

CHAPTER 3

Hong Kong Observatory

Hong Kong Observatory

**Audit Commission
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This audit review was carried out under a set of guidelines tabled in the Provisional Legislative Council by the Chairman of the Public Accounts Committee on 11 February 1998. The guidelines were agreed between the Public Accounts Committee and the Director of Audit and accepted by the Government of the Hong Kong Special Administrative Region.

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HONG KONG OBSERVATORY

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PART 1: INTRODUCTION

1.1 This PART describes the background to the audit and outlines its objectives and scope.

Background

1.2 The Hong Kong Observatory (HKO) was established in 1883 to provide a time service and to make meteorological and magnetic observations. In the 1930s, the HKO began to broadcast weather information to the public. Over the years, the HKO has broadened its activities. The HKO now provides a variety of services under the following three categories:

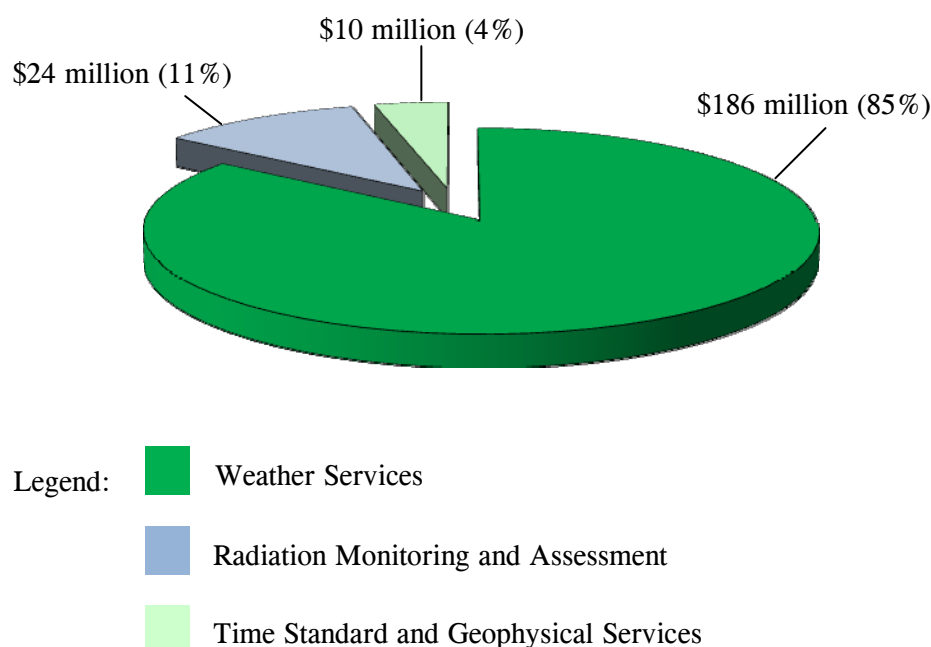
- (a) ***Weather Services.*** The HKO provides weather forecasts and issues warnings to the public, the shipping and aviation communities and different sectors of the society in order to reduce loss of life and damage to property, and minimise disruptions to economic and social activities during inclement weather;
- (b) ***Time Standard and Geophysical Services.*** The HKO maintains the Hong Kong Standard Time and provides geophysical, oceanographic, astronomical and climatological information to the public. Time checking services are provided through the Internet, the Dial-a-Weather System, and local radio and television (TV) stations; and
- (c) ***Radiation Monitoring and Assessment.*** The HKO provides information on environmental radiation levels in Hong Kong. In the event of a nuclear emergency, it will immediately intensify radiation monitoring, assess the radiological consequences and provide advice to the Government regarding the appropriate protective actions to take.

Financial provision and staffing

1.3 In 2009-10, the financial provision for the HKO was \$220 million. Figure 1 shows the financial provision for each category of services.

Figure 1

**Financial provision for the HKO
(2009-10)**



Source: HKO records

Weather services are provided to the general public and some special users. The HKO charges the special users a fee on a cost-recovery basis for providing them with the special weather and warning services. In 2009-10, the estimated revenue from providing services to the special users was \$85 million (Note 1).

1.4 The HKO is organised into four branches with 18 divisions. An Assistant Director oversees the operations of each branch and reports to the Director of the HKO. As at 31 March 2010, the HKO had a strength of 313 staff (291 civil servants and 22 contract staff — see Appendix A). HKO staff are accommodated in the Headquarters at Tsim Sha Tsui and three offices, namely, the Miramar Tower Office (MTO), the King's Park Laboratory and Meteorological Station and the Airport Meteorological Office.

Note 1: *The HKO estimated that about \$84 million (99%) of the revenue would come from the provision of weather services to the Airport Authority.*

Audit review

1.5 The Audit Commission (Audit) has recently carried out a review of the HKO. The audit focused on the following areas:

- (a) automatic weather stations (PART 2);
- (b) accommodation management (PART 3);
- (c) stores management (PART 4);
- (d) other administrative issues (PART 5); and
- (e) performance measurement and reporting (PART 6).

Audit has found that there are areas where improvements can be made and has made a number of recommendations to address the issues.

Acknowledgement

1.6 Audit would like to acknowledge with gratitude the full cooperation of the staff of the HKO during the course of the audit review.

PART 2: AUTOMATIC WEATHER STATIONS

2.1 This PART examines issues relating to automatic weather stations (AWSs).

Automatic weather station network

2.2 The HKO aims to reduce loss of life and damage to property, and minimise disruptions to economic and social activities during inclement weather by providing weather forecasts and issuing warnings to the public. The HKO operates a network of AWSs (see Photographs 1 and 2) covering various locations in the territory to collect meteorological information round-the-clock. As at 30 June 2010, the network comprised 109 AWSs. Generally, an AWS consists of meteorological sensors, power supply and a data processor. Data collected by the AWSs are transmitted at one-minute intervals via telephone circuits, radio links or mobile data communication networks to the HKO. While some AWSs are equipped with multiple sensors to measure a number of weather elements (e.g. wind, rainfall, relative humidity, temperature, atmospheric pressure, visibility and global solar radiation), some are equipped with only one sensor for a single weather element. In general, the HKO is responsible for the maintenance of meteorological equipment installed at the AWSs. The maintenance of the non-meteorological systems and equipment installed at the AWSs is contracted out to the Electrical and Mechanical Services Department (EMSD).

Photograph 1

Weather element sensors at Kau Sai Chau AWS



Source: HKO records

Photograph 2

Wind mast and sensors at King's Park AWS



Source: HKO records

Removal of automatic weather stations and weather element sensors

2.3 In April 2007, the HKO completed a review of the network with a view to identifying AWSs and weather element sensors which should be removed. Based on the review, the HKO concluded that 11 sensors should be removed. Five of the sensors were installed at single-sensor AWSs, while the remaining six were installed at multiple-sensor AWSs. The HKO estimated that the cost of removing the five AWSs and the six sensors would be \$1 million. The saving in maintenance cost would be \$0.1 million per annum.

Audit observations and recommendation

2.4 Audit noted that up to 31 July 2010, only three AWSs and three sensors identified in the 2007 review had been removed. In response to Audit's enquiry, in May 2010, the HKO informed Audit that in addition to those AWSs identified in 2007, another three AWSs should also be removed. The three AWSs were the Black Point AWS in Tuen Mun, the East Lantau AWS, and the Shek Kwu Chau AWS.

Audit recommendation

2.5 **Audit has recommended that the Director of the Hong Kong Observatory should take action to ensure that AWSs and weather element sensors earmarked for removal are removed in a timely manner.**

Response from the Administration

2.6 The **Director of the Hong Kong Observatory** agrees with the audit recommendation. He has said that:

- (a) up to 31 August 2010, two more AWSs identified in the 2007 review had been decommissioned. The remaining three sensors will be removed as soon as possible; and
- (b) of the three additional AWSs identified for removal after the 2007 review, two had been dismantled. The remaining AWS at Shek Kwu Chau will be removed in the next few months.

Maintenance of meteorological equipment at automatic weather stations

2.7 The maintenance of AWS meteorological equipment was carried out by three different divisions of the HKO. One division was under the Aviation Weather Services Branch, and the other two were under the Radiation Monitoring and Assessment Branch.

Audit observations and recommendations

Frequency of preventive maintenance visits

2.8 For each piece of the AWS meteorological equipment, the HKO specified a frequency (i.e. monthly, quarterly, half-yearly or yearly) of preventive maintenance visits that should be made. Audit examined the 2009 preventive maintenance records of 70 AWSs. **Audit found that according to the records, the frequency of preventive maintenance visits for the equipment installed at 23 (33%) AWSs achieved the target**

frequency. For the equipment installed at the remaining 47 (67%) AWSs, the actual frequency of visits was below the target level (see Table 1).

Table 1
Frequency of preventive maintenance visits to 47 AWSs
(2009)

No. of AWSs	Target frequency	Average actual frequency
28	12	6.3
18	4	2
1	1	0

Source: Audit analysis of HKO records

Procedural guidelines for maintenance work

2.9 Of the three divisions responsible for making maintenance visits, only two divisions had promulgated procedural guidelines for the maintenance work. Audit reviewed the two sets of guidelines, and found that one division's guidelines consisted of five pages of detailed maintenance procedures but the other division's guidelines consisted of one page setting out only the general procedures. To help ensure that the AWS equipment is maintained up to the required standard by all the three divisions, it is desirable to adopt a common set of comprehensive guidelines for the maintenance work.

Maintenance records

2.10 Audit noted that different maintenance records were kept by the three divisions. Three different forms, namely "Maintenance Log", "Maintenance Job Form" and "AWS Site Inspection Report" were used to record the faults found and the follow-up actions taken. To ensure consistency and to facilitate monitoring of the maintenance work, the HKO may need to standardise the format and the level of details of the maintenance records of the three divisions.

