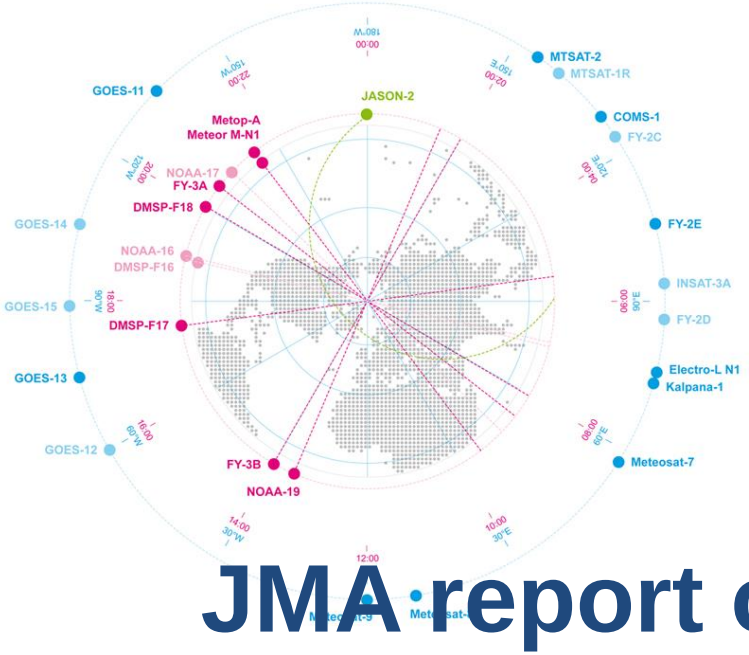


JMA report on the status of current and future satellite systems

Presented to CGMS-43 Plenary session, agenda item E.1

Japan Meteorological Agency

CGMS

Coordination Group for Meteorological Satellites

Overview – Planning of JMA satellite systems (Himawari-series)

GMS (Geostationary Meteorological Satellite)

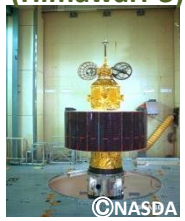
GMS (Himawari)

Launched in Jul 1977

GMS-2 (Himawari-2)

Aug 1981

GMS-3 (Himawari-3)



Aug 1984

GMS-4 (Himawari-4)

Sep 1989

GMS-5 (Himawari-5)

Mar 1995

(GOES-9)

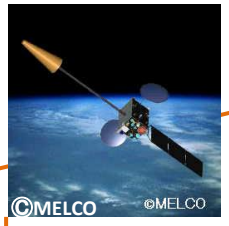
Back-up operation of GMS-5 with GOES-9 by NOAA/NESDIS from May 22, 2003 to June 28, 2005

MTSAT (Multi-functional Transport SATellite)

MTSAT-1R (Himawari-6)

Launched in Feb 2005

MTSAT-2 (Himawari-7)



