Agency Report
JAXA Earth Observation Programs

WGISS-46 @ DLR, Germany

October 22nd – 25th, 2018

Makoto NATSUISAKA, Yosuke IKEHATA, Kaori KUROIWA, and Yuji SHIMOMURA

Japan Aerospace Exploration Agency (JAXA)

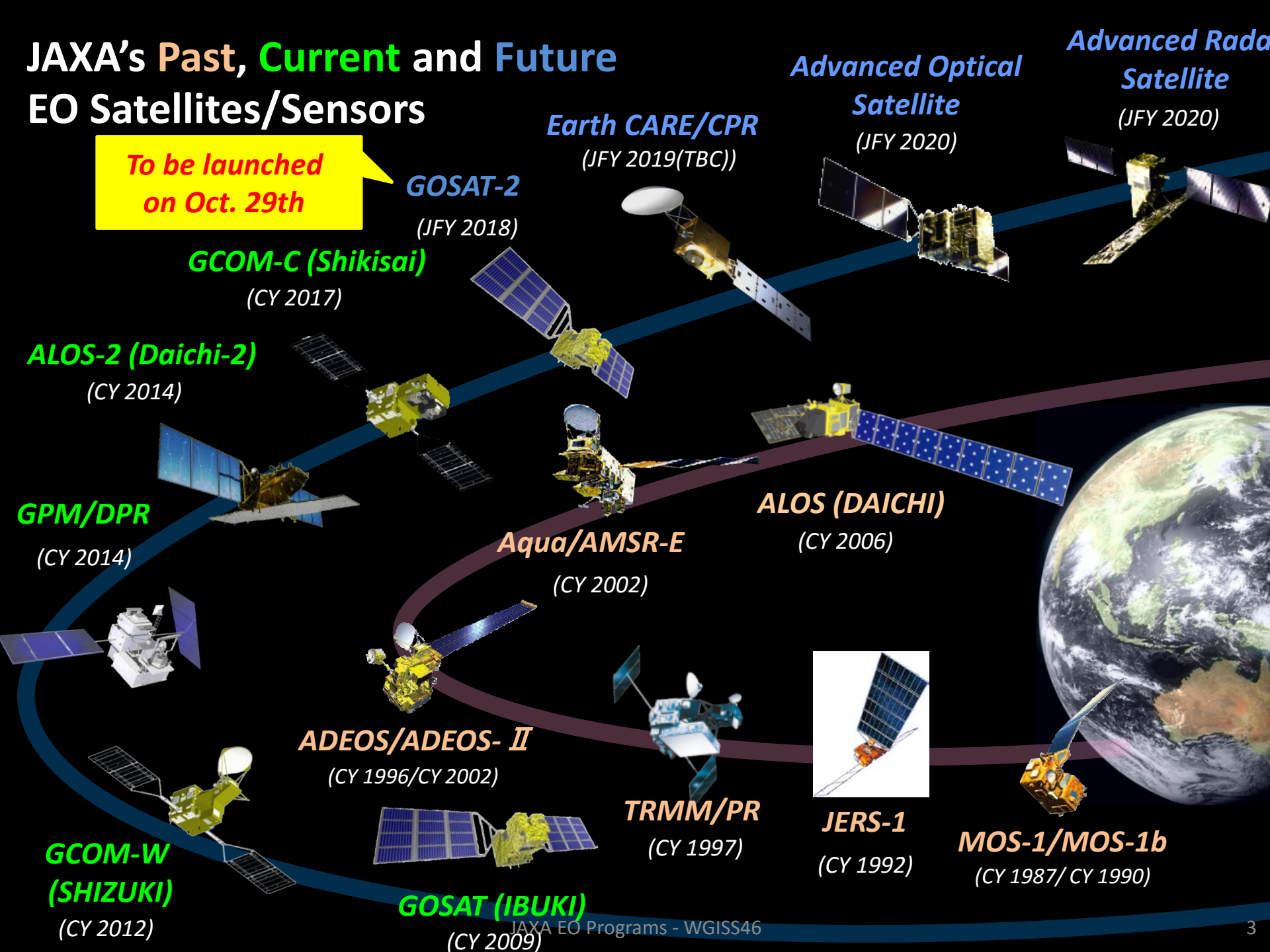
Satellite Applications and Operations Center (SAOC)

Space Technology Directorate I

Topics

1. JAXA EO Strategy
2. Ready to Fly - New Satellite “GOSAT-2”
3. Renewal of G-Portal
4. Data Release of GCOM-C
5. Connections with GEO/CEOS Portals
6. METI Open and Free Platform

JAXA's Past, Current and Future EO Satellites/Sensors

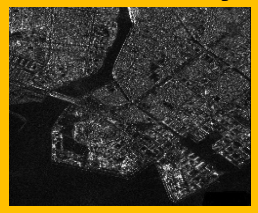


JAXA EO Strategy

JAXA newly developed EO utilization programs in April 2018.

