Himawari-8 Data Distribution/Dissemination

Satellite Program Division
Japan Meteorological Agency

JMA Workshop on WIS Implementation, 20 November 2014

Himawari-8: JMA's Next-Generation Satellite

- Himawari-8 was successfully launched on 7 October 2014.
- JMA plans to start its operation in mid-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.

Himawari-8: Enhanced Performance

	MTSAT-1R/2	Himawari-8
Number of bands	5	16
Interval	30/60 min.	10 min.
Resolution	VIS: 1 km IR: 4 km	VIS: 0.5 km IR: 2 km
Data size	→	50 times!!

B/W TV

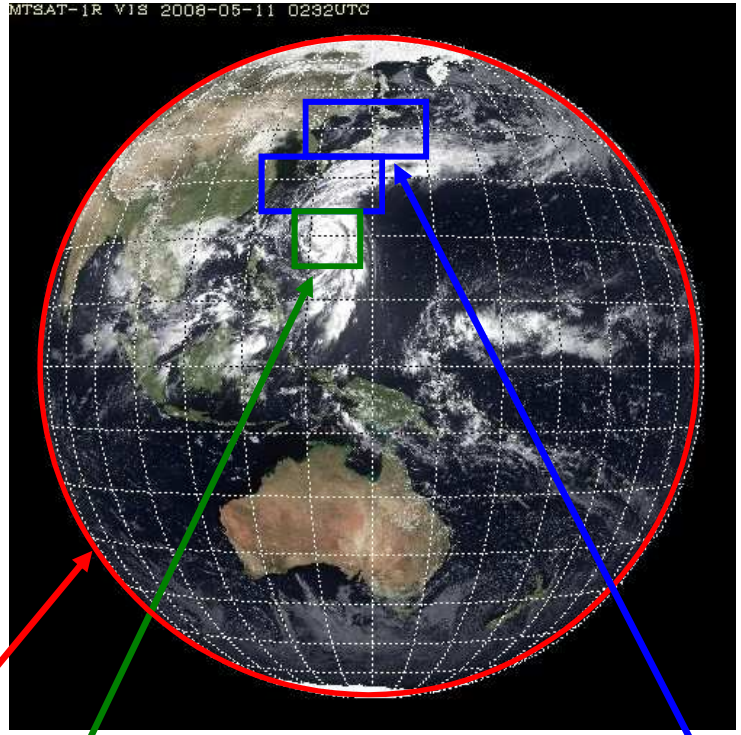
HD TV

Himawari-8: Specification of Observation

Bands of Himawari-8/9

Band	Wavelength [μm]	Spatial Resolution	
1	0.47	1 km	RGB Composited True Color Image
2	0.51	1 km	
3	0.64	0.5 km	
4	0.86	1 km	
5	1.6	2 km	
6	2.3	2 km	
7	3.9	2 km	
8	6.2	2 km	Water Vapor
9	6.9	2 km	
10	7.3	2 km	
11	8.6	2 km	SO_2
12	9.6	2 km	O_3
13	10.4	2 km	Atmospheric Windows
14	11.2	2 km	
15	12.4	2 km	
16	13.3	2 km	CO_2