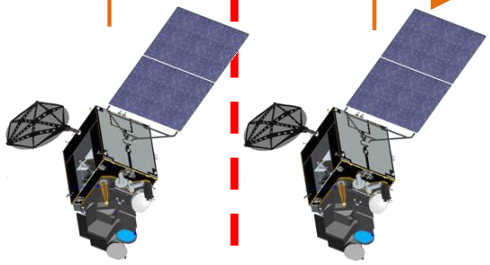
Feb 2006

Himawari-8 **Himawari-9**

Himawari

Oct 2014

2016

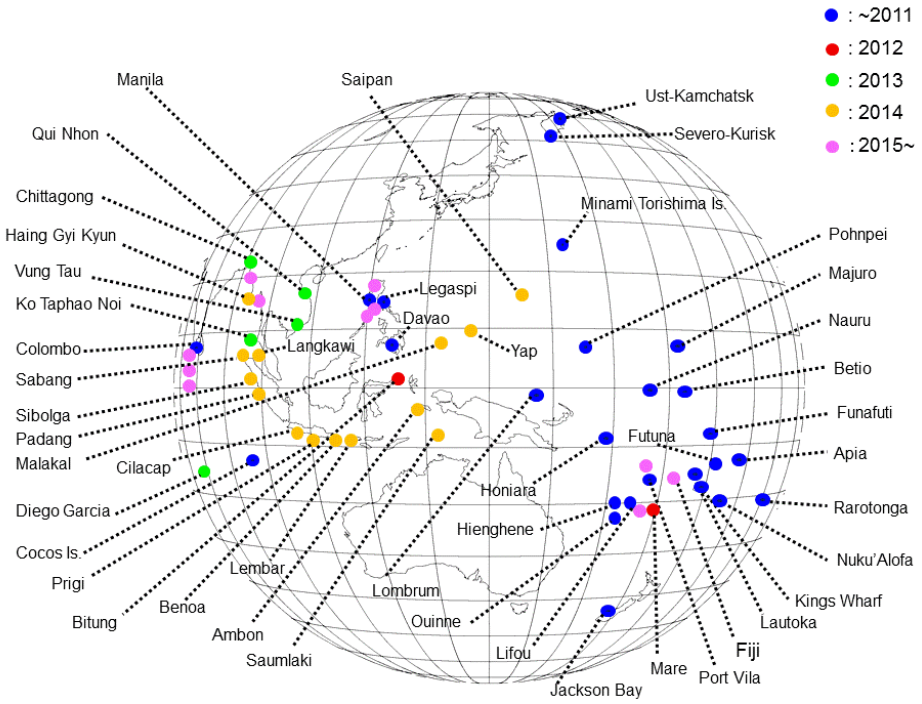


Satellite	Observation period
GMS	1978 – 1981
GMS-2	1981 – 1984
GMS-3	1984 – 1989
GMS-4	1989 – 1995
GMS-5	1995 – 2003
GOES-9	2003 – 2005
MTSAT-1R	2005 – 2010
MTSAT-2	2010 – 2015
Himawari-8	2015 – 2022
Himawari-9	2022 – 2029

Coordination Group for Meteorological Satellites

CURRENT GEO SATELLITES

- MTSAT-DCS (Data Collection System) plays a very important role in **disaster prevention services** in the Asia and Pacific regions.
- In recent years, the number of **tidal/tsunami stations** using MTSAT-DCS has rapidly increased. In addition, the **high-frequent collection** (6-minute intervals) is implemented.

