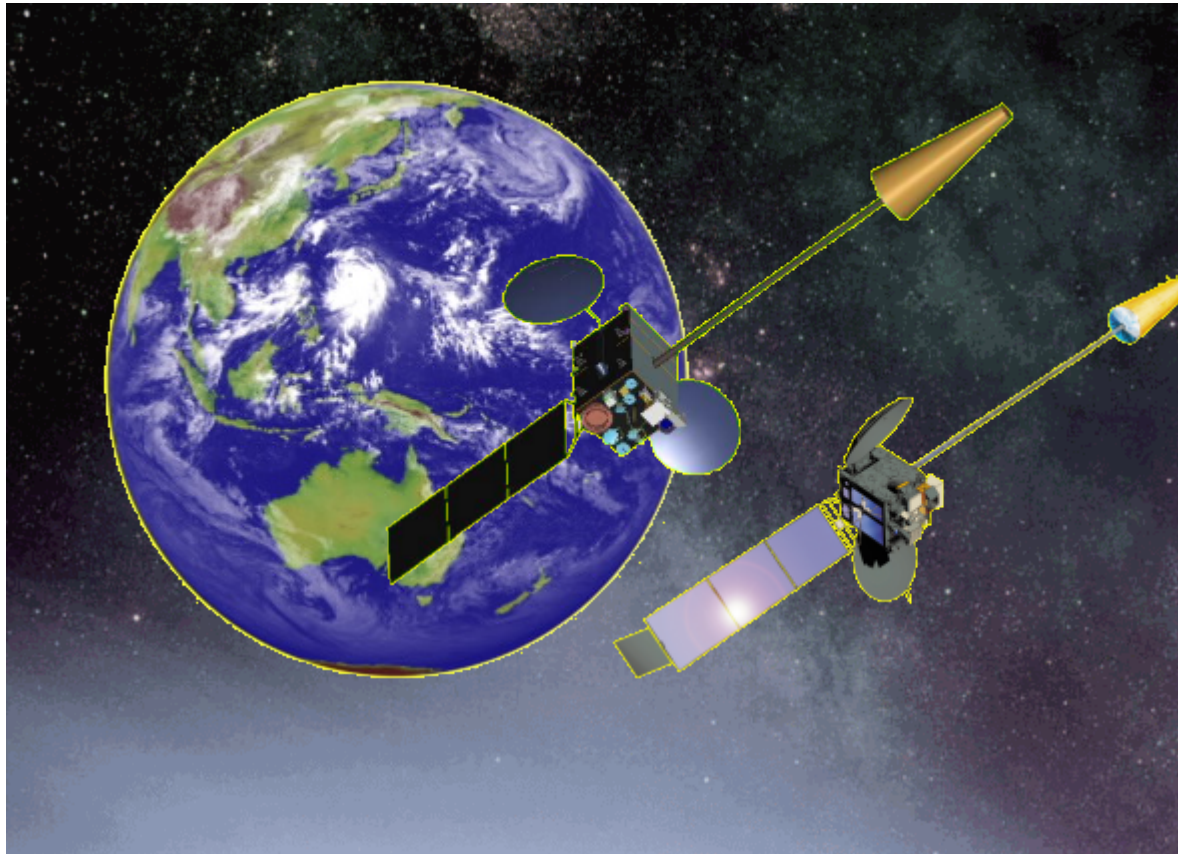




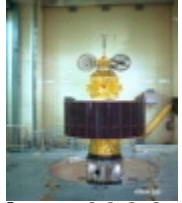

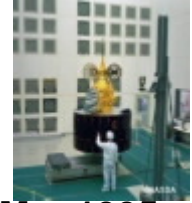
# Status Report on the Current and Future Satellite Systems of Japan Meteorological Agency



## Overview - Planning of Japanese GEO satellite systems

### History of "Himawari"

#### GMS (Geostational Meteorological Satellite)

<b>GMS</b> (Himawari)	<b>GMS-2</b> (Himawari-2)	<b>GMS-3</b> (Himawari-3)	<b>GMS-4</b> (Himawari-4)	<b>GMS-5</b> (Himawari-5)
				
Jul 1977	Aug 1981	Aug 1984	Sep 1989	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** **MTSAT-2**  
(Himawari-6) (Himawari-7)



