing on 9 December 2014, a summary of which is as follows:

- regarding the delay in the replacement of the ATC system, he pointed out that enhancing aviation safety and ATC efficiency was the prime objective of the replacement of the system. The ATC system was a major and highly complex integrated system. Prior to its commissioning, the system had to go through comprehensive testing to ensure that it operated smoothly, safely and stably that could fully comply with the latest international requirements and meet the safety standards stipulated by CAD, which must not be compromised. The project for the ATC system was not an ordinary project of equipment replacement. The overseeing of the tendering and installation work should meet the highest international aviation standards, with a view to ensuring the system could cope with the latest development in aviation technology, and that it could operate in a safe and reliable manner; and
- the Transport and Housing Bureau ("THB") understood that the public were concerned about the replacement of the ATC system, in particular how the delay in commissioning the new system would affect the ATC operation, the operational reliability of the existing ATC system, etc., which had been pointed out in the Audit Report. CAD had accepted the various improvement recommendations made by the Director of Audit, and would continue to urge the Contractor of the ATMS ("the ATMS Contractor") to expedite action in rectifying the outstanding problems in the new system and monitor the remaining contract work more closely in order to minimize further delay of the project.

The full text of the Secretary for Transport and Housing's opening statement is in *Appendix 5*.

Opening statement by the Director-General of Civil Aviation

9. **Mr Norman LO Shung-man, Director-General of Civil Aviation**, made an opening statement at the beginning of the Committee's public hearing held on 9 December 2014, the summary of which is as follows:

- CAD accepted all the recommendations in the Audit Report;
- aviation safety was CAD's topmost priority. The new ATC system must meet stringent ATC requirements before commissioning. CAD would continue to urge the ATMS Contractor to expedite actions on rectifying the outstanding deficiencies/observations in the new system

and would closely monitor the remaining contract work to ensure minimum project delay;

- on the ageing of the existing ATC system, CAD had implemented appropriate measures and had stepped up maintenance efforts to keep it in smooth operation until the new ATC system was available;
- the main objective of the the precision runway monitor ("PRM") project, which was implemented almost 20 years ago, was to enable higher runway capacity for the new airport's two runways. Before the PRM radar could achieve its anticipated objective, CAD had achieved it by continuously optimizing ATC procedures, flight operations and meteorological conditions for approaches;
- during the 16 years from the commissioning of the new airport back in 1998 to the present, runway capacity had been increased to 66 movements per hour from 31 movements per hour. In 2015, it would further be increased to 68 movements per hour, exceeding the maximum capacity of 63 movements per hour for the dual runways estimated in the 1994 Airspace Design Study; and
- in managing major equipment projects in the future, CAD would strengthen project appraisal to ensure full evaluation of uncertainties and risks impacting on project viability.

The full text of the Director-General of Civil Aviation's opening statement is in *Appendix 6*.

B. Procurement and implementation of the new air traffic control system project

10. One of the major functions of CAD is to provide ATC services to flights arriving at or departing from the Hong Kong International Airport and aircraft overflying the Hong Kong Flight Information Region.

11. The ATC system, comprising advanced electronics systems, is an essential tool enabling air traffic controllers to provide safe, reliable, effective and efficient ATC services.

12. In May 2007, CAD obtained funding of \$1.565 billion to replace its ATC system. According to the paper submitted by the Administration to the Legislative Council ("LegCo") Finance Committee ("FC")³, the existing ATC system would be approaching the end of its useful life by 2012 and the new ATC system was targeted for commissioning in December 2012. However, as at May 2015, it was not yet in operation.

13. CAD implemented the new ATC system project through eight major contracts, including the ATMS contract, the Air Traffic Services Data Management System contract, the Aeronautical Information Management System contract, the Aeronautical Messaging System contract, the Communication Backbone contract, the Communications and Recording System contract, the Relocation and Expansion of Air Traffic Services Message Handling System contract and the Ancillary and Technical Support Systems contract. Seven of the eight contracts were substantially completed on schedule, and there has been substantial delay in the implementation of the ATMS contract. This contract, with original contract value of \$486 million, is the most complex in terms of scope, design, system software development, functional and system interoperability requirements. As at May 2015, it had two contract variations with a total sum of \$89.2 million.

Delay in the implementation of the ATMS contract

14. The Committee noted with concern that there was a substantial delay in the implementation of the ATMS contract which was targeted for completion on 20 December 2013⁴, but slippages in the completion of various milestones of the ATMS contract were revealed in the Table 3 of the Audit Report. As such, the Committee enquired about the reasons for the slippages.

15. **Mr Simon LI Tin-chui, Deputy Director-General of Civil Aviation**, explained at the public hearings that:

- the slippage in the ATMS Contractor's submission of Detailed Design Document to CAD was due to the complexity of ATMS and its

3 Please refer to the paper submitted by the Economic Development and Labour Bureau to FC in May 2007 [LC Paper No. FCR (2007-08)9] for details.

4 According to Tables 2 and 3 of the Audit Report, tender invitation was issued in November 2009 and the ATMS contract was awarded in February 2011. The original target date of completion of Phase 1 ATMS and system integration was June 2013, but due to the second contract variation, it was extended for six months, until 20 December 2013.

integration with other ATC systems, and a longer time required to resolve issues identified during the meeting of the Detailed Design Review ("DDR") in order to meet CAD's requirements; and

- the slippage in the ATMS Contractor's submission of Site Acceptance Tests Procedures to CAD was due to the change in the testing requirements of CAD. With experience gained during the Factory Acceptance Tests, it was agreed between CAD and the ATMS Contractor that scenario-based test should be included in the Site Acceptance Tests Procedures. The scenario-based test would enable more thorough checks on the system functions, performance and reliability as it would emulate live operations.

16. In reply to the Committee's request, **Director-General of Civil Aviation** provided a table setting out the reasons for slippages in various milestones of the ATMS contract in his reply dated 27 December 2014 (in *Appendix 7*).

17. The Committee was of the view that CAD, as a professional department, should have anticipated the complexity of the ATMS project. In addition, scenario-based test, which was an important test using live traffic, should have been included in the tender specifications of the new ATMS and CAD should have allocated sufficient time for completing this test in the first place.

18. The Committee was concerned about the three-and-a-half year serious delay of the ATMS project, i.e. from end 2012 (the end of usable life of the existing ATMS) to the estimated first half of 2016 (when the new ATMS and ATC System would be ready for operation) and the implications of the delay on the project costs. At the request of the Committee, **Director-General of Civil Aviation** provided a table setting out the reasons for slippages in various critical tasks of the implementation of the ATC system project in his reply dated 27 December 2014 (in *Appendix 8*) and a table comparing the actual figures with the estimated capital cost for the replacement of ATC system in his reply dated 12 December 2014 (in *Appendix 9*).

19. The Committee noted that CAD had stated in its reply dated 12 December 2014 (in *Appendix 10*) that "the original schedule for the procurement and testing of the new ATC system might be a bit too ambitious". In this connection, the

Committee asked for CAD's basis to make this statement. **Director-General of Civil Aviation** stated in his letter dated 24 December 2014 (in *Appendix 11*) that:

- according to the overseas experience, it normally took more than two-and-a-half years from contract award to completion for similar large-scale ATC system replacement. For instance, it took six years for Singapore to replace their ATC centre, with three years' delay incurred. Likewise, the Swanwick ATC centre in the United Kingdom, which was responsible for the southern airspace covering the Heathrow airport, took about 11 years to replace their ATC centre and suffered about six years' delay;
- with hindsight, CAD considered that it would be more desirable if some buffer periods had been included in the original implementation plan of the ATC system project to cater for the additional time required to resolve any possible unforeseen issues that might arise during the implementation of such sophisticated and complicated system; and
- CAD would draw lessons from this case.

Tendering exercise for the procurement of the new ATMS

20. According to Table 3 and paragraph 2.13 of the Audit Report, there were a large number of deficiencies/observations identified during the Factory Acceptance Tests of the ATMS contract and there were slippages in the completion of various milestones of the ATMS contract. As such, the Committee looked into whether CAD had selected a suitable contractor to provide the new ATMS as well as whether the tendering exercise had been conducted properly, fairly and impartially. CAD was requested to explain in details the procurement process of the new ATMS.

21. **Director-General of Civil Aviation** stated at the public hearings and in his letter dated 27 December 2014 (in *Appendix 12*) that CAD had strictly followed the rules and procedures as stipulated in the Government Stores and Procurement Regulations ("SPR") and the World Trade Organization Government Procurement Agreement ("WTO GPA") throughout the procurement of ATMS to ensure fairness and impartiality in the tendering exercise. At the request of the Committee, **Director-General of Civil Aviation** provided a flowchart showing the steps leading to the award of the tender for the ATMS contract in his reply dated 27 December 2014 (in *Appendix 13*).

Preparation and formulation of Tender Document for the procurement of ATMS

22. Regarding the preparation and formulation of Tender Document, **Director-General of Civil Aviation** explained in his letters dated 12 and 27 December 2014 (in Appendix 10 and Appendix 12) that:

- the tender document for procurement of the new ATC system were developed by CAD in accordance with SPR. The tender document set out the technical requirements for the new system, including a stable and reliable system architecture, enhanced flight information and data processing capability, highly automated with advanced safety net features, precise flight trajectory prediction function, etc. These requirements were formulated based on the latest technical, operational and safety standards adopted worldwide in regard to ATC system, as well as the experience in operating the existing ATC system. The objective was to enhance the processing capacity and functions of the new ATC system in compliance with the latest International Civil Aviation Organization ("ICAO") requirements;
- prior to developing the tender document, CAD had conducted comprehensive market research on the ATC system, and paid fact-finding visits to overseas major ATC centres to exchange views with the ATC personnel there and learnt from their experience. This allowed CAD to acquire more in-depth understanding on the latest technical, operational and safety standards adopted worldwide in operating ATC system, thereby facilitating the incorporation of latest technology and safety requirements into the tender document;
- CAD also consulted the aviation industry about its plan to replace the ATC system, including the International Air Transport Association, the Hong Kong Air Traffic Control Association, and the Panel on Economic Services (renamed as the "Panel on Economic Development" ("ED Panel") in October 2007) of LegCo. From 2007 onwards, CAD discussed and collected views of the ATC personnel in various areas, including new system project planning, system functions, human-machine interface, operation workflow, implementation and transition etc., and incorporated the collected views into the tender document to ensure that the new ATC system could meet CAD's operational needs and requirements; and
- regarding whether a higher weighting than 40% could be adopted for the technical score, CAD had explored during the preparation of the

tender document for the ATC system project in 2008 with Government Logistics Department ("GLD") on the feasibility, especially for the ATMS contract, but was advised that a higher technical weight would not necessarily ensure a higher quality of the service/product to be delivered by the successful supplier and a value for money purchase had to be ensured. GLD also advised that the setting of mandatory requirements and essential requirements under the marking scheme before calculating the technical/price score would instead guarantee that only those capable contractors with quality proposals would be awarded with the contracts. In view of GLD's advice, CAD adopted 40% weighting for technical score and 60% for price score in accordance with SPR for a value for money procurement for ATMS, which was eventually approved by the Central Tender Board⁵ ("CTB").

Tender invitation

23. The Committee noted from paragraph 5 of the memorandum dated 8 December 2010 from GLD to the Chairman of CTB (in *Appendix 14*) that 45 local suppliers and 43 suppliers from places outside Hong Kong were invited to submit tender proposals for providing the new ATMS, and five offers from five suppliers outside Hong Kong were received. In this regard, the Committee asked:

- based on what criteria and through what channels the supplier list of 45 local suppliers and 43 overseas suppliers for the ATMS tender exercise was compiled;
- whether it was common for open tenders to have a low response rate, i.e. only five tenders proposals received out of more than 80 invitations sent out; and
- the number of suppliers invited to submit proposals for the tender for procuring the existing ATMS in the early 1990s, and the number of tender proposals received.

24. **Ms Maisie CHENG Mei-sze, Director of Government Logistics**, explained in her letter dated 12 January 2015 (in *Appendix 15*) that:

⁵ CTB was chaired by the Permanent Secretary for Financial Services and the Treasury and comprised the representatives from the Financial Services and Treasury Bureau ("FSTB") and GLD, etc.

- GLD maintained lists of local and overseas suppliers of various goods and related services to facilitate the issue of tender notifications. Suppliers could apply for inclusion in the relevant GLD supplier lists according to the nature of goods/services they provided;
- with a view to widening the source of supply and obtaining the most cost-effective tender proposals, the Government adopted open tendering in 2009 for the procurement of ATMS. Apart from publishing the relevant tender notice in the Government Gazette and on the website of GLD, the Government also invited all local and overseas suppliers of GLD listed under the product group of "radar apparatus, including navigational aid radars" to participate in the tender exercise;
- compared with previous open tenders for procuring highly specialized, complicated and technical system, the response rate of this tender was not considered low; and
- the procurement of the existing ATMS in 1993 was arranged through two stages, i.e. a prequalification tender exercise and a restricted tender exercise. During Stage 1, a prequalification tender exercise was arranged to invite interested suppliers to conduct a System Definition Study at no cost to the Government. CAD had arranged an open tender for the prequalification exercise. According to CAD's record, 30 suppliers had been invited to tender and subsequently a total of five proposals were received. Upon completion of the System Definition Study, CAD had shortlisted three suppliers. The then Government Supplies Department was requested by CAD to arrange a restricted tender exercise by inviting these three suppliers in Stage 2 for the implementation of ATMS. As a result, all three invited suppliers submitted proposals for the Stage 2 tender in June 1994.

25. **Director of Government Logistics** supplemented at the hearing that, at the time when the tender for the procurement of the new ATMS was issued in 2009, the arrangements for prequalification were rarely adopted by the Administration in tenders of major systems except for public works.

Tender evaluation

26. As regards the tender evaluation process for the new ATMS, **Director-General of Civil Aviation** stated at the public hearings and in his letter dated 27 December 2014 (in Appendix 12) that:

- through an open tender exercise, a total of five tender proposals were received for the ATMS contract. The five tenders received were assessed by a tender assessment panel ("TAP") comprising 11 experienced engineering and ATC personnel of CAD⁶. TAP adopted a two-envelope approach, which was a requirement stipulated in SPR and a government-wide practice, as stipulated in the Tender Document. Under this approach, TAP first conducted a technical assessment of each tenderer's proposal and calculated the technical score. After completion of the technical assessment and obtaining agreement from GLD, GLD then provided TAP with the price information of the tender proposals to calculate the price score;
- regarding the marking scheme of the ATMS tender exercise, a weighting of 40% for technical score and 60% for price score was adopted. The marking scheme was developed in accordance with SPR⁷ and approved by CTB, and clearly stipulated in the Tender Document during the stage of tender invitation; and

Technical assessment results

- after the technical and price evaluation of the tenders by TAP, the tender proposal with the highest score was recommended for consideration and approval by CTB. Since the proposal submitted by the Contractor of the existing ATMS obtained the highest overall score, the ATMS contract was recommended to be awarded to the Contractor and the recommendation was subsequently approved by CTB⁸.

6 Please refer to paragraph 17 of CAD's reply dated 12 December 2014 (in Appendix 10) for the posts of the 11 members of TAP.

7 SPR stipulates that departments should normally adopt a 30% - 40% weighting for technical score, as against a weight of 60%-70% for price score and departments should note that a higher technical weighting would not necessarily ensure a higher quality of service or goods to be delivered by the successful tenderer.

8 Please refer to the Tender Assessment Report (in Appendix 14) submitted by GLD to CTB for details.

Experience of TAP members

27. In response to the Committee's enquiry about the competency and relevant experience of TAP members in conducting the tender evaluation for the ATMS contract, **Director-General of Civil Aviation** replied at the public hearings that:

- although only two of the TAP members had been involved in the procurement of the existing ATMS, TAP comprised experienced engineers from the Air Traffic Engineering and Standards Division of CAD who had been involved in the procurement of a number of subsystems as well as CAD's operational controllers who had been involved in carrying out evaluation and training duties;
- at the beginning of this project, TAP members had paid visits to overseas major ATC centres and attended international conferences relating to ATC system; and
- he believed that the members of TAP had the competency to conduct the tender assessment for the ATMS contract in a professional manner.