Number of Bands: 5 → 16



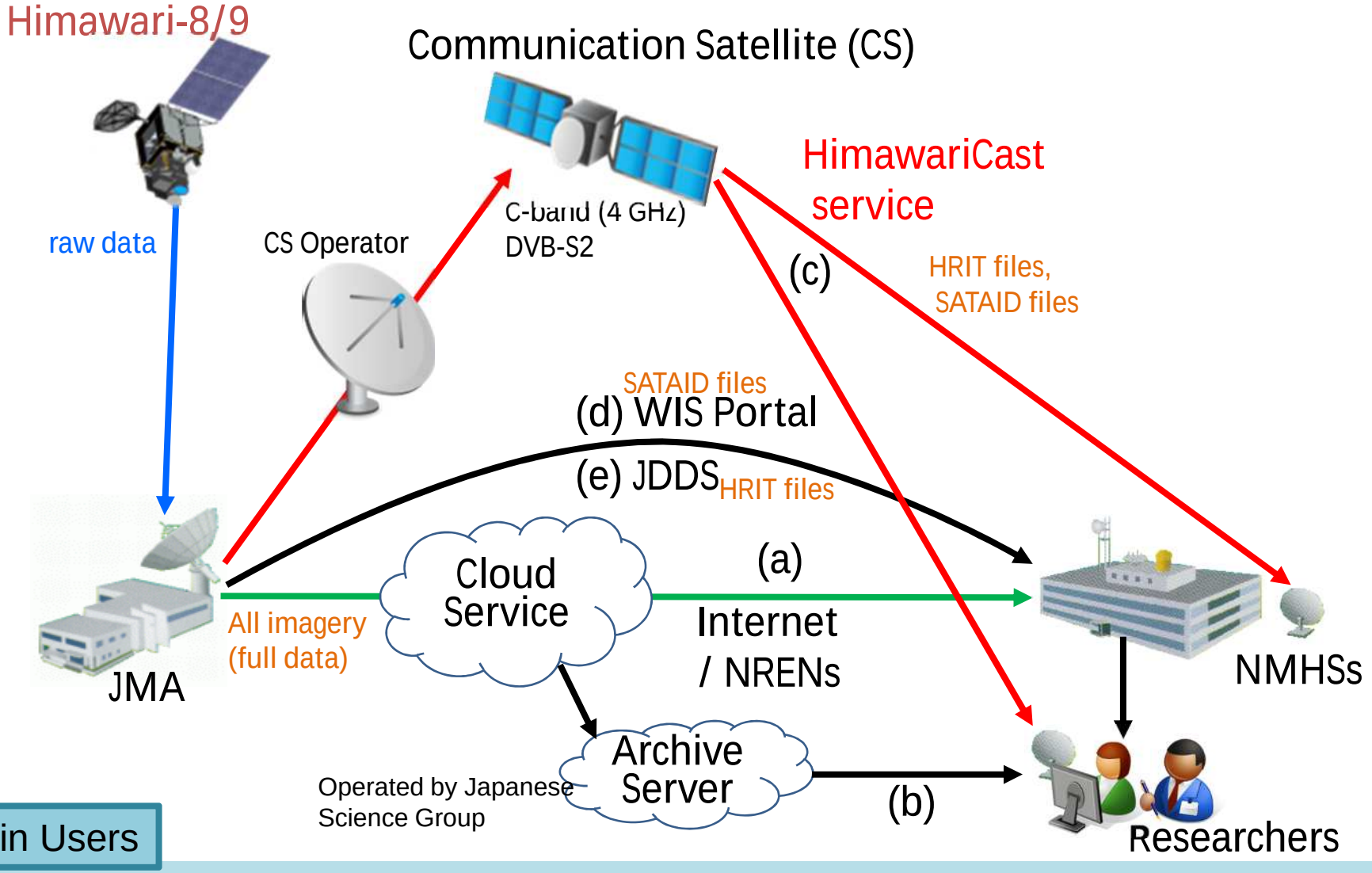
Full disk
Interval: 10 minutes (6 times per hour)

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

Target Area
Interval: 2.5 minutes (4 times in 10 minutes)
Dimension: EW x NS: 1000 x 1000 km

Interval: 30/60 min. → 10 min.

Himawari-8: Data Distribution/Dissemination



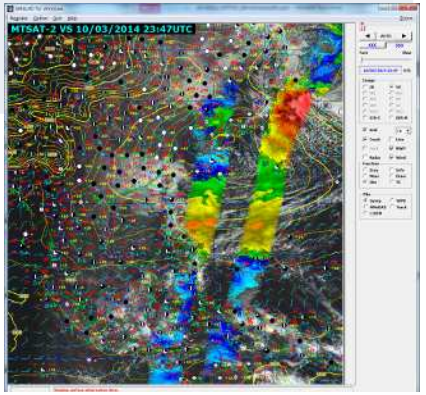
Main Users

(a) Cloud Service: NMHSs (1 agency / nation)
(b) Archive Server: Universities and Researchers
(c) HimawariCast: Every users
(d) WIS Portal and (e) JDDS: NMHSs