Feb 2005 Feb 2006

**Himawari-8** **Himawari-9**  
**Himawari**

2014 2016



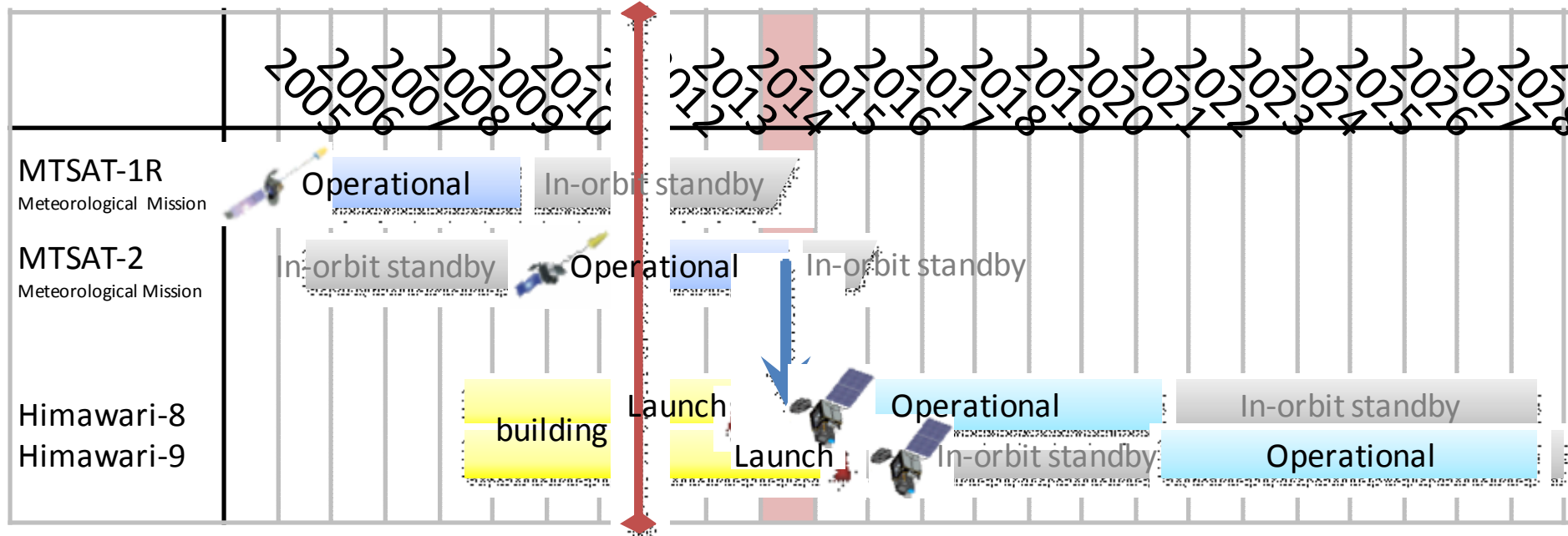
Satellite	Observation period
GMS	1978 – 1981
GMS-2	1981 – 1984
GMS-3	1984 – 1989
GMS-4	1989 – 1995
GMS-5	1995 – 2003
GOES-9	2003 – 2005
MTSAT-1R	2005 – 2010
MTSAT-2	2010 – 2015
Himawari-8	2015 – 2022
Himawari-9	2022 – 2029

