

Head 168 — HONG KONG OBSERVATORY

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

Estimate 2017–18 **\$303.1m**

Establishment ceiling 2017–18 (notional annual mid-point salary value) representing an estimated 307 non-directorate posts as at 31 March 2017 rising by four posts to 311 posts as at 31 March 2018 **\$171.6m**

In addition, there will be an estimated five directorate posts as at 31 March 2017 and as at 31 March 2018.

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

	2015–16 (Actual)	2016–17 (Original)	2016–17 (Revised)		2017–18 (Estimate)
Financial provision (\$m)	241.9	250.3	255.2 (+2.0%)		258.9 (+1.4%)
					(or +3.4% on 2016–17 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 TV weather programmes and educational materials on hazardous weather phenomena.

4 In 2016–17, HKO fulfilled its performance pledge of issuing at least one bulletin every hour of the day, disseminating 99 per cent of the bulletins within ten minutes after each hour, and attained a forecast accuracy (as verified by objective means) of 89 per cent. HKO implemented a quality management system for public weather services as advocated by the World Meteorological Organization (WMO), and obtained the International Organization for Standardization (ISO) 9001:2015 certificate after completing the required audits. The total number of page views of the HKO website and mobile weather application “MyObservatory” exceeded the 100 billion mark in 2016.

5 Weather information was enhanced in 2016–17 to meet the needs of the public through:

- launching the “Announcement on Localised Heavy Rain” service for the alerting of potential serious flooding due to heavy rain in individual districts;
- revamping the “Weather Information for Schools” webpage to provide more regional rainfall information;
- launching a new webpage on “Hong Kong Weather Information for Tourists”;
- launching the “Weather Note” webpage to facilitate communication with the public and the media regarding interesting weather-related subjects or issues;
- extending the “MyObservatory” application to wearable devices;
- enriching the contents of the “MyObservatory” application with new functions and features such as a Geographic Information System (GIS) display of “Regional Weather” and the “South China Coastal Waters” forecast on Android platform and launching a new weather widget on iOS platform;
- enriching the “Met on Map” service, a one-stop service hub powered by a GIS platform, with more comprehensive weather information including global satellite mosaics, visibility and relative humidity reports and lightning location information;
- launching a new online information service “Post of the Day” to provide daily reminders on weather, climate and related news through social media platforms and the “MyObservatory” application;
- increasing the update frequency of the satellite imageries over eastern Asia from every 30 minutes to every ten minutes and providing more detailed regional and global satellite imageries on the HKO website; and
- enriching regional weather information on the HKO website to provide weather photos round the clock, including more weather photos taken at Victoria Peak, as well as temperatures at Tai Mei Tuk.

6 HKO maintains a close surveillance of the weather at and around the Hong Kong International Airport and provides the aviation community with the weather information needed for its operations. In 2016–17, with the commissioning of the Civil Aviation Department (CAD)’s new Air Traffic Control Centre, all the associated new/upgraded meteorological facilities were operational with effect from the same date. Meanwhile, HKO started to provide a suite of significant convection forecast products to CAD in full-swing during day time to facilitate runway and airspace capacity estimation. HKO also enhanced its briefing service to the Airport Authority Hong Kong and the aviation community to include tropical cyclones affecting other regional airports for early handling of diverted flights. Hong Kong’s fleet of voluntary automatic aircraft observation was also expanded to around 20 aircraft.

7 Other noteworthy items for 2016–17 include:

- signing a co-operation agreement with the Civil Aviation Administration of China and the China Meteorological Administration on the establishment of an Asian Aviation Weather Centre (AAWC) of which HKO would serve as the backup centre;
- enhancing marine meteorological observations for tropical cyclone monitoring over the data-sparse oceans by deploying drifting buoys equipped with pressure and sea surface temperature sensors over the South China Sea;
- launching enhanced tropical cyclone observation missions using a new dropsonde system in collaboration with the Government Flying Service to further strengthen the analysis and the forecasting of tropical cyclones over the South China Sea;
- commissioning an enhanced lightning location information system with higher detection efficiency and accuracy as well as launching a mobile version of the location-specific lightning alert webpage;
- launching the “Data Collection or Production Centre for the World Weather Information Service” of WMO to facilitate exchange of and public online access to official weather forecasts and climatological information on cities across the globe;
- developing and hosting the online version of the updated “International Cloud Atlas” for WMO for use by the general public and the media worldwide;
- launching a trial version of one-hour lightning nowcast on the mobile version of the HKO website and on the Automatic Regional Weather Forecast webpage;
- providing meteorological support to the Hong Kong Olympic Windsurfing team in Rio 2016 Olympics;
- launching a new webpage on storm surge database to provide more information on historical storm surges in Hong Kong;
- commissioning a replacement upper-air sounding system utilising a new model of radiosonde for upper-air observation;
- organising the “WMO World Weather Research Programme 4th International Symposium on Nowcasting and Very-short-range Forecast 2016”, which was held in Asia for the first time and was attended by more than 150 weather experts from over 20 countries/regions;
- organising, in collaboration with a number of government bureaux/departments, tertiary institutions and community partners, a roving public exhibition entitled “Climate Change – Our Response” under the Science in Public Service (SIPS) Campaign to promote public awareness and actions in combating climate change;

