

Head 168 — HONG KONG OBSERVATORY

Controlling officer: the Director of the Hong Kong Observatory will account for expenditure under this Head.

Estimate 2016–17 **\$292.3m**

Establishment ceiling 2016–17 (notional annual mid-point salary value) representing an estimated 303 non-directorate posts as at 31 March 2016 rising by four posts to 307 posts as at 31 March 2017 **\$161.0m**

In addition, there will be an estimated five directorate posts as at 31 March 2016 and as at 31 March 2017.

Controlling Officer's Report

Programmes

Programme (1) Weather Services	This programme contributes to Policy Area 7: Public Safety (Secretary for Commerce and Economic Development).
Programme (2) Radiation Monitoring and Assessment	This programme contributes to Policy Area 9: Internal Security (Secretary for Security).
Programme (3) Time Standard and Geophysical Services	This programme contributes to Policy Area 7: Public Safety (Secretary for Commerce and Economic Development).

Detail

Programme (1): Weather Services

	2014–15 (Actual)	2015–16 (Original)	2015–16 (Revised)		2016–17 (Estimate)
Financial provision (\$m)	229.0	236.9	243.1 (+2.6%)		250.3 (+3.0%)
					(or +5.7% on 2015–16 Original)

Aim

2 The aim is to provide weather forecasts and issue warnings to the public, special users, the shipping community and aviation groups in order to reduce loss of life and damage to property, and minimise disruption to economic and social activities during hazardous weather.

Brief Description

3 The Central Forecasting Office and Airport Meteorological Office of the Hong Kong Observatory (HKO) are responsible for the preparation and issuance of weather information, forecasts and various warnings on hazardous weather to the public, the shipping community and aviation groups. HKO also promotes public awareness of, and community preparedness for, natural disasters. The work involves:

- operating a network of mostly automated weather stations;
- carrying out real-time exchange of data with meteorological centres in the world;
- receiving meteorological satellite imageries, and operating weather radar systems and other meteorological instruments;
- analysing meteorological data and computing the future weather by numerical modelling;
- disseminating weather information by a diversity of means;
- issuing warnings on hazardous weather such as tropical cyclones, storm surges, rainstorms, landslips, flooding, thunderstorms, windshear, fire danger and extreme hot and cold conditions; and
- conducting public talks, interviews and training courses as well as producing educational materials on hazardous weather phenomena.

4 In 2015–16, HKO fulfilled its performance pledge of issuing at least one bulletin every hour of the day, disseminating 100 per cent of the bulletins within ten minutes after each hour, and attained a forecast accuracy (as verified by objective means) of 92 per cent. To enable the public to better prepare for the typhoon season, HKO extended its tropical cyclone forecast track from three days to five days ahead. The Tate's Cairn weather radar for monitoring severe weather was replaced in 2015.

5 Weather information was enhanced in 2015–16 to meet the needs of the public through:

- launching a re-designed front page of the HKO website to conveniently display weather information on different weather situations;
- strengthening the “Automatic Regional Weather Forecast” service by seamlessly integrating the “Digital Weather Forecast” and the “Rainfall Nowcast” services and providing automatic regional weather forecasts for nine days, including the state-of-sky forecast;
- enriching the contents of the mobile weather application “MyObservatory” with new functions and features such as location-based weather forecast, weather report at user-customisable locations, weather widgets, marine forecast, earthquake information and educational resources;
- revamping the “World Weather Information” service on the HKO website;
- launching on the HKO website a one-stop service hub “Met on Map” featuring global weather information on a Geographical Information System (GIS) platform for convenient access by the public;
- launching revamped webpages to display satellite pictures on the GIS platform;
- increasing the update frequency of the 64-km range weather radar image website and the “Rainfall Nowcast” website from every 12 minutes to every six minutes;
- extending the area of coverage of the computer forecast weather maps generated from HKO’s numerical weather prediction model; and
- enriching regional weather information on the HKO website to include weather photos at Sheung Shui and Victoria Peak as well as temperatures at Yuen Long Park.