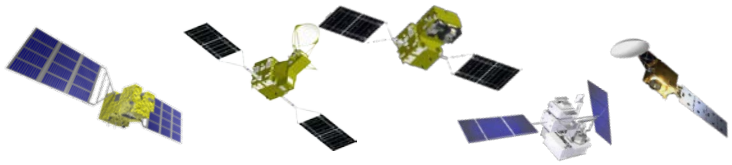
Global Climate Change

National Safety &Security



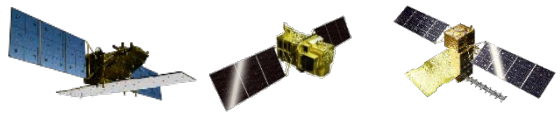
Disaster Risks Management

Global Monitoring Satellites



GOSAT, GCOM-W and GCOM-C Series Missions;
GPM and EarthCARE

High Resolution Satellites



ALOS Series Missions

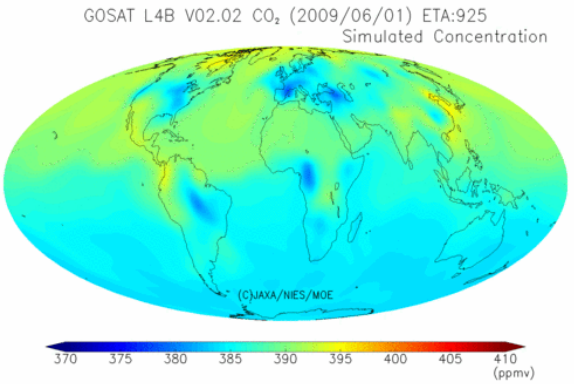
Challenge: Continuity and sustainability of earth observations

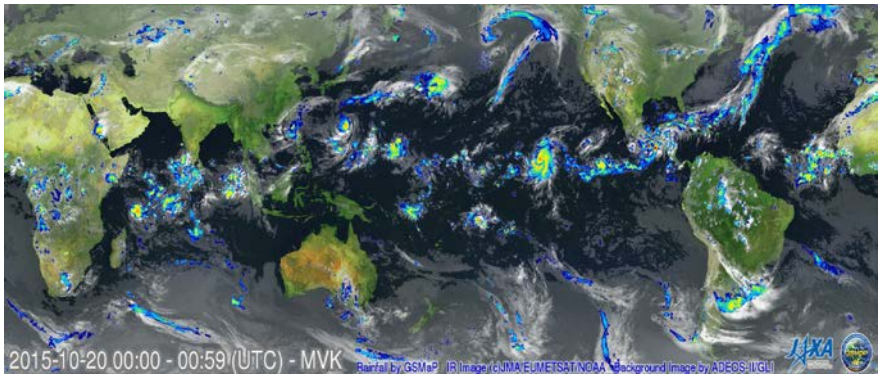
⇒ JAXA proposes series of missions under the following conditions.

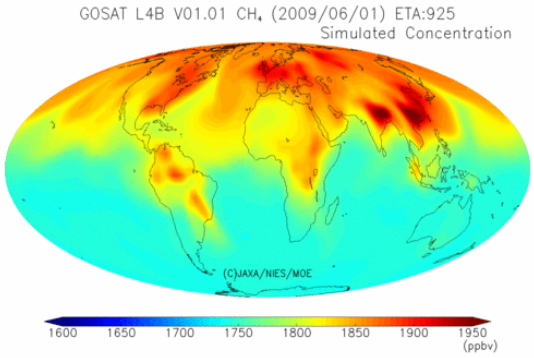
- **Establishment of an institutional framework to assure continuity of data provision.**
- **Cost-reduction of satellite development and operations.**
- **Research and development of innovative sensor technologies.**

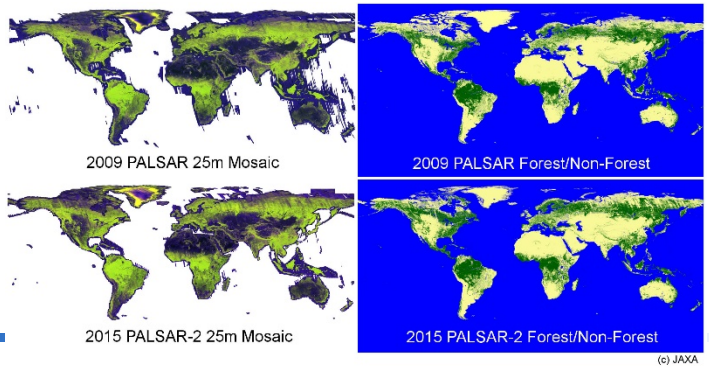
JAXA EO Strategy

- The “Unified Climate Change Program” will focus on
  - (a) Green House Gases observation,
  - (b) Global Satellite Precipitation Map (GSMaP),
  - (C) Global Forest Monitoring.
- JAXA will promote related activities through cooperation with CEOS.