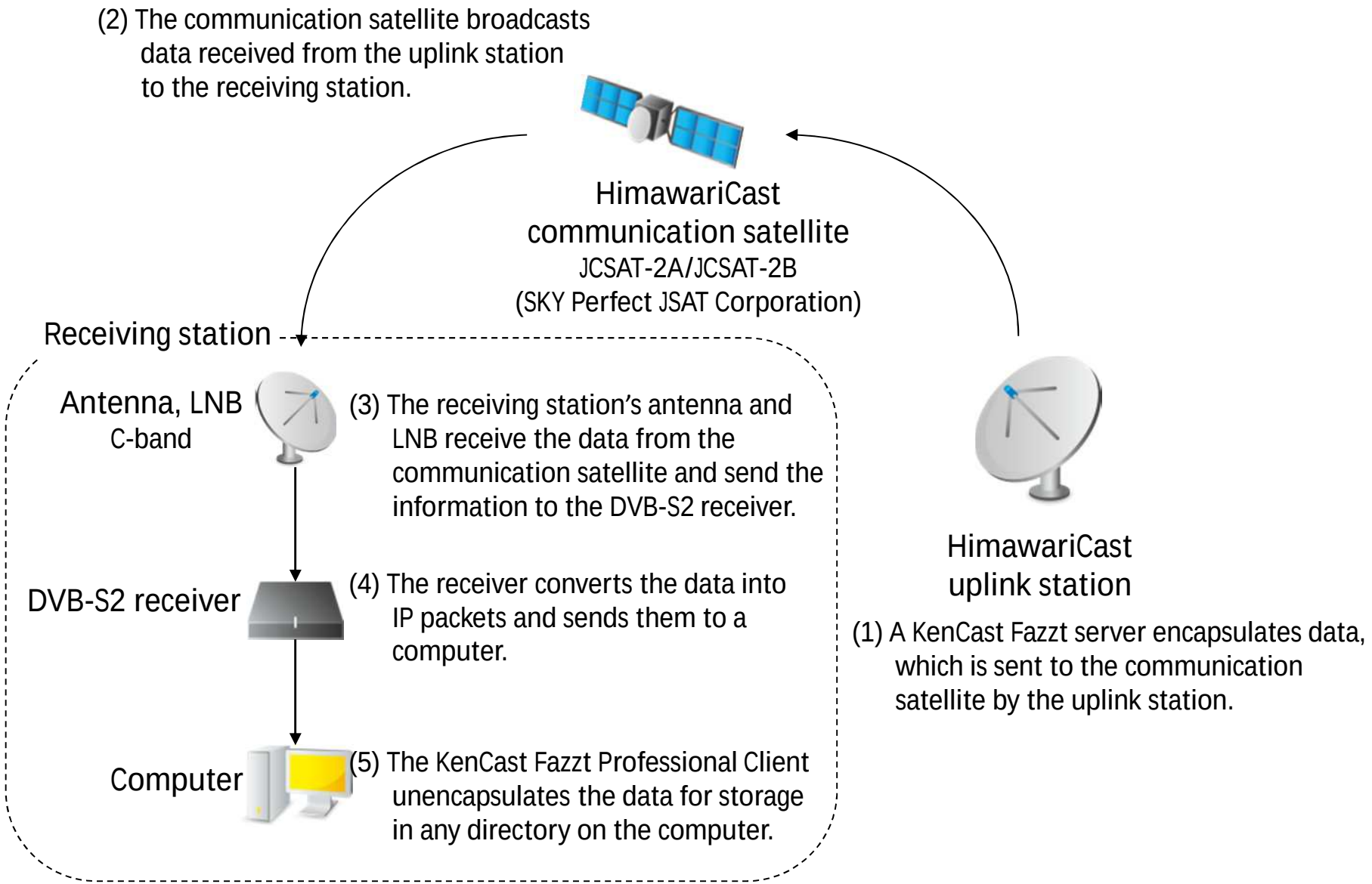
HimawariCast Service: Dataset

Data type	Format	Notes
Himawari imagery (full disk)	HRIT files LRIT files • Divided into 10 segments and compressed using bzip2 • Compatible with the MTSAT HRIT/LRIT services	- Interval: 10 minutes MTSAT-2 observation schedule followed while MTSAT-2 is in operation - HRIT: 5 bands (VIS: 1 km, IR1-4: 4 km) - LRIT: 4 bands (VIS, IR1, IR3, IR4: 5 km) - Approx. 40 GB / day for storage
NWP products (GPV)	SATAID format • Compressed using bzip2	- JMA Global Spectral Model (GSM) products (48-hour forecast, 1.25-degrees resolution) - Interval: 6 hours - Approx. 40 MB / day for storage
In-situ observations (SYNOP, TEMP, SHIP)	SATAID format • Archived using tar and compressed using bzip2	- Observational data for East Asia and Western Pacific regions - Interval: 30 minutes - Approx. 5 MB / day for storage
ASCAT ocean surface wind (EUMETSAT)		- Observational data from EUMETSAT's Metop polar-orbiting satellites - Interval: 30 minutes - Approx. 10 MB / day for storage

- Data in SATAID format will be disseminated for NMHSs using SATAID application.
- With SATAID application, you can overlay GPV, SYNOP, etc. on satellite imagery.