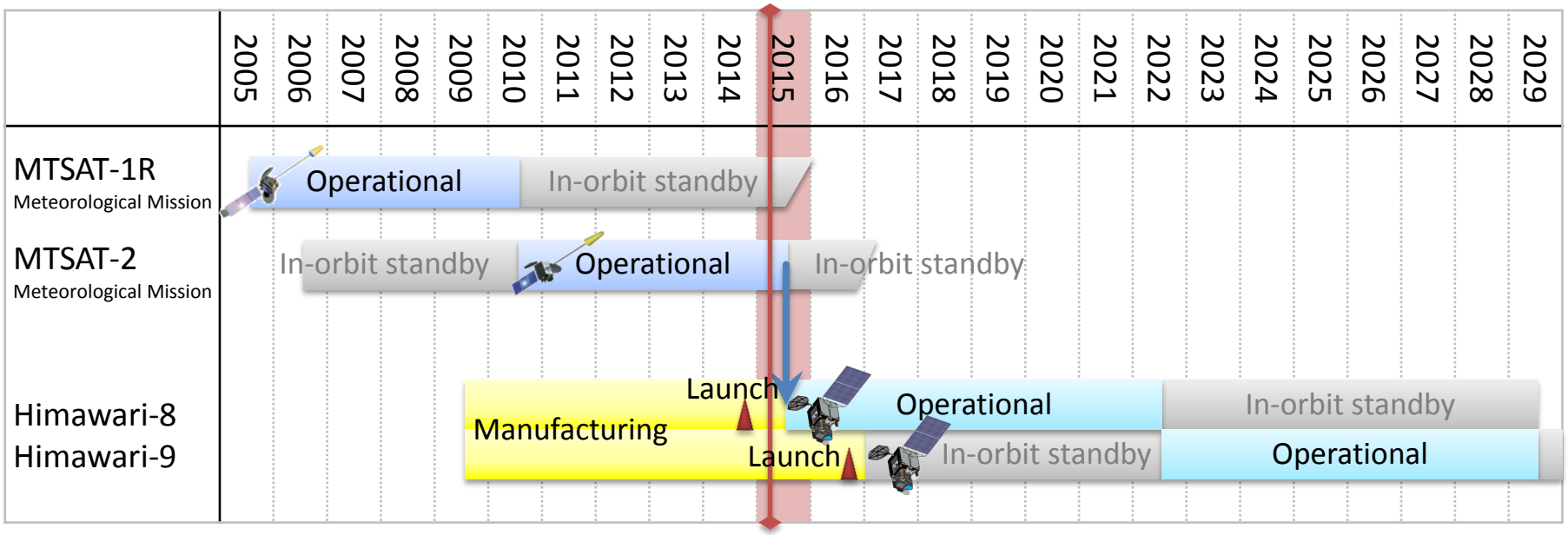


Coordination Group for Meteorological Satellites

New **tidal/tsunami stations** using MTSAT-DCS

CGMS

FUTURE GEO SATELLITES



- **Himawari-8** was successfully launched on 7 October 2014.
- Currently, **Himawari-8** is in the in-orbit commissioning phase.
- JMA plans to start its operation in **July 2015** as a replacement for **MTSAT-2**.
- **Himawari-8** will observe the **East Asia and Western Pacific regions** for a period of **15 years** with **Himawari-9**.

Dawn of a “New Era”