28. As to whether CAD had implemented any measures in respect of the new ATMS tender to regulate post-service employment of its staff (including those on non-civil service contract ("NCSC")) to ensure that they would not take up any post-service work which might constitute real or potential conflict of interest with their previous duties in CAD, **Director-General of Civil Aviation** explained in his letter dated 25 March 2015 (in *Appendix 16*) that:

- under the prevailing control regime stipulated by the Civil Service Bureau, directorate civil servants leaving government service (e.g. on retirement, resignation, completion of agreement) were required to obtain prior permission before they could take up any outside work during the prescribed restriction periods, so as to ensure that civil servants leaving the Civil Service did not take up work which might constitute actual, potential or perceived conflict of interest with their former government duties or which could undermine the image of the Civil Service or embarrass the Government;
- staff employed under NCSC terms were also subject to the control under the Prevention of Bribery Ordinance (Cap. 201), which criminalized bribery and corrupt transactions in both the public and

private sectors, and the Official Secrets Ordinance (Cap. 521), which controlled the unauthorized disclosure of official information; and

- in respect of the new ATMS tender, CAD had followed strictly the rules and procedures in SPR. All TAP members had signed declaration and undertaking to confirm no conflict of interest prior to the conduct of the tender assessment exercise. The composition of TAP was also approved by CTB.

Due diligence

29. On the question of whether CAD had conducted due diligence to assess that all five tender proposals were in compliance with the mandatory requirements as stipulated in the Conditions of Tender, **Director-General of Civil Aviation** explained in his letter dated 12 January 2015 (in *Appendix 17*) that CAD had strictly followed the evaluation procedures as laid out in the Conditions of Tender, which were in line with international and industry practices. CAD verified compliance of the tenderers' proposed systems against all the essential requirements through checking their submitted documents, clarification with the tenderers, and solicitation of information, including the user feedback, system performance and tenderer performance, etc., through questionnaires. CAD also conducted visits to the factory sites of all the five tenderers (with same set of checklist items sent in advance to all the tenderers) to verify that their proposed systems could meet the relevant essential requirements.

30. The Committee noted from the Conditions of Tender that the Government reserved the right to conduct visits to the factory(ies) and reference site(s) of all the tenderers who have passed Stage 2 evaluation to verify compliance with the essential requirements⁹. In this connection, the Committee enquired whether CAD had conducted visits to the reference site(s) of all the tenderers who have passed Stage 2 evaluation.

31. **Director-General of Civil Aviation** said at the public hearings and explained in his letter dated 12 January 2015 (in *Appendix 17*) that CAD had not conducted visit to the reference sites of the tenderers during the technical assessment stage but TAP had conducted site visits to factories of all the five tenderers that had

⁹ According to Clause 8.2 of Part II of the Tender Document, "[s]ite visits to the factory(ies) and reference site(s) of any Tenderer who has passed Stage 2 evaluation in Clause 24.1 may be required so as to enable the Government to inspect the operational equipment as proposed in its tender in the course of the evaluation."

met the mandatory requirements in the Tender Document. TAP had also devised and issued a set of questionnaire inviting written responses from users of the reference sites provided by the tenderers. This was considered to be a more efficient and cost-effective arrangement given the following considerations:

- in view of the complexity and highly technical nature of ATMS, it would be more effective for CAD to conduct factory visits to assess the technical capability of the tenderers as more specific and comprehensive on-site tests or inspections of the systems of the tenderers could be conducted, and questions could be raised with the tenderers on the spot, which could facilitate direct communications and clarifications with the tenderers; and
- a factory setup would provide a more suitable environment for the tenderers to demonstrate their latest technology and the essential features of ATMS, especially those safety-critical ones, with the use of test beds or simulators.

32. The Committee also enquired whether CAD had solicited comments from users of the ATMS Contractor's Proposed System regarding its performance prior to the award of the ATMS contract, **Director-General of Civil Aviation** stated at the public hearings and in his letters dated 12 January 2015 (in Appendix 17) and dated 18 February 2015 (in **Appendix 18**) that:

- the ATMS Contractor's Proposed System was currently used by airports in Dubai as well as the airports in Delhi, Mumbai and Chennai of India. ATMS designed and manufactured by the ATMS Contractor using the same crucial sub-systems as the Proposed System were also widely used in Germany, the United States and Canada;
- the said Dubai and Indian airports had not commenced the operation of the Proposed System at the time when CAD awarded the ATMS contract to the Contractor in February 2011. As such, CAD had not sought comments from the Dubai and Indian airports prior to the award of the ATMS contract. Moreover, CAD had strictly followed the tender evaluation procedures as laid down in the Tender Document and sent questionnaires only to those reference sites which were provided by the tenderers to solicit users' feedback on the tenderers' systems; and

- CAD sent questionnaires to the reference sites at Germany and Canada provided by the ATMS Contractor to solicit users' feedback on the technical, operational and stability performance of the Contractor's Proposed Systems, and its performance, etc. The two systems used at these sites were installed with core components of the ATMS Contractor's Proposed System, namely the Surveillance Data Processing ("SDP") and Flight Data Processing ("FDP") Systems, which were critical core components in ATMS in supporting ATC operations. SDP System was used to monitor the location of flights on radar, while FDP System was used to process the flight plans filed by airlines.

33. The Committee noted that there were some media reports related to the unsatisfactory performance of the ATMS Contractor's Proposed System at the airports in India in 2010. As such, the Committee enquired whether CAD and GLD were aware of any articles/reports in the media concerning the performance of the ATMS Contractor's Proposed System at airports in Delhi, Mumbai or Chennai of India prior to the award of the ATMS contract in February 2011.

34. **Director-General of Civil Aviation** stated in his letter dated 25 April 2015 (in *Appendix 19*) that CAD understood that the Indian newspapers referred to at the Committee public hearings were media reports of 2010 related to the performance of the ATMS Contractor's Proposed Systems at the Indian airports. According to the Airport Authority of India, the ATMS Contractor's Proposed Systems at the Indian airports, namely Delhi, Mumbai and Chennai, only commenced operations from July to September 2011. According to CAD record, CAD had not received any media reports in the Indian newspapers as mentioned before the award of the ATMS contract in February 2011. **Director of Government Logistics** also stated in her letter dated 15 April 2015 (in *Appendix 20*) that according to GLD's record, GLD had not received any information or document concerning reports on the use of the ATMS Contractor's Proposed System in Indian airports before the ATMS contract was awarded.

35. Referring to the media report concerning the disappearance of the aircraft of Mr David Cameron, Prime Minister of the United Kingdom, from the screen of ATMS used by the airport of New Delhi on 28 July 2010, the Committee asked whether similar incidents had occurred during testing of the new ATMS.

36. **Director-General of Civil Aviation** stated at the public hearing on 28 March 2015 that the cause of the disappearance of an aircraft from the screen of an ATMS was a very complicated issue, and that he was unable to comprehend the circumstances of the incident without a technical analysis report. He further stated that CAD had been communicating with the airport authority in New Delhi since 2013 and was informed that there was no problem with the ATMS used by the New Delhi Airport.

37. After the public hearing on 28 March 2015, **Director-General of Civil Aviation** confirmed in his reply dated 5 May 2015 that during one of the testing scenarios of the Site Acceptance Tests conducted for the new ATMS in late September 2014, there was an incident in which a number of aircrafts disappeared from the test screen for 10 seconds before they were reinstated on-screen again. In this regard, the Committee queried why the Director-General of Civil Aviation had not advised the Committee about the occurrence of such incident during the public hearing on 28 March 2015.

38. In reply, **Director-General of Civil Aviation** explained in his letter dated 15 May 2015 (in *Appendix 21*) that:

- CAD had no information of the circumstances, technical analysis or rectification of the said incident at New Delhi Airport. For any complex and large-scale system such as ATMS, even using the same system from the same manufacturer, there could be many causes, including causal factors attributable to external systems or human factors, leading to an apparently similar phenomenon;
- the new ATMS in Hong Kong was different with the installation in New Delhi in terms of system complexity, configuration, adaptation, and interfaces with other ATC systems;
- without being privy to the ATMS system at New Delhi Airport or details of the incident, CAD was unable to confirm if observations of similar nature of failure had occurred during the testing of the new ATMS;
- CAD's recorded observations could be specific to the new ATMS in Hong Kong. As the cause of failure of the new ATMS during testing could be different from the incident in New Delhi, CAD could not draw a conclusion that they were similar incidents; and

- the momentary loss of targets for about 10 seconds from the screen of the new ATMS in late September 2014 had been positively identified and subsequently rectified in November 2014 with no recurrence since then, CAD therefore had not advised the Committee about the occurrence of such incident during the public hearing on 28 March 2015.

39. The Committee noted that according to Clause 8.1 of Part II of the Tender Document, the tenderers were required to provide a list of reference site(s) of one or more ATMS(s) which the tenderer had supplied, installed and assisted in the commissioning for the purposes of ATC and the ATMS at any one of the aforementioned reference site(s) must have been operated as the "main" system in at least one ATC centre. However, the ATMS Contractor only provided reference sites using the core components of its Proposed System. As such, the Committee enquired, besides the ATMS Contractor, whether all of the other tenderers who passed Stage 2 evaluation had provided reference sites using the full version of their proposed systems.

40. **Director-General of Civil Aviation** stated at the public hearings and in his letter dated 25 March 2015 (in Appendix 16) that:

- the Tender Document had not specified that tenderers who had passed Stage 2 evaluation had to provide reference sites using the full version of their proposed systems; and
- two out of the five tenderers who had passed Stage 2 assessment had provided reference sites which had installed core components of their proposed systems only.

41. In response to the Committee's enquiry about whether the tenderers had provided reference sites using full version of their proposed system, **Director-General of Civil Aviation** admitted that some of the words used in the Tender Document were not clear, which might have made it easy for some tenderers to make use of the situation.

42. At the request of the Committee, **Director of Government Logistics** and **Director-General of Civil Aviation** provided a consolidated table showing the six stages of the tender evaluation of the ATMS contract, the corresponding tender

clauses and the evaluation activities carried out by TAP in each stage. The table is in *Appendix 22*.

Tendering terms and process

43. The Committee noted from Clause 3.1 of Part VII of the Tender Document for the procurement of the new ATMS that the Contractor was required to provide an ATMS that could accommodate the concurrent operations of 120 controller working positions. In this connection, the Committee asked why CAD only required the tenderers to provide an ATMS with a track record of having no less than 40 ATC centre air traffic controller working positions in one ATC centre in Clause 8.1 of Part II of the Tender Document.

44. **Director-General of Civil Aviation** said at the public hearings and explained in his letter dated 15 January 2015 (in *Appendix 23*) that:

- since CAD considered that around 40 to 50 ATC controller working positions would be required for the new ATC centre, the requirement that a reference system in a tenderer's proposal should be equipped with a minimum of 40 ATC controller working positions in one ATC centre was incorporated into the Tender Document; and
- the remaining 70 to 80 ATC controller working positions would be allocated to the backup centre, operational main tower and the backup ATC tower.

45. The Committee also noted from Clause 8.1 of Part II of the Tender Document that the tenderers were required to provide serviceability/availability figures showing that the system was put in service for no less than six consecutive months any time within the last 10 years preceding the Tender Closing Date. In view of the fact that six months might not fully reflect the capability and performance of the system to handle the fluctuation in air traffic due to seasonal changes, the Committee enquired about:

- the reason for using "no less than 6 consecutive months" as the minimum track record requirement in Clause 8.1 Part II of the Tender Document; and

- the minimum track record requirement for procuring the existing ATMS in 1993.

46. **Mr Richard WU Chi-kwong, Assistant Director-General of Civil Aviation (Air Traffic Engineering Services), and Mr HUI Man-ho, Chief Electronics Engineer (Technical Support) of CAD**, said at the public hearings on 28 March and 15 January 2015 respectively, and **Director-General of Civil Aviation** explained in his letter dated 12 January 2015 (in Appendix 17) that:

- based on operational experience and the experience of CAD during the Chek Lap Kok Hong Kong International Airport project, CAD had set down a mandatory requirement on the track records of the systems submitted by the tenderers and considered that a six-month period should be sufficient to identify key anomalies that might arise in the system;
- in the Tender Document for the procurement of major ATMS by Thailand and Singapore, the tenderers were only required to provide an operational reference site and there was no minimum operation track record requirement;
- for the existing ATMS, the tenderers were required to provide serviceability/availability figures of the systems similar to the proposed system for the previous 12 months, but it was not a mandatory requirement; and
- with experience gained over the years, CAD adopted a no-less than six months' mandatory requirement for the new ATMS tender. This minimum operation period was also adopted in the Tender Document of other major ATC systems.

47. According to Clause 8.4 of Part II (Conditions of Tender) of the Tender Document (in *Appendix 24 (pages 244 to 246)*), "a proposed System with no proven performance record will not be considered further", the Committee asked how the phrase "proven performance record" should be interpreted.

48. **Director of Government Logistics** stated in her letter dated 12 January 2015 (in Appendix 15) that:

- the relevant Tender Document was prepared by CAD and vetted by GLD and the Department of Justice ("DoJ") before tender invitation;
- in the interpretation of a tender document, a clause must not be considered in isolation, but must be considered in the context with relevant provisions of the document. As such, the wording "A proposed System with no proven performance record will not be considered further" in the last sentence of Clause 8.4 must not be taken out in isolation, but must be read in context with the wording and spirit in Clause 8;
- Clause 8 was concerned with the provision of the tenderer's track records. According to Clause 8.1, a tenderer should provide track records to demonstrate its past experience and compliance with certain mandatory requirements for the purposes of the Stage 2 assessment. According to Clause 8.2, a tenderer should also provide track records including reference site(s) which the Government might conduct site visit when necessary, so as to evaluate the tenderer's compliance with the essential specifications for the purposes of the Stage 3 assessment; and
- there were four sentences in Clause 8.4. "A proposed System with no proven performance record will not be considered further" in the last sentence was a reference to the preceding sentence. According to the first two sentences of Clause 8.4, the Government might contact any users of the reference sites whose details were provided by the tenderer under Clause 8.2 for supplementary information, so as to prove that the tenderer had the capability to provide a system that could meet the essential specifications in the Tender Document. The third sentence of Clause 8.4 stated that in the event that the reference from a user indicated the system proposed could not meet with the essential specifications, the tenderer should provide explanations and a new user reference to prove the performance of the system. Therefore, the "proven performance record" in the fourth sentence of Clause 8.4 referred to performance record of the system in the user reference in the previous sentence.

49. Since it was clearly stated in Clause 8.4 of Part II of the Tender Document that "[a] proposed System with no proven performance record will not be considered further", the Committee queried why CAD awarded the contract to the Contractor

who proposed a new System with no proven performance as it was not yet in operation prior to the award of the ATMS contract.