HimawariCast Service: System Structure



HimawariCast Service: Satellites and Configuration

- Communication satellite: JCSAT-2A (154 degrees East)

  followed by JCSAT-2B in Q4 of 2015

  Parallel dissemination of both satellites (approx. 1 week) is planned.

Antenna:

- Diameter: 2.4 m (19.6 dB/K)

  For details, see http://www.data.jma.go.jp/mscweb/en/himawari89/himawari_cast/himawari_cast.html

Receiver, Low Noise Block Converter (LNB):

- Type: DVB-S2
- Modulation: QPSK
- FEC: 3/5
- Roll-off factor: 0.2
- Symbol rate: 2,586.148 ksps
- Frequency: 4,148.000 MHz (C-band)

  Same frequency will be used by JCSAT-2A and 2B.
- Polarization: Linear (JCSAT-2A: Vertical, JCSAT-2B: Horizontal)

  JCSAT-2A users need to shift the polarization angles of their LNBs by 90 degrees in order to receive JCSAT-2B.

Computer:

- Datacasting client software: KenCast Fazzt Professional Client

  http://www.kencast.com/

Internet Cloud Service: Dataset

Format	Observation Area	Notes
Himawari Standard Data (HSD) • Divided into 10 segments	Full disk Target area	- Interval: 10 min. (full disk); 2.5 min. (target area) MTSAT-2 observation schedule followed while MTSAT-2 is in operation - 16 bands (VIS: 0.5-1 km, NIR: 1-2 km, IR: 2 km) - Approx. 188 GB / day for transmission
PNG	Full disk Target area	- True-color images (composites of 3 visible bands) - Interval: 10 min. (full disk); 2.5 min. (target area) MTSAT-2 observation schedule followed while MTSAT-2 is in operation - Spatial resolution: 1 km - Approx. 22 GB / day for transmission
NetCDF	Target area	- Interval: 2.5 min. - 16 bands (VIS: 0.5-1 km, NIR: 1-2 km, IR: 2 km) - Approx. 22 GB / day for transmission

- NMHS can get data using HTTP 1.1 client such as Web browser or Wget.
- NMHS can select data necessary for its operation.
  (HSD is created separately for each band, and divided into 10 segments.)

16 bands x 10 segments = 160 files / 10 minutes

- Basically one download per one nation.
- Account registration is required.
- High speed Internet access (25 Mbps) is required to download all HSD.

Internet Cloud Service: Data Access

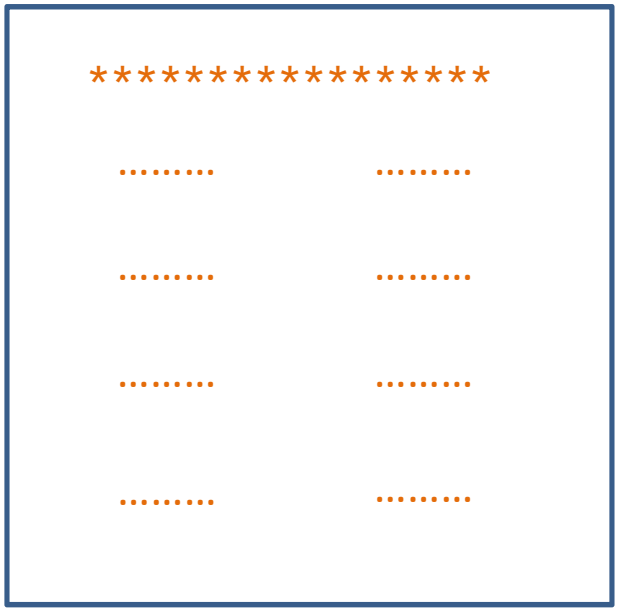
- JMA will communicate with each NMHS to specify what extent of data they want to get, i.e. full data or specific bands or specific segments.
- Dedicated web page which shows only necessary files for each NMHS will be provided. Users can collect all the necessary files by downloading all the files from dedicated web page.
- JMA will provide a client software for downloading files. It's source code will be open so that user will be able to modify it freely.