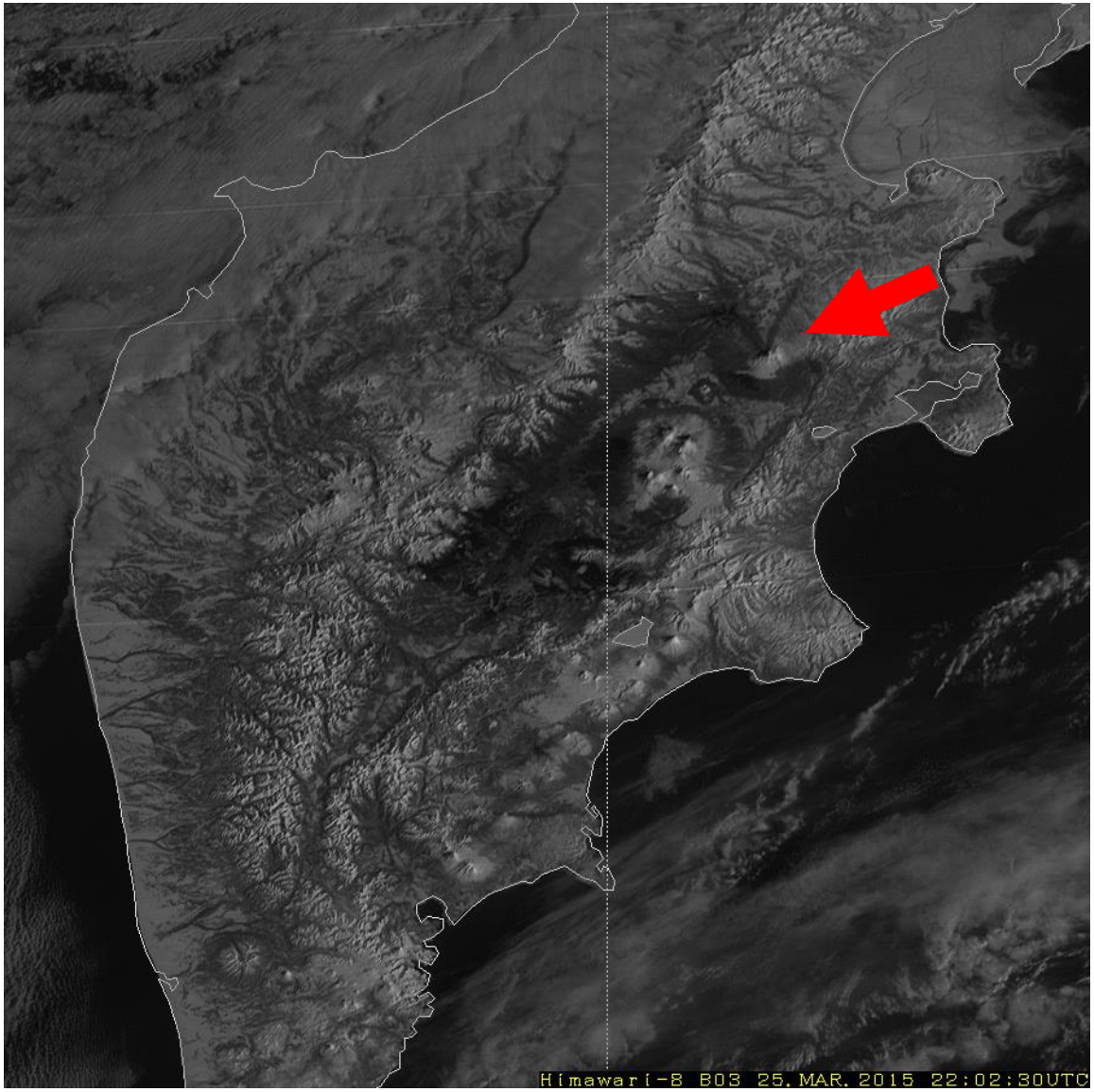
MTSAT-2

Every 60 minutes in Monochrome

Himawari-8

Every 10 minutes in Full-Color

Captured the Moment of Volcano Eruption



Target Area Observation

Mt. Shiveluch in Kamchatka

Band-03 (0.64 µm, visible)
Every 2.5 minutes

Data distribution/dissemination methods

Two Ways of Himawari-8/9 Imagery Dissemination/Distribution

HimawariCast via Communication Satellite

- Service for **Everyone**
- **JMA's Baseline** for Imagery Dissemination
- **14 bands** (1 VIS and 13 IR) every **10 minutes** for Full Disk
- Coarse Spatial Resolution as of MTSAT **HRIT compatible**
- **No Pass Code** for Receiving

HimawariCloud via Internet Cloud

- Service for **NMHSs** with high-speed Internet access
- **Full Specification** (temporal and spatial) of Imagery
- All **16 bands** (3 VIS and 13 IR)

Data distribution/dissemination methods

Himawari-8/9

Communication Satellite (CS)

raw data

HimawariCast service

HRIT files, SATAID files

CS Operator

All imagery (full data)

JMA

HimawariCloud service

NMHSs

Users

C-band antenna

LNB

DVB-S2 receiver

PC & software

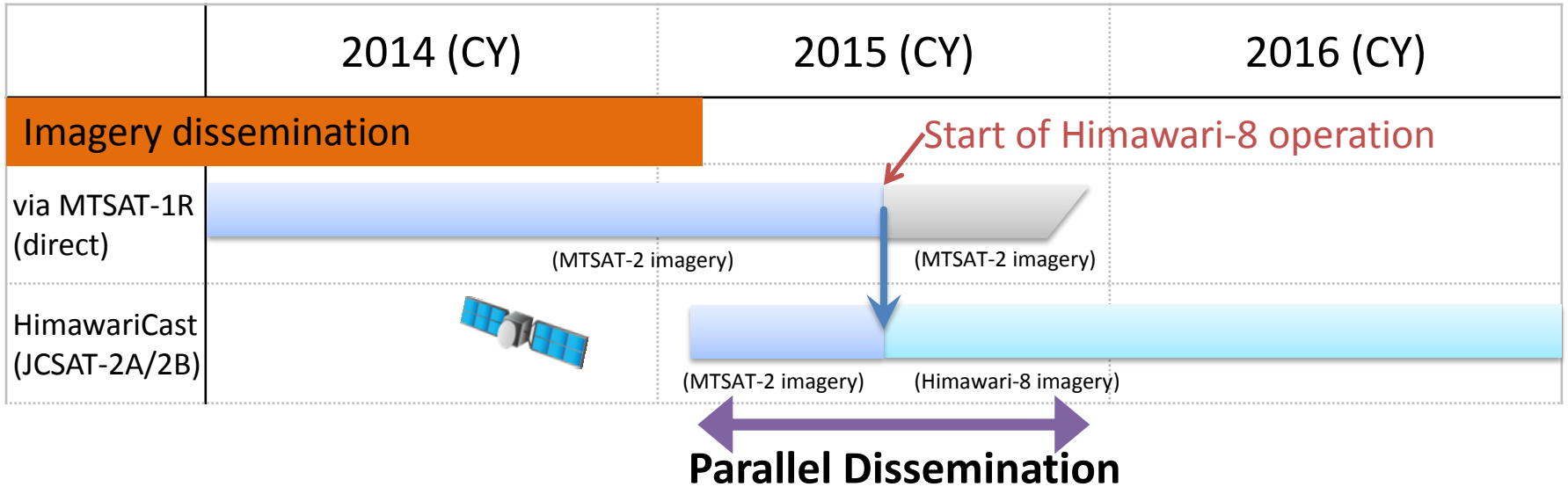
HimawariCast service

- **HimawariCast service** started disseminating **MTSAT-2 imagery** in **January 2015**.
- **Himawari-8 imagery** will be disseminated after **Himawari-8** becomes operational in **July 2015**.