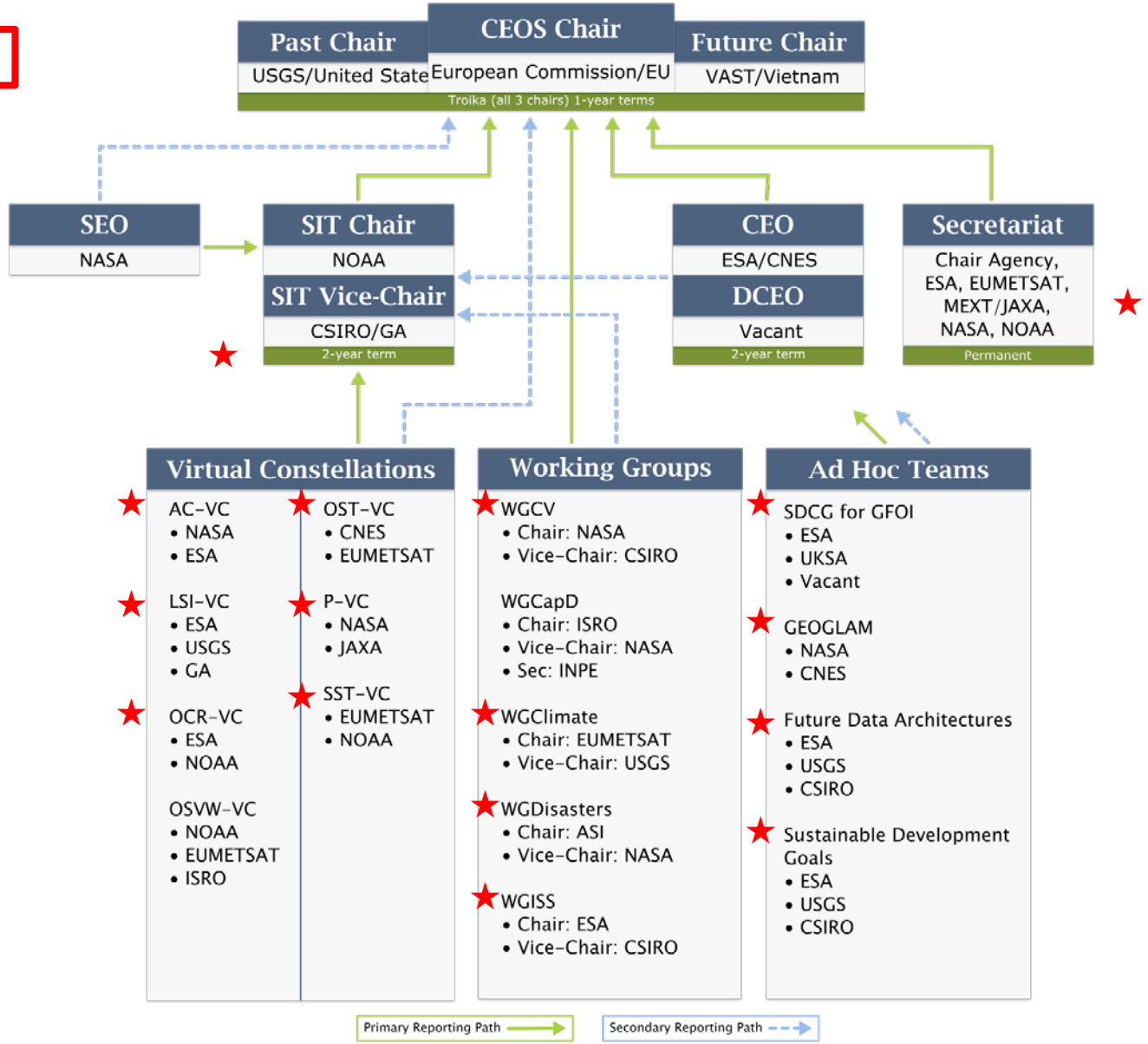






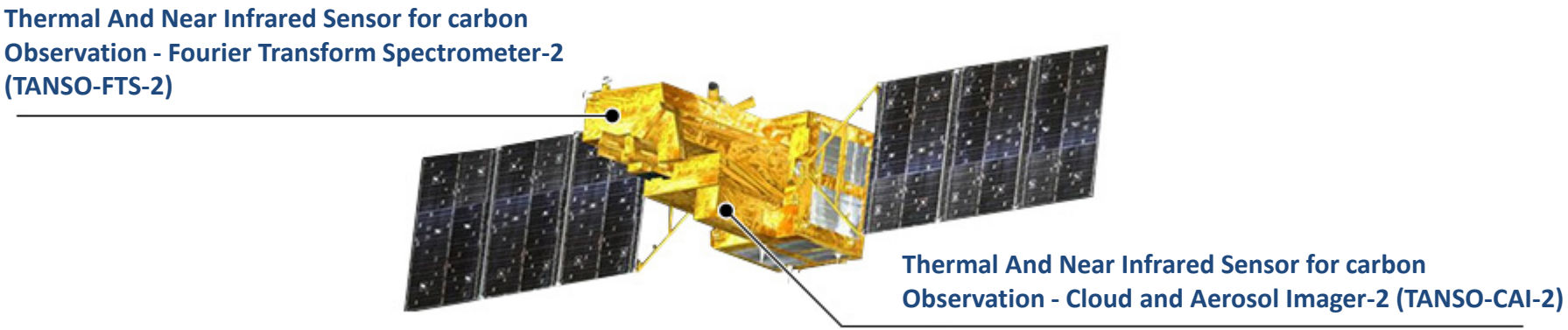
JAXA Cooperation with CEOS

★ JAXA



GOSAT-2 "IBUKI-2"

- GOSAT-2 (Greenhouse gases Observing SATellite-2) is ready to fly.
- A joint mission with Ministry of the Environment (MOE) and National Institute for Environmental Studies (NIES)
- To be jointly launched with KhalifaSat of Mohammed bin Rashid Space Centre (MBRSC) in UAE with H-IIA 40 on Oct. 29th, 2018.
- Global monitoring of the greenhouse gas emissions, as well those inventories
- Global monitoring of aerosols like PM2.5
- Joint calibration / validation with NASA OCO-2