160 files in 1 full disk observation

	Band 1	Band 2	Band 3	….	Band 16
Seg1					
Seg2					
Seg3					
….					
Seg10					

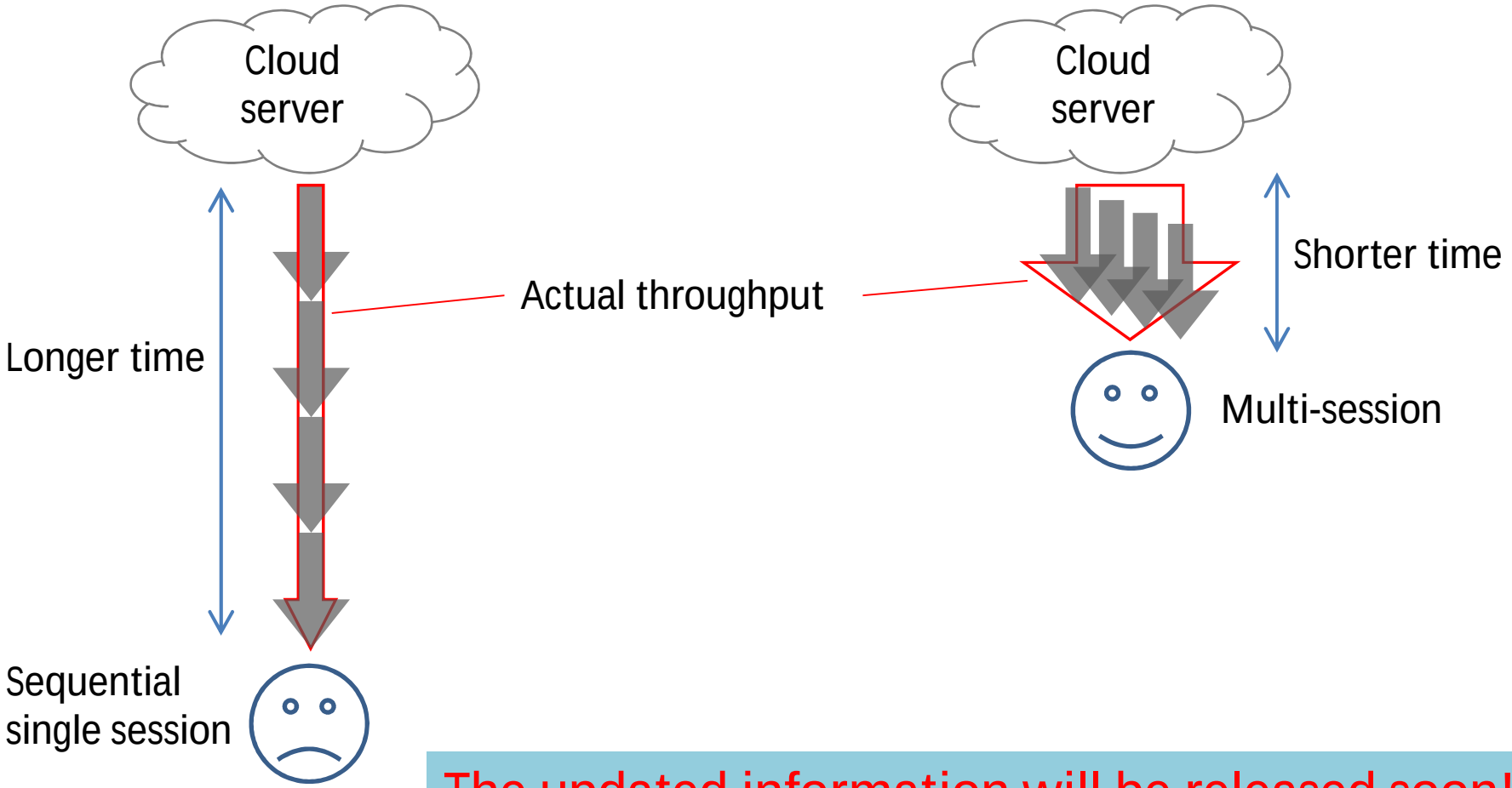
User's selection (bands & segments)