Audit recommendations

2.11 **Audit has recommended that the Director of the Hong Kong Observatory should:**

- (a) ensure that preventive maintenance of the AWS meteorological equipment is carried out according to the target frequency;
- (b) promulgate a set of comprehensive guidelines on the maintenance of the meteorological equipment to provide guidance to all the divisions responsible for the work; and
- (c) consider the need to standardise the maintenance records of all the divisions to facilitate efficient and effective monitoring of the work.

Response from the Administration

2.12 The **Director of the Hong Kong Observatory** agrees with the audit recommendations. He has said that:

- (a) during corrective maintenance trips to the AWSs, the opportunity was always taken to check out all the equipment. Therefore, preventive maintenance was actually carried out more frequently than recorded. The HKO will review its preventive maintenance schedule, taking into account factors such as equipment operating status, data availability, and degree of redundancy in equipment design, with a view to specifying more realistic target frequencies and enhancing the effectiveness of the preventive maintenance visits;
- (b) the HKO has promulgated a set of comprehensive guidelines on the maintenance of the meteorological equipment for all the divisions concerned; and
- (c) the HKO has standardised the maintenance records of all the divisions.

Maintenance of non-meteorological equipment by the Electrical and Mechanical Services Department

2.13 The EMSD provides maintenance and repair services for some engineering systems and equipment installed at 61 AWSs under two Service Level Agreements (SLAs). One of the SLAs covers aviation related engineering systems and equipment (Aviation SLA) for an annual fee of \$1.4 million. The other SLA covers other engineering systems and equipment (Non-aviation SLA) for an annual fee of \$2.8 million. In addition to those installed at the AWSs, the SLAs also cover engineering systems and equipment installed at other venues of the HKO.

Audit observations and recommendations

Frequency of preventive maintenance

2.14 Under the Aviation SLA, the EMSD should submit a preventive maintenance schedule to the HKO for comments at the beginning of each financial year. Audit noted that for the three years from 2008-09 to 2010-11, only the preventive maintenance schedule for 2010-11 was available for audit examination. For the Non-aviation SLA, the EMSD was not required to submit any maintenance schedule. Audit also noted that information on the actual frequency of preventive maintenance carried out by the EMSD was not readily available for monitoring purpose.

Annual/quarterly reports

2.15 Under the Aviation SLA and the Non-aviation SLA, the EMSD should submit quarterly reports and annual reports respectively to the HKO on service availability of major engineering systems, response time, fault rectification time and provision of technical advice on projects and procurement services. **Audit examined the reports for the three-year period 2007-08 to 2009-10 and noted that:**

- (a) **while 11 of the 12 quarterly reports required under the Aviation SLA were received within 3 months after the respective quarter, the report for the quarter ended 30 September 2008 was received more than 5 months after the quarter; and**
- (b) **no annual report under the Non-aviation SLA was received.**

Service Review Meetings

2.16 Under the Aviation SLA, the HKO was required to hold quarterly Service Review Meetings (SRMs) with the EMSD to review its service performance. Audit noted that only 8 of the required 12 quarterly SRMs were held during the three-year period 2007-08 to 2009-10. Under the Non-aviation SLA, the HKO should hold regular SRMs with the EMSD. However, no record was available showing that any SRMs had been held.

Audit recommendations

2.17 **Audit has recommended that the Director of the Hong Kong Observatory should:**

- (a) **maintain proper records of the preventive maintenance schedules and the maintenance work carried out by the EMSD with a view to ensuring that the work is carried out in a satisfactory manner;**

- (b) ensure that the EMSD submit the preventive maintenance reports as required by the SLAs in a timely manner;
- (c) organise SRMs with the EMSD according to the requirements of the SLAs to review its service performance; and
- (d) if the Aviation and Non-aviation SLAs are to be renewed in future, consider the need to rationalise the different requirements regarding the submission of maintenance schedule, and the frequency of reports and SRMs to ensure that the requirements are standardised or any difference is properly justified.

Response from the Administration

2.18 The **Director of the Hong Kong Observatory** agrees with the audit recommendations. He has said that:

- (a) the HKO will liaise with the EMSD to obtain and maintain proper records of preventive maintenance carried out by the EMSD;
- (b) the HKO will ensure that the submission of the preventive maintenance reports by the EMSD is in accordance with the SLAs;
- (c) the HKO meets with the EMSD from time to time to discuss services provided under the SLAs. SRMs with the EMSD will be organised in accordance with the requirements of the SLAs; and
- (d) when the Aviation and Non-aviation SLAs are renewed in future, the HKO will consider the need to rationalise the different requirements, having regard to the service requirements and cost implications.

2.19 The **Director of Electrical and Mechanical Services** agrees with the audit recommendations. He has said that:

- (a) the annual preventive maintenance schedules for 2008-09 and 2009-10 had been submitted to the HKO in April 2008 and May 2009 respectively. The EMSD will continue to submit the preventive maintenance schedules and reports as required by the SLAs;
- (b) the EMSD keeps proper records of preventive maintenance carried out and will provide such records to the HKO upon request;

- (c) ad-hoc meetings were held with the HKO by staff at working level to review service performance under the Non-aviation SLA, although no records were kept for these meetings. The EMSD will organise SRMs with the HKO according to the requirements of the SLAs; and
- (d) together with the HKO, the EMSD will consider the need to rationalise the different requirements regarding the submission of maintenance schedule and the frequency of reports and SRMs to ensure that the requirements are standardised or any difference is properly justified when the SLAs are renewed in future.

Site selection for new automatic weather stations

2.20 To meet the growing demand for more meteorological measurements, the HKO established 22 new AWSs during the period April 2006 to March 2010. Selecting appropriate sites for AWSs is critical for obtaining accurate meteorological data. According to the World Meteorological Organisation, representativeness of observations made at the AWSs is one of the factors that should be considered in site selection.

Audit observations and recommendations

2.21 Audit examined the site selection records of 8 of the 22 AWSs established during the period April 2006 to March 2010. Audit found that:

- (a) for 5 temperature AWSs, a paper showing photos, location maps and some descriptions of the proposed sites was submitted to the management for consideration;
- (b) for 2 temperature AWSs, basic analyses of the sites were made. The justifications for selecting the sites were:
 - (i) near populated area;
 - (ii) generally good exposure;
 - (iii) good security;
 - (iv) easy access; and
 - (v) power supply available nearby; and
- (c) for the remaining AWS, namely the AWS at Ho Koon Education cum Astronomical Centre (HKEAC), the temperature measurement taken at the station was later criticised by the public for being not representative of the

Tsuen Wan region (see Appendix B). The HKO was searching for another suitable site in Tsuen Wan for setting up a new AWS to supplement the measurements taken at this station.

Audit recommendations

2.22 Audit has recommended that the Director of the Hong Kong Observatory should:

- (a) ensure that thorough site selection analysis is conducted and properly documented before deciding to establish a new AWS; and
- (b) expedite the action to find a suitable site for establishing a new AWS in the Tsuen Wan region to supplement the temperature measurements taken at the HKEAC AWS.

Response from the Administration

2.23 The Director of the Hong Kong Observatory agrees with the audit recommendations. He has said that:

- (a) while thorough site analysis has always been and will continue to be conducted in establishing new AWSs, more attention will be paid to detailed documentation in future; and
- (b) the HKO has identified a new site in the Tsuen Wan region and has started work to establish the new AWS by 2010 or 2011.

Community Weather Information Network

2.24 In August 2007, the HKO established the Community Weather Information Network (Co-WIN) jointly with The Hong Kong Polytechnic University and the Hong Kong Joint-school Meteorological Association. The aim is to gather weather information collected by weather stations in schools and organisations, and make it available on the Internet for use by the public after carrying out appropriate data quality assurance. Through Co-WIN, the HKO also aims to promote weather education.

2.25 The HKO gives professional advice to Co-WIN members on the installation and maintenance of the AWSs under Co-WIN, provides technical assistance in the setting up of the Co-WIN website and in the quality assurance of weather data. Weather information collected by the Co-WIN AWSs includes temperature, rainfall, solar radiation and ultraviolet index. The Co-WIN AWSs automatically transmit weather information to the

central server once every minute via the Internet. The information on the Co-WIN website is also updated simultaneously.

2.26 The HKO planned to integrate the weather observations from the Co-WIN AWSs into the HKO's weather information service so that it could widen the area coverage. As at 1 July 2010, there were 85 Co-WIN members and 68 Co-WIN AWSs.

Audit observations and recommendations

2.27 Through assisting Co-WIN members in setting up AWSs and collecting weather information, the HKO has promoted weather education. The weather information collected at the Co-WIN AWSs may be useful for the HKO in providing the public with more comprehensive weather information and with a wider area coverage. The HKO had been considering incorporating the weather information collected at the Co-WIN AWSs into the HKO website. However, up to 30 June 2010, such information had not yet been published on the HKO website.

Audit recommendations

2.28 **Audit has recommended that the Director of the Hong Kong Observatory should:**

- (a) **conduct a review on the weather information collected by the Co-WIN AWSs with a view to selecting suitable weather information for incorporating into the HKO website; and**
- (b) **in the light of the review, consult Co-WIN members for their early agreement to the publication of weather information on the HKO website.**

Response from the Administration

2.29 The **Director of the Hong Kong Observatory** agrees with the audit recommendations. He has said that:

- (a) a review of the quality of the weather information collected by the Co-WIN AWSs has been completed and information suitable for incorporation into the HKO website has been identified; and
- (b) the publication of the Co-WIN weather information on the HKO website is expected to start before the end of 2010.