- As far as JMA knows, **23 NMHSs** plan to receive **HimawariCast** data.

Data type	Format	Notes
Himawari imagery (full disk)	**HRIT files** **LRIT files** • **Compatible with the MTSAT HRIT/LRIT services**	- **Interval: 10 minutes** - **HRIT: 14 bands (VIS: 1 km, IR: 4 km)** - **LRIT: 4 bands (VIS, IR1, IR3, IR4: 5 km)**
• NWP products • In-situ observations • ASCAT ocean surface wind	SATAID format	- Superimposed onto satellite imagery by SATAID software

HimawariCast service



- Direct dissemination of **MTSAT-2 imagery** via MTSAT-1R will be continued until around **November 2015** for users' transitions.

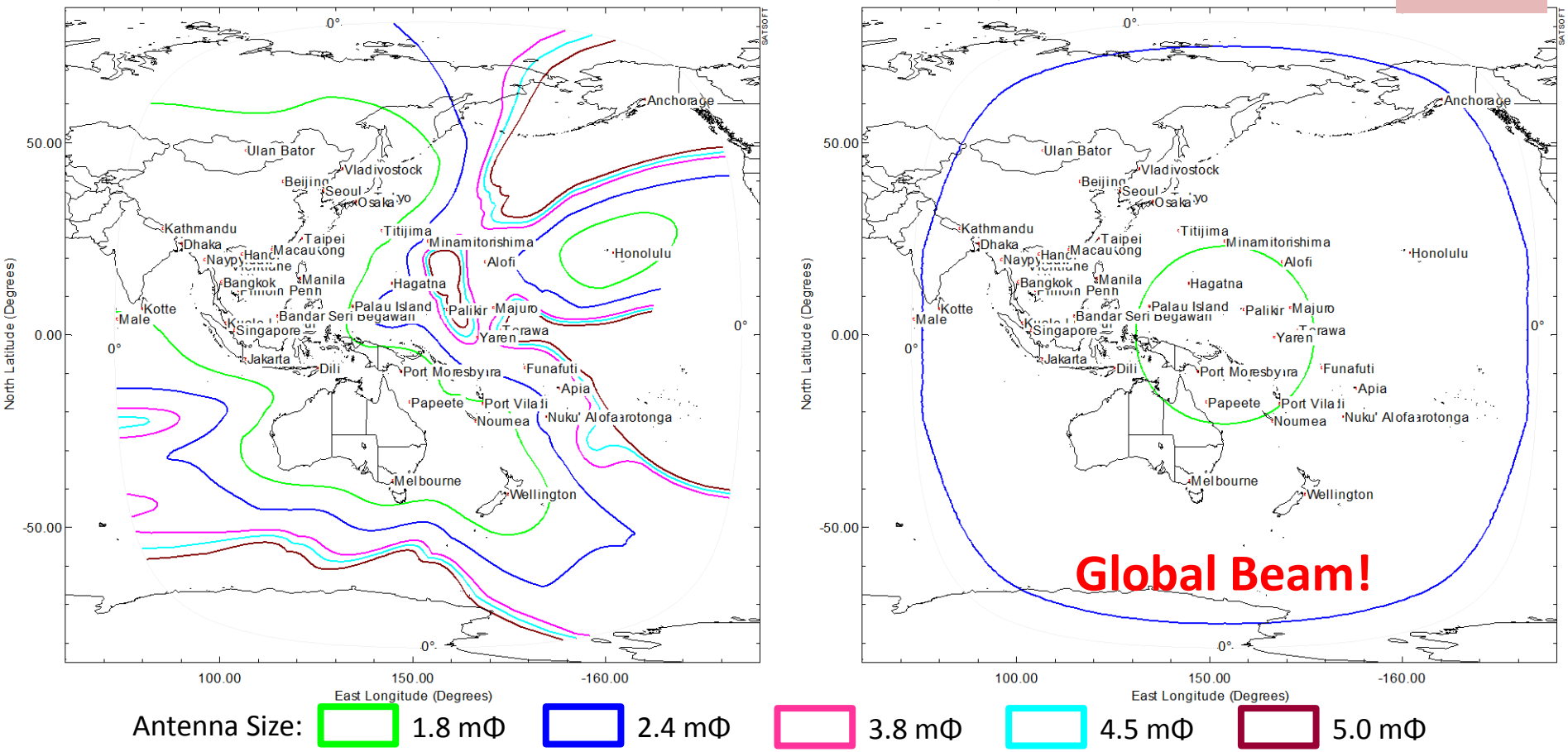
Coordination Group for Meteorological Satellites