**Coordination Group for Meteorological Satellites**



FUTURE GEO SATELLITES

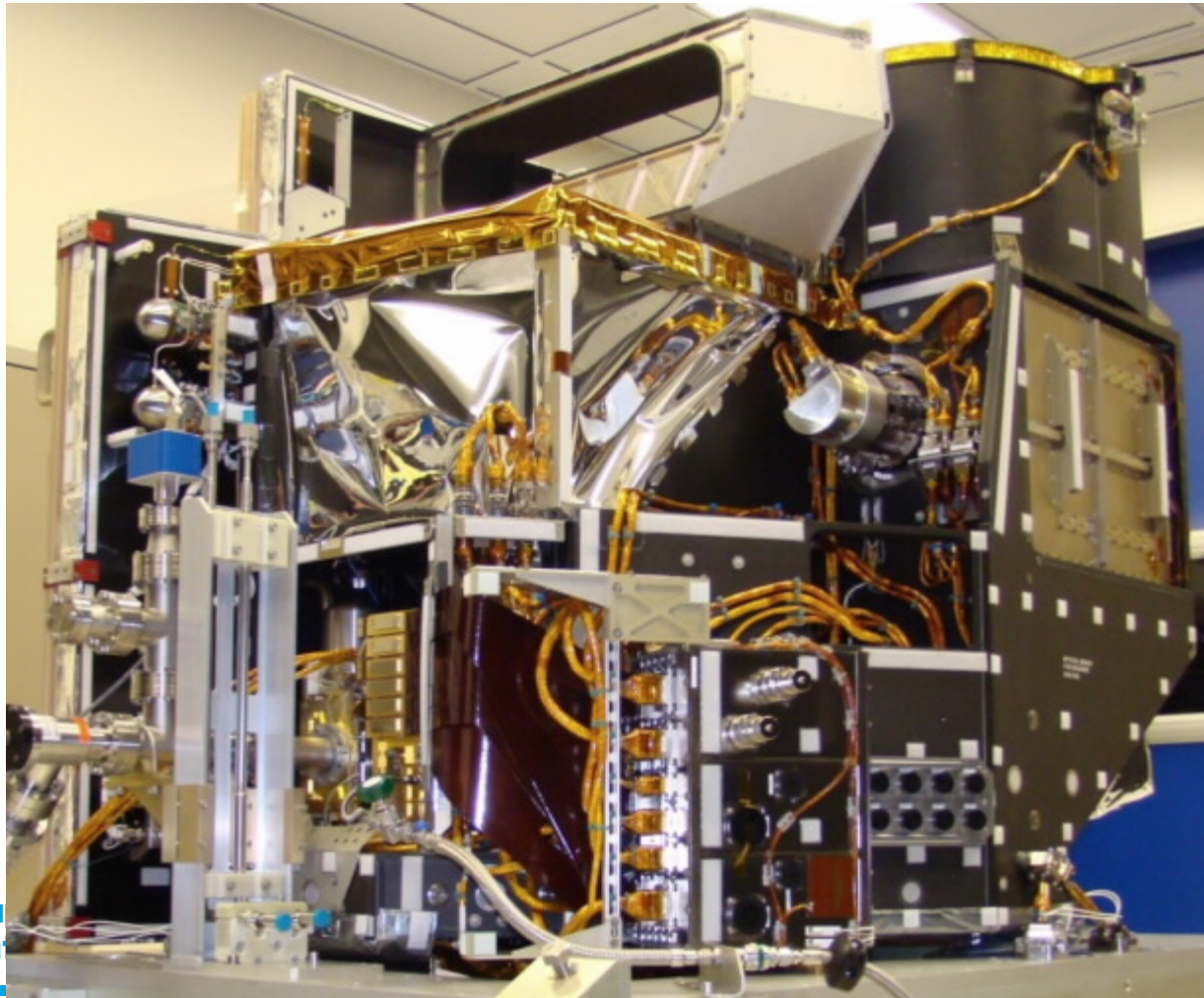
# Himawari-8/9 Schedule



- JMA plans to launch **Himawari-8** in **2014** and begin its operation in **2015**
- The launch of **Himawari-9** for in-orbit standby is also scheduled in **2016**
- **Himawari-8/9** will be in operation around **140 degrees East** covering the East Asia and the Western Pacific for 15 years

## FUTURE GEO SATELLITES

### Advanced Himawari Imager (AHI) instruments on the Himawari-8 is under manufacturing by ITT Exellis



## FUTURE GEO SATELLITES

# Specification of "Himawari-8/9" Imager (AHI)

as of HIMAWARI-8/9

Band	Central Wavelength [μm]	Spatial Resolution
X 1	0.43 - 0.48	1km
X 2	0.50 - 0.52	1km
X 3	0.63 - 0.66	0.5km
X 4	0.85 - 0.87	1km
X 5	1.60 - 1.62	2km
X 6	2.25 - 2.27	2km
X 7	3.74 - 3.96	2km
X 8	6.06 - 6.43	2km
X 9	6.89 - 7.01	2km
X 10	7.26 - 7.43	2km
X 11	8.44 - 8.76	2km
X 12	9.54 - 9.72	2km
X 13	10.3 - 10.6	2km
X 14	11.1- 11.3	2km
X 15	12.2 - 12.5	2km
X 16	13.2 - 13.4	2km