50. **Director-General of Civil Aviation** stated at the public hearings and explained in his letter dated 15 January 2015 (in Appendix 23) that:

- the Tender Document was issued after endorsement from GLD and DoJ. As explained by GLD, Clause 8.4 should be interpreted with consideration given to the full text and spirit under Section 8 of Part II of the Tender Document;
- when CAD conducted the tender exercise for the new ATMS in 2011, an unsuccessful tenderer alleged that the Proposed System provided by the ATMS Contractor had failed to meet the requirement of possession of "proven performance record" as specified in the Tender Document, hence in breach of the relevant provision of the WTO GPA. In accordance with the relevant provisions of the WTO GPA, the Government had immediately referred the complaint to the Review Body on Bid Challenges¹⁰, a dedicated and independent body established under the WTO GPA, for review. After review of the case, the Review Body found that the System proposed by the Contractor possessed the necessary "proven performance record". The Review Body had not seen any unfairness or bias which the Government had operated on any tenderer including the complainant. The complaint was therefore dismissed;
- the term "System" in fact was not referred to a specific ATMS or a whole set of systems proposed by a tenderer. It should be interpreted to mean "a basket of systems and sub-systems" and the core component system should have been used by some ATC centres previously; and
- systems from the ATMS Contractor were widely used at airports in the United States, Germany and Canada. Although carrying different model numbers, the main functions and the latest technologies of such systems were identical to those of the new ATMS. Presently, the ATMS Contractor's Proposed System was in use at Dubai Airport as

¹⁰ According to the reply dated 15 January 2015 from CAD (in Appendix 23), the Review Body provides a dedicated, independent and impartial avenue to review challenges by suppliers who are involved in the relevant procurement against any alleged breach of the WTO GPA during the procurement process. It is served by a Secretariat within the Trade and Industry Department, and comprises 12 members selected from a wide spectrum of society, including legal, engineering, accountancy fields, and are appointed by the Secretary for Commerce and Economic Development.

well as three Indian airports. The average daily departure/arrival flights were around 1 000 at Dubai Airport, 900 at Delhi Airport in India, and 1 100 at Hong Kong International Airport.

51. At the request of the Committee, **Director-General of Civil Aviation** provided the Decision of the Review Body on Bid Challenges (in Appendix 24) regarding the complaint lodged by an unsuccessful tenderer of the ATMS contract concerning the requirement of possession of "proven performance record" by the ATMS Contractor.

52. In reply to the Committee's enquiries about the drafting of Clause 8.4 of the Part II of the Tender Document, **Director of Government Logistics** stated in her letter dated 15 April 2015 (in Appendix 20) that:

- according to SPR, if a goods or services contract had an estimated value exceeding \$100 million, the department must send the tender documents to DoJ for vetting before the issue of the tender. GLD would also vet the tender documents from the perspective of good procurement practice;
- CAD sent the first version of the tender documents for the new ATMS ("first version") to DoJ and GLD for vetting via its email dated 13 May 2009 in accordance with the above requirements of SPR. The last sentence of Clause 8.4 of the first version was "A proposed System with no proven performance (that meet the requirements in the Specifications) will not be considered further.";
- according to GLD's record, DoJ's comments on and proposed amendments to CAD's first version were issued via email dated 12 June 2009. DoJ requested CAD to confirm whether in accordance with the mandatory requirements in Appendix B (of Part II (the Conditions of Tender)) of the first version, it was not necessary for a tenderer to have experience in supplying and installing air traffic management system which was the same model as the one proposed for that tendering exercise. DoJ also pointed out that the last sentence of Clause 8.4 of the first version, "A proposed System with no proven performance (that meet the requirements in the Specifications) will not be considered further.", appeared slightly clumsy. DoJ suggested that in deciding whether the wording in the brackets was needed, CAD should consider whether the product literature and the statement of compliance

provided by a tenderer would be sufficient to prove that the system complied with the specifications, and whether the system must have been used elsewhere before it could be accepted;

- according to GLD's record, CAD responded via its email dated 24 June 2009 to DoJ's comments on and proposed amendments to the first version. In response to DoJ's advice on Clause 8 above, CAD agreed that the reference to the same model be removed from Clause 8, to be consistent with the mandatory requirements in Appendix B (of Part II (the Conditions of Tender)), and agreed with DoJ's proposed wording on Clause 8.4 for amending the last sentence as "A proposed System with no proven performance records will not be considered further."; and
- GLD had not commented on or proposed amendments to Clause 8 of the first version.

Liquidated damages arising from delay in the implementation of the contract

53. As regards the ATMS contract provisions relating to liquidated damages¹¹ arising from delay in the implementation of the contract, **Director-General of Civil Aviation** stated at the public hearings and in his letters dated 15 January 2015 (in Appendix 23) and 25 March 2015 (in Appendix 16) that:

- the clause providing for the payment of liquidated damages arising from delay were included during the tender preparation and had been reviewed by GLD (from the usual procurement angle) and DoJ (from the legal perspective);
- according to the established legal principles concerning determination of liquidated damages, the amount had to be based on a genuine estimate of the losses which would be suffered by Government arising from the delay of the project. The losses included extra costs for maintenance charges for the existing system (including stocking specialized spare parts for the existing system and software maintenance for the existing system), and any extra manpower required for operating the existing system to ensure continued safety and efficiency and so on. CAD had made reference to these items of losses in arriving at the daily rate

¹¹ The relevant contract provisions on liquidated damages arising from delay in the implementation of the new ATMS contract is in Appendix 17 (page 180).

chargeable as liquidated damages for each of Phases 1 and 2 ATMS¹². This was in line with the established approach adopted by Government in tender documents to avoid any argument that the amount was extortionate and was a penalty and was therefore not legally enforceable;

- determination of compensation was in accordance with GLD's usual practice for large-scale/complex systems, and the details of consideration on genuine pre-estimation of loss provided by DoJ, and was based on the associated daily cost of maintaining the operation of the existing system for each of day of delayed delivery of the new system (up to a maximum of 100 days); and
- according to the relevant contract provision, the ATMS Contractor would be required to pay a total maximum of around \$5 million in the case of delay in Phase 1 of the ATMS contract, and up to a maximum of around \$3 million in the case of delay in Phase 2 of the ATMS contract.

54. Responding to the Committee's enquiries as to GLD's usual practice for determining the liquidated damages for large-scale/complex systems and whether there were changes made between the relevant clauses in the tender documents of the new ATMS and the existing ATMS, **Director of Government Logistics** explained in her letter dated 20 March 2015 (in *Appendix 25*) that:

- in determining the liquidated damages for delays in the completion dates for large-scale/complex systems, it was the Government's practice that the user department would assess the genuine pre-estimate of loss of the concerned system on a case-by-case basis. The amount, subject to a cap, was set either at a fixed daily or weekly amount or percentage of the one-off cost / the contract value; and
- for the last and present purchases of ATMS, the methods of determining the liquidated damages in the contract conditions were generally the same, i.e. CAD determined the liquidated damages, subject to a cap, based on the genuine pre-estimate of loss per day at that time. However, due to the different implementation plans of the two systems, the liquidated damages were based on the delays in the completion dates of different parts of the systems. In the last contract, the liquidated damages were based on the delays in the completion

12 According to Note 1 to Table 1 of the Audit Report, the ATMS contract work comprised two phases. Phase 1 contract work referred to the operation of the new ATC centre in the CAD headquarters and Phase 2 contract work referred to the conversion of the existing air-side ATC centre into a back-up centre.

dates of the simulator and the system¹³. Under the current contract, liquidated damages were based on the delays in the completion dates of Phases 1 and 2 of the system.

55. The Committee noted that while the contract provisions on liquidated damages for the procurement of the existing ATMS required the Contractor to pay a maximum of around \$20 million (US\$2,630,040) for delay in providing the simulator and the system, the new ATMS contract only required the same Contractor to pay up a maximum of around \$8 million in the case of delay in the implementation of Phases 1 and 2 of the new ATMS contract.

56. According to CAD, the amount of liquidated damages had to be based on a genuine estimate of the losses which would be suffered by Government arising from the delay of the project, and the ATMS Contractor is also the contractor for the existing ATMS. In this regard, the Committee asked about the extra costs incurred and paid to the contractor to ensure the continued safe and efficient operation of the existing ATMS and extra manpower expenditure required for operating the existing ATMS, arising from the late delivery of the new ATMS project.

57. **Director-General of Civil Aviation** stated in his letter dated 25 April 2015 (in Appendix 19) that:

- the average annual expenditure on system maintenance of the existing ATMS in 2013 and 2014 was \$5.9 million. This amount included a one-off enhancement measure for the existing ATMS conducted in 2014 to enhance the system's capability to handle the increasing volume of air traffic to ensure its safe and reliable operations; and
- the average annual manpower cost to maintain the operation of the existing ATMS was around \$9.5 million in 2013 and 2014. Such manpower cost would be incurred in any case for operating the existing ATMS, or for the new ATMS upon its commissioning.

58. The Committee was also very concerned whether extra cost would be incurred to extend the warranty periods of the other seven major contracts for

¹³ A copy of the relevant contract provisions on liquidated damages for the purchase of the existing ATMS is in *Appendix 26*.

implementing the new ATC system project¹⁴ as a result of the delay in the implementation of the ATMS contract.

59. **Director-General of Civil Aviation** stated in his letter dated 15 May 2015 (in *Appendix 27*) that:

- seven out of the eight major systems of the new ATC system had been substantially completed, two of the systems had been in operation since 2013 and others would be put into use by phases from 2015. These systems were now operating to support the existing ATC equipment operations and training of the air traffic controlling officers. Upon the commencement of the new ATMS, they would be fully integrated with the new system;
- the commencement and expiry of the warranty periods of these systems were independent from the implementation of the new ATMS contract. No extra costs were incurred in extending the warranty periods for these systems as a result of the delay of the implementation of the new ATMS contract; and
- there were provisions in the contracts allowing CAD to procure maintenance services for all the systems after the expiry of the warranty period.

60. At the request of the Committee, **Director-General of Civil Aviation** provided in his reply dated 15 May 2015 a table setting out the duration and expiry date of the warranty period of the eight major contracts under the ATC system project (in *Appendix 28*).

61. The Committee noted from paragraph 1.6 of the Audit Report that CAD set up a dedicated project team to oversee the preparation and implementation of the new CAD headquarters project and the ATC replacement project. In this connection, the Committee enquired about the manpower situation and expenditure of this project team.

¹⁴ CAD implemented the new ATC system project through eight major contracts. Please refer to Table 1 of the Audit Report for details.

62. **Director-General of Civil Aviation** stated in his letter dated 25 April 2015 (in Appendix 19) that:

- for the implementation of the new CAD headquarters project and the ATC system replacement project, an Assistant Director-General of Civil Aviation ("ADGCA") post was established on 1 October 2007 to head a dedicated Project Team, following the approval from FC of LegCo in May 2007. The post had lapsed in March 2013. The supervision and implementation work of the ATC system replacement project had since been undertaken by an ADGCA in addition to his other duties;
- the Project Team was supported by seven civil service posts created on a time-limited basis and other serving CAD officers through internal redeployment, as well as officers appointed on time-limited NCSC terms. In addition, a Senior Architect and a Senior Electrical and Mechanical Engineer were temporarily seconded from the Architectural Services Department and the Electrical and Mechanical Services Department respectively to support the Project Team with their professional advice. The total number of staff in the Project Team varied at different stages of the project. As the project progresses, the Project Team had gradually reduced its staff complement. As at April 2015, the Project Team had 24 members¹⁵;
- the revised completion date for the new ATMS as stated in the contract signed with the ATMS Contractor was December 2013¹⁶. The manpower cost for time-limited posts and NCSC staff of the Project Team from January 2014 to end March 2015 was \$23.3 million. No additional expenses were incurred for redeploying existing staff of CAD to work on the ATC system replacement project; and
- the actual manpower costs for the Project Team in 2013-2014 and 2014-2015 were \$28.5 million and \$29.1 million respectively and these figures included the manpower cost for time-limited posts, NCSC posts and CAD staff redeployed to the Project Team.

15 Please refer to Appendix 19 for the details of the manpower situation and expenditure of the Project Team for involving in the CAD headquarters project and ATC system replacement project from 2007-2008 financial year.

16 According to Table 3 of the Audit Report, this is a revised target completion date which had been extended for six months due to the second contract variation.

System requirements of the new ATMS

63. On the question of whether CAD had changed the system requirements for the new ATMS in the Tender Document from that of the existing ATMS, **Director-General of Civil Aviation** explained at the public hearings and in his letter dated 15 January 2015 (in Appendix 23) that:

- there was no change in the system requirements in the new ATMS Tender Document from the existing ATMS. Based on the operational experience of the existing ATMS, CAD had incorporated more detailed concrete system requirements into the Tender Document and the Contractor was required to provide both system hardware and software for the new ATMS, same as in the case of the existing ATMS;
- there were currently over 20 ATC controller working positions at the existing ATC centre. Upon review of the operational experience of the existing ATMS and anticipating future growth in air traffic, CAD considered that around 40 to 50 ATC working positions would be required for the new ATC centre. Thus, the requirement that a reference system in a tenderer's proposal should be equipped with a minimum of 40 ATC controller working positions was incorporated into the Tender Document; and
- the new ATMS was required to have greatly enhanced processing capability and functions as compared to the existing ATMS. The new ATMS could handle 8 000 flight plans daily, roughly five times of that of the system in use at the existing ATC centre. The new ATMS could also simultaneously monitor 1 500 air or ground targets, roughly 1.5 times of the existing system, capable to cope with future air traffic growth.

64. The Committee noted that the ATMS contract would be implemented in two phases, namely Phase 1 and Phase 2 which involved different systems. At the request of the Committee, **Director-General of Civil Aviation** provided in his reply dated 25 March 2015 (in *Appendix 29*) a table setting out the milestones with details of corresponding system(s) involved/to be involved in each milestone starting from the completion of Phase 1 to the completion of Phase 2 in the Implementation Plan of the ATMS contract.

Financial vetting

65. The Committee noticed that the Tender Document stipulated that the successful contractor had to provide 15 years of maintenance services to the new ATMS and enquired whether the Administration had conducted financial vetting of the tenderers to assess their financial capability to complete the contract. **Director-General of Civil Aviation** replied that CAD had strictly followed GLD's tender procedures in the procurement of ATMS. In this connection, **Director of Government Logistics** explained that according to the relevant regulations, it was not necessary to conduct financial vetting for contracts for the supply of goods. As the one-off costs of the ATMS contract was more than 10 times of the recurrent maintenance costs, it was considered as a contract for the supply of goods and CAD was not required to conduct financial vetting of the tenderers.

66. The Committee was of the view that the Administration was too rigid for not taking into consideration the actual amount of the recurrent maintenance cost in determining whether to conduct financial vetting of tenderers for contracts for the supply of goods, in particular special consideration should be given to contracts for specialist systems with long support and maintenance services included in the contracts.

Implementation of the ATMS contract

Deficiencies/observations identified by CAD in ATMS

67. As reported in paragraph 2.13 of the Audit Report, there were numerous deficiencies/observations identified during the Factory Acceptance Tests of ATMS, i.e. 204 deficiencies/observations were recorded between 18 June and 18 July 2012. Although those deficiencies/observations had been rectified with only 23 still outstanding by June 2013, another 104 deficiencies/observations were newly identified during the verification process. In view of the successful rectification of a large number (181) of deficiencies/observations and the ATMS Contractor's undertaking to rectify and verify all the remaining 127 outstanding deficiencies/observations (23 plus 104) by the Site Acceptance Tests stage, CAD conditionally accepted the Factory Acceptance Tests results in June 2013, 11 months later than the original target completion date.

68. In view of the large number of deficiencies/observations identified during the Factory Acceptance Tests of ATMS, the Committee was concerned whether

CAD had consulted GLD regarding the acceptance of the Factory Acceptance Tests results conditionally.

69. **Director-General of Civil Aviation** explained in his letter dated 18 February 2015 (in Appendix 18) that in June 2013, the ATMS Contractor had resolved about 90% of the outstanding items identified during the Factory Acceptance Tests. The remaining ones were not critical to the technical and operational performance of ATMS. CAD considered that the Contractor had demonstrated that the system was generally compliant with the requirements specified in the Final Specifications of the contract, and thus considered the Factory Acceptance Test result as generally acceptable to CAD. This arrangement was made in accordance with Clauses 2.2 and 2.4.5 of Schedule 6 of Part V of the Tender Document the ATMS contract. Moreover, according to SPR, controlling officers were responsible for the management of the contract awarded. Therefore, CAD had not consulted GLD on this.