PART 3: ACCOMMODATION MANAGEMENT

3.1 This PART examines how the HKO manages the use of its office accommodation.

Office accommodation

3.2 At the end of June 2010, the HKO had four offices with a floor area of about 5,205 square metres (m²). Details are shown in Table 2.

Table 2
Office accommodation
(30 June 2010)

Office	Floor area	Remarks
Headquarters	3,247 m ²	Government owned and located in Tsim Sha Tsui. It comprises the 1883 Building and Annex built in 1883, and the Centenary Building built in 1983 (see Photograph 3).
MTO	1,028 m ²	Leased and located in Tsim Sha Tsui near the Headquarters
Airport Meteorological Office	670 m ²	Accommodation located inside the Air Traffic Control Tower of the Hong Kong International Airport (HKIA)
King's Park Laboratory and Meteorological Station	260 m ²	Government owned and located in Ho Man Tin

Source: HKO records

Photograph 3
The Headquarters



Source: HKO records

Facilities converted to other uses

3.3 To facilitate the efficient use of office accommodation, the Government Property Agency (GPA) encourages bureaux and departments to submit proposals on rationalisation of accommodation or co-location, where feasible, to achieve savings.

Audit observations and recommendations

3.4 Audit reviewed the utilisation of the facilities in the Headquarters and the MTO, and found that some of them had been converted to other uses. However, no record was available showing that the HKO had submitted proposals to the GPA on rationalisation or co-location of such facilities to achieve savings.

Canteen

3.5 In the Headquarters, a canteen (including a kitchen of 23.4 m² and a dining area of 81.2 m²) was provided. In March 1998, the GPA queried the need for the canteen. In response, the HKO informed the GPA that the canteen was well justified. The reasons given by the HKO included:

- (a) when a tropical cyclone signal was hoisted, the workload for Headquarters officers would be extremely heavy. Having to dine outside meant that some duties could not be attended to with due care and diligence. Personal safety of these officers would also be in question; and
- (b) when other inclement weather warnings were issued, officers had to concentrate on their duties and not be distracted by doubts on the availability of sustenance.

3.6 Audit noted that due to financial reasons, in June 1999, the catering service at the canteen was discontinued. The kitchen and the dining area are now used as a pantry and a multi-function room respectively (see Photographs 4 and 5). In this regard, Audit notes that:

- (a) the area of the kitchen (23.4 m²) is almost four times the size of a pantry, which is 6 m² as specified in the GPA's space standard;
- (b) there are already six other pantries in the Headquarters;
- (c) the usage of the multi-function room (e.g. for meetings and for receiving visitors from schools and other organisations) is similar to that of the conference hall with a floor area of 163.1 m² (see Photographs 6 and 7) in the Headquarters; and
- (d) the conference hall can be divided into two parts, namely Conference Hall 1 and Conference Hall 2 (see Photograph 7) by a partition. However, under the current booking system, the bookings are made for the whole conference hall. Even if only a part of the hall is required for a function, the whole conference hall is booked.

Photograph 4

The pantry converted from the kitchen



Source: HKO records

Photograph 5

The multi-function room converted from the dining area



Source: Photograph taken by Audit

Photograph 6

Conference hall in the Headquarters



Source: Photograph taken by Audit

Photograph 7

Conference Hall 1 and Hall 2 in the Headquarters



Source: Photograph taken by Audit

Pantries

3.7 Ten pantries of a total area of 55 m² were originally provided in the Headquarters (see Photograph 8). However, four of the pantries are used as store rooms.

Photograph 8**A pantry in the Headquarters**

Source: Photograph taken by Audit

Language laboratory

3.8 The HKO provides a language laboratory of 16.5 m² (see Photograph 9) in the MTO. The laboratory was set up in 1998 for HKO staff to learn languages, such as Putonghua. No log book was maintained to record the utilisation of the laboratory. **In June 2010, Audit staff visited the laboratory and found that it was used as a store room for audio-visual and IT equipment.**

Photograph 9

Language laboratory in the MTO



Source: HKO records

Audit recommendations

3.9 **Audit has recommended that the Director of the Hong Kong Observatory should:**

- (a) submit proposals to the GPA on the rationalisation of the office space occupied by the canteen, the pantries and the language laboratory with a view to achieving savings; and
- (b) improve the booking system by allowing separate bookings for Conference Hall 1 and Hall 2 with a view to improving their utilisation.

Response from the Administration

3.10 The Director of the Hong Kong Observatory agrees with the audit recommendations. He has said that:

- (a) the HKO will submit proposals to the GPA to rationalise the office space occupied by the canteen, the pantries and the language laboratory; and

- (b) the HKO has improved the booking system to allow separate bookings for Conference Hall 1 and Hall 2.

3.11 The **Government Property Administrator** agrees with the audit recommendation in paragraph 3.9(a).

Rest rooms

3.12 Five rest rooms of a total area of 97.3 m² are provided in the Headquarters for use by officers of the Forecasting and Warning Services Branch on shift duties, and officers on standby duties and special duties during periods of inclement weather (e.g. when a tropical cyclone warning signal is in force). In total, there are 14 beds provided in the five rest rooms.

Audit observations and recommendations

3.13 According to the HKO's Staff Notice No. 24/82 issued in October 1982, users of the rest rooms should record their usage in a log book. In June 2010, Audit tried to analyse the log book to ascertain the utilisation of the rest rooms. However, the HKO was unable to produce the log book for Audit's examination.

3.14 In view of the improvements in the transportation systems in recent decades, staff may prefer to go home as far as the weather conditions permit, rather than staying in the rest rooms. As such, the demand for the rest rooms may have decreased over the years. In the absence of utilisation records, it is difficult to ascertain the real need for the rest rooms.

Audit recommendations

3.15 **Audit has recommended that the Director of the Hong Kong Observatory should:**

- (a) **consult the staff to ascertain their need for retaining the rest rooms;**
- (b) **in the light of the consultation, rationalise the number of rest rooms;**
- (c) **if any of the rest rooms are retained, require the users to record their usage in the log book; and**

- (d) review the utilisation annually and take necessary action to rationalise the number of rest rooms according to the utilisation.

Response from the Administration

3.16 The **Director of the Hong Kong Observatory** agrees with the audit recommendations. He has said that:

- (a) the HKO will consult the staff on the need for retaining the rest rooms and review the utilisation; and
- (b) the users have been reminded to properly record their usage in the log book.

Classroom and conference room

3.17 There is a classroom of 60 m² and a conference room of 24 m² (see Photograph 10) in the MTO. The classroom can be divided into two smaller classrooms (Classroom A and Classroom B — see Photographs 11 and 12) by a partition.

Photograph 10

Conference room in the MTO



Source: HKO records

Photograph 11**Classroom A in the MTO**

Source: Photograph taken by Audit

Audit observations and recommendations

3.18 The HKO does not keep records on the actual utilisation of the classroom. Audit reviewed the 2009-10 booking records and found that there were bookings for 20 functions to be held in the classroom. For 18 of the 20 functions, the number of users at any one time was not more than 10. **Audit visited the classroom in June 2010 and noted that some of the area of Classroom B was used for temporary storage. It appeared that Classroom B might not have been used to its full extent (see Photograph 12).**

Photograph 12

Classroom B in the MTO



Source: HKO records

3.19 To improve the utilisation of the classroom and the conference room, the HKO may wish to review whether the provision of a separate conference room in the MTO is necessary because:

- (a) meetings can be arranged to be held in either Classroom A or Classroom B, which can be converted easily to a conference room by using suitable convertible furniture; and
- (b) in the Headquarters, there are a conference hall (see Photographs 6 and 7) and a conference room which can be used for meetings.

Audit recommendations

3.20 **Audit has recommended that the Director of the Hong Kong Observatory should:**

- (a) **review the usage of Classrooms A and B and the conference room in the MTO; and**

- (b) explore saving opportunities by rationalising the usage of the rooms, e.g. by using convertible furniture at Classrooms A and B so that they can be converted to a conference room when necessary.

Response from the Administration

3.21 The **Director of the Hong Kong Observatory** agrees with the audit recommendations. He has said that:

- (a) the HKO conducts in-house training for newly recruited staff as well as training workshops for international participation in Classrooms A and B. The HKO will review the usage of these classrooms and the conference room in the MTO; and
- (b) subject to the results of the review and the views of the GPA, the HKO may consider changing any released space to office space for university interns, contract staff and visiting scholars.

Resource Centre

3.22 The HKO has a Resource Centre of 53 m² in the MTO (see Photograph 13). The Centre was established in April 2000 as a one-stop shop for information access by the public. Information available at the Centre includes annual typhoon reports and research papers. The HKO's saleable publications (such as the HKO Calendar) and souvenirs bearing the HKO logo are also on sale at the Centre. The Centre is open from Monday to Friday (except public holidays) from 9:00 a.m. to 12:15 p.m., and from 1:45 p.m. to 4:45 p.m. In 2009-10, the cost of operating the Centre was about \$497,000.

Photograph 13

Resource Centre



Source: Photograph taken by Audit

Audit observations and recommendations

3.23 During its first year of operation in 2000-01, about 1,600 people visited the Resource Centre. **However, the number of visitors has decreased by 64% to only a few hundreds in recent years (see Table 3).** Audit considers that the availability of most information on the HKO website may have reduced the need for the public to visit the Centre.