CGMS

HimawariCast service

- Communication satellite: **JCSAT-2A** (154 degrees East)
  followed by **JCSAT-2B** in Q4 of 2015

JCSAT-2A → **JCSAT-2B** Tentative



Antenna Size: 1.8 mΦ 2.4 mΦ 3.8 mΦ 4.5 mΦ 5.0 mΦ

HimawariCloud service

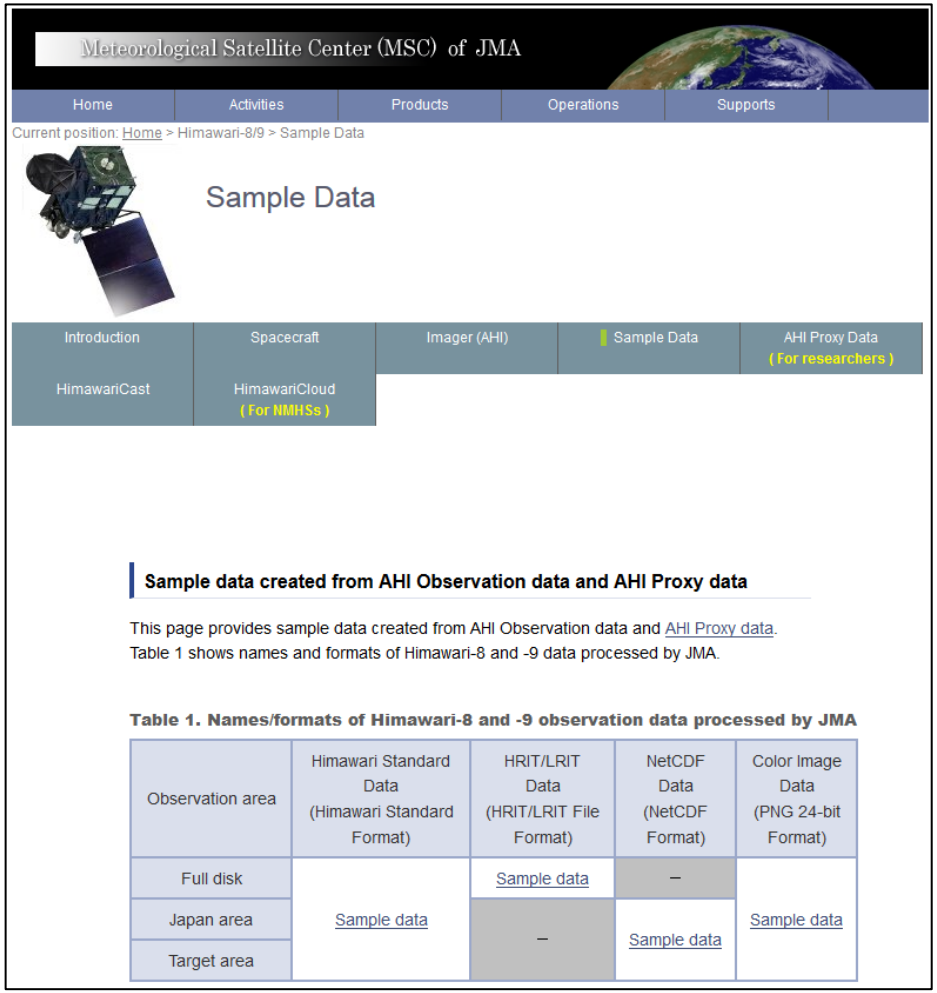
- **HimawariCloud service** started distributing Himawari-8 in-orbit-test imagery in **April 2015**.
- Full-disk imagery is available **within 8 minutes** on the **HimawariCloud** server.
- Upon receiving application forms, JMA is providing **HimawariCloud** accounts for NMHSs in the East Asia and Western Pacific regions.