70. The Committee was also very concerned about the safety of the new ATMS. In this regard, **Director-General of Civil Aviation** said at the public hearings and explained in his letters dated 12 December 2014 (in Appendix 10), 27 December 2014 (in Appendix 12), 25 April 2015 (in Appendix 19) and 27 May 2015 (in *Appendix 30*) that:

- the deficiencies/observations items identified by CAD during the Factory Acceptance Tests did not imply that the new ATMS was not functioning properly nor it was unsafe. Given the stringent acceptance tests and the complexity of the new ATMS, it was unavoidable that some deficiencies/observations items were identified. The purpose of the test was to ensure that ATMS manufactured by the large overseas ATC system supplier could adapt to the local air traffic management environment, and the system could operate safely, stably and reliably;
- as at April 2015, all the 204 deficiencies/observations recorded during the Factory Acceptance Tests conducted in June to July 2012 had been rectified by the ATMS Contractor. During the Site Acceptance Tests conducted in August to November 2014, about 1 000 follow-up items were recorded on site. Of these follow-up items, about 80% of them were minor in nature and would not affect the safety and the commencement of operation of the new ATMS. CAD had been closely monitoring the performance of the Contractor, and had

requested the Contractor to take all possible measures to expedite the rectification of the remaining 20% (i.e. 200 items) outstanding priority items. The ATMS Contractor had been working closely with CAD in putting additional resources to address the 200 outstanding priority items in question. As at 15 May 2015, there were about 14 outstanding priority items which would be rectified/addressed by the Contractor before end-June 2015; and

- it was not uncommon to have deficiencies/observations items identified during acceptance test in ATC system replacement projects in other countries. Similar observations were also recorded during the testing of the existing ATC system prior to its implementation at the Hong Kong International Airport.

71. At the request of the Committee, **Director-General of Civil Aviation** provided a breakdown of the 308 deficiencies/observations items by their nature in his reply dated 27 December 2014 (in paragraph 16 of Appendix 12).

Two contract variations

72. The Committee noted from Table 2 and paragraph 2.6 of the Audit Report that after the ATMS contract was awarded to the Contractor in February 2011, CAD and the ATMS Contractor had already identified areas for improvement in the new ATMS to enhance operational efficiency and on safety grounds a few months during the DDR stage in mid-2011. After various discussions with the ATMS Contractor, CAD in January 2012 submitted a request to GLD to seek GLD Tender Board's approval for acquiring additional requirements in ATMS by way of contract variation.

73. The Committee further noted from paragraphs 2.9 and 2.12 of the Audit Report that during the procedure evaluation and training sessions of ATMS (commencing in August 2012), CAD identified the need to implement further system enhancements to improve the operational efficiency as well as to meet new requirements of the ICAO Global Air Navigation Plan¹⁷ ("GANP") and Regional

¹⁷ According to Note 7 of the Audit Report, ICAO's GANP sets out the regulatory requirements, procedures and technology associated with performance improvement initiatives. Through the implementation of Aviation System Block Upgrades framework in GANP, it was expected that civil aviation could achieve global harmonisation, increased capacity, enhanced operational efficiency and improved environment globally.

Performance-based Navigation Implementation Plan ("PBN")¹⁸. In June 2013, CAD submitted a request to the GLD to seek the GLD Tender Board's approval for a second contract variation to implement further system enhancements. After the issue of the second contract variation in October 2013, the target completion dates of some milestones in the contract were correspondingly adjusted¹⁹. The total sum of two contract variations was \$89.2 million (i.e. 18 % of the original contract value).

74. Against the above background, the Committee asked about:

- the justifications for having two contract variations for the procurement of ATMS;
- the reason why those essential requirements were not included in the contract in the first place;
- whether CAD was aware of those additional/new requirements at the time of preparing the tender specifications for the ATMS contract; and
- the source of funding to cover the two contract variations in the procurement of ATMS.

75. **Director-General of Civil Aviation** stated at the public hearings and in his letters dated 27 December 2014 (in Appendix 12), 12 January 2015 (in Appendix 17) and 15 January 2015 (in Appendix 23), and **Deputy Director-General of Civil Aviation** and **Mr Richard WU Chi-kwong, the then Chief Electronics Engineer (Projects) of CAD**, supplemented at the public hearings on 15 December 2014 and 6 January 2015 that:

- CAD believed that the enhancement of the new ATMS prior to its commissioning was more cost effective and would help reduce safety risk associated with system changes if implemented after system commissioning;
- for the two contract variations to enhance the new ATMS, CAD had strictly followed the relevant rules and procedures under SPR. Both

18 According to Note 8 of the Audit Report, the PBN for the Asia and Pacific Region provides a high-level strategy for the evolution of the navigation applications to be implemented in the short term (2008-2012) and medium term (2013-2016).

19 The contractual dates of completion of two milestones were extended for six months. Please refer to Table 3 of the Audit Report for details of the target and actual completion dates of various milestones of the ATMS contract.

contract variations had been reviewed and approved by GLD. CAD had followed the relevant procedures in submitting its requests to GLD with detailed relevant information and pricing;

- the funding for the two contract variations was provided from the budget approved by FC in 2007;
- CAD reckoned that there should not be any further contract variation prior to the commissioning of the new ATMS;

Contract Variation 1

- the Tender Document was finalized as early as April 2009. Immediately after the award of contract in February 2011, system DDR commenced. Due to the large scale and complexity of the contract and stringent contractual requirements, there had been a substantial lapse of time following drafting of the Tender Document and request for contract variation to GLD in January 2012. During that period, ICAO had provided new requirements with greater details and specific guidelines on regional contingency plans for operation by air space users and airport users to handle different emergency situations (such as when an ATMS was malfunctioning or operating in degraded mode), which would involve additional data exchange and synchronization;
- meanwhile, from its operational experience of the existing ATMS in use, CAD also noted the need to enhance other functions of the new ATMS, including "Missed Approach" procedures, Air Traffic Services Interfacility Data Communication ("AIDC") and operational efficiency enhancements. In view of operational efficiency, training efficiency, air traffic safety and the latest ICAO requirements, CAD recognized the need for system enhancements to better equip ATMS to handle various emergency situations, including the ability for ATC staff to continue to provide ATC services, further strengthening flight safety;
- since commencement of the system design in 1994 up to January 2015, a total of 23 software changes had been made to the existing ATMS for system enhancements, and CAD anticipated that further enhancements would also be made to the new ATMS after the commissioning of the system;

Enhancement of the Ultimate Fallback System

- CAD had specified in the Tender Document that ATMS should consist of three major sub-systems, namely a Main ATMS system, a Fallback ATMS system and an Ultimate Fallback System ("UFS"). UFS had been specified in the Tender Document as a separate system with software and system architecture fully independent from those of the Main ATMS and Fallback ATMS systems. The purpose of including UFS in the Tender Document was to mitigate the risk of encountering a total system failure of ATMS when both the Main and Fallback ATMS systems failed at the same time, thus ensuring flight safety. The requirements for the UFS in ATMS were on par with similar system setup and best practices adopted in major ATC centres overseas, such as the United States, Germany, Norway, etc.;
- CAD had looked into the relevant requirements of ICAO and the developments of the ATC systems in the region during tender preparation, and considered that it would be sufficient to set out in the Tender Document of ATMS that UFS be equipped with basic ATC functions in the event of failure of the two Main and Fallback ATMS systems;
- after the award of the ATMS contract in February 2011, ICAO further concluded to formulate a Regional Air Traffic Management Contingency Plan in September 2011 to provide a systematic contingency response framework in the Asia-Pacific Region. The framework set out greater details and more concrete guidance to airspace and aerodrome users to facilitate operations under various ATC contingency situations, such as ATC system failure or degradation. In the light of this new ICAO development, CAD had reviewed the system requirements for UFS in the Tender Document and the ATMS contract, and considered it necessary to enhance such requirements so as to better equip the new ATC system with more enhanced capability to handle contingency situations to ensure flight safety;

Additional simulator training and input operator positions

- the provision of around 32 simulator training and input operator positions in the original contract of the new ATMS was to ensure efficient operation of the air traffic management services at the Hong Kong Flight Information Region while professional training was

provided to ATC staff. According to CAD's plan, the Simulator System of ATMS was to be utilized for training air traffic controllers on approach control, en-route control and terminal control as well as evaluation of ATC procedures. With continuing review of operational experience of the existing ATMS by CAD's ATC staff, CAD had reviewed in details the training needs for operating the new system and recognized the need to incorporate terminal control into the training programmes so as to better equip ATC staff to cope with the sustained air traffic growth in the long term;

- CAD agreed that it would have been desirable to incorporate such requirements when drafting the Tender Document;

Interoperability with the neighbouring ATC centres

- the new ATMS would be equipped with the latest version of AIDC (version 3.0). However, it would not be able to exchange data with the neighbouring ATC centres that were using a lower version of AIDC. In order to ensure interoperability with the neighboring ATC centres, enhancement had to be made to the new ATMS to enable it to be compatible with the lower versions of AIDC used by different neighboring ATC centres; and

Contract Variation 2

- ICAO promulgated the requirements for the Asia Pacific Regional PBN in September 2011, and endorsed GANP with the Aviation System Block Upgrades ("ASBU") framework during the 12th ICAO's Air Navigation Conference for enhancement of safety, airspace capacity and efficiency. In accordance with the recommendations endorsed during the conference, ICAO had requested its members to finalize the alignment of regional air navigation plans with GANP by May 2014, and focus on implementation of ASBU according to operational needs. Hong Kong, being a regional aviation hub, was required to timely implement the relevant requirements in accordance with the ICAO's recommendations and the actual operational needs in order to enhance safety, airspace capacity and efficiency.

76. In reply to the Committee's request, **Director-General of Civil Aviation** provided the details and the cost of each item in the two contract variations in his

replies dated 12 January 2015 (in *Appendix 31*) and 17 February 2015 (in *Appendix 32* and *Appendix 33*).

77. As to why CAD had not conducted a fresh tender exercise for procuring UFS, **Director-General of Civil Aviation** stated in his letter dated 27 December 2014 (in Appendix 12) that, given the contract with the ATMS Contractor already stated the requirement of having a UFS in place, in order to enhance functions of UFS so as to meet the latest ICAO's initiative, CAD considered that it would be justified and more cost-effective to acquire the enhancements through variation of contract instead of conducting a fresh tender exercise. CAD had therefore followed the stipulations in SPR and sought DoJ's advice (from WTO GPA perspective) and GLD Tender Board's approval for the contract variation with a view to enhancing the requirements of UFS.

78. Since the price score had accounted for 60% of the overall score in the assessment of the tenders, the Committee asked whether it would be unfair to other tenderers for CAD to procure additional items through two contract variations, which had caused a significant change in the total value of the contract, i.e. from \$486 million to \$575.2 million, after the award of the contract to the ATMS Contractor. **Director-General of Civil Aviation** advised at the public hearings that even if the contract was awarded to the tenderer with the second highest overall score, CAD would also need to procure the additional items through two contract variations in 2012 and 2013 respectively, and CAD could not guess the price that could have been offered by this tenderer for the two variation orders in 2012 and 2013.

Criteria on whether and when an enhancement to ATMS should be made

79. Responding to the Committee's enquiry as to the criteria on whether and when an enhancement to ATMS should be made, in particular for enhancements arising from new ICAO's initiatives, and whether it was a must for all countries to implement ICAO's initiatives and the consequences of not implementing these initiatives, **Director-General of Civil Aviation** stated at the public hearings and explained in his letter dated 12 January 2015 (in Appendix 17) that:

- in implementing an enhancement on ATMS, CAD's key considerations were compliance with international stipulations, aviation safety, operational needs and cost-effectiveness;

- whenever ICAO promulgated an initiative (e.g. GANP, the Regional Air Traffic Management Contingency Plan etc.) for enhancement of safety and operational efficiency, all states/administrations were required to map out plans to implement the initiatives, taking into account the operational efficiency, aviation safety and cost-effectiveness;
- it was not a must for all countries to implement ICAO's initiatives. CAD could "file a difference" with ICAO if ICAO's initiatives were not implemented, and this "difference" would be made public. It would not be in Hong Kong's interests as an aviation hub of not implementing such initiatives; and
- as the new ICAO requirement came out during project stage, it would be more cost-effective and of lower safety risks for the new measures to be incorporated before the system was put in operation as there would be greater synergy on software development/testing, and minimal impact on operations.

80. At the request of the Committee, **Director-General of Civil Aviation** provided in his reply dated 13 February 2015 (in *Appendix 34*) a list of the countries in the Asia-Pacific Region and other regions of the world which had adopted the Air Traffic Management contingency arrangements referred to in paragraph 2.7 (a) of the Audit Report.

Assessment of the performance of the ATMS Contractor

81. On the question of whether CAD had assessed the performance of the ATMS Contractor prior to submitting the request for the first contract variation, **Director-General of Civil Aviation** stated in his letter dated 12 January 2015 (in Appendix 17) that prior to submitting the request for the first contract variation to GLD in January 2012, CAD had considered the contractor's performance based on the following facts:

- since award of new ATMS contract in February 2011, the ATMS Contractor had timely submitted the monthly progress reports, and its performance was satisfactory;
- the ATMS Contractor had timely submitted the acceptance test procedures for the computer-based training system, and conducted the test as scheduled;

- during DDR, the ATMS Contractor had engaged a team of professional system and software engineers, particularly those who had sound knowledge and experience in the existing ATMS, to participate in DDR. The ATMS Contractor demonstrated professionalism in the system design, and devoted a lot of efforts to incorporate the discussed requirements into the detailed design documents of the system; and
- the ATMS Contractor was also the contractor of the existing ATMS and the service provider of the software maintenance support service of the existing ATMS. The performance of the existing system was stable and reliable whilst the Contractor's performance had been satisfactory to CAD.

Guidelines to deal with contract variations

82. As to whether CAD's procurement strategy of the new ATMS with two variation orders had achieved the best value for money and how the Administration would ensure that the variation orders were justified and the process was conducted in an open and fair manner, **Mr YEUNG Tak-keung, Deputy Secretary for Financial Services and the Treasury (Treasury)**³ stated at the public hearings and **Secretary for Financial Services and the Treasury** explained in his letters dated 29 December 2014 and 13 January 2015 (in *Appendix 35* and *Appendix 36*) that:

- the Government had clear guidelines for bureaux/departments to deal with contract variations to ensure that they were properly conducted. As stipulated in SPR, contract variations should be avoided as far as possible and should normally be used as a stop-gap measure. Under no circumstances might a department vary a contract which would result in the approved commitment or approved project estimate being exceeded. For contract variations amounting to new procurements covered by WTO GPA, the procuring department shall ensure that all relevant requirements of WTO GPA were complied with and seek advice from DoJ if needed. There were different levels of authorities for approval of contract variations of different nature and value. The department should copy the approved contract variations to the Director of Audit for record;
- the ATMS contract was awarded by GLD on behalf of CAD. Under SPR, for goods and service contracts awarded by GLD on the advice of CTB, the GLD Tender Board was the approving authority for variations with the accumulated value of the variations up to 30% of

the original contract value. According to the information provided by CAD to the GLD Tender Board, the two contract variations to the ATMS contract were required to meet the higher international standards on air traffic management, new requirements of ICAO and the operational needs of the future air traffic growth in Hong Kong. CAD had confirmed that they were not aware of these additional/new requirements at the time of preparing the tender specifications for the ATMS contract. The additional/new requirements were essential to meet CAD's operational requirements and hence a genuine need of procurement;

- Clause 9.4 of the Part IV of the Tender Document for ATMS stated clearly that where a change of the system or services was requested by the Government to overcome an actual or likely failure of the Contractor to meet any of the contract requirements, the Contractor shall not be entitled to any increase in the total system price or maintenance charges. When approving CAD's applications for the two contract variations involving increase of the total system price and/or maintenance charges, the GLD Tender Board was satisfied that Clause 9.4 was not applicable and that the additional/new requirements to ATMS were essential to meet CAD's operational requirements and hence a genuine need of procurement;
- ATMS was a highly complex and mission-critical system. Installation of any enhancements required modifications of the proprietary software developed by the ATMS Contractor, which had the exclusive intellectual property rights over the source codes. According to CAD, there was no other potential and suitable supplier with such technical expertise which could arrange software customization and development for the additional/new requirements of ATMS. In the absence of any reasonable alternative, procuring the additional/new requirements by contract variation with the ATMS Contractor was the only viable option;
- CAD had also sought legal advice on the appropriateness to procure the additional/new requirements by contract variations from WTO GPA's perspective. For protection of the intellectual property rights of the products provided by the ATMS Contractor, and for reasons of compatibility and interchangeability with the existing functions of ATMS, no legal objection to procuring the additional/new requirements by contract variations was received;

- the ATMS Contractor had provided proposals for the contract variations with detailed costs and manpower requirements for evaluation by the Government. After comparing the prices quoted in the proposals and those in the ATMS contract, CAD had confirmed that the quoted prices were fair and reasonable for the Government to accept as they were no less favourable than the existing contract rates. CAD had also evaluated the manpower requirements to ensure that these were commensurate with the work required;
- in considering the two contract variations concerned, the GLD Tender Board had critically examined the justifications provided by CAD to ensure that the process was conducted in a fair manner and the Government's interest was duly protected. When granting approval for the contract variations, the GLD Tender Board had nevertheless remarked that it was unsatisfactory for a procuring department to seek multiple contract variations and requested CAD to review its tendering strategy and better plan its purchases in the future; and
- against the above, FSTB was content that the contract variations were approved in accordance with the established procedures and guidelines in this respect.