Table 3
Number of visitors to the Resource Centre
(2005-06 to 2009-10)

Year	Number
2005-06	1,170
2006-07	1,089
2007-08	957
2008-09	664
2009-10	576

Source: HKO records

Audit recommendations

3.24 **Audit has recommended that the Director of the Hong Kong Observatory should:**

- (a) **carry out a comprehensive review of the operation of the Resource Centre; and**
- (b) **in the light of the review, take effective measures to:**
 - (i) **explore other means of providing information (e.g. through the HKO website) and selling HKO publications and souvenirs (e.g. through the online Government Bookstore and the souvenir shop of the Hong Kong Science Museum) to the public; or**
 - (ii) **if the Centre is to be retained, improve its utilisation.**

Response from the Administration

3.25 The Director of the Hong Kong Observatory agrees with the audit recommendations. He has said that:

- (a) at present, the Resource Centre is the only location where the HKO sells some of its publications and other items such as souvenirs bearing the HKO logo;

- (b) the HKO will conduct a comprehensive review of the operation of the Resource Centre; and
- (c) subject to the results of the review, the HKO will explore other means of providing information and selling the HKO publications and souvenirs to the public, or take effective measures to improve the utilisation of the Resource Centre.

Annual accommodation review

3.26 In order to improve the monitoring and allocation of office accommodation, Accommodation Circular No. 3/2000 requires bureaux and departments to:

- (a) conduct, on an annual basis, a comprehensive and critical review of all the office accommodation (including government-owned and leased accommodation) allocated to them;
- (b) advise the GPA whether there is any surplus accommodation in excess of 50 m² which may be surrendered; and
- (c) explore saving opportunities and exhaust all internal rationalisation of space before putting forward requests for additional office accommodation.

Audit observations and recommendations

3.27 In June 2008, the HKO requested the GPA for the provision of an additional storage area of 120 m². However, no record was available showing that the HKO had explored saving opportunities and exhausted all internal rationalisation of space before putting forward the request. In response to Audit's enquiry, the HKO informed Audit in August 2010 that in January 2010, the HKO commenced a comprehensive accommodation review.

Audit recommendations

3.28 **Audit has recommended that the Director of the Hong Kong Observatory should:**

- (a) **in the current accommodation review, take into account the improvements in the utilisation of the existing office accommodation that may be brought about by implementing the audit recommendations in this report; and**
- (b) **in future, comply with the requirements of Accommodation Circular No. 3/2000 by exploring saving opportunities and exhausting all internal**

rationalisation of space before putting forward requests for additional office accommodation.

Response from the Administration

3.29 The **Director of the Hong Kong Observatory** agrees with the audit recommendations. He has said that:

- (a) the preliminary result of the current accommodation review indicates that there is an overall shortage of office space of around 280 m². The HKO will take into account improvements in the utilisation of the existing office accommodation brought about by implementing the audit recommendations in the current accommodation review to address the shortage; and
- (b) in future, the requirements of Accommodation Circular No. 3/2000 will be complied with to improve the utilisation of office accommodation.

3.30 The **Government Property Administrator** agrees with the audit recommendation in paragraph 3.28(b).

PART 4: STORES MANAGEMENT

4.1 This PART examines issues relating to stores management.

Stores and Procurement Regulations

4.2 The Stores and Procurement Regulations (SPRs) specify the requirements on proper management and accounting of government stores. Under the SPRs, Controlling Officers are responsible for the general supervision and control of the stores and stores accounts under their control. As at 31 March 2010, the value of stores under the control of the Director of the HKO was \$63.7 million.

4.3 According to the SPRs, departmental stores are classified into inventory and non-inventory items. Inventory items are generally stores of a permanent or non-consumable nature and with a unit cost at or above \$1,000 at the time of purchase, while all the other stores are non-inventory items.

Inventory items

4.4 The SPRs stipulate that the Departmental Stores Manager is responsible for inventory stores received and issued. He should:

- (a) ensure that when inventory items are issued from stock to an entity (e.g. a branch, a section or a unit), the items should be struck off from the Inventory Sheet and Distribution Record of the issuing entity and entered in the Record of the receiving entity; and
- (b) arrange to check the inventories at least once a year and ensure that any discrepancies are dealt with in accordance with the SPRs.

Audit observations and recommendations

Issue of inventory items

4.5 Audit examined the recording of inventory stores issued to the Radiation Monitoring and Assessment Branch of the HKO during the period June 2003 to June 2010. Audit found that five inventory items costing \$92,600 issued in April 2009 were struck off from the Inventory Sheet and Distribution Record of the issuing unit. However, they were not entered in the Record of the Branch (see Table 4).

Table 4
Inventory items issued in April 2009
not entered in Inventory Sheet and Distribution Record

Item	No. of items issued	Cost of items issued (\$)
Electronic Personal Dosimeter	2	13,000
Radiation Protection Survey Meter	1	31,030
Environmental Gamma Probe	1	15,070
Handheld Alpha-Beta Monitor	1	33,500
Total	5	92,600

Source: HKO records

Inventory check

4.6 Audit selected one division of the Radiation Monitoring and Assessment Branch and two divisions of the Aviation Weather Services Branch to examine the annual inventory checks for the three years 2007-08 to 2009-10. Audit found that records were not available to show that the HKO had conducted the checks. Upon Audit's enquiry, the HKO informed Audit that:

- (a) every year, by issuing memos to the user divisions, the Supplies Section of the HKO had requested them to verify inventory items held under their custody, and report any discrepancies to the Supplies Section; and
- (b) for the three years examined by Audit, no reports had been received from the user divisions.

4.7 The 2010 inventory check exercise was carried out by the Supplies Section by issuing memos to the user divisions in May 2010. As no reports of discrepancies were received from the user divisions up to 30 June 2010, the HKO considered that the inventory check was successfully completed.

4.8 Audit considers that this arrangement is not entirely satisfactory. In the absence of supporting documents of the inventory check performed by the user divisions, Audit could not ascertain whether the check had been properly conducted and whether discrepancies, if any, had been properly dealt with.

Audit recommendations

4.9 **Audit has recommended that the Director of the Hong Kong Observatory should ensure that:**

- (a) **issues of inventory stores are properly entered in the Inventory Sheet and Distribution Record of the receiving entity;**
- (b) **inventory checks are properly carried out at least once a year; and**
- (c) **the results of the inventory checks are properly documented.**

Response from the Administration

4.10 The **Director of the Hong Kong Observatory** agrees with the audit recommendations. He has said that:

- (a) the five inventory items issued in April 2009 have now been properly entered in the Inventory Sheet and Distribution Record of the receiving branch; and
- (b) the HKO has taken measures to ensure that the SPR requirements are complied with, and that proper documentation is kept for inventory checks.

4.11 The **Director of Government Logistics** agrees with the audit recommendations. She has said that implementing the recommendations would enhance the HKO's stores management.

Non-inventory items

4.12 According to the SPRs, non-inventory items held in stock should be recorded in a Non-inventory Stores Ledger. No further accounting is required for non-inventory items once their issue has been recorded in the Ledger.

Audit observations and recommendations

Need to review classification of some non-inventory items

4.13 Audit reviewed the stores records of the HKO and noted that some stores items classified by the HKO as non-inventory items were relatively expensive and might worth being accounted for as inventory items. Examples of these items include cameras, transmitters and current meters (see Appendix C). Audit considers that as they are not accounted for and controlled as inventory items, they are subject to a higher risk of loss.

4.14 The major difference between the accounting for inventory and non-inventory items is that inventory items are required to be controlled until they are disposed of, while non-inventory items are not controlled once they are issued by the departmental store unit. According to the SPRs, if departments consider that certain non-inventory items should be accounted for as inventory items for control purposes, they should account for them in accordance with the applicable SPRs.

Issue of non-inventory items

4.15 The procedures for issue of departmental stores were stipulated in the SPRs. According to the procedures, the officer receiving non-inventory items (which are not regularly required in fairly large quantities) should record and sign on the Non-inventory Stores Ledger.

4.16 Audit selected 53 stores items in the Non-inventory Stores Ledger for examination. Audit found that seven issues in 2009 were not recorded in the Ledger. After the audit examination, the HKO updated the Ledger on 9 July 2010. The delay in recording the issues ranged from 231 days to 534 days (see Table 5).

Table 5
Delay in recording issues of non-inventory items

Non-inventory item	Date of issue	Delay in recording the issue (Day)
Humidity probe	20.11.2009	231
Wind direction processor board	17.4.2009	448
	4.9.2009	308
	22.10.2009	260
Wind direction sensor	21.1.2009	534
	4.9.2009	308
	22.10.2009	260

Source: Audit analysis of HKO records

Remarks: The recording of the issues of the items was made on 9 July 2010.

Safe custody of non-inventory items

4.17 The SPRs impose on all public officers a general duty to ensure proper use and custody of government property and stores allocated to them. According to the SPRs, public officers are personally responsible for the safe custody of all stores received by them in the course of their duties.