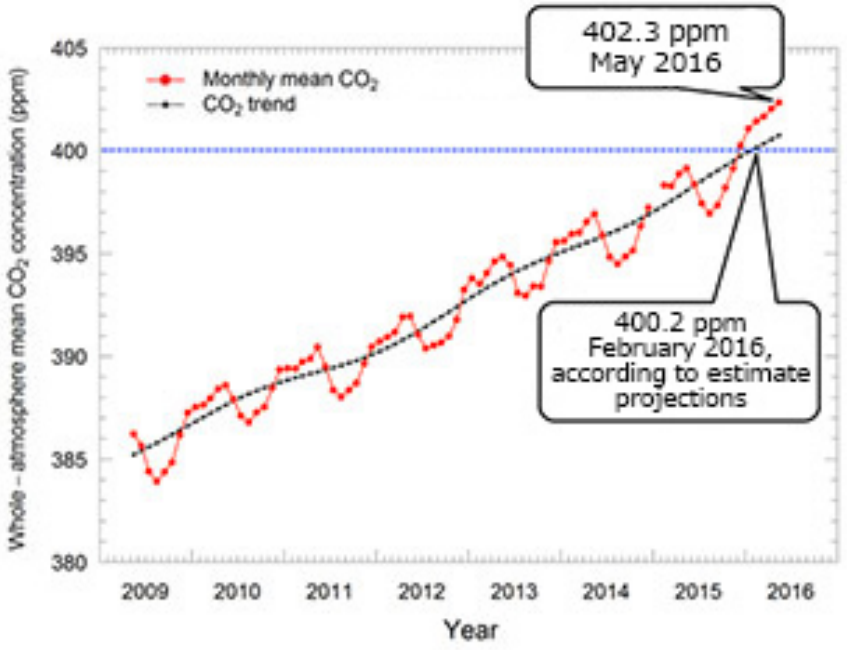


GOSAT-2 "IBUKI-2"

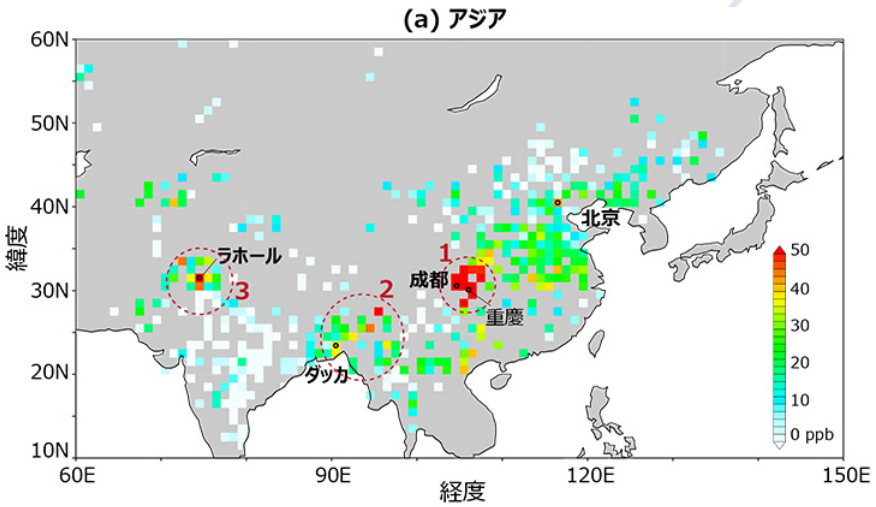
	GOSAT-2	GOSAT
Observation Targets	Carbon dioxide, methane, carbon monoxide -> Examine the feasibility of the estimation of the anthropogenic emission	Carbon dioxide, methane
Instruments	Thermal And Near Infrared Sensor for carbon Observation - Fourier Transform Spectrometer-2 (TANSO-FTS-2)	Thermal And Near Infrared Sensor for carbon Observation - Fourier Transform Spectrometer (TANSO-FTS)
	Thermal And Near Infrared Sensor for carbon Observation - Cloud and Aerosol Imager-2 (TANSO-CAI-2)	Thermal And Near Infrared Sensor for carbon Observation - Cloud and Aerosol Imager (TANSO-CAI)
Observation Accuracy	0.5 ppm (carbon dioxide) and 5 ppb (methane) at a 500-km mesh over land a month and a 2000-km mesh over ocean a month	4 ppm (carbon dioxide) and 34 ppb (methane) at a 1,000-km mesh over land per 3 month
Size	5.3m(X) x 2.0m(Y) x 2.8m(Z) (16.5m(Y))（when expanded in orbit)	2.4m（X）x 2.6m（Y）x 3.7m（Z） （13.7m（Y））
Weight	1,800 kg	1,750 kg
Generated Power	5,000 W	3,770W
Design life	5 years	5 years
Altitude	613km	666km
Repeat Cycle	6 day	3 day

GOSAT-2 "IBUKI-2"