Engagement of external experts

83. In view of the complexity involved in the implementation of the ATMS contract, the Committee asked whether consideration had been given by CAD to engaging external experts to assist in the procurement of ATMS.

84. **Director-General of Civil Aviation** explained in his letter dated 12 January 2015 (in Appendix 17) that during the early stage of system procurement, CAD had looked into the need and suitability on engagement of external experts. However, given the tight time frame and the highly technical nature of the project, it would be more cost-effective and efficient to make use of CAD staff who would be in a better position to communicate the users' requirements and needs directly to the contractor. In addition, CAD considered that engaging external consultants would involve higher costs due to extra coordination and supervision of the consultant.

Termination of contract

85. According to Clauses 44.1.1 and 44.1.2 of Part IV of the Tender Document for the procurement of the new ATMS, "the Government shall be entitled to terminate the Contract by serving a 14 days' notice in writing on the Contractor if the Contractor persistently or flagrantly fails to carry out the whole or any part of the Services punctually or in accordance with the terms and conditions of the Contract; or the Contractor fails to observe or perform any of its obligations under the Contract and (in the case of a breach capable of being remedied) has failed to remedy the breach to the satisfaction of the Government Representative within 30 days (or such longer period as the Government Representative may, in its sole discretion, allow) after the issuance by the Government Representative to the Contractor of a notice in writing requiring it to do so." ²⁰ As such, the Committee asked whether CAD would consider terminating the contract with the Contractor in case that the Contractor had failed to provide a safe, reliable and stable System by the first half of 2016 or any other indicative date to be set by CAD.

86. **Director-General of Civil Aviation** stated at the public hearing that CAD would not terminate the contract with the Contractor since CAD had the confidence that the new ATC system would be ready for operation in first half of 2016.

87. The Committee further enquired about the basis that allowed CAD to have confidence that the new ATC system would be ready for operation in first half of 2016, given that the ATMS system has been delayed for at least three-and-a-half years from the original target date of end 2012.

88. **Director-General of Civil Aviation** replied in his letter dated 25 April 2015 (in Appendix 19) that:

- with additional resources from the ATMS Contractor devoted to the project, progress had been made by the ATMS Contractor in rectifying the outstanding deficiencies/observations of the new ATMS. All the deficiencies/observations recorded during the Factory Acceptance Test had been rectified by the ATMS Contractor. Separately, around 90% of the priority items identified during the Site Acceptance Test had been rectified/addressed. The remaining ones were expected to be ready for verification by mid-2015. In addition, simulation training for air traffic controlling officers had commenced in early 2015;

20 An extract of Clauses 44 and 45 of Part IV of the Tender Document is in *Appendix 37*.

- given the latest progress of the new ATMS, CAD expected completing all the acceptance test events of the new ATMS by the third quarter of 2015, followed by full-fledged training for air traffic controlling officers. Upon completion of training, the new ATC centre would commence operation; and
- in view of the development above, CAD was confident that the new ATC centre would be ready for operation in the first half of 2016.

89. **Director-General of Civil Aviation** supplemented in his letter dated 27 May 2015 (in *Appendix 38*) that to ensure the ATC operational staff would be confident and competent in using the new ATMS smoothly, effectively and safely after its formal commencement of operation, CAD had already commenced providing simulation training on system functionalities of the new ATMS in January 2015 for the ATC operational staff to familiarize themselves with the functions of the new ATMS. At the request of the Committee, **Director-General of Civil Aviation** provided a detailed work plan of transition of the existing ATMS to the new ATMS (in *Appendix 39*).

Supervisory role of THB and report to LegCo

90. In response to the Committee's enquiries about the actions taken by THB in supervising the procurement of ATMS by CAD and whether THB had reported to LegCo about the two contract variations and delays in implementing the ATMS contract, **Mr YAU Shing-mu, Under Secretary for Transport and Housing**, stated at the public hearings and **Secretary for Transport and Housing** explained in his letters dated 24 December 2014 and 12 January 2015 (in *Appendix 40* and *Appendix 41*) that:

- THB, through its regular meetings with the Director-General of Civil Aviation, received reports regularly from the Director and other key Directorate officers of CAD on the major work of CAD, including progress on the replacement of the ATC system. Apart from the said meetings, THB also maintained close contact with CAD regarding the progress of the ATC system and related work;
- since the tendering process of the ATC system took longer time than anticipated, and coupled with the delay in the commissioning date of the new CAD headquarters building, CAD anticipated in the first half of 2010 that the commissioning date of ATMS would be deferred from

the original estimate of December 2012 to 2013, and reported the development to THB. Subsequently, CAD set out in the contract of ATMS that the completion date of ATMS was mid-2013; and

- as regards the implementation of the ATMS contract, THB was informed in the second half of 2012 that, considering the results of the Factory Acceptance Tests of ATMS which indicated that follow-up actions were required on a number of outstanding issues, the commissioning date of the new ATC centre would be affected. THB, through its meetings with CAD, had repeatedly requested CAD while ensuring the smooth operation, safety and stability of the new system to step up its efforts to enhance its supervision of the work of the ATMS Contractor, and settle the outstanding issues of the new ATC system as soon as possible to minimize the delay. In order to expedite the project, CAD had adopted the following improvement measures:
 - (a) establishing a steering committee chaired by the Deputy Director-General of Civil Aviation on the new ATC centre and system project in April 2013 to enhance monitoring of the progress of the replacement of ATMS, and give timely instructions on key issues;
 - (b) visiting the ATMS Contractor's plant in Boston of the US between October and November 2013 by CAD staff responsible for the project to discuss and examine the items being enhanced as well as the outstanding issues and operational details of ATMS;
 - (c) conducting meetings between the Director-General of Civil Aviation/Deputy/Assistant Director-General of Civil Aviation and the ATMS Contractor's senior management in Hong Kong in November 2013 and May, August and October 2014. At the meetings, CAD requested the ATMS Contractor to take all possible measures to minimize the delay of the project, including the deployment of additional resources and personnel with relevant experience, settling outstanding issues of ATMS as early as possible, and submitting a practicable implementation plan for the project;
 - (d) conducting weekly teleconferences between the subject ADGCA and Chief Electronics Engineer and the ATMS Contractor's senior management since early 2014, with a view to reviewing

the project progress, adjusting work priorities and human resources, etc., to tackle the major issues in a timely manner, and enhance communication and collaboration between the two sides; and

- (e) as per CAD's request, the ATMS Contractor's project management and professional personnel came to Hong Kong on several occasions since early 2014 to discuss with CAD staff the outstanding issues of ATMS. The expert project team of the Contractor stayed in Hong Kong for four weeks between April and May 2014 to expedite the completion of the Site Acceptance Tests.

91. In response to the Committee's enquiry about whether THB and CAD had reported the progress of the ATC replacement project to LegCo, **Secretary for Transport and Housing** provided in his reply dated 12 January 2015 (in Appendix 41) copies of the relevant documents submitted to LegCo by THB and CAD since they were aware of the delay in the commissioning date of the new ATC centre in 2010. The Committee, however, noted that:

- in response to the queries regarding the new ATC system from members of FC during the examination of the Estimates in 2010 and 2011 and in the paper for briefing ED Panel on relevant policy initiatives in the Chief Executive's 2011-2012 Policy Address, CAD/THB had advised members that the new ATC centre was scheduled for operation by the end of 2013;
- in the paper for briefing ED Panel on relevant policy initiatives in the Chief Executive's 2013 Policy Address and in response to the questions regarding the replacement of the ATC system from a member of FC during the examination of the Estimates in 2013, THB/CAD further advised members that the earliest operation of the new ATC centre was estimated to be in the second quarter of 2014 without mentioning about the delay in the implementation of the ATMS contract; and
- it was only until July 2013 that CAD provided a reply to an enquiry from a member of the ED Panel explaining the reasons for the delay in the implementation of the ATMS contract and advised members that the earliest operation of the new ATC centre was estimated to be in second half of 2014.

Way forward

92. The Committee noted with concern that the existing ATC system was operating above its planned capacity, with frequency of surveillance data display problems increasing since 2011, but the new ATC system originally targeted for commissioning in December 2012 had experienced delay in implementation, and as at May 2015, the new ATC system was not yet in operation. In the light of this, the Committee asked for:

- the latest estimate of the date of commissioning of the new ATC system;
- the measures to be taken by CAD to expedite the project; and
- the contingency measures to deal with further delays.

93. **Director-General of Civil Aviation** stated at the public hearings and in his letter dated 12 December 2014 (in Appendix 10) that:

- seven out of eight system projects of the entire new ATC system had been substantially completed as scheduled. Two of the system projects had been put into operational use since 2013. Another five system projects were planned for operation in phases commencing 2015. CAD was making an all-out effort to work with the system contractor in testing the remaining ATMS. According to the current testing and problem rectification progress, the entire new ATC system is expected to be available in 2015 for training ATC personnel. After completion of all the training (9-12 months) and confirming the new ATC system could fulfill all the safety requirements, it was planned to commission the new ATC centre in the first half of 2016;
- CAD had been looking forward to early commissioning of the new ATC system. However, ATMS of the new ATC system was a highly complicated and sophisticated system requiring longer time than expected for conducting difference types of tests, which caused delay to the entire ATC replacement project;
- CAD would continue to urge the ATMS Contractor to expedite rectification of the outstanding problems in the new ATMS and closely monitor the remaining contract work to minimize further project delay. CAD would also request the ATMS Contractor to provide a closure

plan with a view to dealing with all the major issues of ATMS as soon as possible in 2015;

- as regards the existing ATC system, since 2011, CAD had worked closely with system suppliers and maintenance service providers to progressively implement a series of maintenance measures on the existing ATC system in order to sustain the reliable and efficient operation. In view of the delays in new ATMS project, commencing in 2014, CAD had stepped up efforts to strengthen its maintenance on the existing ATC system. Measures included upgrading the relevant surveillance data display workstations and optimizing radar signal inputs to alleviate system loading, etc. According to CAD's estimation, with the aforesaid measures in place, the existing ATC system should maintain safe and reliable operation to cope with the air traffic capacity in Hong Kong; and
- CAD had been attaching paramount importance to the issues mentioned in the Audit Report related to the existing ATC systems, such as surveillance data display problems (e.g. frozen/hang-up) at some controller positions. While such occurrences did not have substantial impacts on ATC, CAD had taken immediate and decisive measures to deal with the problems in order to upkeep the performance of the system.

94. In response to the Committee's enquiries about the contingency measures to be taken by THB to deal with any further delay in the replacement of the ATC system, **Under Secretary for Transport and Housing** stated at the public hearings that THB had all along been considering and preparing contingency measures to deal with further delay in the replacement of ATC system and a contingency strategy would be in place to deal with the situation. However, he considered that it inappropriate to reveal details at this juncture.

C. Management of the precision runway monitor project

95. In June 1996, CAD obtained funding approval from FC to procure additional special equipment and systems and construct additional facilities to support the operation of the second runway of the Hong Kong International Airport, including a PRM radar and a PRM tower.

96. The Committee noted from paragraphs 3.6 and 3.13 of the Audit Report that, before seeking funding from FC for the PRM radar in 1996, CAD had been made aware of the constraints in adopting independent mixed mode of operation²¹ to maximize the utilization of the capacity of the Hong Kong International Airport's dual runways by two consultancy studies in 1990 and 1994. In particular, the 1994 Study pointed out that there was no acceptable solution for total independent mixed mode of operation due to terrain obstructions, south and northeast of the Hong Kong International Airport. However, CAD proceeded with the procurement of the PRM radar in the belief that there might be advancement in technology to permit simultaneous independent operations and the PRM radar could then support independent mixed mode of operation. In the event, the expected changes in technology did not happen.

97. As a result, the PRM radar was only put into use for purposes other than supporting the independent mixed mode of operation of the Hong Kong International Airport's runways, i.e. for providing essential distance information, monitoring final approaches of aircrafts and monitoring missed approaches in relation to aircraft departures. Such other uses turned out to be supplemental and were discontinued after some 20 months to 4 years. The PRM radar had been put into standby mode from January 2005 onwards.

98. The Committee further noted from paragraph 3.15 of the Audit Report that, in the funding application of 1996, members of the LegCo Public Works Subcommittee ("PWSC")/FC were informed that the PRM radar was required for independent mixed mode of operation to enable full utilization of the capacity of the Hong Kong International Airport's dual runways. However, Members were not informed of the associated constraints in adopting the independent mixed mode of operation and the implementation of which was contingent on advancement in technology.

99. Against the above background, the Committee made the following enquiries with CAD:

- the processes which led to the decision on the procurement of the PRM radar;

21 According to paragraph 3.8(c) of the Audit Report, independent mixed operation mode would allow each runway to function separately and without coordination with operations on the other runway, as if the runways were two different airports.

- about the basis of CAD's belief that there might be advancement in technology to permit independent mixed mode of operation;
- why the associated constraints in adopting the independent mixed mode of operation and the implementation of which was contingent on advancement in technology had not been included in the funding application to LegCo in 1996;
- how many times the PRM radar had been used since it had been put into standby mode in January 2005; and
- whether CAD had established a mechanism to regulate the procurement of equipment.