6 HKO maintains a close surveillance of the weather at and around the Hong Kong International Airport (HKIA) and provides the aviation community with the weather information needed for its operations. In 2015–16, the new meteorological information systems for interfacing with the Civil Aviation Department (CAD)’s new air traffic control systems and the new Terminal Doppler Weather Radar for airport surveillance at Brothers Point were commissioned. In respect of service, HKO continued to provide a suite of significant convection forecast products to CAD on a trial basis to facilitate runway and airspace capacity estimation. Meanwhile, HKO continued to collaborate with the Airport Authority Hong Kong to enhance the Airport Thunderstorm and Lightning Alert System for minimising the impact of lightning on airport operation and extending the inner alerting zone to cover the mid-field concourse.

7 Other noteworthy items for 2015–16 include:

- signing co-operation agreements with Meteo France to enhance collaboration in meteorological science and technology, and with the Philippine Atmospheric Geophysical and Astronomical Services Administration to co-operate on weather data exchange, typhoon monitoring and aviation weather service;
- commissioning a meteorological profile measuring system installed on a new government fixed-wing aircraft to collect meteorological data for enhancing the monitoring and forecasting of tropical cyclones;
- installing two Light Detection and Ranging systems at the runways of HKIA to replace the existing obsolete systems;
- acquiring a short-range Light Detection and Ranging system to detect and alert building-induced turbulence at HKIA;
- conducting trial studies to enhance marine meteorological observations over the data-sparse oceans by making en route upper-air meteorological observations using a portable sounding system on board a Voluntary Observing Ship during one of its voyages across the South China Sea;
- launching the mobile version of the “Educational Resources” webpage accessible through the “MyObservatory” application and a series of online quiz games for public education purposes;
- launching the “Weather Information for Outdoor Photography” webpage as a portal for weather information and forecasts as well as educational materials to help the public take and contribute outdoor weather photos;
- expanding the Community Weather Information Network (Co-WIN), operated in collaboration with the Hong Kong Polytechnic University, to a membership of over 150 including two from overseas (Guam and the Philippines);
- organising a number of educational events and outreach activities engaging young people and students through Co-WIN and Science in the Public Service (SIPS), including the Weather Observation and Weather Photos Competition, the Sea Level Measurement Device Design Competition, the Public Course on Weather Observation and various scientific talks;
- promoting weather education through the “Community Weather Observing Scheme”, an initiative of Co-WIN for sharing weather observations and photos;
- launching two TV and radio Announcements in the Public Interest on threats posed by swells associated with distant tropical cyclones and thunderstorms respectively;

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- enhancing the TV weather services with a new weather graphics system;
 - launching short videos on hazards associated with tropical cyclones for local and international communities to promote disaster awareness and preparedness; and
 - conducting a training workshop on rainfall nowcasting under the World Meteorological Organization (WMO)'s Voluntary Co-operation Programme.
- 8 The key performance measures in respect of weather services are:

Targets

	Target	2014 (Actual)	2015 (Actual)	2016 (Plan)
forecasts perceived as accurate by the public (%)	78	77	78	78
accurate public forecasts as verified by objective means (%)	88	91	92	90
accurate forecasts as assessed by ship captains (%)	96	97	96	96
accurate forecasts as assessed by airline operators (%)	96	98	98	98
hourly local weather reports disseminated within the first ten minutes of each hour (%)	99	99	100	99

Indicators

	2014 (Actual)	2015 (Actual)	2016 (Estimate)
calls answered by the Dial-a-Weather system (million)#	12.3	9.7	10.0
telephone enquiries answered manually#	21 345	17 789	18 000
visits to the HKO website (million)^	72 522	68 865	70 000
companies and organisations subscribing to special weather and warning services	111	112	112
total revenue from the above subscribers (\$m)	0.7	0.7	0.7
media interviews and public lectures/talks on weather#	1 163	1 344	1 200
meteorological documents for flights departing Hong Kong	198 000	208 000	210 000
visits to the aviation weather information system (million)@	84.3	110.5	115.0

The actual figures may vary depending on whether there are more weather changes of concern to the public in that particular year.