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- organising a number of educational events and outreach activities engaging young people and students through SIPS and the Community Weather Information Network, including the Weather Observation and Weather Photos Competition, the Public Course on Weather Observation as well as various scientific and public talks;
 - organising educational events and outreach activities to celebrate the 20th anniversary of “Friends of the Observatory” with more than 11 000 members;
 - jointly organising with the Senior Citizen Home Safety Association the “Sky of Silver Age” weather photo competition in early 2016 to encourage elderly people in Hong Kong to develop a more outgoing lifestyle through the appreciation of weather phenomena around them; and
 - conducting an international training workshop on the use and interpretation of mesoscale numerical weather prediction under WMO’s Voluntary Co-operation Programme.
- 8 The key performance measures in respect of weather services are:

Targets

	Target	2015 (Actual)	2016 (Actual)	2017 (Plan)
forecasts perceived as accurate by the public (%)#	78	78	74	78
accurate public forecasts as verified by objective means (%)	88	92	89	90
accurate forecasts as assessed by ship captains (%)	96	96	98	96
accurate forecasts as assessed by airline operators (%)	96	98	100	98
hourly local weather reports disseminated within the first ten minutes of each hour (%)	99	100	99	99

Indicators

	2015 (Actual)	2016 (Actual)	2017 (Estimate)
calls answered by the Dial-a-Weather system (million)#	9.7	10.2	10.0
telephone enquiries answered manually#	17 789	20 563	19 000
visits to the HKO website (million)^	68 865	105 014	110 000
companies and organisations subscribing to special weather and warning services	112	107	107
total revenue from the above subscribers (\$m)	0.7	0.7	0.7
media interviews and public lectures/talks on weather#	1 344	2 023	1 400
meteorological documents for flights departing Hong Kong	208 000	209 000	212 000
visits to the aviation weather information system (million)	110.5	147.4	160.0

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.

Matters Requiring Special Attention in 2017–18

- 9 During 2017–18, HKO will:
- enhance social media weather services to meet the increasing expectations of the media and the public,
 - continue to enrich the contents of the “MyObservatory” application,
 - continue to enhance the “Met on Map” service with more weather and geophysical information,
 - continue to enhance the automatic weather station network for the provision of more weather information,
 - organise publicity events for the 100th anniversary of the numbered tropical cyclone signal system to promote public awareness of typhoon-related hazards,
 - further develop and promote outreach and public educational activities to enhance public awareness of and preparedness for natural disasters and climate change,
 - develop new aviation meteorological products and services for the AAWC, and
 - enhance the services to general aviation to include detailed weather information for general aviation hot spots in Hong Kong.

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Programme (2): Radiation Monitoring and Assessment

	2015–16 (Actual)	2016–17 (Original)	2016–17 (Revised)	2017–18 (Estimate)
Financial provision (\$m)	27.9	29.4	30.1 (+2.4%)	32.1 (+6.6%)
				(or +9.2% on 2016–17 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 2016–17, 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 audits under ISO 9001:2008 for the radiation laboratory and 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. New radiation monitoring equipment, enhanced communication facilities and a new computer system for nuclear accident consequence assessment were implemented for enhancing emergency preparedness and response capability.

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

Target

	Target	2015 (Actual)	2016 (Actual)	2017 (Plan)
data availability of radiation monitoring network (%).....	99.0	99.6	99.7	99.5

Indicators

	2015 (Actual)	2016 (Actual)	2017 (Estimate)
exercises and drills.....	19	20	20
visits to HKO's webpage on radiation.....	1 361 160	1 906 176	1 400 000

Matters Requiring Special Attention in 2017–18

14 During 2017–18, 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

	2015–16 (Actual)	2016–17 (Original)	2016–17 (Revised)	2017–18 (Estimate)
Financial provision (\$m)	11.7	12.6	12.8 (+1.6%)	12.1 (–5.5%)
				(or –4.0% on 2016–17 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, provides time signals for the public and contributes to the International Bureau of Weights and Measures for the determination of the universal standard time. 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 2016–17, the objectives and targets of this programme were generally met through the following achievements and activities:

- enhancing the “Weather Information for Astronomical Observation” webpage with a new observation site at the Ho Koon Nature Education cum Astronomical Centre in Tsuen Wan,
- launching the mobile version of the “Global Earthquake Information Webpage” to provide real-time earthquake information,
- acquiring a replacement caesium-beam clock and adding a leap second on 1 January 2017 for maintaining the Hong Kong time standard,
- revamping the climate change webpage and publishing the second edition of the climate change pamphlet “Hong Kong In A Warming World” to update the climate projections for Hong Kong after the Paris Agreement (COP21), and
- producing educational videos to promote public understanding and awareness of climate change and its impacts.

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

Targets

	Target	2015 (Actual)	2016 (Actual)	2017 (Plan)
time standard accuracy (microseconds per day)	0.1	0.1	0.1	0.1
geophysical, meteorological and oceanographic data capture rate (%)	99	100	99	99
climatological information (% of written requests responded to within ten working days)	99	100	100	100

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Indicators

	2015 (Actual)	2016 (Actual)	2017 (Estimate)
visits to HKO's Internet time service (million).....	13 356	25 041	25 000
requests for geophysical, climatological and oceanographic information and advice	812	774	800

Matters Requiring Special Attention in 2017–18

19 During 2017–18, HKO will continue to:

- keep abreast of storm surge, earthquake and tsunami risk assessment in the region;
- monitor and study climate change issues and promote public understanding of the challenges ahead, especially in the light of the Paris Agreement and the projection of likely impacts on Hong Kong;
- provide the latest climate change information and assessment, including the projection of likely impacts on Hong Kong in support of policy-making and initiatives to combat climate change;
- engage various stakeholders in promoting the effective use of climate information and in developing climate-related services in support of the emerging needs of different sectors and government bureaux/departments; and
- develop educational initiatives and support outreach activities to promote the understanding of the mitigation, adaptation and resilience-building measures required in combating climate change impacts.

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ANALYSIS OF FINANCIAL PROVISION

	2015–16 (Actual) (\$m)	2016–17 (Original) (\$m)	2016–17 (Revised) (\$m)	2017–18 (Estimate) (\$m)
Programme				
(1) Weather Services.....	241.9	250.3	255.2	258.9
(2) Radiation Monitoring and Assessment.....	27.9	29.4	30.1	32.1
(3) Time Standard and Geophysical Services	11.7	12.6	12.8	12.1
	281.5	292.3	298.1 (+2.0%)	303.1 (+1.7%)
				(or +3.7% on 2016–17 Original)

Analysis of Financial and Staffing Provision

Programme (1)

Provision for 2017–18 is \$3.7 million (1.4%) higher than the revised estimate for 2016–17. This is mainly due to the increase in salary provision for four additional posts in 2017–18.

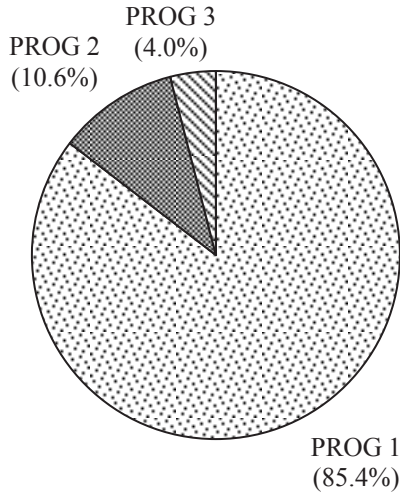
Programme (2)

Provision for 2017–18 is \$2.0 million (6.6%) higher than the revised estimate for 2016–17. This is mainly due to increased requirement for capital expenditure.

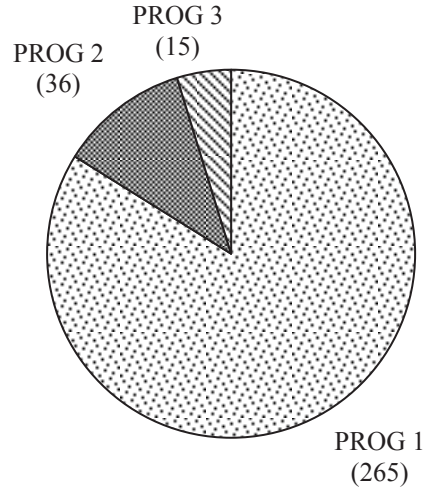
Programme (3)

Provision for 2017–18 is \$0.7 million (5.5%) lower than the revised estimate for 2016–17. This is mainly due to decreased requirement for capital expenditure.