4.18 On 12 July 2010, Audit selected 24 stores items for stock verification. **Audit found discrepancies between the physical balances and the ledger balances of 5 items (see Table 6).**

Table 6
Discrepancies found in a stock verification
(12 July 2010)

Stores item	Physical balance (No.)	Ledger balance (No.)	Discrepancy (No.)	Unit cost (\$)	Total cost of discrepancy (\$)
Wind direction processor board	33	31	2	4,026	8,052
Wind speed sensor	37	38	-1	4,411	4,411
Wind speed processor board	45	39	6	3,324	19,944
Platinum temperature sensor	43	55	-12	1,766	21,192
Humidity solarimeter interface	21	20	1	350	350

Source: Stock verification carried out by Audit

4.19 During the stock verification, Audit noted that the stores and the Non-inventory Stores Ledger were not under the custody of any designated officer but were left in an open office area. An honour system was adopted under which officers might help themselves to the stores and record the transactions on the Ledger by themselves. **Audit considers that the honour system is not entirely satisfactory because:**

- (a) **there is no control on the safe custody and issue of the stores; and**
- (b) **the officers may not have recorded the transactions on the stores ledger properly, which gives rise to discrepancies between the physical and ledger balances.**

Audit recommendations

4.20 **Audit has recommended that the Director of the Hong Kong Observatory should:**

- (a) **critically review the Non-inventory Stores Ledger with a view to identifying non-inventory items which should be accounted for as inventory ones for control purposes in view of their nature and cost;**
- (b) **in the light of the review, take appropriate action to revise the stores records so that items identified in the review are accounted for as inventory ones;**
- (c) **issue guidelines to staff involved in stores management to ensure that stores are properly classified into inventory and non-inventory items in future;**
- (d) **take necessary action to ensure that issues of non-inventory stores are recorded in the Non-inventory Stores Ledger as required by the SPRs in a timely manner;**
- (e) **conduct a comprehensive stock verification with a view to ensuring that the ledger balances for all stores are accurate;**
- (f) **investigate discrepancies between physical balances and ledger balances found during the stock verification; and**
- (g) **take necessary action to ensure that stores and stores ledgers are kept in safe custody of the responsible officers.**

Response from the Administration

4.21 The **Director of the Hong Kong Observatory** agrees with the audit recommendations. He has said that:

- (a) although the existing classification of inventory and non-inventory items is in line with the SPRs, the HKO will review the Non-inventory Stores Ledger to identify items which should be accounted for as inventory ones;
- (b) subject to the review findings, the stores records will be updated as appropriate;
- (c) guidelines on the classification of inventory and non-inventory items have been issued to staff to facilitate the review;
- (d) regular inspections will be conducted to ensure that the Non-inventory Stores Ledger is updated in a timely manner;
- (e) stock verification has been initiated to ensure that the ledger balances are accurate. The discrepancies identified by Audit in July 2010 have been investigated and rectified;

- (f) investigations will be carried out to rectify any further discrepancy between the physical and ledger balances found during the stock verification; and
- (g) staff have been reminded to keep stores and stores ledgers in safe custody of the responsible officers.

4.22 The **Director of Government Logistics** agrees with the audit recommendations. She has said that implementing the recommendations would enhance the HKO's stores management.

PART 5: OTHER ADMINISTRATIVE ISSUES

5.1 This PART examines other administrative issues of the HKO.

Scientific Advisers and members of Strategic Advisory Committee

5.2 In 2003, the HKO appointed 10 Scientific Advisers for a term of five years. In 2008, when the appointment of the 10 Advisers expired, the HKO appointed 26 Advisers also for a term of five years. The functions of the Scientific Advisers are to:

- (a) help the HKO maintain contact with the worldwide scientific community;
- (b) advise the HKO on broad directions and goals;
- (c) provide external views on the HKO's research and development work; and
- (d) provide guidance to the HKO on specific subject areas.

5.3 In 2009, the HKO established a Strategic Advisory Committee (SAC) to advise the HKO on strategic areas. Six members were appointed for a term of two years. The members meet annually to review the HKO's work in the previous year and to advise on the way forward in various strategic areas.

5.4 In April 2010, the HKO appointed another Scientific Adviser for a term of five years from 1 April 2010 to 31 March 2015.

Audit observations and recommendations

5.5 The Scientific Advisers and SAC members were appointed for a term of five years and two years respectively. In April 2010, the HKO informed Audit that their periods of appointment were as those shown in Table 7.

Table 7
Periods of appointment for Scientific Advisers and SAC members

Appointee	Period
Scientific Advisers for 2003-08	July 2003 to June 2008
Scientific Advisers for 2008-13	August 2008 to July 2013
SAC members for 2009-11	March 2009 to February 2011

Source: Information provided by the HKO

5.6 Audit found that:

- (a) except for the Scientific Adviser appointed in 2010, the exact periods of appointment were neither documented nor communicated to the appointees;
- (b) there was a broken period of one month in July 2008 between the appointments of the 2003-08 Scientific Advisers and the 2008-13 Scientific Advisers;
- (c) for three Scientific Advisers (one of the Scientific Advisers for 2003-08 and two of the Scientific Advisers for 2008-13) and one SAC member, no record was available showing that they had accepted the HKO's invitations for appointment; and
- (d) nine Scientific Advisers for 2003-08 accepted the HKO's invitations for appointment after the commencement of their period of appointment. Eight of them accepted the invitations in August 2003 and the remaining one accepted the invitation in September 2003.

Audit recommendations

5.7 Audit has recommended that the Director of the Hong Kong Observatory should:

- (a) **document the commencement and expiry dates for future appointments, and communicate them to the Scientific Advisers and SAC members;**

- (b) take measures to facilitate the Scientific Advisers' and the SAC members' acceptance of the invitation for appointment before the commencement of the appointment, and properly document their acceptance; and
- (c) make efforts to avoid any broken period between two successive appointments.

Response from the Administration

5.8 The **Director of the Hong Kong Observatory** agrees with the audit recommendations. He has said that measures will be taken in future to ensure that:

- (a) formalities are completed before the commencement of the appointment;
- (b) information relating to the appointments are properly documented, including the period of appointment and the acceptance of the invitation for appointment; and
- (c) there is no broken period between two successive appointments.

Presentation on TV weather programme

5.9 Since 1987, the HKO has made an arrangement with TV stations to provide staff to present weather information. The existing arrangement is that staff of the HKO volunteer to present weather information on two TV weather programmes in the morning at about 6:45 a.m. from Monday to Saturday, and two TV programmes in the evening at about 6:30 p.m. from Monday to Friday. During the programmes, the staff presents weather information at a studio set up in the Headquarters and the presentation is televised by the TV stations. Each programme lasts for about two minutes. The TV stations pay a service fee of about \$500 per programme to the HKO, and the HKO pays an honorarium of \$400 to the staff. In 2009-10, 18 officers (16 in the Scientific Officer grade and 2 in the Experimental Officer grade) presented weather information in 1,236 programmes and received honorariums of \$494,400. The TV stations paid about \$618,000 for the service.

Audit observations and recommendation

5.10 Since 1987, when the HKO started the arrangement of providing staff to present weather information on TV weather programme, all the presenters have been volunteers. In 1989, the HKO obtained the approval of the then Secretary for the Treasury for paying honorarium to the presenters on two justifications:

- (a) the presentation was a duty undertaken outside the officer's conditioned hours of service; and
- (b) the presentation was a duty outside the scope of the officer's normal duties.

5.11 Audit considers that there may be a need for the HKO to revisit the practice of assigning TV presentation to its staff on a voluntary basis and paying honorarium to them because of the following reasons:

- (a) a mission of the HKO is to deliver useful and effective meteorological services. As presentation of weather information on TV weather programme is one of the effective means of disseminating weather information to the public, it may not be entirely appropriate to regard the presentation as a duty outside the scope of the normal duties of its staff;
- (b) the arrangement with the TV stations was made about 23 years ago. As it has become a long-standing practice for HKO staff to present weather information on TV weather programme, such practice could have been incorporated into the staff's normal duties;
- (c) as the HKO operates round the clock, there are duty staff of the Scientific Officer grade and Experimental Officer grade during the time of presentation of the TV weather programme. Such staff can take up the presentation duty within their conditioned hours of service;
- (d) as those staff who are most suitable for performing the presentation duty may not volunteer to become presenters, the existing voluntary arrangement may not be able to ensure the quality of the delivery of weather information to the public through the presentation; and
- (e) it is not uncommon for other civil servants to present information about their work to the public outside their conditioned hours of service without receiving honorarium.

Audit recommendation

5.12 **Audit has recommended that the Director of the Hong Kong Observatory should, in consultation with the Secretary for Financial Services and the Treasury, revisit the existing arrangement of providing staff volunteers to present weather information on TV weather programme and paying honorarium to them.**

Response from the Administration

5.13 The **Director of the Hong Kong Observatory** agrees with the audit recommendation. He has said that:

- (a) in consultation with the Financial Services and the Treasury Bureau, the HKO will revisit the arrangement of providing presenters for TV weather programme;

- (b) the current arrangement caters for the needs of the TV stations which may change from time to time; and
- (c) the TV weather programmes are produced at the time slots specified by the TV stations, and with presenters of the aptitude meeting the broadcasting standards of the stations.

5.14 The **Secretary for the Civil Service** agrees with the audit recommendation. She has said that:

- (a) the HKO should conduct a review on the feasibility of incorporating the presentation on TV weather programme into the normal duties of its staff; and
- (b) the Civil Service Bureau stands ready to provide assistance to the HKO during the review.

5.15 The **Secretary for Financial Services and the Treasury** agrees with the audit recommendation. He has said that the Financial Services and the Treasury Bureau stands ready to consider the HKO's review findings and its recommendation on whether the payment of honorarium should be continued.

Freelance scriptwriters for TV weather programme

5.16 Approval was given by the Director of the HKO to some staff to take up paid outside work as freelance scriptwriters for TV weather programme for presentation by staff of the TV stations. The scriptwriters receive a remuneration of \$500 from the TV stations for each script they provide. In 2009-10, 11 staff (4 in the Scientific Officer grade and 7 in the Experimental Officer grade) engaged in the freelance scriptwriting, receiving \$182,500 from the TV stations.