100. **Director-General of Civil Aviation** stated at the public hearings and in his letter dated 24 December 2014 (in Appendix 11) that:

- due to the long time lapse and scattered handling offices of the PRM project, CAD was unable to produce full records of the processes which led to the procurement decision;
- available records showed that the then Director-General of Civil Aviation was aware of the problems involved in the procurement of the PRM radar;
- notwithstanding the terrain constraints identified by the consultants in 1990 and 1994 for adopting independent operations for the Hong Kong International Airport, the consultant in 1990 considered that by the time the Hong Kong International Airport commenced operation (i.e. in 1998), new technology or procedures of ICAO would be available to permit independent operations;
- the consultancy study in 1994 concerning the Airspace Design Study of the new Hong Kong International Airport was not able to identify a viable solution to overcome the terrain constraints. Yet, CAD at that time had not ruled out the possibility that new technological advancement and ICAO procedures would happen in the future for independent operations. In addition, CAD had taken into account the advice of the Airspace Design Consultancy Working Group which comprised aviation industry representatives, such as the International Air Transport Association, International Federation of Airline Pilots'

Association, Government Flying Service, etc. in 1995, that advancement in aviation technology, namely the satellite navigation systems, might provide solutions for the independent mode of operations at Chek Lap Kok in future. CAD had therefore considered that PRM would be needed for monitoring the flight track of aircraft in both fully independent mode and segregated mode of operations at the Hong Kong International Airport;

- he confirmed that the associated constraints in adopting the independent mixed mode of operation and the implementation of which was contingent on advancement in technology or new ICAO procedures had not been included in the funding application to LegCo in 1996;
- with hindsight, he believed that it was not appropriate and was a mistake for CAD to inform FC members in the funding application in 1996 that the PRM radar would allow independent mixed mode of operation to enable full utilization of the capacity of the Hong Kong International Airport's dual runways, and it was wrong for CAD not to inform FC members of the other functions of the PRM radar;
- the PRM radar had not been used since it had been put into standby mode in January 2005;
- CAD agreed with Audit's views that cost-benefit analysis should be conducted before making major procurement decisions and both the pros and cons of a proposed project should be provided in the funding application to LegCo; and
- CAD had established mechanism in place to regulate the procurement of equipment. In response to the Audit Report, CAD had issued an internal memorandum reminding all relevant officers to strictly adhere to the approval processes in the procurement of major equipment.

101. As to whether the PRM tower at an estimated cost of \$100.9 million as mentioned in the Administration's paper to PWSC for the meeting on 12 June 1996 (in *Appendix 42*) was a dedicated structure to house the PRM radar, **Director-General of Civil Aviation** stated at the public hearings and in his letter dated 24 December 2014 (in *Appendix 11*) that the PRM Tower was not dedicated to housing the PRM radar. As set out in paragraphs 3(g) and 6 of the Administration's Paper to PWSC for the meeting on 12 June 1996, the 56-metre high PRM Tower

would function as the ancillary ATC tower and provide space for offices and equipment rooms for CAD and the Hong Kong Observatory, as well as observation/radio communication rooms for the Customs and Excise Department, and a radio equipment room with antenna for the Hong Kong Police Force. Such ancillary system and equipment were required to cover the second runway and support the ancillary ATC systems so that the essential functions could be maintained in case of any emergency affecting the normal operation of the ATC Tower and Complex constructed in the first phase of the new airport.

102. On the question of whether consideration would be given to reviewing the justifications for continuing putting the PRM radar in the standby mode which incurred an annual maintenance cost of \$200,000, including whether it would be more cost-effective to dispose of the PRM radar by reselling it, **Director-General of Civil Aviation** stated at the public hearings and in his letter dated 24 December 2014 (in Appendix 11) that CAD would conduct a review to determine the costs and benefits of maintaining the PRM radar on standby mode and consideration will be given to disposing of or reselling it.

D. Administration of air traffic control service related charges

103. The Committee noted from paragraph 1.8 of the Audit Report that under the Government's "user pays" principle, the amortized capital cost and the recurrent cost for providing ATC services was recovered through ATC service charges and en-route navigation charges. In this connection, the Committee asked how CAD could ensure that the Government's "user pays" principle was followed when determining the ATC service charges and en-route navigation charges and whether the capital cost of the new ATC system should be borne by present users or future users as only the latter group of users could directly benefit from the new system.

104. **Director-General of Civil Aviation** stated in his letter dated 25 April 2015 (in Appendix 19) that there was established Government-wide mechanism for the regular review of government fees and charges. CAD followed strictly the stipulated procedures promulgated by FSTB in the regular fee review with a view to ensuring that the "user pays" principle was followed when determining the ATC service charges and the en-route navigation charges. CAD strictly followed the Costing Manual published by the Director of Accounting Services in preparing and vetting the costing statements for the fee reviews on the ATC service charges and the en-route navigation charges and, where necessary, sought the advice from FSTB

and/or DoJ on the basis for including the relevant costs and imposing the revised charges on the users.

105. According to Table 6 of the Audit Report, the total amount of overdue en-route navigation charges was \$15.7 million as at 31 March 2014. The Committee enquired about the updated figure on the total overdue amount in January 2015. **Director-General of Civil Aviation** advised in his letter dated 12 January 2015 (in Appendix 17) that as at 7 January 2015, the total overdue amount of en-route navigation charges was \$21.3 million.

106. In reply to the Committee's enquiry regarding the actions taken by CAD to follow up on overdue en-route navigation charges, **Director-General of Civil Aviation** explained at the public hearings that:

- CAD had followed the procedures as stipulated in the Financial and Accounting Regulations, such as the issuance of reminders and warning letters, in dealing with overdue en-route navigation charges;
- regarding the largest default case, CAD had all along taken active follow-up actions to recover the outstanding amount. Apart from issuing reminders and warning letters to the airline, CAD had sent letters to the senior management of the company and sought the assistance of the civil aviation authority of the airline's home country. Two representatives from senior management of the airline had come to Hong Kong to discuss the matter with CAD; and
- CAD had also informed ICAO of this default case and raised the issue of overdue en-route navigation charges at a Conference of Directors General of Civil Aviation, Asia and Pacific Regions, with a view to formulating effective measures to tackle the problem.

107. In his reply dated 7 February 2015 (in *Appendix 43*), **Director-General of Civil Aviation** further explained that CAD had sought the advice of ICAO on overdue en-route navigation charges in 2013, and further raised the issue for discussion at the Conference of Directors General of Civil Aviation, Asia and Pacific Regions in November 2014. The Conference suggested that ICAO should facilitate the setting up of a mechanism for sharing information and best practices on the subject, and should continue identifying practical operational measures to deal with problems of overdue charges. ICAO had proposed to discuss the issue at its Air

Navigation Services Economics Panel in May 2015. CAD would closely monitor the development.

108. The Committee noted from paragraphs 4.17 and 4.18 that CAD had agreed with Audit's recommendation to take effective measures to prevent the loss of revenue in default en-route navigation charge cases, including demanding a security deposit or banker's guarantee from specific airline operators using the CAD's navigation services on a case-by-case basis having regard to their payment records. In this connection, the Committee enquired about the progress of implementing this measure.

109. **Director-General of Civil Aviation** replied in his letter dated 12 January 2015 (in Appendix 17) that CAD was exploring the criteria and details for implementation of demanding a one-month security deposit or banker's guarantee from specific airline operators using the CAD's navigation services on a case-by-case basis having regard to their payment records. **Director-General of Civil Aviation** further advised in his letter dated 7 February 2015 (in Appendix 43) that CAD had written to DoJ on 26 January 2015 to seek legal advice on the proposal. CAD would follow up closely with DoJ.

110. At the request of the Committee, **Director-General of Civil Aviation** provided in his reply dated 12 January 2015 (in *Appendix 44*) the details of the cases which involved an overdue en-route navigation charges of \$250,000 or more and the follow-up actions taken on these cases.

E. Administration of the mandatory occurrence reporting scheme

Long Outstanding cases

111. The Committee noted from paragraph 5.8 of the Audit Report that, as at 16 June 2014, there were 3 336 mandatory occurrence reporting ("MOR") cases (of which 2 189 were closed and 1 147 were outstanding cases) in the past five years. Ageing analysis of the 1 147 outstanding cases showed that 811 (71%) had remained outstanding for over one year. As at 12 August 2014, the number of outstanding cases has dropped to 634. In this regard, the Committee asked why the 811 cases had remained outstanding for over one year.

112. **Director-General of Civil Aviation** explained at the public hearing on 15 December 2014 that:

- regarding the 634 outstanding cases as at 12 August 2014, less than 30 cases remained outstanding;
- there were a large number of cases remaining outstanding in the past because the case officers had not updated the MOR database after taking follow-up actions on the cases; and
- in response to Audit enquiry, CAD had reviewed all the cases in the MOR database and updated the status of all completed cases.

113. As revealed in paragraph 5.21 of the Audit Report, of the 3 374 MOR cases, 634 were outstanding as at 12 August 2014. Ageing analysis of these 634 cases showed that 201 had remained outstanding for over four years. According to the dates of last action recorded in the MOR database, 117 of these 201 cases had no follow-up action recorded since 2009. In the light of this, the Committee asked for the measures that CAD would take to ensure that follow-up actions on long outstanding cases were taken and the MOR database was updated in a timely manner.

114. **Director-General of Civil Aviation** stated in his letter dated 24 December 2014 (in Appendix 11) that CAD had introduced periodic MOR review meetings since November 2014 to ensure that each MOR case had been adequately followed up by the organizations concerned and actions taken by respective CAD officers were captured in the database in a timely manner.

115. On the question of whether consideration would be given to writing off long outstanding MOR cases which required no further follow-up actions, **Director-General of Civil Aviation** stated in his letter dated 24 December 2014 (in Appendix 11) that:

- in respect of each MOR report, CAD would review and take follow-up actions based on the circumstances and causes of each individual case, in accordance with the established procedures as stipulated in the CAD MOR guidelines. Only when all the required actions had been taken and adequately followed up by the organizations concerned would the MOR case be closed; and

- on reviewing those cases identified as long outstanding, CAD had discovered that the investigation work on them had been completed by the respective organizations and subsequently accepted by CAD. However, the database was not updated timely to reflect the situation when the Audit conducted the audit on CAD. All those long outstanding cases were then closed.

Timeliness of reporting

116. As reported in paragraph 5.12 of the Audit Report, of the 3 374 MOR reports received by CAD from 2009-2010 to 2013-2014, 1 037 (31%) could not meet the statutory four-day-reporting rule. In this connection, the Committee enquired about:

- the reasons for the late MOR reports;
- the measures to be taken by CAD to improve the situation; and
- whether penalty was imposed on frequent non-compliant cases.

117. **Director-General of Civil Aviation** stated at the public hearings that:

- for minor MOR cases, operating personnel usually made reports to their respective airlines after they left Hong Kong and arrived at their destinations. The respective airlines then reported the cases to CAD. This might be the reason for the late MOR reports;
- CAD had reminded all airlines of the statutory four-day reporting rule;
- CAD had revised the MOR reporting form to facilitate reporting organizations/personnel to indicate the time when the occurrences came to their knowledge to facilitate the counting of the four-day-reporting period; and
- for frequent late MOR reporting cases, CAD would review the reasons of non-compliance and the seriousness of the cases and take necessary follow-up actions, such as holding meetings with the senior management of the operators concerned and the issuance of warning letters.

Airport vehicles not giving way to aircraft

118. The Committee noted from paragraph 5.20 of the Audit Report that the examination of the 412 medium risk MOR cases had revealed that the most frequent incidents were related to "airport vehicles not giving way to aircraft" (33 cases from January to December 2012). Among the 1 025 cases without risk level assigned/captured, there were 75 similar incidents. According to CAD, the Airport Standards Division had followed up all these cases using its monitoring regime on airport operation, and had conducted a review on these cases in January 2013. The review found that these cases often occurred in apron area involving slow-moving taxiing aircraft and vehicles, i.e. not meeting the reporting criteria of an obstruction in runways or aircraft manoeuvring areas as mentioned in CAD's guidelines on reportable occurrences. As such, CAD had ceased to categorize these cases as reportable occurrences since 2013. Audit noted from the records of the Airport Standards Division that during January 2013 and March 2014, there were 66 cases of "airport vehicles not giving way to aircraft". In other words, there were a total of 174 (33 + 75 + 66) such cases from 2009-2010 to 2013-2014. In this regard, the Committee enquired about the justifications for ceasing the categorization of these cases as reportable occurrences "airport vehicles not giving way to aircraft" and the follow-up actions taken on these cases.

119. **Director-General of Civil Aviation** advised at the public hearings that:

- all of the cases relating to "airport vehicles not giving way to aircraft" mentioned in the Audit Report were without safety implications;
- although CAD had ceased to categorize these cases as reportable occurrences since 2013, it had discussed all these cases with the Airport Authority Hong Kong; and
- the Airport Authority Hong Kong had recently reminded all airside drivers to observe the Airport Authority Bylaws regarding giving way to aircrafts and also reminded them of the penalty relating to this offence in the Airside Driving Offence Points Scheme.

Collation and usage of the information in MOR database

120. With reference to the experience gained on the MOR Scheme since the relevant guidelines were issued in 1999, the Committee asked the measures that CAD

would take to improve the collation of information for the MOR database, and subsequent analysis and follow-up actions with a view to improving air traffic safety.

121. **Director-General of Civil Aviation** explained in his letter dated 24 December 2014 (in Appendix 11) that:

- it was CAD's long standing pledge and commitment to sustain and improve the aviation safety standards of Hong Kong. With experience gained from operating the MOR Scheme and in line with the latest global aviation developments, CAD had taken a number of measures in recent years, to improve the collation and usage of the information for the MOR database with the aim of achieving continuous improvement in aviation safety;
- apart from the efforts made by CAD in the monitoring and follow up of the individual MORs by taking immediate actions as necessary, CAD had in recent years, made positive use of the information from the MOR database for safety education and promotion purposes;
- through monitoring and analysis of the trends and follow-up actions, safety information developed from the MOR database was disseminated to the aviation services providers and industry partners to promote knowledge of these occurrences so that others and the industry at large might learn from them. Specific advice, notices and safety publications were issued to provide the industry with relevant safety guidelines, recommendations and/or instructions;
- since 2013, CAD had established a holistic safety data review and analysis mechanism based on the available safety information, including the MOR data, in line with the latest global aviation developments. A safety committee comprising senior officers of different regulatory divisions of CAD was also established to regularly review and address any potential safety concerns and determine the actions required; and
- CAD agreed with the Audit on the need to strengthen the management of the MOR database and to improve the collation of the information for the MOR database so that it could provide accurate and up-to-date information to support MOR case management and trend analysis of significant aviation safety issues. It was CAD's aim to continue to

improve the MOR scheme and database with the ultimate objective of achieving continuous improvement in aviation safety.