RGB

Composited True Color Image

1.3 μm for GOES-R

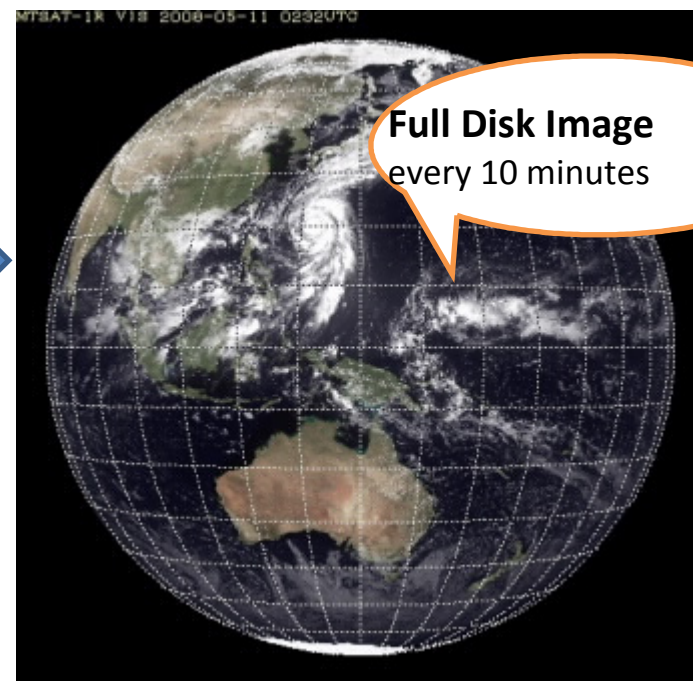
Water Vapour

SO<sub>2</sub>

O<sub>3</sub>

Atmospheric Windows

CO<sub>2</sub>



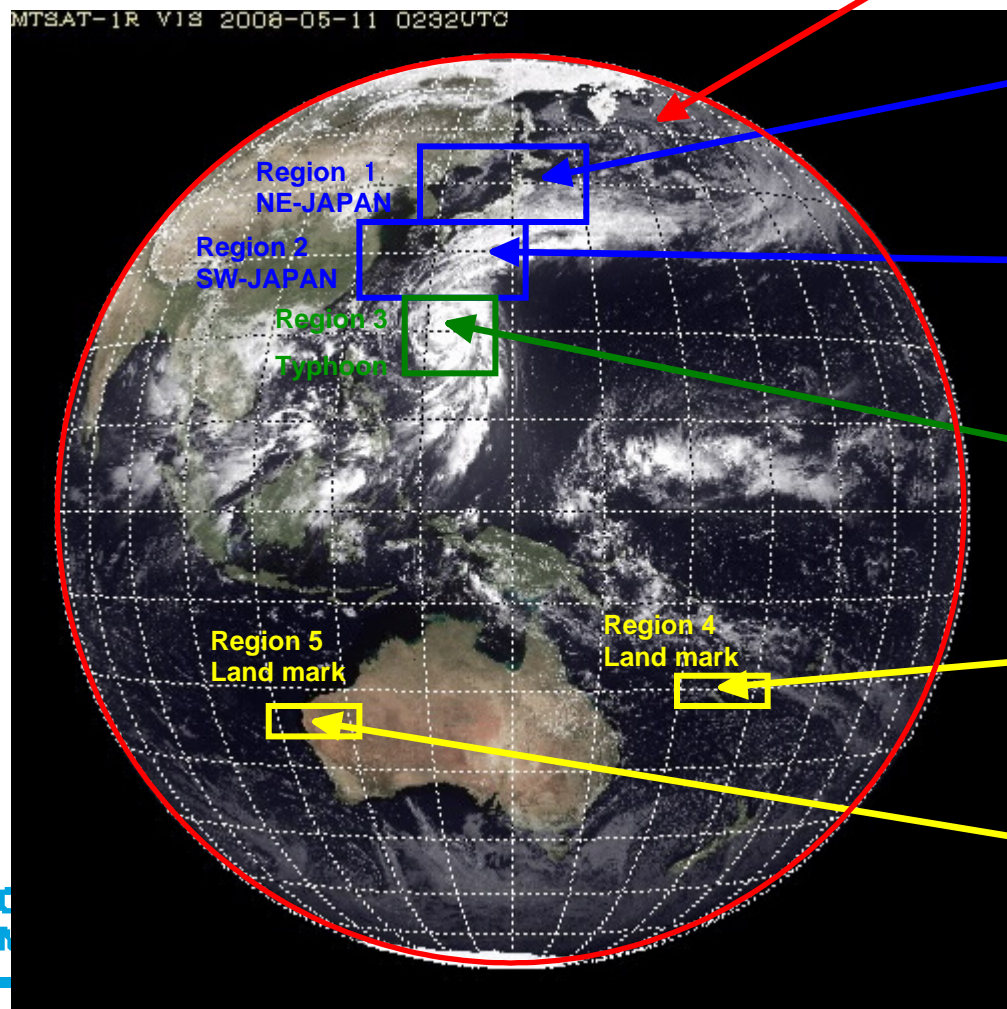
Band	Central Wavelength [μm]	Spatial Resolution
1	0.55 - 0.90	1km
2	3.50 - 4.00	4km
3	6.50- 7.00	4km
4	10.3 - 11.3	4km
5	11.5 - 12.5	4km

as of MTSAT-1R/2

X: ABI

### AHI Sectored Observations in 10 minutes

MTSAT-1R VIS 2008-05-11 0232UTC



#### Full disk

Interval : **10 minutes** (6 times per hour)  
23 swath

#### Region 1 JAPAN (North-East)

Interval : **2.5 minutes** (4 times in 10minutes)  
Dimension : EW x NS: 2000 x 1000 km  
2 swath

#### Region 2 JAPAN (South-West)

Interval : **2.5 minutes** (4 times in 10minutes)  
Dimension : EW x NS: 2000 x 1000 km  
2 swath

#### Region 3 Typhoon

Interval : **2.5 minutes** (4 times in 10minutes)  
Dimension : EW x NS: 1000 x 1000 km  
2 swath

#### Region 4 Land mark

Interval : **0.5 minutes** (20 times in 10minutes)  
Dimension : EW x NS: 1000 x 500 km  
1 swath