➢ Achievements of GOSAT



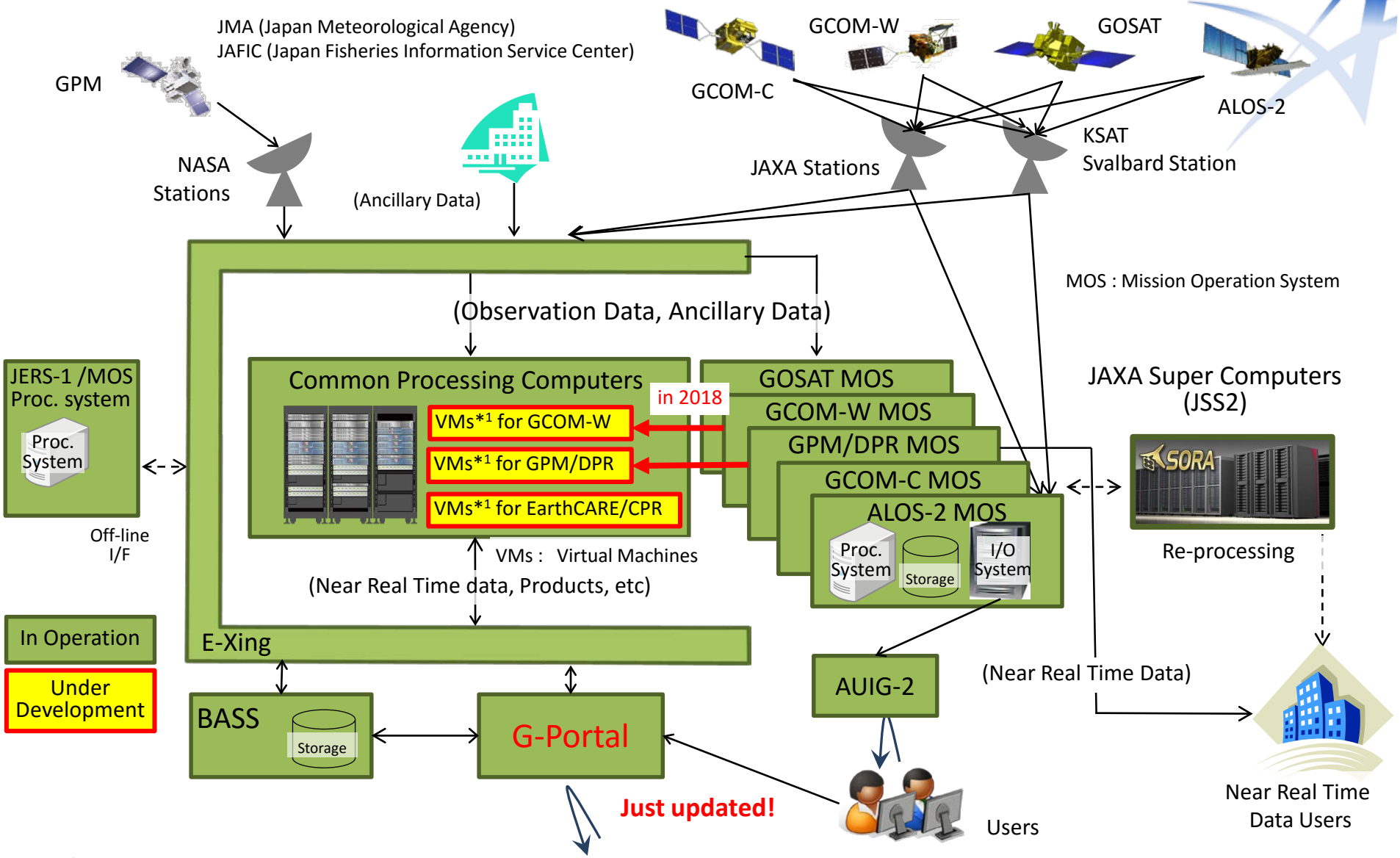
Global monitoring of GHGs
-> Assessment data for Paris Agreement



Monitoring of the GHGs emissions and inventories due to human activities

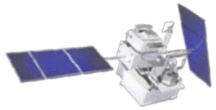
-> acquire longer-time trends and higher accuracy with GOSAT-2

Ground Segments for the JAXA EO Satellites

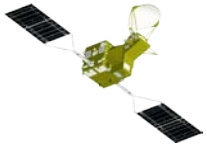


EO Portals (before Jul., 2018)

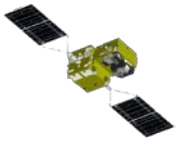
GOSAT



GPM/DPR



GCOM-W

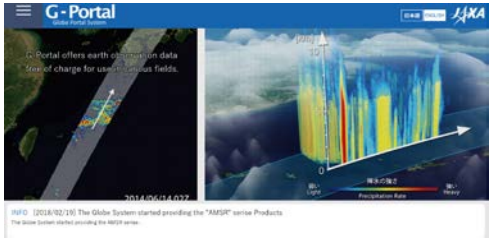


GCOM-C*

Standard Products

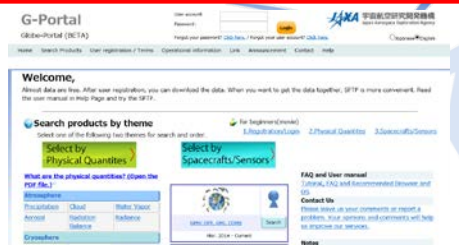
+ Past Satellites and Sensors (MOS-1/1b, JERS-1, ADEOS, ADEOS-II, Aqua/AMSR-E, TRMM/PR)