Dedicated web page for each NMHS



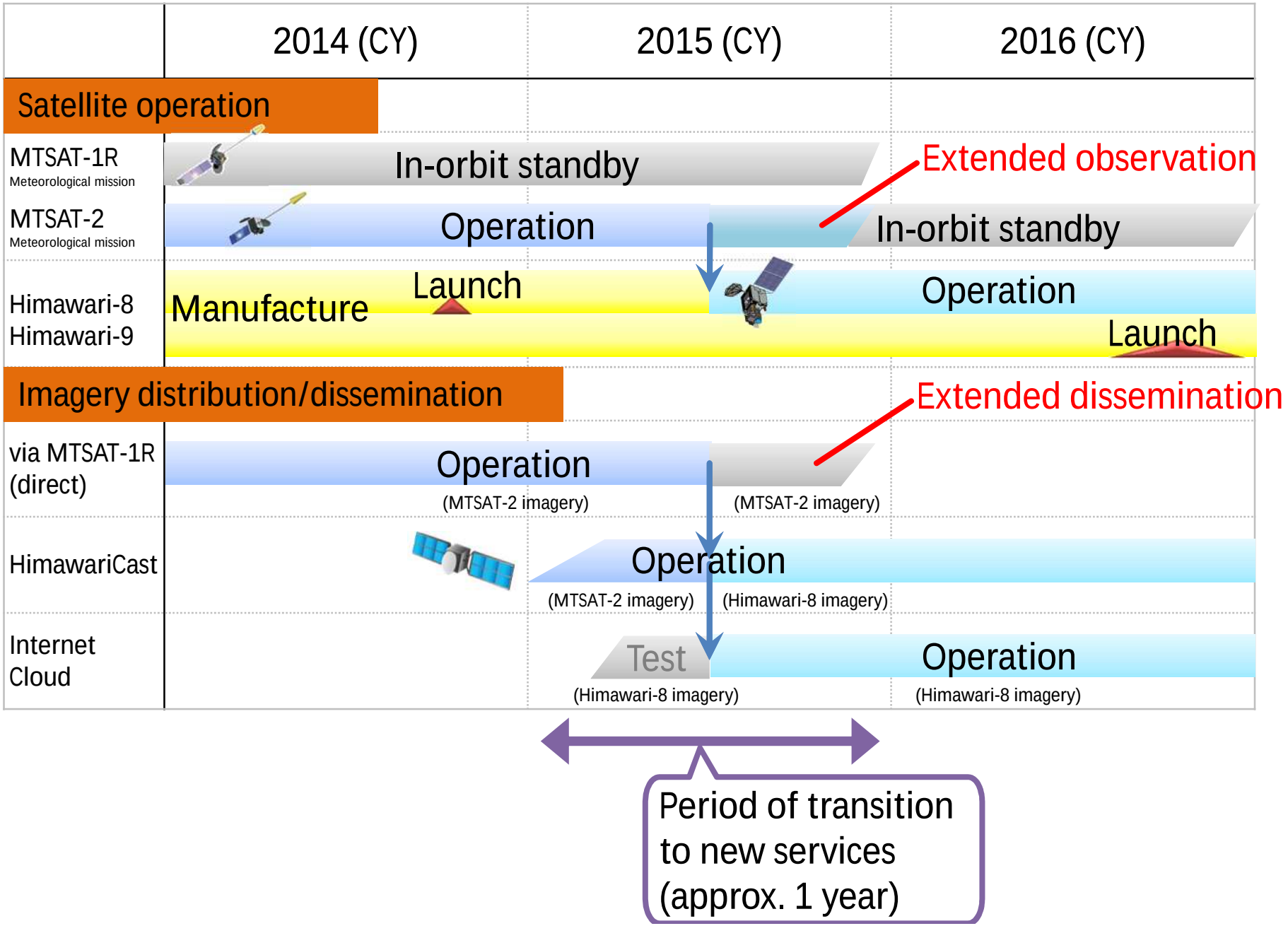
Internet Cloud Service: Key Technique

- To achieve actual high throughput, multi-session is a key technique.
- Sequential single session may result very low throughput.
- Client software will support multi-session download.



The updated information will be released soon!

Transition Schedule



Point of Contact

- JMA would appreciate it if your NMHS would consider the best environment to obtain and utilize Himawari-8 imagery for your meteorological services.

- If you have any question, please feel free to contact

Yasushi IZUMIKAWA (Mr.)
Satellite Program Division, Japan Meteorological Agency
metsat@met.kishou.go.jp