F. Conclusions and recommendations

Overall comments

122. The Committee:

- emphasizes that:
 - (a) air safety, for the purpose of protecting life and property, must not be compromised under any circumstances;
 - (b) the provision of a safe, reliable, effective and efficient air traffic control ("ATC") system is of paramount importance to Hong Kong, and this is essential for Hong Kong to maintain itself as an international and regional aviation hub; and
 - (c) it is the constitutional role of the Legislative Council ("LegCo") in approving public expenditure under Article 73(3) of the Basic Law, and Article 64 of the Basic Law states that "[t]he Government of the Hong Kong Special Administrative Region must abide by the law and be accountable to the Legislative Council of the Region.....". As such, the Administration, to fulfil its constitutional duty under Article 64 of the Basic Law, must provide accurate, complete and not misleading information on public expenditure to LegCo and its committees for approval. In addition, it is incumbent on the Administration to report timely and in a proper manner to the Finance Committee ("FC") of LegCo and the relevant Panels of LegCo for any substantial delay in the implementation of the approved proposals. It is also important for the Administration to obtain FC's approval, where necessary, for any subsequent substantial variations in relation to the approved funding proposals;
- is gravely concerned that air safety might have been or will be seriously compromised because, according to the paper submitted by

the Administration to FC²², the existing ATC system would reach the end of its usable life in 2012. Some components were already out of production and the system was being sustained through redeployment of existing parts where possible. Members of FC were also informed that replacement of the ATC system was required in order to ensure the continued provision of safe, reliable, efficient and effective ATC services in line with air traffic growth. The new ATC system was targeted for commissioning in December 2012. However, as at May 2015, the new ATC system was not yet in operation and the latest estimate was that the new system would only be ready for operation in the first half of 2016;

- held a total of six public hearings from December 2014 to March 2015 to receive evidence on the findings and observations of the Director of Audit's Report ("the Audit Report"). The Committee conducted a visit to the Civil Aviation Department ("CAD") on 23 May 2015 to better understand the operation of the existing Air Traffic Management System ("ATMS") and the testing of the new ATMS;
- has received a number of submissions from members of the public on the administration of the ATC and related services and for fairness to all parties concerned, has warned itself that it should not admit any of the submissions or any information received by the Committee as evidence per se;
- has allowed witnesses reasonable opportunities to be heard during public hearings and to provide further evidence, either orally or in writing;
- has made its conclusions and recommendations based only on evidence received by the Committee, including information in the Audit Report and evidence given by the witnesses (either orally or in writing);

Procurement and implementation of the new ATC system project

Implementation of the new ATC system project

- notes that in May 2007, CAD obtained funding of \$1.565 billion to replace its ATC system by a new ATC system which would be

²² Please refer to the paper submitted by the Economic Development and Labour Bureau to FC in May 2007 [LC Paper No. FCR (2007-08)9] for details.

implemented through eight different major contracts. Seven of the eight contracts were completed on schedule, but there has been substantial delay in the implementation of the ATMS contract;

- further notes that, according to paragraph 2.3 of the Audit Report, this ATMS contract, with original contract value of \$486 million, is the most complex in terms of scope, design, system software development, functional and system interoperability requirements;
- finds it appalling and totally unacceptable that the existing ATC system, according to the Administration, ought to have been retired by December 2012 owing to the anticipated end of production of some components, its inability to support some of the functionalities common in state-of-the-art ATC systems and its limited functionality and capacity which inhibited inter-operability with other ATC systems in the neighbouring cities. CAD would not be able to meet mounting challenges in providing safe and reliable ATC services using the existing ATC system as evidenced by the following:
 - (a) as revealed in the Audit Report²³, the existing ATC system has been operating above its planned capacity, with frequency of surveillance data display problems increasing since 2011. However, as at May 2015, no new, safe and reliable ATC system as represented by CAD to LegCo is in operation and the latest estimate was that the new system would only be ready for operation in the first half of 2016;
 - (b) the delay of at least three-and-a-half years (from December 2012 to the first half of 2016) in the replacement of the existing ATC system with a usable life which, according to CAD, should have ended in 2012, might pose a serious threat to Hong Kong's aviation safety and might have an adverse impact on Hong Kong's position as an international and regional aviation hub; and
 - (c) in the light of the delay, public money of more than \$33 million²⁴ has been spent on average each year since 2013 to ensure the

²³ Please refer to paragraph 2.19 of the Audit Report for details.

²⁴ This amount comprised the annual maintenance cost of the existing ATMS at \$5.9 million and the annual manpower expenditure for the Project Team involved in the CAD Headquarters project and ATC system replacement project at around \$28 million. The new CAD Headquarters was completed in 2012.

continued safe and efficient operation of the existing ATMS and on the ATC replacement project;

Procurement of the new ATMS

- strongly condemns CAD's incompetence and negligence in managing the procurement and implementation of the new ATMS project which has been delayed for at least three-and-a-half years, as evidenced by the following:
 - (a) CAD, as the department responsible for providing ATC services, had seriously underestimated the complexity involved in the implementation of this safety-critical and complex system with a total estimated contract value of \$1.0332 billion²⁵ as it had admitted that "the original schedule for the procurement and testing of the new ATC system might be a bit too ambitious"²⁶;
 - (b) CAD did not engage or seek any external expert to assist in the procurement of the new ATMS despite the complexity involved;
 - (c) CAD's procurement of the new ATMS with two contract variations had caused a significant change in the total value of the contract, i.e. from \$486 million to \$575.2 million, which might give rise to criticism of unfairness to other tenderers²⁷ as the price score had accounted for 60% of the overall score in the assessment of the tenders;
 - (d) CAD obtained FC's approved funding of \$1.565 billion for the new ATC system project²⁸. The total tender price of the eight contracts under the project was \$944 million, but another \$89.2 million of the remaining fund was spent on the two contract variations of the ATMS contract without informing LegCo;

25 Please refer to Table 1 of the Audit Report for a breakdown of the total estimated contract value of \$1.0332 billion for the eight major contracts for implementing the new ATC system project.

26 Please refer to the reply dated 12 December 2014 from CAD (in Appendix 10) for details.

27 Five tenderers have submitted proposals in response to the tender invitation for the procurement of the new ATMS.

28 Please refer to the paper submitted by the Economic Development and Labour Bureau to FC in May 2007 [LC Paper No. FCR(2007-08)9] for details.

- (e) the Administration had not conducted financial vetting of the tenderers to assess their financial capability to complete the contract with a value of \$575.2 million, which required the ATMS Contractor to provide 15 years of maintenance services for the new ATMS;

Due diligence

- (f) CAD has not solicited comments regarding the performance of the new ATMS offered by the ATMS Contractor from the airports where the new ATMS was adopted and functioning in 2010²⁹ during the tender evaluation process. The ATMS contract was subsequently awarded to the ATMS Contractor in February 2011;
- (g) CAD had not conducted visits to the airports where the new ATMS was adopted and functioning in 2010, nor was it aware of the articles/reports in the media concerning the unsatisfactory performance of the new ATMS at these airports in 2010 prior to the award of the ATMS contract in February 2011;
- (h) CAD had not conducted visits to the reference sites provided by the tenderers during the tender assessment stage;

Tendering terms and process

- (i) although the ATMS Contractor was required to provide an ATMS that could accommodate the concurrent operations of 120 controller working positions, CAD only required the tenderers to provide an ATMS with a track record of having no less than 40 ATC centre air traffic controller working positions in one ATC centre in Clause 8.1 of Part II of the Tender Document for the procurement of the new ATMS;
- (j) contrary to the requirement of providing serviceability/availability figures of the systems similar to the proposed system for the previous 12 months by the tenderers

²⁹ According to paragraph 17 of the Decision of the Review Body on Bid Challenges (in Appendix 24), the Government Logistics Department pointed out that the system proposed by the ATMS Contractor had already been adopted and functioning in one or more airports, which was supported by two media articles reporting that the systems at two airports had successfully completed the Site Acceptance Test in December 2008, and that the system at one airport had successfully completed the Factory Acceptance Test in January 2009.

during the tendering process of the existing ATMS, CAD only required the tenderers for the new ATMS to provide an ATMS with a minimum track record of not less than six months in Clause 8.1 of Part II of the Tender Document, as this short track record might not fully reflect the capability and performance of the new ATMS to handle the fluctuations in air traffic due to seasonal changes;

- (k) in Part II - Conditions of Tender, there is no information on how the term "System" should be interpreted while in Part IV - Conditions of Contract, the term "System" means "the air traffic management system to be implemented by the Contractor in accordance with the terms and conditions of the contract in two phases, Phase 1 ATMS and Phase 2 ATMS". Further, Clause 8.4 of Part II of the Tender Document provides that "A proposed System with no proven performance record will not be considered further". According to CAD, the term "System" should be interpreted to mean a basket of systems and sub-systems³⁰. However, such interpretation was not expressly provided in the Tender Document and the contract was subsequently awarded to an ATMS Contractor who proposed a new system that was not yet in operation³¹. This might be unfair to the tenderers or potential tenderers and might open up to abuse as it would be extremely difficult, if not impossible, for the tenderers or any parties who were interested in submitting tender proposals to be aware of the interpretation of the term "System" as intended by CAD prior to the award of the contract;

30 When CAD conducted the tender exercise for the new ATMS in 2011, an unsuccessful tenderer alleged that the Proposed System provided by the Contractor had failed to meet the requirement of possession of "proven performance record" as specified in the Tender Document, hence in breach of the relevant provision of the World Trade Organization Government Procurement Agreement ("WTO GPA"). In accordance with the relevant provisions of WTO GPA, the Government had referred the complaint to the Review Body on Bid Challenges, a dedicated and independent body established under the WTO GPA, for review. After review of the case, the Review Body found that the System proposed by the Contractor possessed the necessary "proven performance record". The Review Body had not seen any unfairness or bias which the Government had operated on any tenderer including the complainant. The complaint was dismissed. Please refer to the Decision of the Review Body on Bid Challenges (in Appendix 24) for details.

31 According to CAD's reply dated 18 February 2015 (in Appendix 18), Dubai and Indian airports, the current users of the Contractor's Proposed System, had not commenced the operation of the Contractor's Proposed System at the time when CAD awarded the ATMS contract to the Contractor in February 2011.

Factory Acceptance Tests

- (l) Factory Acceptance Tests were conducted from June 2012 to June 2013. There were numerous deficiencies/observations identified during the Factory Acceptance Tests, i.e. 204 deficiencies/observations were recorded in June and July 2012. Although those deficiencies/observations had been rectified with only 23 still outstanding by June 2013, another 104 deficiencies/observations were identified between August 2012 and June 2013. In view of the successful rectification of 181 of the deficiencies/observations and the ATMS Contractor's undertaking to rectify and verify all the remaining 127 outstanding deficiencies/observations (23 plus 104) by the Site Acceptance Tests stage, CAD conditionally accepted the Factory Acceptance Tests results in June 2013, 11 months later than the original target completion date. CAD's acceptance of the Factory Acceptance Tests conditionally when there were still a large number of outstanding deficiencies/observations has put CAD in a very unfavourable position. Such acceptance was not made in accordance with Clause 12 of Part IV of the Tender Document for the procurement of the new ATMS³²;

Scenario-based test

- (m) scenario-based test, which was an important test using live traffic, was not included in the contract. It was agreed between CAD and the ATMS Contractor only after the Factory Acceptance Tests were conducted that scenario-based test should be included in the Site Acceptance Tests Procedures, which were originally due for submission on 11 April 2012. Since March 2013, the ATMS Contractor had made several submissions of the Site Acceptance Tests Procedures which were agreed in May 2014. As a result, the Site Acceptance Tests, which were on the critical path of the ATMS contract, only commenced in

32 According to Clauses 12.1 and 12.2 of Part IV of the Tender Document for the procurement of the new ATMS, "Factory Acceptance Tests in accordance with Schedule 6 shall be carried out at the time specified in such Schedule and the Implementation Plan", and "[s]hould the System fail to pass any Factory Acceptance Tests by being found not to comply with the Final Specifications, the Contractor shall remedy the defects and/or deficiencies and the relevant test(s) shall be repeated within a reasonable time but in any event not exceeding 4 weeks. Any repeat testing shall not, however, relieve the Contractor of its obligations to meet Implementation Plan dates including Key Dates and the Completion Date".

mid-August 2014, 10 months later than the revised target completion date of the Site Acceptance Tests³³;

Site Acceptance Tests

- (n) during the Site Acceptance Tests of the new ATMS commenced in mid-August 2014, about 1 000 follow-up items were recorded on site and according to CAD, about 80% of them were minor in nature. For the remaining 20% priority items, the ATMS Contractor has rectified 90% of them by March 2015. As at 15 May 2015, there were about 14 outstanding priority items which would be rectified/addressed by the Contractor before end-June 2015;

Contract variations

- (o) CAD had failed to include certain requirements in the system specifications of the Tender Document of the new ATMS as those requirements could have been anticipated with careful planning and foresight. Some of these requirements include the enhancement of the Air Traffic Services Interfacility Data Communications interface and the simulator system expansion by increasing the number of simulator training and input operator positions from 32 to 48. The failure has resulted in two contract variations (with the first contract variation requested only 11 months after the award of the ATMS contract) with a total cost of \$89.2 million (i.e. 18% of the original contract value) incurred for the new ATMS to meet additional/new requirements as well as a delay in the implementation of the ATMS contract;
- (p) there was no established mechanism to determine whether and when an enhancement to ATMS should be made, in particular for enhancements arising from newly recommended requirements from the International Civil Aviation Organization;

³³ According to paragraph 2.12 of the Audit Report, the target completion dates of some milestones in the ATMS contract have been revised (i.e. by an extension of six months) due to the second contract variation. Please refer to Table 3 of the Audit Report for the target and actual completion dates of various milestones of the ATMS contract as at October 2014.

Liquidated damages

- (q) according to CAD, the ATMS Contractor is also the contractor³⁴ for the existing ATMS and CAD has to pay around \$5.9 million a year to the ATMS Contractor for upgrading and maintenance works of the existing ATMS to ensure the continued safe and efficient operation of the existing system beyond 2012 (the original target date for commissioning the new ATMS). Under Clause 17.2 of Part IV of the Tender Document, the ATMS Contractor is only required to pay up to a maximum of around \$5 million and \$3 million in the case of delay in the implementation of Phases 1 and 2 of the new ATMS contract respectively³⁵. Hence, there is no incentive for the ATMS Contractor to expedite the delivery of the new ATMS;
- (r) contrary to the contract conditions on liquidated damages for the procurement of the existing ATMS which required the Contractor to pay a maximum of around \$20 million (US\$2,630,040) for delay in providing the simulator and the system³⁶, the new ATMS contract only required the ATMS Contractor to pay up to a maximum of around \$8 million (\$5 million + \$3 million) in the case of delay in the implementation of Phases 1 and 2 of the new ATMS contract; and

Termination of contract

- (s) according to Clauses 44.1.1 and 44.1.2 of Part IV of the Tender Document for the procurement of the new ATMS, "the Government shall be entitled to terminate the Contract by serving a 14 days' notice in writing on the Contractor if the Contractor persistently or flagrantly fails to carry out the whole or any part of the Services punctually or in accordance with the

34 Please refer to Appendix 17 for details.

35 According to Clause 17.2 of Part IV of the Tender Document, "If the Contractor fails to provide a Sub-System Ready for Service by the Completion Date, the Contractor shall pay to the Government within 7 days upon demand by the Government as and by way of liquidated damages and not as a penalty for any loss or damage sustained by the Government resulting from delay during the period from the Completion Date to the date on which the Contractor actually provides the Sub-System Ready for Service the sum of HK\$52,190 for each day or part of the day of such delay up to a total maximum of HK\$5,219,000 in the case of Phase 1 ATMS, and HK\$34,314 for each day or part of the day of such delay up to a maximum of HK\$3,431,400 in the case of Phase 2 ATMS."

36 A copy of the relevant contract conditions on liquidated damages for the purchase of the existing ATMS is in Appendix 26.

terms and conditions of the Contract; or the Contractor fails to observe or perform any of its obligations under the Contract and (in the case of a breach capable of being remedied) has failed to remedy the breach to the satisfaction of the Government Representative within 30 days (or such longer period as the Government Representative may, in its sole discretion, allow) after the issuance by the Government Representative to the Contractor of a notice in writing requiring it to do so." However, after a delay of 15 months in the implementation of the contract (from the revised contractual date of completion³⁷ (i.e. 20 December 2013) up to the end of March 2015), CAD has yet to formulate any plans in case it was necessary to terminate the contract with the ATMS Contractor;

- strongly condemns and deplores that the Director-General of Civil Aviation, as the head of CAD, had blatantly failed to perform his responsibilities and duties in ensuring that due diligence was conducted adequately and thoroughly, the conditions of the ATMS contract were set out clearly and appropriately, and the ATMS contract was implemented effectively, on schedule and in a cost-effective manner, as evidenced by the above findings;
- expresses grave concern and finds it unacceptable that the Transport and Housing Bureau ("THB"), as the Bureau overseeing the operations of CAD, had failed to perform its supervisory role to ensure an effective implementation of the new ATC system project by CAD;
- expresses grave concern and finds it unacceptable that despite that THB and CAD had mentioned from time to time about the progress of the implementation of the new ATC centre in the paper to the LegCo Panel on Economic Development ("ED Panel") regarding the annual Policy Address briefing as well as in the replies to queries from members of FC during the examination of the Estimates and from members of ED Panel³⁸, THB and CAD had neither informed FC of the two contract variations of the ATMS contract nor drawn members' attention to the substantial delay in the replacement of the ATC system,

³⁷ According to paragraph 2.12 of the Audit Report, the target completion dates of some milestones in the ATMS contract have been revised (i.e. by an extension of six months) due to the second contract variation. Please refer to Table 3 of the Audit Report for the target and actual completion dates of various milestones of the ATMS contract as at October 2014.