^ Figures measured in page views refer to the number of access to the HKO website which include the mobile website, the Weather Wizard and the mobile application. The actual figures may vary depending on whether there are more weather changes of concern to the public in that particular year.

@ The increase in 2015 was primarily attributable to the utilisation of new forecast products to support air traffic management during inclement weather. The increasing trend is expected to continue in 2016.

Matters Requiring Special Attention in 2016–17

- 9 During 2016–17, HKO will:
- enhance the “Met on Map” service with more weather and geophysical information,
 - strengthen quality management in public weather services by obtaining the relevant ISO certification as advocated by the WMO,
 - continue to enrich the contents of the “MyObservatory” application and extend its accessibility to wearable devices,
 - continue to enhance the automatic weather station network for the provision of more weather information,
 - further develop and promote outreach and public educational activities including the launch of SIPS Roving Exhibition 2016 to enhance public awareness of and preparedness for natural disasters and climate change,
 - launch the significant convection forecast and briefing services to support air traffic flow management,
 - collaborate with local airlines to increase automatic aircraft weather observations, and
 - continue to enhance media weather services to meet the increasing expectations of the media and the public.

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Programme (2): Radiation Monitoring and Assessment

	2014–15 (Actual)	2015–16 (Original)	2015–16 (Revised)	2016–17 (Estimate)
Financial provision (\$m)	27.0	27.2	28.0 (+2.9%)	29.4 (+5.0%)
				(or +8.1% on 2015–16 Original)

Aim

10 The aim is to provide information on environmental radiation levels in Hong Kong and advise government departments on the protective action that may be necessary during nuclear emergencies.

Brief Description

11 HKO monitors ambient radiation levels in Hong Kong and conducts radiological measurements on air, soil, water and food samples. In the event of a nuclear emergency, HKO will notify and advise government departments on the possible consequences in Hong Kong and recommend protective action. HKO organises training and exercises on radiation monitoring for other government departments involved in the Hong Kong contingency plan for nuclear emergencies. The work involves:

- operating a network of radiation monitoring stations, an aerial radiation monitoring system, a radiological survey vehicle, a radiation laboratory and an emergency radiation data management system;
- keeping abreast of the latest development on the methodology for nuclear accident consequence assessment; and
- planning and participating in exercises and drills in response to nuclear emergencies.

12 In 2015–16, all radiation monitoring and assessment work in this programme was carried out satisfactorily. All equipment was maintained in a state of readiness, highlighted by the successful annual surveillance audit under ISO 9001:2008 for the radiation laboratory as well as the successful ISO 9001:2008 accreditation of the ambient gamma radiation level measurement service. Inter-comparisons between Hong Kong and Guangdong on radiological measurements continued. Exercises, drills and training on radiation monitoring and assessment were conducted. Additional radiation monitoring equipment and enhanced communication facilities were being implemented for enhancing emergency preparedness and response capability.

13 The key performance measures in respect of radiation monitoring and assessment are:

Target

	Target	2014 (Actual)	2015 (Actual)	2016 (Plan)
data availability of radiation monitoring network (%).....	99.0	99.7	99.6	99.5

Indicators

	2014 (Actual)	2015 (Actual)	2016 (Estimate)
exercises and drills.....	19	19	20
visits to HKO's webpage on radiation.....	1 625 073	1 361 160	1 400 000

Matters Requiring Special Attention in 2016–17

14 During 2016–17, HKO will continue to:

- implement the agreed arrangements between Hong Kong and Guangdong on radiation monitoring and assessment,
- conduct drills and exercises on emergency response in conjunction with other government departments as well as the relevant Guangdong counterparts,
- organise training on radiation monitoring and assessment, and
- take forward the enhancement of radiation monitoring and assessment facilities.