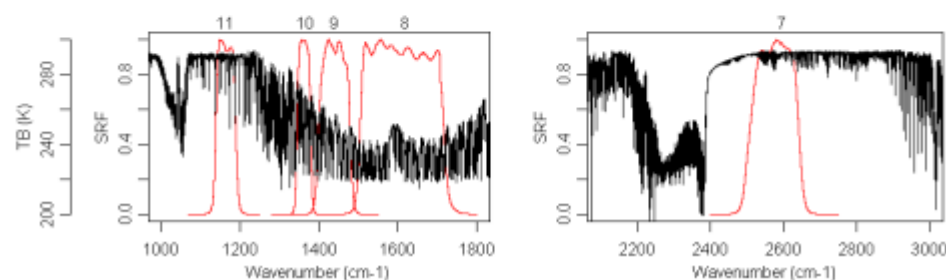
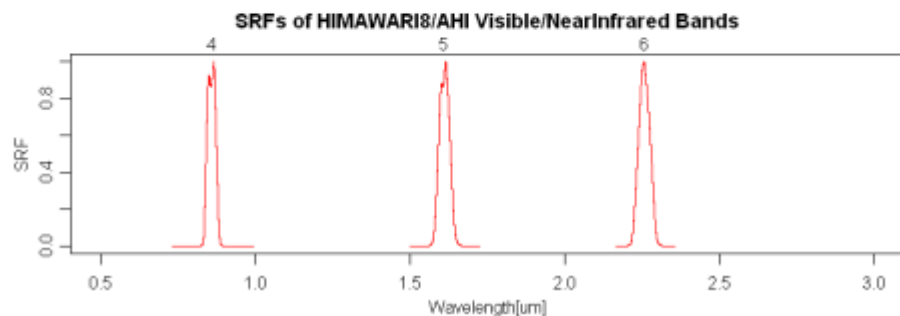
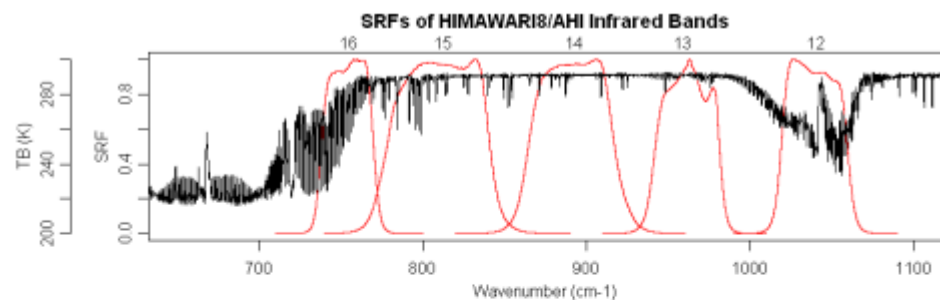
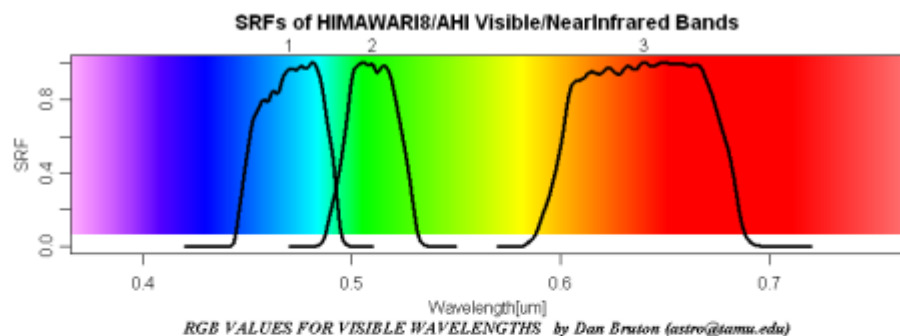
#### Region 5 Land mark

Interval : **0.5 minutes** (20 times in 10minutes)  
Dimension : EW x NS: 1000 x 500 km  
1 swath

### Estimated SRFs (Spectral Response Functions) of AHI is available in JMA/MSM Web Page

(VIS, NIR)

(IR)



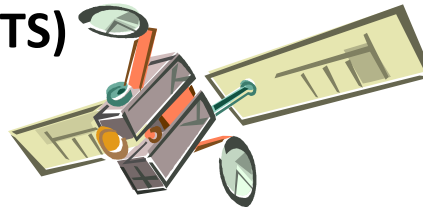
[https://mscweb.kishou.go.jp/himawari89/space\\_segment/spsg\\_ahi.html](https://mscweb.kishou.go.jp/himawari89/space_segment/spsg_ahi.html)



# Disseminating Plan of Himawari-8/9 data (Draft)

Himawari-8/9

Commercial Telecommunication Satellite (CTS)



- Disaster areas where landlines are down
- Countries where landlines are not well-developed

Data

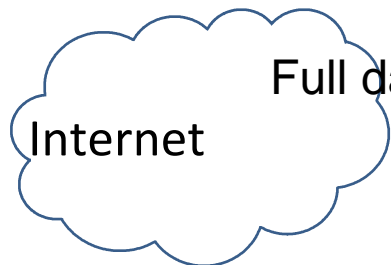


JMA



CTS Operator

C-band (3 GHz)  
HRIT/LRIT compatible  
data



Internet

Full data

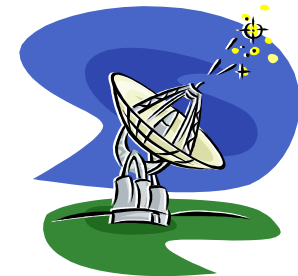
Users with developed  
Internet environment