³⁸ Please refer to THB's reply dated 12 January 2015 (in Appendix 41) for details.

undermining the role of LegCo in monitoring Government expenditure effectively;

- expresses grave concern and finds it unacceptable that the new ATMS, with a delay of three-and-a-half years and with two contract variations, might deviate from the originally planned ATMS in 2011 when the tender was issued. Further, in the light of the said delay, the new ATMS might have compatibility problems with other systems in the ATC System, which might pose safety risks to ATC services in Hong Kong;
- has yet to be convinced with assurance and explanation by the Director-General of Civil Aviation demonstrating that he and CAD are capable of managing the ATMS project to work towards the target operation date of the new, safe and reliable ATC system in the first half of 2016;
- expresses grave concern and finds it unacceptable that in tendering major specialist systems, the user departments are wholly responsible for drafting the user requirements, tendering and contract provisions as well as the tender evaluation work. As such, despite that other related Government departments, including the Government Logistics Department and the Department of Justice were involved in vetting the tender document, these departments and the supervising bureau would not possess the necessary technical expertise to take up an effective monitoring and gatekeeping role to ensure that the Tender Document is drafted in an objective and impartial manner;
- expresses grave concern and finds it unacceptable that as only four international airports are using the new ATMS and some of the airports are already considering switching their ATMS to other new systems, there might be a genuine risk that the new ATMS in Hong Kong will become one of the remaining few users of the System worldwide by the time when the new ATMS is commissioned in Hong Kong. The ATMS Contractor will have difficulties and small economies of scale to provide efficient system support and maintenance services for the new ATMS;

- notes that:
 - (a) the Director-General of Civil Aviation admitted that some of the words used in the tender documents were not clear, which had made it easy for the tenderers to make use of the situation;
 - (b) CAD agreed that it would have been more satisfactory if CAD could anticipate some of the requirements in the two contract variations and include them into the tender specifications;
 - (c) CAD would continue to urge the Contractor to expedite actions on rectifying the outstanding deficiencies/observations in the new ATMS and would closely monitor the remaining contract work to minimize further project delay; and
 - (d) on the ageing of the existing ATC system, CAD had implemented appropriate measures and had stepped up maintenance efforts to keep it in smooth operation until the new ATC system is available;
- urges CAD to:
 - (a) ensure that the new ATMS must be safe, reliable and stable to be used, and that aviation safety must not be compromised under any circumstances;
 - (b) ensure that all the deficiencies/observations identified during the Factory Acceptance Tests and Sites Acceptance Tests must be completely and satisfactorily resolved prior to putting the new ATMS into operation;
 - (c) request the Contractor to take all possible effective measures to expedite the implementation of the new ATMS contract;
 - (d) closely monitor the performance of the Contractor and take pro-active effective measures to ensure that the Contractor settles the outstanding issues in a timely and satisfactory manner;
 - (e) closely monitor the existing ATC system and take pro-active effective measures to ensure the existing ATC system is timely maintained in good operational conditions until the new ATC system is commissioned;

- (f) consider formulating a contingency plan as soon as possible to deal with the termination of the ATMS contract in case that the Contractor has failed to provide a safe, reliable and stable system by the first half of 2016 or any other indicative date to be set by CAD/THB;
 - (g) consider engaging external experts to assist in the procurement of complex systems in the future;
 - (h) ensure that for future tenders, all foreseeable requirements are included in the tender specifications in the first place and the conditions of the contracts are formulated appropriately and clearly in order to achieve the best value-for-money purchase for the Government;
 - (i) ensure that for future tenders, the terms and conditions of the tenders must be interpreted in a fair manner, and any terms with interpretation which may appear to depart from a literal and plain meaning should be made known to all potential tenderers during the tender invitation as far as practicable;
 - (j) consider taking more effective measures as specified in the conditions of tenders (such as visit to reference sites in the case of procurement of the new ATMS) to assess the performance of the tenderers for future major procurement projects;
 - (k) update LegCo and/or obtain FC's approval, where applicable, in the future for any subsequent substantial variations in its approved funding proposals, such as contract variations or delays in the implementation of major projects; and
 - (l) develop a mechanism to determine whether and when an enhancement to ATMS should be made, in particular for enhancements arising from new requirements from the International Civil Aviation Organization;
- urges THB to:
- (a) consider engaging external and independent experts immediately to assess the safety and performance of the new ATMS as well as the likelihood of completing Phase 1 of the new ATMS contract by the ATMS Contractor in the first half of 2016, and

then formulate a plan on the way forward for the ATC system replacement project accordingly based on the expert findings;

- (b) closely monitor the performance of CAD to ensure that there will be no further delay in the implementation of the ATC system replacement project;
 - (c) step up its supervisory role to ensure the effective implementation of major projects by CAD in the future; and
 - (d) update LegCo and/or obtain FC's approval, where applicable, in the future for any subsequent substantial variations in its approved funding proposals, such as contract variations or delays in the implementation of major projects;
- requests CAD and THB to update the LegCo ED Panel on the progress of the ATC project, in particular during the critical period in the coming months leading to the first half of 2016 when the new ATC system is expected to come into operation;
 - in light of the importance of air safety in protecting lives and properties, expects the Administration to take appropriate follow-up actions on the issues that were raised and came to Members' attention which may fall outside the remit of the Committee;

Management of the precision runway monitor ("PRM") project

- expresses strong resentment that CAD had failed in its responsibilities in ensuring public money spent on procuring new systems and equipment was good value for money, resulting in a gross waste of public money of about \$200 million, as evidenced by the following:
 - (a) the PRM radar at a cost of \$101.4 million, together with a building cum tower³⁹ at an estimated cost of \$100.9 million to house the radar, was commissioned in January 2000. However, the PRM radar had not been used to support the independent

³⁹ According to the paper submitted by the Administration to the Public Works Subcommittee in 1996 [LC Paper No. PWSC(96-97)19], this 56-metre high building cum tower would also function as the ancillary ATC tower and provide space for offices and equipment rooms for CAD and the Royal Observatory (the Observatory resumed its original name "Hong Kong Observatory" in 1997), observation/radio communication rooms for the Customs & Excise Department, and a radio equipment room with antenna for the Hong Kong Police Force. The base of the building would be enlarged to function as the ancillary ATC centre and provide accommodation for the ancillary ATC and meteorological equipment.

mixed mode of operation⁴⁰ of the Hong Kong International Airport's runways, i.e. the intended use of the PRM radar to maximise the runway capacity stated in the funding application to FC in June 1996. Instead it was used from March 2001 for providing essential distance information, monitoring final approaches of aircrafts and monitoring missed approaches in relation to aircraft departures;

- (b) the use of the PRM radar for monitoring missed approaches in relation to aircraft departures had been discontinued in December 2002, and the use of the PRM radar for providing essential distance information and monitoring final approaches of aircrafts had also been discontinued in January 2005. The PRM radar had been put into standby mode from January 2005 onwards;
 - (c) despite that CAD had been made aware of the constraints in adopting independent mixed mode of operation to maximise the utilization of the capacity of the Hong Kong International Airport's dual runways by two consultancy studies in 1990 and 1994, it still proceeded with the procurement of the PRM radar in the belief that there might be advancement in technology to overcome such constraints in the future. As the expected changes in technology had not happened, the PRM radar was only put into use for purposes other than supporting the independent mixed mode of operation of the Hong Kong International Airport's runway. Such other uses⁴¹ turned out to be supplemental and were discontinued after some 20 months to 4 years; and
 - (d) the annual maintenance cost of the PRM radar was \$1.1 million before it had been put into standby mode and was reduced to \$0.2 million from January 2005 onwards;
- expresses strong resentment that while members of the Public Works Subcommittee("PWSC")/FC were informed in the funding application

⁴⁰ According to paragraph 3.8(c) of the Audit Report, independent mixed operation mode would allow each runway to function separately and without coordination with operations on the other runway, as if the runways were two different airports.

⁴¹ Please refer to paragraphs 3.5 and 3.6 the Audit Report for details.

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in 1996⁴² that the PRM radar was required for independent mixed mode of operation to enable full utilization of the capacity of the Hong Kong International Airport's dual runways, they were not informed of the apparent constraints in adopting the independent mixed mode of operation and the implementation of which was contingent on advancement in technology (if any);

- notes that in managing major equipment projects in the future, CAD would strengthen project appraisal to ensure full evaluation of uncertainties and risks impacting on project viability;
- urges CAD to:
 - (a) develop a mechanism to vet and approve the procurement of major equipment in the future to ensure that the equipment purchased are cost effective and public money are used in a prudent manner; and
 - (b) ensure in the future that both the pros and cons of a proposed project, including the potential risks inherent in the project and all relevant contingent factors, are provided in the funding application to enable LegCo Members to make an informed decision on whether to support the project;

Administration of ATC service related charges

- expresses serious concern that the amount of overdue en-route navigation charges has increased since 2009-2010, and as at 7 January 2015, the overdue amount of en-route navigation charges was \$21.3 million;
- notes that CAD would seek the Department of Justice's advice on the feasibility of demanding a security deposit or banker's guarantee for all airline operators on a case-by-case basis having regard to the operator's payment records;
- urges CAD to:
 - (a) take effective follow-up actions to recover the overdue en-route navigation charges as soon as possible;

⁴² Please refer to the paper submitted by the Director of Architectural Services to PWSC in June 1996 [LC Paper No. PWSC(96-97)19] for details.

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- (b) expedite the progress in exploring the feasibility of demanding a security deposit or banker's guarantee from all operators on a case-by-case basis having regard to the operator's payment records; and
- (c) adhere to the Government's "user pays" principle in determining the ATC service charges and en-route navigation charges in the future;

Administration of the mandatory occurrence reporting ("MOR") scheme

- expresses concern that:
 - (a) the information in the MOR database, which is an important management tool for monitoring the progress of follow-up actions on reported hazardous or potentially hazardous occurrences and for trend analysis of significant aviation safety issues, was not accurate and not timely updated;
 - (b) CAD had not made use of the information in the MOR database for analysis with a view to improving air traffic safety; and
 - (c) no follow-up actions had been taken on 117 long outstanding cases since 2009;
- notes that:
 - (a) it was CAD's pledge and commitment to sustain and improve the aviation safety standards of Hong Kong. With experience gained from operating the MOR Scheme and in line with the latest global aviation developments, CAD has taken a number of measures in recent years to improve the collation and usage of the information from the MOR database with the aim of achieving continuous improvement in aviation safety; and
 - (b) CAD has agreed with the Audit recommendation on the need to strengthen the management of the MOR database and to improve the collation of the information for the MOR database so that it could provide accurate and up-to-date information to support MOR case management and trend analysis of significant aviation safety issues; and

- urges CAD to:
 - (a) take measures to ensure the accuracy of the MOR database at all times;
 - (b) ensure that follow-up actions on long outstanding cases are taken in a timely manner; and
 - (c) take effective measures to improve the collation of information for the MOR database, and the subsequent analysis and follow-up actions by making reference to the experience gained on the MOR Scheme since the relevant guidelines were issued in 1999, with a view to improving air traffic safety.

Specific comments

Procurement and implementation of the new ATC system project

123. The Committee:

- finds it appalling and totally unacceptable that:
 - (a) in 2007, FC was informed that the new ATC system was targeted for commissioning in December 2012 to replace the existing ATC system which was approaching the end of its usable life. However, as at May 2015, the new ATC system was not yet in operation mainly due to a delay in implementing the ATMS contract;
 - (b) a number of outstanding deficiencies/observations (including 76 carried forward from the Factory Acceptance Tests and 420 comments collected during user's training and testing sessions) remained to be followed up during the Site Acceptance Tests of the ATMS contract, which only commenced in mid-August 2014. As at April 2015, all the 204 deficiencies/observations recorded during the Factory Acceptance Test conducted in June to July 2012 had been rectified by the ATMS Contractor. According to CAD, of the 1 000 follow-up items recorded on site during the Site Acceptance Test conducted in August to November 2014, about 80% of them were minor in nature and

would not affect the safety and the commencement of operation of the ATMS. For the remaining 20% priority items, around 90% had already been rectified/addressed. As at 15 May 2015, there were about 14 outstanding priority items which would be rectified/addressed by the Contractor before end-June 2015; and

- (c) the ageing effect of the existing ATC system was becoming more apparent as evidenced by the increasing number of surveillance data display problems since 2011. Moreover, during the period from January to June 2014, there were a total of 122 days (67% of the 181 days) on which the number of active flight plans handled by the existing ATC system was above its planned capacity of 1 000;
- notes that the Director-General of Civil Aviation has agreed with the Audit recommendations in paragraph 2.23 of the Audit Report;

Management of PRM project

- expresses strong resentment that:
 - (a) the PRM radar costing \$101.4 million was only put into use for purposes other than supporting the independent mixed mode of operation of the Hong Kong International Airport's runways as originally intended. Such other uses⁴³ turned out to be supplemental and were discontinued after some 20 months to 4 years, and the PRM radar has been put into standby mode since January 2005; and
 - (b) before seeking funding approval for the PRM radar in 1996, CAD had been made aware of the constraints in adopting independent mixed mode of operation by two consultancy studies in 1990 and 1994. CAD's decision to procure the PRM radar was based on various assumptions, including advancement in technology which was outside CAD's control. Despite these uncertainties, there was no record to show that CAD had conducted necessary risk assessments and evaluated the project's viability;

⁴³ Please refer to paragraphs 3.5 and 3.6 the Audit Report for details.

- notes that the Director-General of Civil Aviation has agreed with the Audit recommendations in paragraph 3.16 of the Audit Report;

Administration of ATC service related charges

- expresses serious concern that:
 - (a) CAD had not analyzed the cost recovery situation after implementing the en route navigation charge level as recommended in each fees and charges review to ensure that the charge level was conducive to achieving the full cost recovery principle; and
 - (b) the amount of overdue en route navigation charges at year end had increased by 230% from \$4.7 million in 2009-2010 to \$15.7 million in 2013-2014;
- notes that the Director-General of Civil Aviation has agreed with the Audit recommendations in paragraph 4.17 of the Audit Report;

Administration of MOR scheme

- expresses concern that:
 - (a) while the MOR database is an important management tool for monitoring the progress of follow-up actions on MOR cases and for trend analysis of significant aviation safety issues, there were instances of delays in inputting data in respect of new cases and in updating case status, and incorrect classification of cases;
 - (b) of the 3 374 MOR reports received by CAD from 2009-2010 to 2013-2014, 1 037 (31%) did not meet the statutory four-day-reporting rule. Of the 1 037 late reports, 28% were received after 14 days (i.e. beyond the statutory retention period of data from a flight data recorder);
 - (c) of the 3 374 MOR cases, no risk level had been assigned to 967 cases, contrary to the laid down procedures; and

- (d) of the 634 MOR cases that were outstanding as at 12 August 2014, 201 had remained outstanding for over four years. 117 of these 201 cases had no follow-up actions recorded since 2009⁴⁴;
- notes that the Director-General of Civil Aviation has agreed with the Audit recommendations in paragraph 5.22 of the Audit Report; and

Way forward

- notes that the Director-General of Civil Aviation has agreed with the Audit recommendation in paragraph 6.7 of the Audit Report.

Follow-up action

124. The Committee wishes to be kept informed of the progress made in implementing the various recommendations made by the Committee and the Audit Commission.

⁴⁴ According to the reply dated 24 December 2014 from CAD (in Appendix 11), CAD has conducted a detailed review of those cases identified as long outstanding. It was noted that the investigations of all of them had been completed by the respective organizations and subsequently accepted by CAD. However, the database was not updated timely to reflect the situation when the Audit Commission conducted the audit on CAD. All of those long outstanding cases were now closed.