Audit observations and recommendations

5.17 As paid outside work, the freelance scriptwriters provide scripts to the TV stations in their own personal capacity and they receive remuneration directly from the stations. **However, the scripts provided by the scriptwriters may be regarded by the TV stations as if they were provided officially by the HKO.** This is because the HKO is involved in the scriptwriting work in the following ways:

- (a) the HKO provides support to the scriptwriters in their scriptwriting, for example:

- (i) the HKO has set up a webpage in its intranet to facilitate scriptwriting by providing script templates and links to information on other pages of the intranet; and
- (ii) the HKO encourages the scriptwriters to attend its in-house weather conference on the day they write the weather scripts; and
- (b) each script is faxed to the TV stations from the Headquarters under an official memo of the HKO. On the memo, it is stated that the script is issued by the “Duty TV Weather Scriptwriter, HKO”.

5.18 As the mission of the HKO is to deliver useful and effective meteorological services, it seems that the provision of weather scripts to the TV stations should not be treated as outside work of the HKO’s staff. It should logically be recognised by the HKO as one of its work of disseminating weather information to the public.

Audit recommendations

5.19 **Audit has recommended that the Director of the Hong Kong Observatory should:**

- (a) **review the current practice of approving HKO staff to take up paid outside work in providing weather scripts to the TV stations, taking into account the fact that:**
 - (i) **the scripts are written with the assistance of the HKO; and**
 - (ii) **the scripts are provided to the stations in the form of an official document issued by the HKO; and**
- (b) **in the light of the review, take appropriate action to rationalise the arrangement of providing weather scripts to the TV stations.**

Response from the Administration

5.20 The Director of the Hong Kong Observatory agrees with the audit recommendations. He has said that:

- (a) while the purpose of providing assistance to the scriptwriters is to ensure the quality of the weather scripts produced at the request of the TV stations, the HKO will review the current practice of approving staff to take up paid outside work in providing weather scripts to the TV stations; and

- (b) in the light of the review, the HKO will take appropriate action to rationalise the existing arrangement.

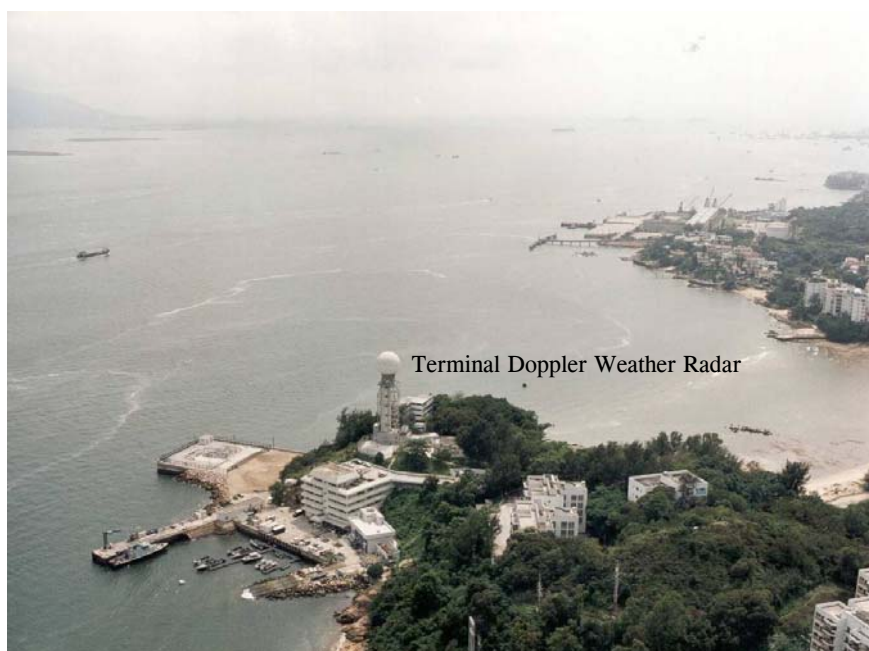
5.21 The **Secretary for the Civil Service** agrees with the audit recommendations. She has said that the Civil Service Bureau stands ready to provide assistance to the HKO during its review.

Installation of a new Terminal Doppler Weather Radar

5.22 The Terminal Doppler Weather Radar (TDWR) located at Tai Lam Chung (see Photograph 14) is a piece of equipment for the detection of windshear. Windshear is a hazardous weather phenomenon that has brought about aircraft accidents around the world. The existing TDWR, which started full operation in 1998, is approaching the end of its serviceable life. To enable the continuous provision of quality aviation weather services, in February 2009, the Finance Committee of the Legislative Council approved the creation of a new commitment of \$110 million for the HKO to replace the existing TDWR. The HKO proposed to install by late 2013 a new TDWR to ensure timely and uninterrupted provision of accurate windshear warnings to aircraft. After the new TDWR was in place, the existing one would be turned into a backup for as long as its economical useful life would permit.

Photograph 14

TDWR at Tai Lam Chung



Source: HKO records

Audit observations and recommendations

5.23 To ensure uninterrupted service of the TDWR during the replacement project, the HKO considers it necessary for the new TDWR to be installed on a separate site. In November 2005, the HKO began to identify a suitable site near Tai Lam Chung, northern Lantau Island, the HKIA and Ma Wan. It expected to have the site available by 2009 for site formation, building construction and equipment installation.

5.24 In January 2009, the Town Planning Board, having satisfied itself that the TDWR would comply with the relevant safety standards, approved the construction of the new TDWR station at Brothers Point, Tai Lam Chung. Since then, the HKO had taken measures to liaise with the local residents to address their concerns about the new TDWR. Such measures included meetings with the Tuen Mun Rural Committee and the Tuen Mun District Council to provide them with information about the new TDWR, inviting local residents to the HKO to help them gain an understanding of radar radiation, modifying the design of the new TDWR to improve its appearance, and shifting the proposed site at Brothers Point by some distance further away from the nearby villages. Up to August 2010, the HKO had obtained temporary land allocation to start geotechnical investigation works.

5.25 Because of ageing, the average annual downtime of the existing TDWR increased from 27 hours for the period 2000 to 2003 to 47 hours for the period 2004 to 2007. The average annual downtime for 2008 and 2009 increased further to 59 hours. There were also difficulties in maintaining the existing TDWR as many components were already out of production and the availability of some spare parts could only be maintained by repairing the faulty ones. In response to Audit's enquiry, in August 2010, the HKO informed Audit that it had a contingency plan to address the potential risk of prolonged failure of the existing TDWR.

Audit recommendations

5.26 **Audit has recommended that the Director of the Hong Kong Observatory should:**

- (a) **closely liaise with the relevant stakeholders to advance the implementation of the new TDWR project; and**
- (b) **take forward the contingency plan to address the risk of the increasing downtime of the existing TDWR.**

Response from the Administration

5.27 The **Director of the Hong Kong Observatory** agrees with the audit recommendations. He has said that:

- (a) the HKO has been actively engaging the stakeholders, including the local villagers, to address their concerns with a view to implementing the new TDWR as soon as possible; and
- (b) the HKO has been taking forward the contingency plan to address the risk of the increasing downtime of the existing TDWR, including carrying out more frequent preventive maintenance, repairing of faulty items by the manufacturer, and pursuing the acquisition of an experimental mobile radar for use as a stopgap measure when the TDWR is out of service.

Talks for the public

5.28 The HKO organises talks for the public on weather related topics with a view to enhancing the public's knowledge and awareness of our environment. In 2008-09 and 2009-10, the HKO organised 139 and 83 talks respectively.

Audit observations and recommendations

Attendance

5.29 Audit reviewed the attendance of the talks and noted that some of the talks organised at schools were very popular, while some talks organised for the public were not well received. The talk "Weather and Everyday Life" was organised six times and five times in 2008-09 and 2009-10 respectively, with the number of attendees ranging from 7 to 54 and the attendance rates ranging from 3% to 68% (see Table 8).

Table 8
Attendance of the talk
“Weather and Everyday Life”
(2008-09 and 2009-10)

Year	Venue	No. of attendees (a)	Capacity of venue (b)	Attendance rate (c) = (a)/(b) x 100%
2008-09	Recital Hall, Hong Kong City Hall	7	110	6%
	Lecture Room, Kwai Tsing Theatre	14	100	14%
	Hong Kong Heritage Discovery Centre, Kowloon Park	26	120	22%
	Cultural Activities Hall, Tuen Mun Town Hall	29	300	10%
	Lecture Room, Yuen Long Theatre	40	100	40%
	Lecture Room, Sha Tin Town Hall	51	120	43%
2009-10	Tin Ching Community Hall, Tin Shui Wai	12	450	3%
	Lecture Room, Tuen Mun Town Hall	17	120	14%
	Lecture Room, Sha Tin Town Hall	22	120	18%
	Conference Hall, HKO Headquarters (1st talk)	54	80	68%
	Conference Hall, HKO Headquarters (2nd talk)	45	80	56%

Source: HKO records

Evaluation of talks

5.30 Talk evaluation is an effective means to obtain feedbacks on the quality of the talk and to identify necessary improvement measures. Audit examination of the 356 talks organised in 2007-08 to 2009-10 revealed that evaluation was conducted for only 28 talks. For these talks, the HKO requested the attendees to complete a questionnaire to indicate their satisfaction level and to suggest improvements. For the remaining 328 talks, no evaluation was conducted.

Audit recommendations

5.31 **Audit has recommended that the Director of the Hong Kong Observatory should:**

- (a) **consider adjusting the frequency of organising talks not well received by the public; and**
- (b) **conduct evaluation for every talk organised and analyse the feedbacks to ascertain if any improvement measures are required.**

Response from the Administration

5.32 The **Director of the Hong Kong Observatory** agrees with the audit recommendations. He has said that:

- (a) all along, the HKO has hoped to reach out to the various districts so that residents there do not have to travel a long way to the HKO for public talks. The HKO has already taken note of the attendance statistics in 2008-09 and revised the frequency/venue of the talks in 2009-10, thereby resulting in improved attendance for some talks. In future, the HKO will continue to review the programme regularly and arrange talks at smaller venues as far as possible, with a view to improving the attendance rate; and
- (b) the HKO has started to carry out evaluation for every public talk wherever possible to ascertain if any improvement measures are required.