jpeg imagery

Users with limited  
Internet connection



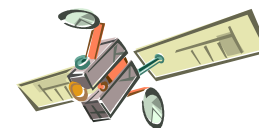
USERS



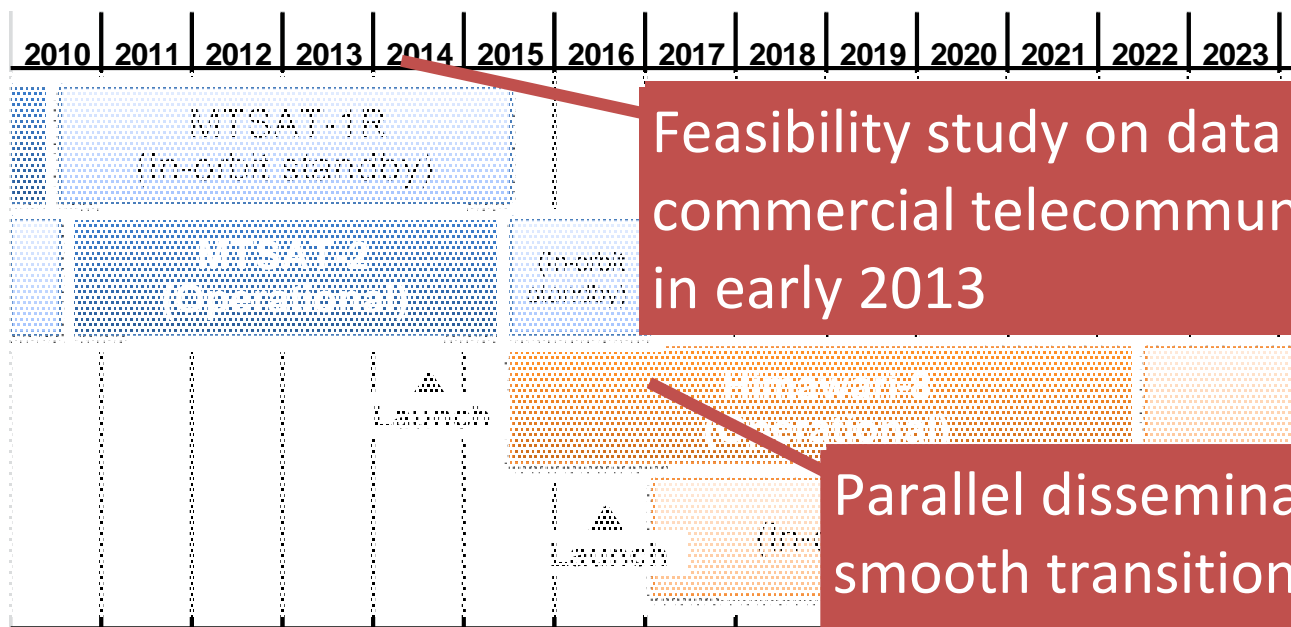
## FUTURE GEO SATELLITES

# Himawari-8/9 Imagery Data Dissemination via Commercial Telecommunication Satellites

## Feasibility Study has just started in JMA



# No budget commitment at present



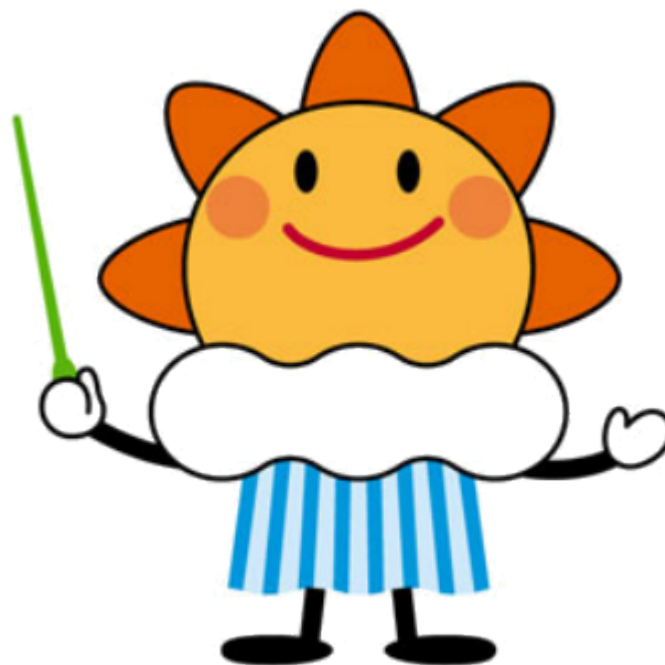
Feasibility study on data dissemination via commercial telecommunication satellites in early 2013

Parallel dissemination for users' smooth transition from MTSAT to Himawari

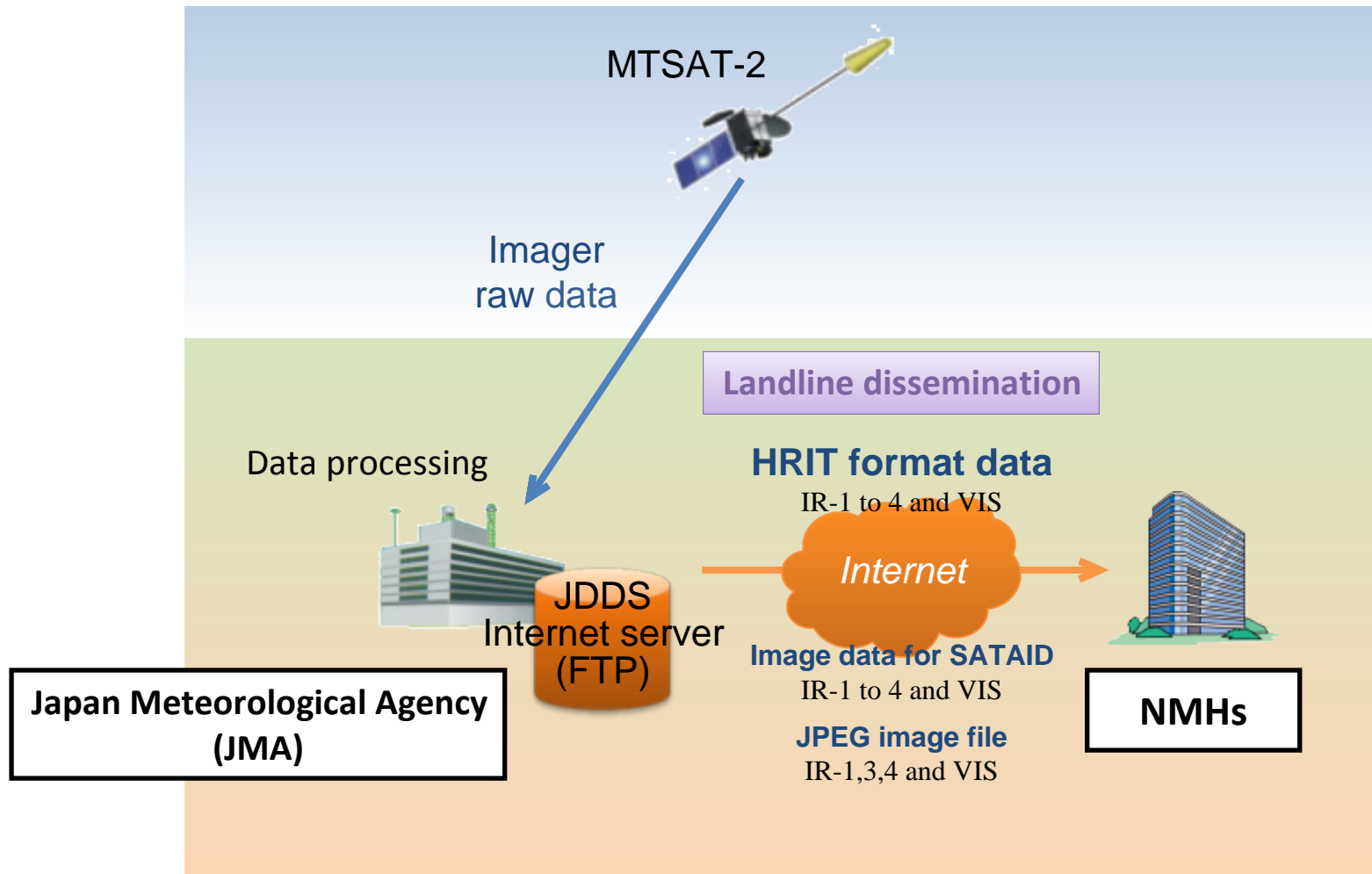
## Data formats of imagery of the Himawari-8/9 (