Observation type	Format	Notes
Full disk (10-minute intervals)	• **Himawari Standard Data (HSD)** • PNG	- **HSD: 16 bands (full resolution)** - PNG: True-color composite (1 km)
Target area (2.5-minute intervals)	• HSD • NetCDF • PNG	- HSD: 16 bands (full resolution) - NetCDF: 16 bands (latitude/longitude grid) - PNG: True-color composite (1 km)

Support for User Readiness: Webpage

Contents:

- Overview of satellite observation
- Overview of data dissemination
- Imager (AHI) specifications
- Sample data
  - Himawari Standard Data (HSD)
  - HRIT/LRIT files
  - NetCDF
  - PNG
- Sample source code to read HSD and convert into other formats

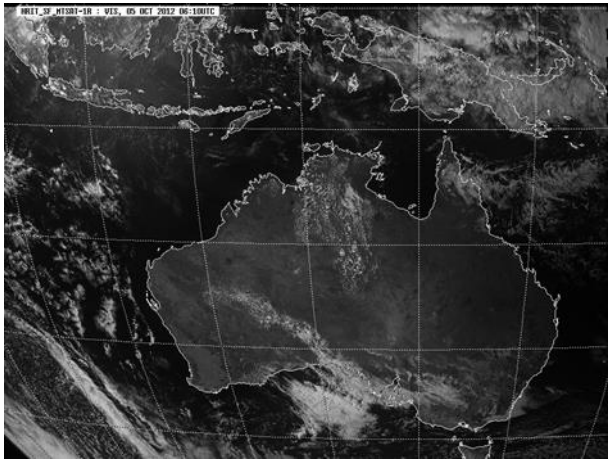


See **http://www.data.jma.go.jp/mscweb/en/himawari89/**

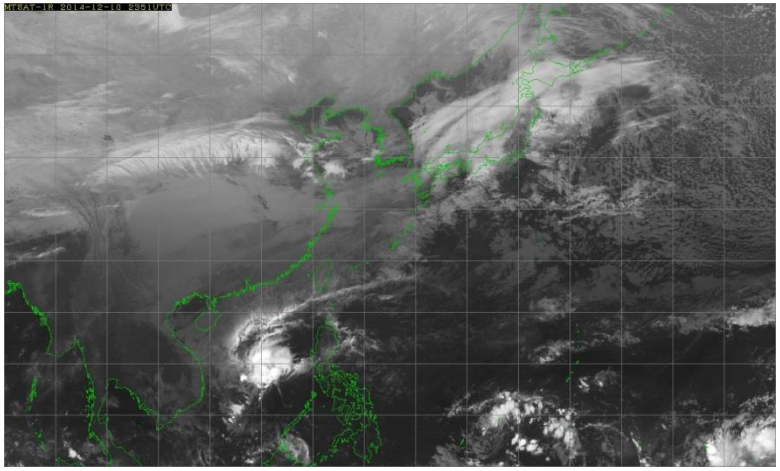
Support for User Readiness: Special Observations