Departmental vehicles

5.33 The HKO operates a fleet of seven departmental vehicles. Five vehicles are used mainly by the Headquarters and two are used mainly by the Airport Meteorological Office.

5.34 According to the instructions promulgated by the Government Logistics Department (GLD) on the keeping of Government Motor Vehicle Log Books:

- (a) the nature of duty should be briefly stated in the “Purpose” column;
- (b) at the end of each journey, the officer using the car or authorising the journey must sign his/her name followed by the designation of the post he/she holds in the “Signature” column; and
- (c) at the end of each month, the Departmental Transport Officer or an officer nominated by him/her should complete the Monthly Transport Returns of the Vehicle Log Book.

Audit observations and recommendations

Nature of duty

5.35 Audit examined the Vehicle Log Books of the seven departmental vehicles for May 2010. Audit found that for 258 (64%) of 404 journeys made, the nature of the duty was not recorded in the “Purpose” column of the Vehicle Log Books (see Table 9).

Table 9

**Nature of duty not recorded in “Purpose” column
(May 2010)**

Vehicle	No. of journeys made	No. of journeys for which nature of duty was not recorded
A	26	24 (92%)
B	106	77 (73%)
C	55	46 (84%)
D	57	36 (63%)
E (Note)	22	20 (91%)
F	68	5 (7%)
G	70	50 (71%)
Total	404	258 (64%)

Source: Audit analysis of HKO records

Note: Vehicle E was under maintenance for the period 1 to 17 May 2010.

Signatures of the users

5.36 Audit's examination of the Vehicle Log Books for May 2010 also revealed that:

- (a) for 37 (9%) of the 404 journeys made, the officers who used the cars or authorising the journeys had not signed their names in the "Signature" column; and
- (b) for 183 (45%) of the 404 journeys, the signatures of the officers were not followed by their post designations. As it is difficult to identify the users from their signatures, Audit considers that the recording of their posts in the Vehicle Log Books is important for monitoring the use of the departmental vehicles.

Monthly Transport Returns

5.37 The Monthly Transport Return, which includes information on average fuel consumption rate (litres per 100 kilometres), total number of passengers carried and total number of trips run, is a useful record for monitoring the use of the departmental vehicles. Audit examination of the Vehicle Log Books for May and June 2010 revealed that no Monthly Transport Returns were completed. In response to Audit's enquiry, in August 2010, the HKO informed Audit that since December 2008, it had adopted the electronic Transport Management Information System to report the monthly utilisation figures of the vehicles. However, Audit noted that there was no agreement obtained from the GLD for not completing the Monthly Transport Returns.

Audit recommendations

5.38 Audit has *recommended* that the Director of the Hong Kong Observatory should ensure that the GLD's instructions on the keeping of Vehicle Log Books are complied with, as follows:

- (a) the nature of duty should be briefly stated in the "Purpose" column;
- (b) at the end of each journey, the officer using the car or authorising the journey must sign his/her name and post designation in the "Signature" column; and
- (c) at the end of each month, the Departmental Transport Officer or an officer nominated by him/her should complete the Monthly Transport Returns of the Vehicle Log Books, unless the agreement to dispense with the completion of the Returns has been obtained from the GLD.

Response from the Administration

5.39 The **Director of the Hong Kong Observatory** agrees with the audit recommendations. He has said that:

- (a) the staff have been reminded to briefly state the nature of duty in the “Purpose” column and to sign their names and post designations in the “Signature” column of the Vehicle Log Books at the end of each journey; and
- (b) the Monthly Transport Returns will be completed at the end of each month.

5.40 The **Director of Government Logistics** agrees with the audit recommendations. She has said that implementing the recommendations would enhance the HKO’s management of its departmental vehicles.

PART 6: PERFORMANCE MEASUREMENT AND REPORTING

6.1 This PART reports the audit findings concerning performance evaluation and performance reporting of the HKO.

Performance management

6.2 Performance measurement and reporting is a key part of the Government's commitment to deliver the best results for the community it serves. A good system of performance management provides a means to measure an organisation's performance, and helps enhance its service quality, transparency and accountability.

6.3 An effective performance management system involves:

- (a) selecting key aspects of performance to measure;
- (b) developing performance indicators and setting targets;
- (c) collecting performance information;
- (d) measuring and reporting actual performance against targets; and
- (e) striving for future improvements in performance.

Accuracy of weather forecast

6.4 The HKO uses a verification scheme to assess the accuracy of weather forecasts as perceived by the public. Under the scheme, the HKO compares the difference between the weather forecast and the actual weather out-turn in terms of five weather elements, namely wind, state of sky, precipitation, visibility and temperature. For each element, the forecast is compared with the actual out-turn to obtain a score according to a predetermined table for different scenarios. Different weightings are assigned to the five elements to reflect the relative importance of each element. The final score for the weather forecast is obtained by adding up the weighted scores for the individual elements. If the final score meets an "accurate/acceptable" mark set by the HKO, the forecast is considered accurate in the public's view. In addition to the verification scheme, the HKO conducts two surveys each year to gauge the public's views on the accuracy of the HKO's weather forecasts.

Audit observations and recommendations

“Accurate/acceptable” mark

6.5 To reflect rising public expectations on the accuracy of the HKO’s weather forecast, the HKO had raised the “accurate/acceptable” mark of its verification scheme in the past years. It was revised from 75 to 80 in July 1987, and then to 85 in January 1996. As the current “accurate/acceptable” mark of 85 was set more than 14 years ago, with the continuous technological advancements in weather forecast and increased public expectations over this period, the HKO may consider whether it is desirable to further revise the mark.

The public’s views on accuracy of weather forecasts

6.6 For the years 2005 to 2009, about 90% of the weather forecasts were assessed as accurate under the verification scheme. However, the results of the HKO surveys revealed that the percentage of weather forecasts perceived as accurate by the public was below 80%. Details are shown in Table 10.

Table 10
Percentage of weather forecasts
perceived as accurate by the HKO and by the public
(2005 to 2009)

Year	HKO (a)	Public (b)	Variance (c) = (a) – (b) (percentage point)
2005	91%	79%	12
2006	90%	78%	12
2007	91%	77%	14
2008	90%	76%	14
2009	90%	79%	11

Source: HKO records

6.7 The HKO may wish to:

- (a) explore the reasons for the variance in the accuracy of the weather forecasts between its verification scheme and the public's views; and
- (b) plan the action that may be necessary for reducing the variance.

Audit recommendations

6.8 **Audit has recommended that the Director of the Hong Kong Observatory should:**

- (a) **consider the desirability of adjusting the “accurate/acceptable” mark for the weather forecast verification scheme to reflect increased public expectations on accurate weather forecast;**
- (b) **consider conducting a review to identify the reasons for the variance in the accuracy of weather forecast between the verification scheme and the public's views; and**
- (c) **in the light of the review, consider the action necessary for reducing the variance, such as by strengthening the HKO's efforts to promote weather education and the public's understanding on weather forecast.**

Response from the Administration

6.9 The **Director of the Hong Kong Observatory** agrees with the audit recommendations. He has said that:

- (a) the HKO regularly reviews its weather forecast verification scheme, taking into account the capability and limitations of the science and technology as well as public expectations. The HKO will conduct a review, possibly through its half-yearly public opinion survey, to take forward the audit recommendations; and
- (b) the HKO will strengthen its efforts to promote weather education and public understanding on weather forecasts and warnings.

Reporting performance

6.10 The HKO publishes 19 key performance measures (7 targets and 12 indicators) in the Controlling Officer's Report (COR) for its three programmes. Details are shown in Table 11.

Table 11
Key performance measures in the COR
(2009-10)

Programme	Number of targets	Number of indicators	Total
(1) Weather Services	4	8	12
(2) Radiation Monitoring and Assessment	1	2	3
(3) Time Standard and Geophysical Services	2	2	4
Total	7	12	19

Source: HKO records

Audit observations and recommendations

Inaccurate performance reported in COR

6.11 Audit examined the actual performance figures for 2007 and 2008 reported in the 2009-10 COR. By comparing to the records kept in the HKO, Audit noted that there were inaccuracies in some of the figures reported in the COR (see Table 12).

Table 12
Actual performance figures reported in 2009-10 COR
(2007 and 2008)

Year	Performance indicator	Figure reported in COR (Number)	Figure in HKO records (Number)	Overstatement/ (understatement) (Number)
2007	Calls answered by Dial-a-Weather system	22.0 million	20.4 million	1.6 million
	Visits to Observatory's webpage on radiation	807,000	803,000	4,000
2008	Visits to Observatory's website	1,397 million	1,395 million	2 million
	Companies and organisations subscribing to special weather and warning services	89	95	(6)
	Meteorological documents for flights departing Hong Kong	152,000	153,000	(1,000)

Source: Audit analysis of HKO records

6.12 According to the HKO, some of the discrepancies were due to manual errors in compiling the figures, while the other discrepancies arose because the preliminary estimated figures were not revised after the final figures were available.

Double counting talks on climate change under two different programmes

6.13 In the 2009-10 COR, 64 talks in 2008 on climate change were included in the number of talks organised under both Programme (1) "Weather Services" and Programme (3) "Time Standard and Geophysical Services". Similarly, in the 2010-11 COR, 67 such talks in 2009 were included in the number of talks organised under both Programmes. As a result, the talks were double counted in the CORs.