Programme (3): Time Standard and Geophysical Services

	2014–15 (Actual)	2015–16 (Original)	2015–16 (Revised)	2016–17 (Estimate)
Financial provision (\$m)	11.3	11.4	11.8 (+3.5%)	12.6 (+6.8%)
				(or +10.5% on 2015–16 Original)

Aim

15 The aim is to maintain the Hong Kong time standard and to provide geophysical, oceanographic, astronomical and climatological information to the public.

Brief Description

16 HKO maintains the Hong Kong time standard and provides time signals for the public. It provides geophysical, oceanographic, astronomical and climatological information to meet the requirements for planning, engineering design and environmental impact assessments. It monitors earthquakes and the sea level and releases related information to the public, including the operation of the tsunami warning system. It also keeps abreast of research and development on international issues such as global climate change and advises the public and government departments on the likely implications. The work involves:

- maintaining a caesium beam clock as the Hong Kong time standard and providing time signals for radio broadcasts, automatic telephone answering service and synchronisation of clocks via the Internet;
- carrying out real-time exchange of seismic data with overseas centres and disseminating earthquake information by various means;
- operating seismological, tide and water level monitoring networks and conducting related analyses;
- compiling climatological and other related data;
- conducting studies on climate change in Hong Kong and promoting public understanding; and
- providing updates on the effects of El Nino and other longer term atmospheric phenomena on Hong Kong.

17 In 2015–16, the objectives and targets of this programme were generally met. Achievements and activities include:

- continuing to contribute to the International Bureau of Weights and Measures for the determination of the universal standard time;
- maintaining the Hong Kong Standard Time with a leap second added on 1 July 2015;
- operating the “Weather Information for Astronomical Observation” webpage in full-swing to provide weather information for astronomical observation hot spots in Hong Kong;
- conducting a joint webcast on the total lunar eclipse on 4 April 2015 with the Hong Kong Space Museum, the Ho Koon Nature Education cum Astronomical Centre, the Po Leung Kuk Ngan Po Ling College and the Hong Kong Sheng Kung Hui Solar Tower, attracting more than 69 000 page views;
- launching a new version of the “Climatological Information Services” webpage to enhance the provision and usage of climate information;
- launching a GIS-based “Global Earthquake Information” webpage to provide information on global earthquakes of magnitude 5.0 or above;
- revamping the “Tidal Information” and “Predicted Tide” webpages for enhancing tidal information services;
- conducting a study on the projection of extreme rainfall for Hong Kong as well as sea level rise for Hong Kong and the adjacent waters in the 21st century as a result of climate change; and
- producing educational videos to promote public understanding and awareness of climate change and its impacts.

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18 The key performance measures in respect of time standard and geophysical services are:

Targets

	Target	2014 (Actual)	2015 (Actual)	2016 (Plan)
time standard accuracy (microseconds per day).....	0.1	0.1	0.1	0.1
geophysical, meteorological and oceanographic data capture rate (%)	99	100	100	99
climatological information (% of written requests responded to within ten working days)	99	100	100	100

Indicators

	2014 (Actual)	2015 (Actual)	2016 (Estimate)
visits to HKO's Internet time service (million).....	10 306	13 356	14 000
requests for geophysical, climatological and oceanographic information and advice	798	812	800

Matters Requiring Special Attention in 2016–17

19 During 2016–17, HKO will continue to:

- engage various stakeholders in promoting the effective use of climate information and develop climate-related services in support of the business needs of different sectors;
- monitor and study climate change issues and promote public understanding of the challenges ahead, especially in the light of the Intergovernmental Panel on Climate Change's latest assessment, the projection of likely impacts on Hong Kong as well as the outcomes from the Paris United Nations Climate Conference; and
- maintain the Hong Kong time standard and keep abreast of storm surge, earthquake and tsunami risk assessment in the region.

