

## **JMA report on the status of current and future satellite systems**

This document summarizes the status of JMA's current and future GEO satellite systems. JMA's new-generation Himawari-9 geostationary satellite was launched on 2 November 2016 and entered operation as back-up to the currently operational Himawari-8 geostationary satellite on 10 March 2017 after a period of in-orbit testing. Both satellites have identical specifications, and Himawari-9 will quickly begin back-up observation in the event of a critical Himawari-8 malfunction to enable continued data provision via the HimawariCast and HimawariCloud services. These twin satellites are expected to support JMA's operation of robust satellite observation services to the Asia-Oceania region until 2029.

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### 1 INTRODUCTION

The Japan Meteorological Agency (JMA) has operated the Himawari-8 geostationary satellite since 7 July 2015. The Agency also launched its new Himawari-9 geostationary meteorological satellite, which is identical to the Himawari-8 unit, on 2 November 2016 from the Tanegashima Space Center of the Japan Aerospace Exploration Agency (JAXA) using H-IIA launch vehicle No. 31 (H-IIA F31). The satellite flew as planned after separating from the rocket and entered geostationary orbit on the scheduled date of 11 November.

After a period of in-orbit testing, Himawari-9 began serving as back-up to Himawari-8 on 10 March 2017 and will continue in this role until the planned switchover in or around 2022. In the event of a critical Himawari-8 malfunction, Himawari-9 will begin back-up observation. This dual combination of new-generation satellites will support JMA's stable provision of continuous satellite observation data for the Asia-Oceania region until 2029 (Figure 1).

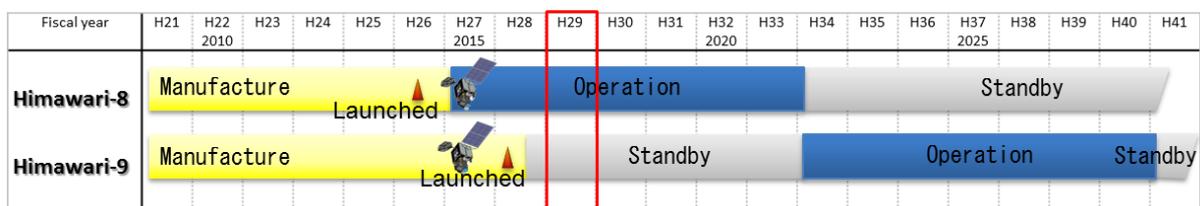


Figure 1: Himawari-8/-9 timeline

### 2 CURRENT SATELLITE SYSTEMS

#### JMA's current GEO satellites

| Sector                        | Satellite  | Location | Launch date | Access                        | Payload and status                     |
|-------------------------------|------------|----------|-------------|-------------------------------|--|
| East Asia and Western Pacific | Himawari-8 | 140.7°E  | 07/10/2014  | HimawariCast<br>HimawariCloud | 16-channel AHI, DCS, SEDA; operational |
|                               | Himawari-9 | 140.7°E  | 02/11/2016  | HimawariCast<br>HimawariCloud | 16-channel AHI, DCS, SEDA; backup      |

#### 2.1 Himawari-8/9

Himawari-8/9 is placed in geostationary orbit at 140.7°E and provides observation and data collection services for the East Asia and Western Pacific regions.

Operational information regarding Himawari-8/9 is provided on JMA's Meteorological Satellite Center (MSC) web page at

<http://www.data.jma.go.jp/mscweb/en/operation8/>.

Himawari-9 and Himawari-8 are located in close proximity at around 140.7°E, separated by only 0.1°. As mentioned in Section 1, the units have identical specifications, and their spectral response characteristics are also similar (Figure 2).

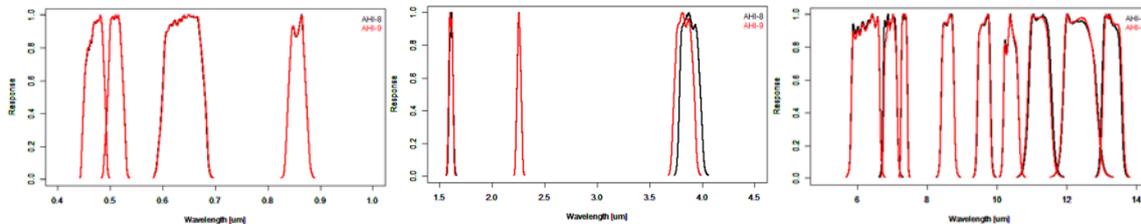


Figure 2 Spectral response characteristics of the AHIs on board Himawari-8 (black) and Himawari-9 (red)

Himawari-8 and -9 are both equipped with Data Collection System (DCS) functionality. Himawari-8 currently supports the Data Collection Service with Himawari-9 in standby as back-up. Further information on Himawari-DCS is available in the Monthly Operations Report section of the JMA/MSO website at [http://www.data.jma.go.jp/mscweb/en/operation8/opr\\_report.html](http://www.data.jma.go.jp/mscweb/en/operation8/opr_report.html).

See JMA-WP-01 for more information on Himawari-DCS.

Himawari-8 and -9 have instruments to sense proton and electron flux for satellite housekeeping known as SEDA (Space Environment Data Acquisition). SEDA text data acquired from the satellites are provided to the National Institute of Information and Communications Technology (NICT) to support near-real-time space environment monitoring and forecasting. For more information, see the NICT Space Weather Information Center Web page at [http://swc.nict.go.jp/contents/index\\_e.php](http://swc.nict.go.jp/contents/index_e.php).

See JMA-WP-02 for more on JMA's space weather activities.

## 2.2 Data distribution/dissemination

JMA distributes Himawari-8/9 data in two ways. One is the HimawariCast service, by which primary sets of imagery are disseminated as operational meteorological services via a commercial communication satellite. The other is the HimawariCloud service, by which full sets of imagery are delivered to National Meteorological and Hydrological Services (NMHSs) via a private Internet cloud service.

The HimawariCast service was transferred from the JCSAT-2A satellite to the JCSAT-2B satellite in July 2016, which required users to change the settings of their receiving equipment. As JMA informed users of this requirement and provided instructions several months in advance, the transfer was relatively smooth.

In collaboration with NOAA/NESDIS, Himawari-8 LRIT full-disk images are re-formatted into NOAA GOES LRIT data and are provided to Central Pacific island nations using the GOES-West satellite.

### **2.3 User support**

To support users preparing for Himawari-8/9 data utilization, JMA provides Himawari-8/9 information on the Himawari User's Guide web page. The information encompasses the schedule, spacecraft/AHI specifications including estimated spectral response functions (SRFs), sample data in various file formats, data distribution/dissemination methods, and reference software for data reading/conversion. JMA also posts Himawari-8/9 information on its Satellite User Readiness Navigator (SATURN) resource. See also the following web pages:

<http://www.jma-net.go.jp/msc/en/support/>

<https://www.wmo-sat.info/satellite-user-readiness/topic/satellites/himawari-8/>