Observation	Format	Dissemination	Remark
Full disc observation	name: TBD	- Internet	<ul style="list-style-type: none"> <li>- Name is to be determined</li> <li>- Based on HRIT</li> <li>- Header extended to contain more meta data</li> <li>- All channels</li> <li>- Full spatial resolutions</li> </ul>
	HRIT file (LRIT file)	<ul style="list-style-type: none"> <li>- Internet</li> <li>- Communication Satellite</li> </ul>	<ul style="list-style-type: none"> <li>- The same format as MTSAT H/LRIT to support current MTSAT users</li> <li>- 5 channels correspond to MTSAT</li> <li>- 4 km for IR, 1 km for Vis</li> <li>- 10 segments for full disk image</li> </ul>
Regional observation	name:TBD NetCDF	- Internet	<ul style="list-style-type: none"> <li>- All channels</li> <li>- Full spatial resolutions for HSF</li> <li>- Latitude/longitude square grids for NetCDF</li> </ul>

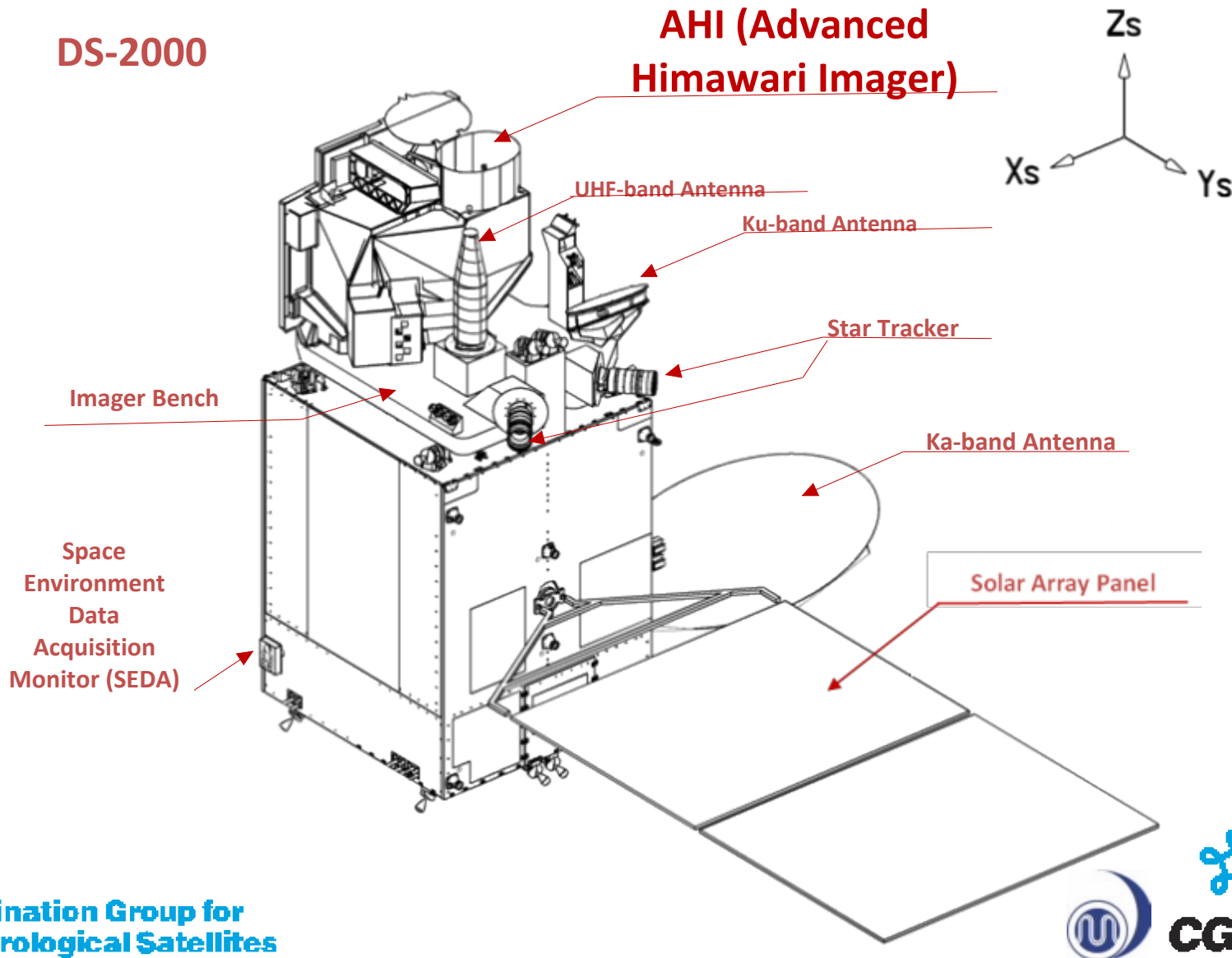
Thank You.