* Products of GWCOM-C/SGLI sensor is to be released in Dec., 2018

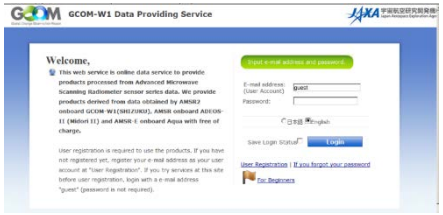


G-Portal

https://gportal.jaxa.jp/gpr/



G-Portal（1st generation）

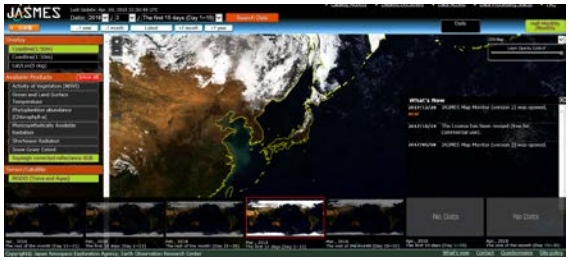


GCOM-W DPSS

High Level Products, Data Sets

GSMaP

http://sharaku.eorc.jaxa.jp/GSMaP/index_j.htm



JASMES

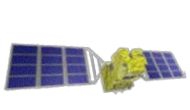
http://www.eorc.jaxa.jp/JASMES/index_map.html

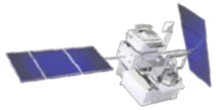
GDAS by NIES*

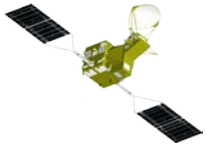
https://data2.gosat.nies.go.jp/gallery/L4B/concmov/concmov.html

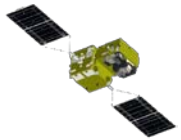
* National Institute for Environmental Studies

EO Portals (after Jul., 2018)


GOSAT


GPM/DPR

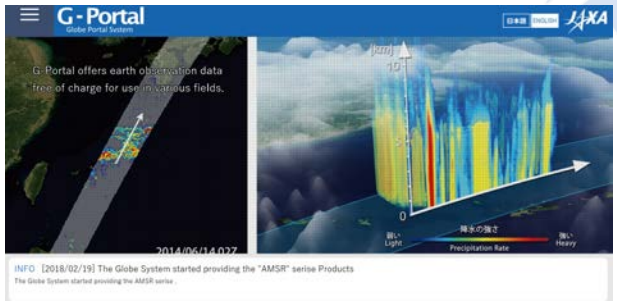

GCOM-W


GCOM-C*

+ Past Satellites and Sensors (MOS-1/1b, JERS-1, ADEOS, ADEOS-II, Aqua/AMSR-E, TRMM/PR)

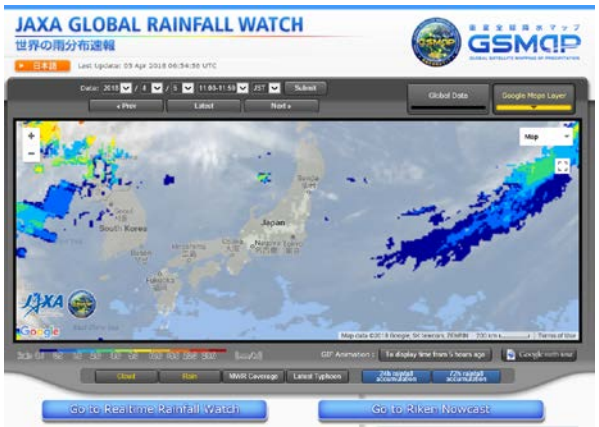
* Products of GWCOM-C/SGLI sensor is to be released in Dec., 2018

Standard Products

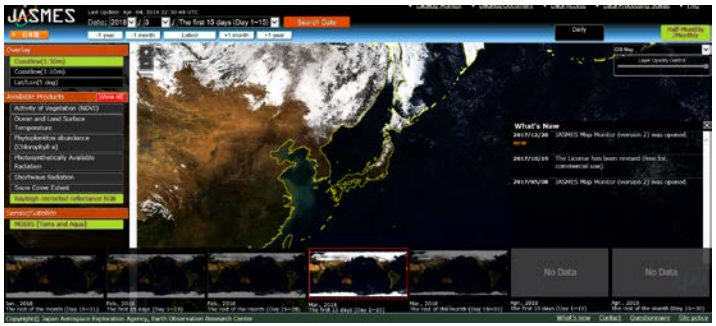


G-Portal
https://gportal.jaxa.jp/gpr/

High Level Products, Data Sets



GSMaP
http://sharaku.eorc.jaxa.jp/GSMaP/index_j.htm



JASMES
http://www.eorc.jaxa.jp/JASMES/index_map.html

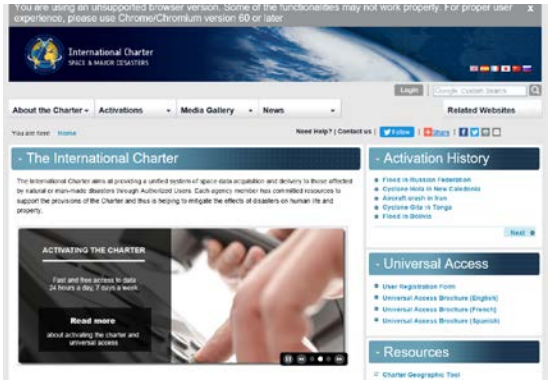
GDAS by NIES*
https://data2.gosat.nies.go.jp/gallery/L4B/concmov/concmov.html
* National Institute for Environmental Studies