Special Observations by the backup satellite, MTSAT-1R

as part of preparations for Himawari-8 high-frequency observation



Period: January – March 2014
Interval: **10 minutes**
Area: around Australia

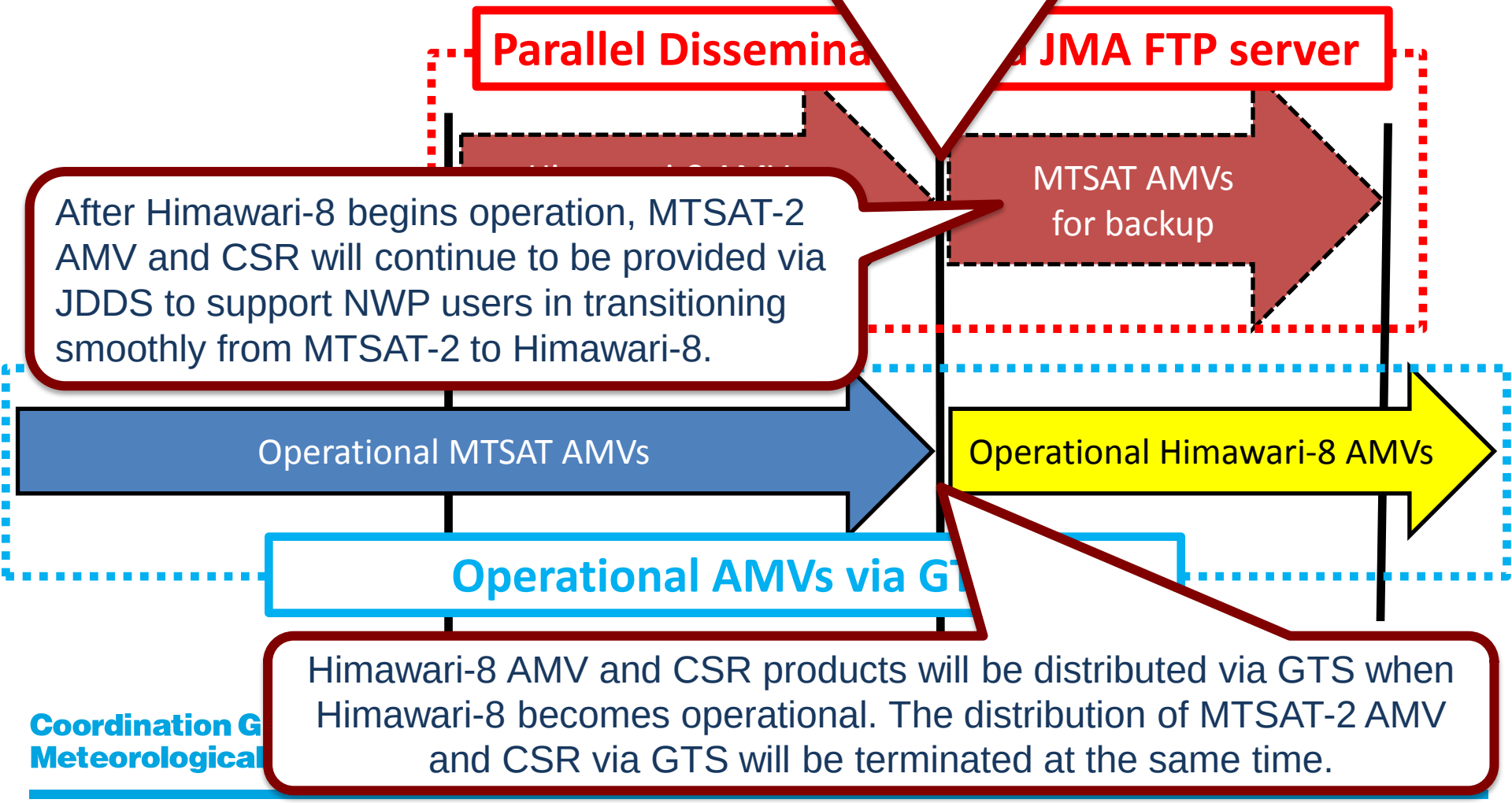


Period: October 2014
Interval: **10 minutes**
Area: East Asia

S… …and CSR

- …ed **in parallel** for **smooth user transition**.

JMA plans to distribute Himawari-8 AMV and CSR via JDDS (the JMA Data Dissemination System) from May to July 2015 so that NWP users can evaluate the products in advance.



After Himawari-8 begins operation, MTSAT-2 AMV and CSR will continue to be provided via JDDS to support NWP users in transitioning smoothly from MTSAT-2 to Himawari-8.

Himawari-8 AMV and CSR products will be distributed via GTS when Himawari-8 becomes operational. The distribution of MTSAT-2 AMV and CSR via GTS will be terminated at the same time.

Support for User Readiness: User Training

- The Australian **Bureau of Meteorology** runs the **National Himawari-8 Training Campaign** as a **VLab** activity. JMA appreciates the Bureau's efforts and contributes to the campaign by providing test data.

- In conjunction with **AOMSUC-6** to be held in November 2015 in Tokyo, JMA plans to hold a **two-day training course** for NMHSs.

Coordination Group for Meteorological Satellites