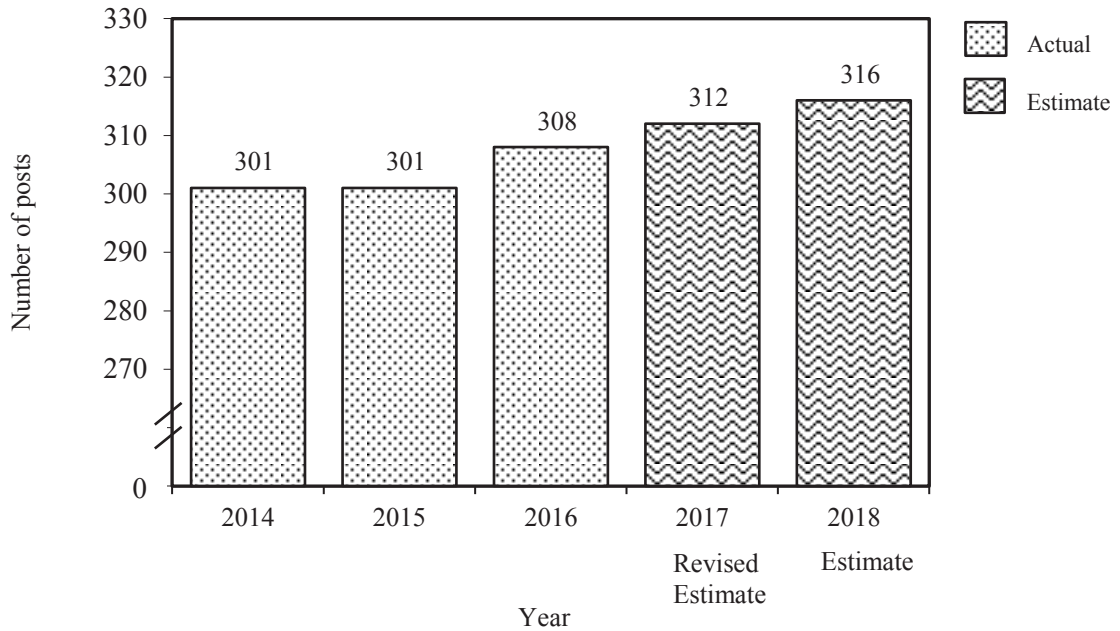
Allocation of provision to programmes (2017-18)



Staff by programme (as at 31 March 2018)



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



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Sub-head (Code)	Actual expenditure 2015–16	Approved estimate 2016–17	Revised estimate 2016–17	Estimate 2017–18	
	\$'000	\$'000	\$'000	\$'000	
Operating Account					
Recurrent					
000	Operational expenses	278,702	281,031	286,837	291,762
	Total, Recurrent.....	278,702	281,031	286,837	291,762
	Total, Operating Account	278,702	281,031	286,837	291,762
Capital Account					
Plant, Equipment and Works					
661	Minor plant, vehicles and equipment (block vote).....	2,765	11,245	11,245	11,321
	Total, Plant, Equipment and Works.....	2,765	11,245	11,245	11,321
	Total, Capital Account.....	2,765	11,245	11,245	11,321
	Total Expenditure	281,467	292,276	298,082	303,083

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Details of Expenditure by Subhead

The estimate of the amount required in 2017–18 for the salaries and expenses of the Hong Kong Observatory is \$303,083,000. This represents an increase of \$5,001,000 over the revised estimate for 2016–17 and \$21,616,000 over the actual expenditure in 2015–16.

Operating Account

Recurrent

2 Provision of \$291,762,000 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 2017 will be 312 posts. It is expected that there will be an increase of four posts in 2017–18. Subject to certain conditions, the controlling officer may under delegated power create or delete non-directorate posts during 2017–18, but the notional annual mid-point salary value of all such posts must not exceed \$171,635,000.

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

	2015–16 (Actual) (\$'000)	2016–17 (Original) (\$'000)	2016–17 (Revised) (\$'000)	2017–18 (Estimate) (\$'000)
Personal Emoluments				
- Salaries.....	181,739	186,760	192,580	198,566
- Allowances.....	1,277	1,710	1,792	1,874
- Job-related allowances.....	186	427	458	488
Personnel Related Expenses				
- Mandatory Provident Fund contribution.....	459	566	539	398
- Civil Service Provident Fund contribution.....	4,096	5,198	5,098	6,478
Departmental Expenses				
- General departmental expenses	90,831	86,255	86,260	83,848
Other Charges				
- World Meteorological Organization.....	114	115	110	110
	278,702	281,031	286,837	291,762