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ANALYSIS OF FINANCIAL PROVISION

	2014–15 (Actual) (\$m)	2015–16 (Original) (\$m)	2015–16 (Revised) (\$m)	2016–17 (Estimate) (\$m)
Programme				
(1) Weather Services.....	229.0	236.9	243.1	250.3
(2) Radiation Monitoring and Assessment.....	27.0	27.2	28.0	29.4
(3) Time Standard and Geophysical Services	11.3	11.4	11.8	12.6
	267.3	275.5	282.9 (+2.7%)	292.3 (+3.3%)
				(or +6.1% on 2015–16 Original)

Analysis of Financial and Staffing Provision

Programme (1)

Provision for 2016–17 is \$7.2 million (3.0%) higher than the revised estimate for 2015–16. This is mainly due to the creation of three posts in 2016–17 and increased requirement for capital expenditure.

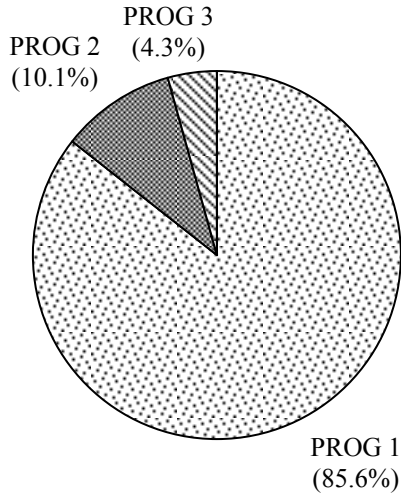
Programme (2)

Provision for 2016–17 is \$1.4 million (5.0%) higher than the revised estimate for 2015–16. This is mainly due to the creation of one post in 2016–17 and increased requirement for capital expenditure.

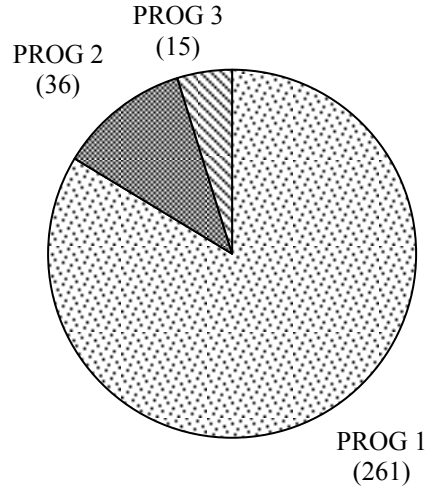
Programme (3)

Provision for 2016–17 is \$0.8 million (6.8%) higher than the revised estimate for 2015–16. This is mainly due to increased requirement for capital expenditure.

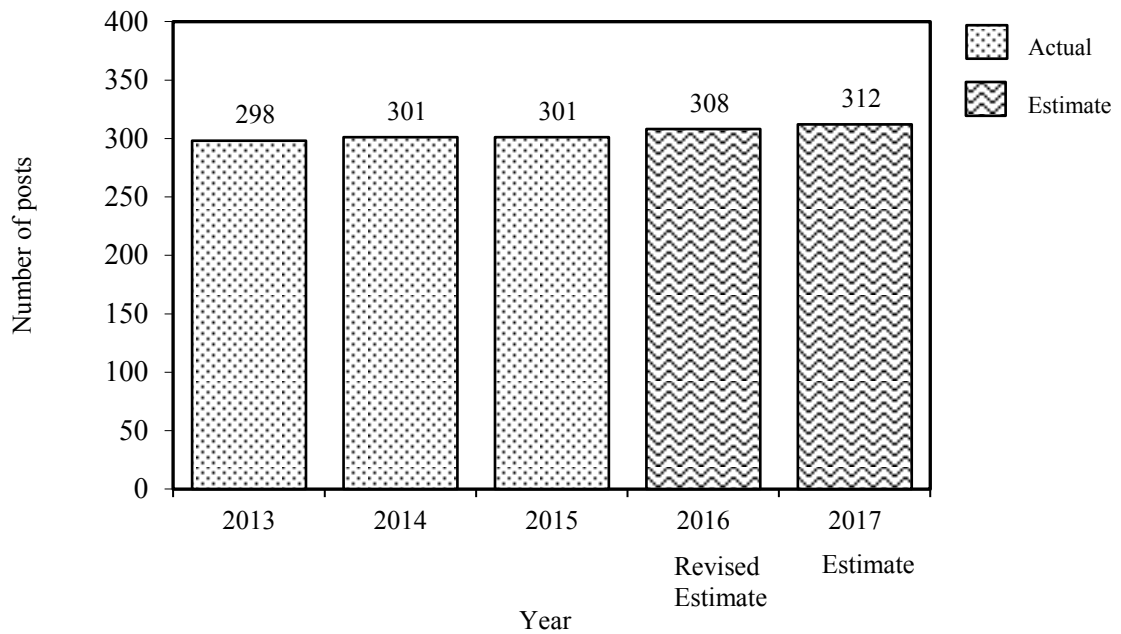
Allocation of provision to programmes (2016-17)