Inaccurate performance information on the website

6.14 “Visits to Observatory’s website” is one of the HKO’s performance indicators. On 31 March 2010, Audit checked the information of this performance indicator published on the HKO’s website and found that the correct figure of 1,395,319,642 for 2008 was misstated as 1,388,022,036. Upon Audit’s advice, the HKO corrected the figure.

Enhancing performance reporting in COR

6.15 The HKO published on its website some performance targets together with their actual achievement in 2009 and planned performance for 2010. Audit compared the information on the website to that in the 2009-10 COR, and found that the information relating to the performance measures in Table 13 was not included in the COR.

Table 13
Performance information published on website but not in 2009-10 COR
(30 June 2010)

Performance measure	Target	Achievement in 2009	Plan for 2010
Hourly local weather report dissemination within the first 10 minutes of each hour	99%	99%	99%
Frequency of issue of local weather forecast	At least once every hour	At least once every hour	At least once every hour
Daily number of marine forecasts issued	2	2	2
Daily number of forecasts for South China Coastal Waters issued	7	7	7
Climatological information (percentage of written requests responded within 10 working days)	99%	99.7%	99.5%

Source: Audit analysis of HKO records

6.16 Comparative performance information against targets is essential for assessing whether the HKO services have met the needs of the public. It may enhance the performance reporting of the HKO if the performance information available on the website is also made available in the COR.

Audit recommendations

6.17 **Audit has recommended that the Director of the Hong Kong Observatory should:**

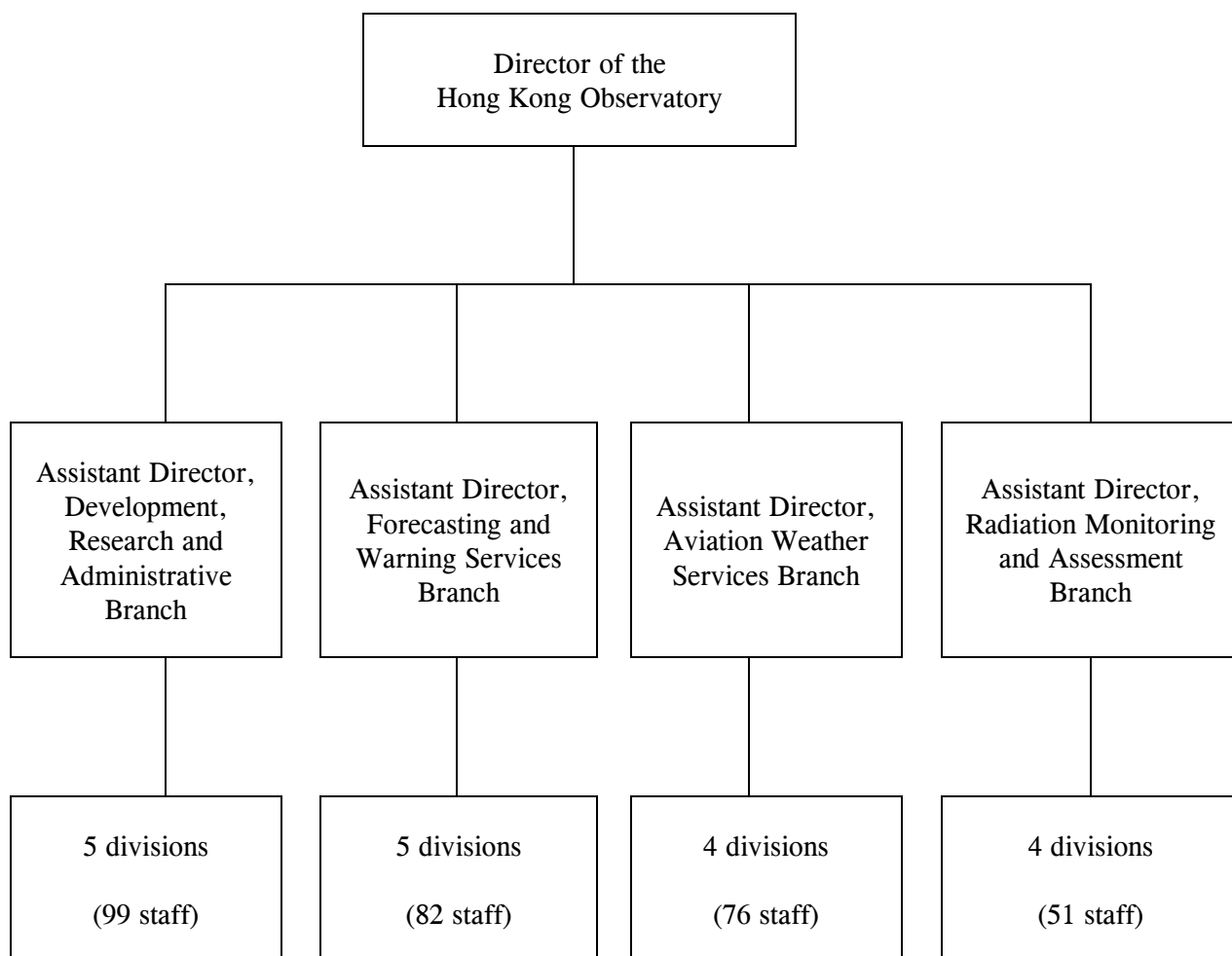
- (a) **take necessary action to ensure the accuracy of the performance information published in the COR and on the website; and**
- (b) **consider enhancing the performance reporting by adding to the COR, where appropriate, the information on performance measures which is available on the HKO's website.**

Response from the Administration

6.18 The **Director of the Hong Kong Observatory** agrees with the audit recommendations. He has said that:

- (a) the “visits to Observatory’s website” figure for 2008 was based on the monthly statistics. The discrepancy was due to the fact that these monthly statistics were revised from time to time and the updated figure was not reflected on the HKO’s website. The HKO has implemented a new procedure to ensure the accuracy of the performance information published in the COR and on the HKO’s website; and
- (b) in consultation with the relevant bureaux, the HKO will assess the feasibility of enhancing the performance reporting in the COR using the performance information on the website.

**Hong Kong Observatory
Organisation chart
(31 March 2010)**



Source: HKO records

**Site selection for the Ho Koon Education cum
Astronomical Centre Automatic Weather Station**

1. Upon the invitation of the HKEAC, the HKO decided to establish an AWS at the HKEAC to provide weather information for Tsuen Wan. On 28 September 2005, two officers of the HKO visited the HKEAC to analyse the suitability of the site for an AWS. In October 2005, a proposal was submitted to an Assistant Director for approval of the setting up of the HKEAC AWS. The result of the site analysis was reported as follows:

“The HKEAC is located at an altitude of approximately 100 metres above mean sea level and 1.5 kilometres NNW from Tsuen Wan MTR Station. The location is about 4 kilometres north of the AWS at Tsing Yi and 3.5 kilometres SW of the Tai Mo Shan peak. The main structure of the centre is a 3-storey building. During the visit, it is identified that the roof of the building furthest away from the dome of the astronomical telescope would be a suitable site for rainfall measurements. The garden at the SW corner of the main building would be suitable for temperature and humidity measurements. However, being blocked by nearby residential buildings to the NE, the site is considered not suitable for wind measurements.”

The HKEAC AWS, with a capital cost of about \$100,000, was officially opened in April 2006.

2. In February 2010, it was reported in a newspaper that the temperature recorded by a reporter in Tsuen Wan was 2°C higher than that reported by the HKO. The HKO explained to the media that because the HKEAC AWS was located at 142 metres above mean sea level, the temperature recorded was lower than that recorded by the reporter.

3. In March 2010, the HKO requested the District Officer (Tsuen Wan) to provide assistance in finding a location for a new AWS in Tsuen Wan. In its memo to the District Officer, the HKO stated that one of the requirements for a typical AWS for temperature measurement is that it should be at a height near the mean sea level.

Audit comments:

4. Audit considers that the site analysis of the HKEAC AWS might not have been thoroughly conducted. In the site analysis report, the elevation of the HKEAC was stated as approximately 100 metres above the mean sea level, but in fact it was 142 metres. Furthermore, as the HKEAC was not at a height near the mean sea level, the temperature measured at the HKEAC AWS was not representative of the region.

Source: HKO records

**Example of stores classified as non-inventory items
(30 June 2010)**

Non-inventory item	Unit cost (\$)	No. of items	Total cost (\$)
Transmitter (2W)	8,075	12	96,900
UHF(450-470MHz) transmitter (5W)	12,402	7	86,814
AWS cabinet with subrack and mother board	2,343	28	65,604
Network Dome Camera	16,000	3	48,000
Day & Night Camera	9,300	11	102,300
Air Sampling System	18,000	4	72,000
Current Meter	78,000	2	156,000
Tipping Bucket Raingauge (0.5mm)	6,000	2	12,000
Stevenson Screen (small)	13,430	2	26,860
Total		71	666,478

Source: HKO records

Acronyms and abbreviations

Audit	Audit Commission
AWS	Automatic weather station
COR	Controlling Officer's Report
Co-WIN	Community Weather Information Network
EMSD	Electrical and Mechanical Services Department
GLD	Government Logistics Department
GPA	Government Property Agency
HKEAC	Ho Koon Education cum Astronomical Centre
HKIA	Hong Kong International Airport
HKO	Hong Kong Observatory
m ²	Square metre
MTO	Miramar Tower Office
SAC	Strategic Advisory Committee
SLA	Service Level Agreement
SPRs	Stores and Procurement Regulations
SRM	Service Review Meeting
TDWR	Terminal Doppler Weather Radar
TV	Television