Portals for Disaster Preventions

Not changed

ALOS-2
(L-band Rader)

Daichi Bousai WEB
http://jaxa-dis.maps.arcgis.com/home/index.html

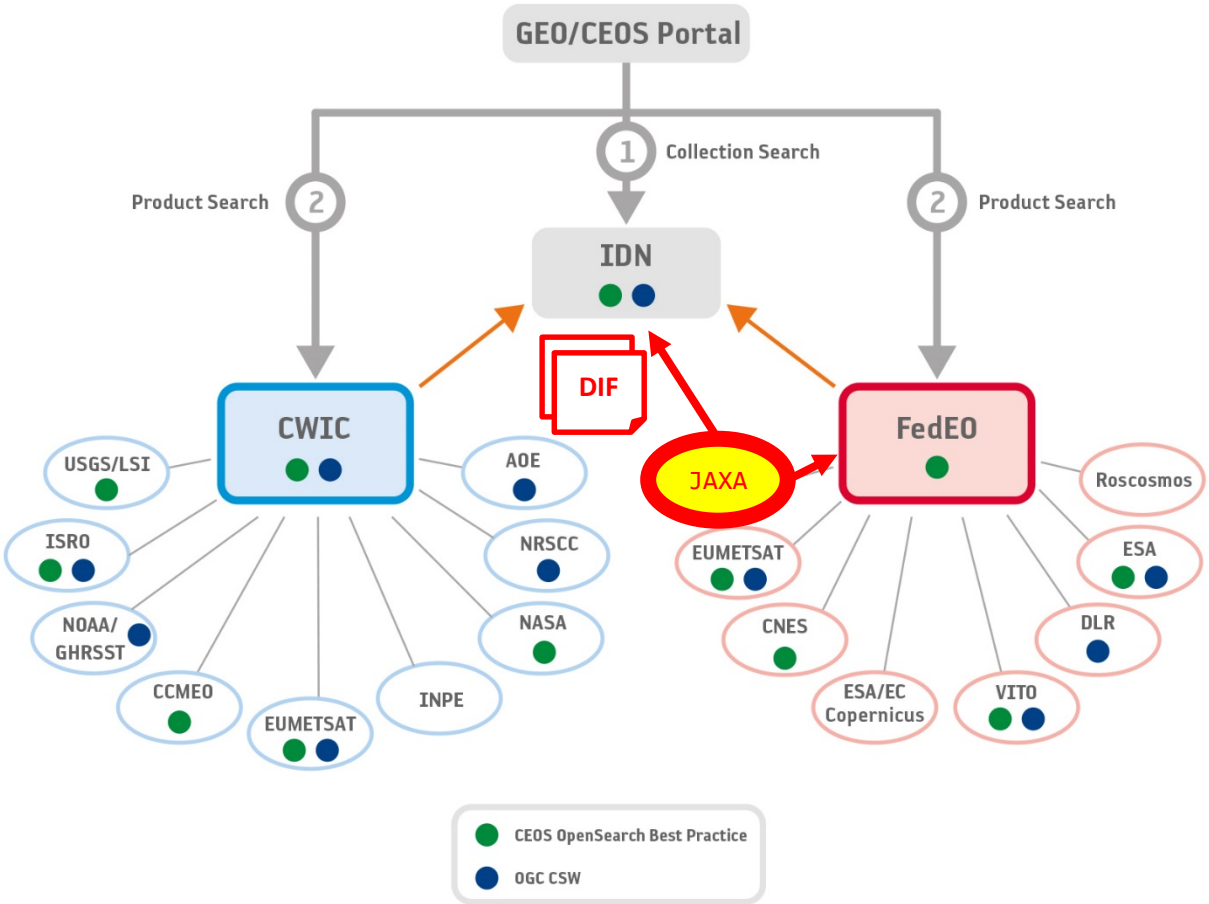


International Charter Space and Major Disasters
https://disasterscharter.org/web/guest/home

Sentinel Asia
https://sentinel.tksc.jaxa.jp

Connections with GEO/CEOS Portals

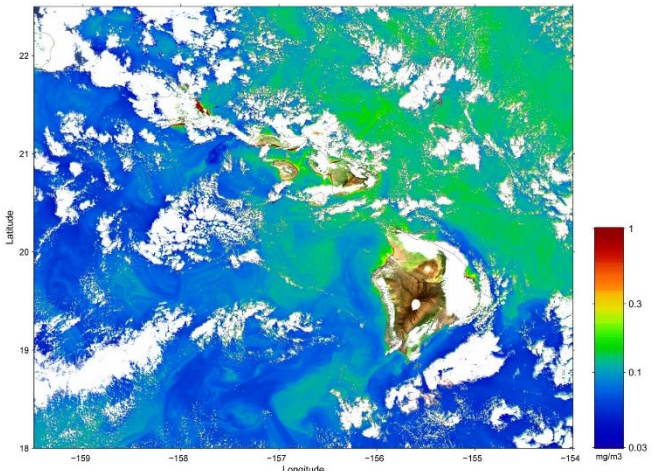
- JAXA considers GEO/CEOS portals as primary gateways to the global users.
- JAXA has already connected G-Portals with GEOSS portals through IDN and FedEO.
- JAXA registered DIF-10 to IDN and will add GCOM-C information by the product release.
- JAXA directly updated GEOSS catalogue information in Oct., 2018.