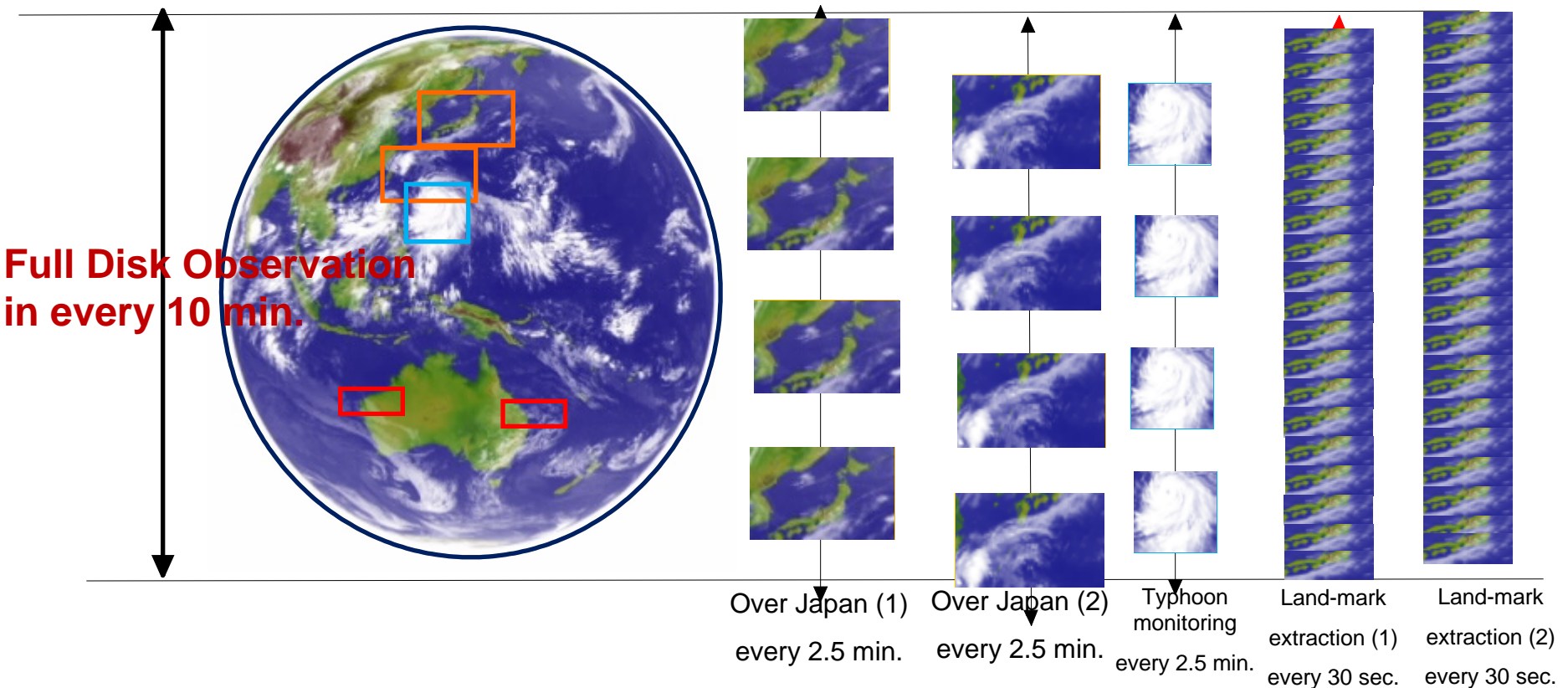
# Landline dissemination service via Internet (JDDS: JMA Data Dissemination System)



# Appearance of Himawari-8/9



# A Sequence of Himawari-8/9 AHI Observation in 10 minutes Time Frame



**A combination of one “Full Disk” and “small sectored” Imagery in 10 minutes**