Staff by programme (as at 31 March 2017)



Changes in the size of the establishment (as at 31 March)



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Sub-head (Code)	Actual expenditure 2014–15	Approved estimate 2015–16	Revised estimate 2015–16	Estimate 2016–17	
	\$'000	\$'000	\$'000	\$'000	
Operating Account					
Recurrent					
000	Operational expenses	267,278	272,749	280,132	281,031
	Total, Recurrent.....	267,278	272,749	280,132	281,031
	Total, Operating Account	267,278	272,749	280,132	281,031
Capital Account					
Plant, Equipment and Works					
661	Minor plant, vehicles and equipment (block vote).....	—	2,765	2,765	11,245^Ω
	Total, Plant, Equipment and Works.....	—	2,765	2,765	11,245
	Total, Capital Account.....	—	2,765	2,765	11,245
	Total Expenditure	267,278	275,514	282,897	292,276

- Ω Provision of \$11,245,000 under *Subhead 661 Minor plant, vehicles and equipment (block vote)* represents an increase of \$8,480,000 (306.7%) over the revised estimate for 2015–16. This reflects the updating of the ambit of this block vote subhead as set out in the Introduction to the Estimates and the increased requirement for scheduled replacement of minor plant and equipment.

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Details of Expenditure by Subhead

The estimate of the amount required in 2016–17 for the salaries and expenses of the Hong Kong Observatory is \$292,276,000. This represents an increase of \$9,379,000 over the revised estimate for 2015–16 and \$24,998,000 over the actual expenditure in 2014–15.

Operating Account

Recurrent

2 Provision of \$281,031,000 under *Subhead 000 Operational expenses* is for the salaries, allowances and other operating expenses of the Hong Kong Observatory.

3 The establishment as at 31 March 2016 will be 308 posts. It is expected that there will be an increase of four posts in 2016–17. Subject to certain conditions, the controlling officer may under delegated power create or delete non-directorate posts during 2016–17, but the notional annual mid-point salary value of all such posts must not exceed \$161,024,000.

4 An analysis of the financial provision under *Subhead 000 Operational expenses* is as follows:

	2014–15 (Actual) (\$'000)	2015–16 (Original) (\$'000)	2015–16 (Revised) (\$'000)	2016–17 (Estimate) (\$'000)
Personal Emoluments				
- Salaries.....	170,473	176,154	183,313	186,760
- Allowances.....	993	1,633	1,661	1,710
- Job-related allowances.....	250	400	281	427
Personnel Related Expenses				
- Mandatory Provident Fund contribution.....	385	528	551	566
- Civil Service Provident Fund contribution.....	3,452	3,979	4,152	5,198
Departmental Expenses				
- General departmental expenses	91,611	89,940	90,060	86,255
Other Charges				
- World Meteorological Organization.....	114	115	114	115
	267,278	272,749	280,132	281,031

Capital Account

Plant, Equipment and Works

5 Provision of \$11,245,000 under *Subhead 661 Minor plant, vehicles and equipment (block vote)* represents an increase of \$8,480,000 (306.7%) over the revised estimate for 2015–16. This reflects the updating of the ambit of this block vote subhead as set out in the Introduction to the Estimates and the increased requirement for scheduled replacement of minor plant and equipment.