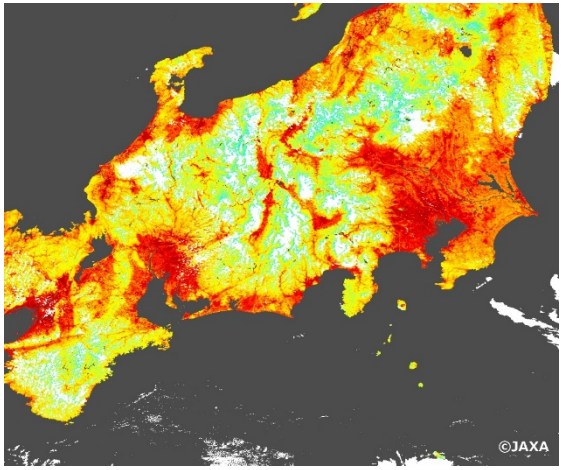
GCOM-C Product Release

- JAXA Product release of GCOM-C will be distributed from G-Portal in Dec., 2018.
- The sample products are now available.
  https://suzaku.eorc.jaxa.jp/GCOM_C/data/product_std.html

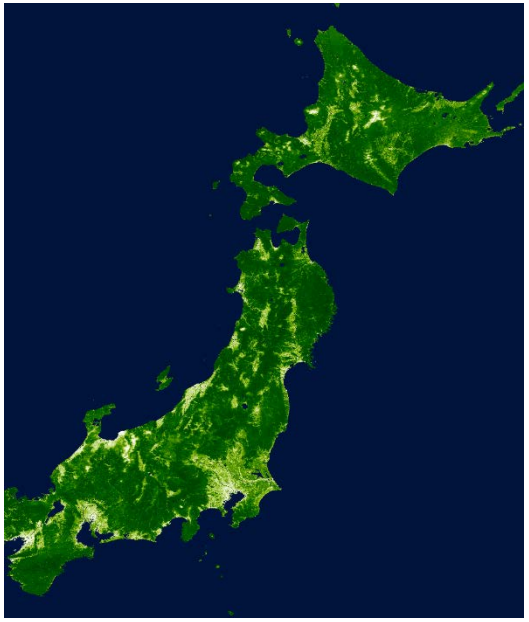
GCOM-C (Global Climate Observation Mission – Climate)
SGLI (Second Generation Land Imager)



Chlorophyll-a at 250m resolution



Land Surface Temperature



NDVI

GCOM-C Product Release

Common	
Radiance	• TOA radiance (including system geometric correction)

✓ **GCOM-C products will contribute to global monitoring for the climate change.**

Land	
Reflectance	• Precise geometric correction
	• Atmospheric corrected reflectance
Vegetation and carbon cycle	• Vegetation index
	• Above-ground biomass ECV
	• Vegetation roughness index
	• Shadow index
	• Fraction of Absorbed Photosynthetically available radiation ECV
	• Leaf area index ECV
Temp.	• Surface temperature
Application	Land net primary production
	Water stress trend
	Fire detection index ECV
	Land cover type ECV
	Land surface albedo ECV

Atmosphere	
Cloud ECV	• Cloud flag/Classification
	• Classified cloud fraction
	• Cloud top temp/height
	• Water cloud optical thickness /effective radius
	• Ice cloud optical thickness
	Water cloud geometrical thickness
Aerosol ECV	• Aerosol over the ocean
	• Land aerosol by near ultra violet
	• Aerosol by Polarization
Radiation budget ECV	Long-wave radiation flux
	Short-wave radiation flux

Ocean	
Ocean color ECV	• Normalized water leaving radiance
	• Atmospheric correction parameter
	• Photosynthetically available radiation
	Euphotic zone depth
In-water	• Chlorophyll-a conc.
	• Suspended solid conc.
	• Colored dissolved organic matter
In-water	Inherent optical properties
Temp.	• Sea surface temp. ECV
Application	Ocean net primary productivity
	Phytoplankton functional type
	Redtide
	multi sensor merged ocean color
	multi sensor merged SST

Cryosphere	
Distribution	• Snow and Ice covered area ECV
	• Okhotsk sea-ice distribution
	Snow and ice classification
	Snow covered area in forest and mountain
Surface properties	• Snow and ice surface Temperature
	• Snow grain size of shallow layer
	Snow grain size of subsurface layer
	Snow grain size of top layer
	Snow and ice albedo ECV
	Snow impurity
	Ice sheet surface roughness
Boundary	Ice sheet boundary monitoring ECV

Blue: standard products
Red: research products

METI Open and Free Platform

- METI (Ministry of Economy, Trade and Industry) is developing open and free platform for EO data “Tellus”. The ver. 1 will be released in Feb. 2019.

https://www.tellusxdp.com/

xData Alliance

「Tellus」の開発への貢献と利用促進などを目的として組成した
パートナーシップ（協力企業）一覧です。

SAKURA internet, AXELSPACE, ABEJA, G空間情報センター, EXA, 北海道オープンデータ推進協議会, B Inc. jig.jp group, mercari R4D, RESTEC, sojitz, MIZUHO みずほ情報総研, GEHIRN, spacesystems, SIGNATE, ABBALab, if IncubateFund, iSGS, Opt Ventures, SPIRAL VENTURES, B DASH VENTURES

- JAXA provides ALOS AVNIR-2 and PALSAR data to the platform.

Long-term Plan