Agency Report
JAXA Earth Observation Programs

WGISS-47 @ NOAA, Silver Spring

April 29th – May 2nd, 2019

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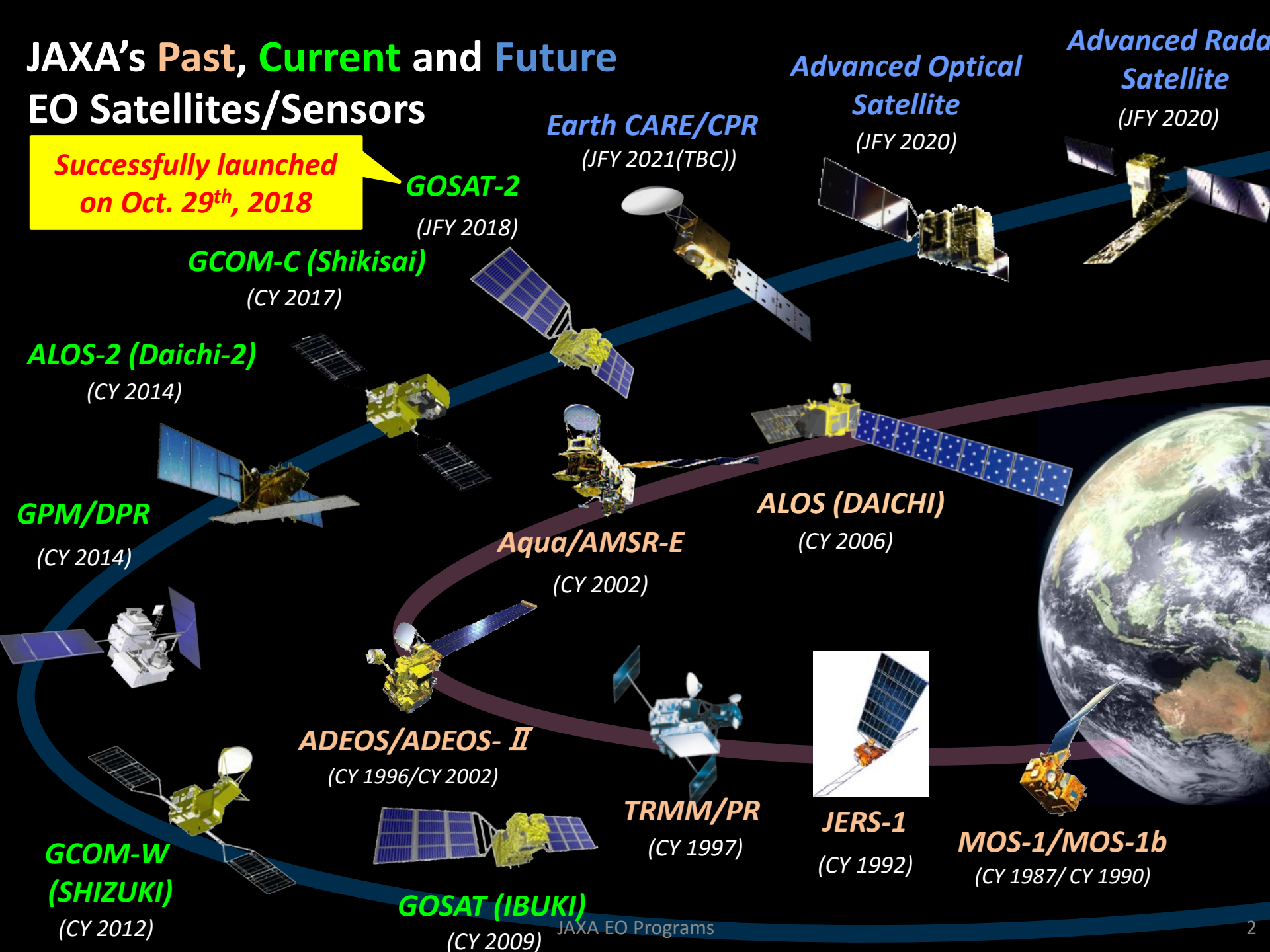
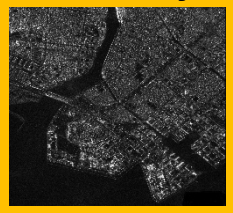
JAXA's Past, Current and Future EO Satellites/Sensors



JAXA EO Strategy

JAXA newly developed EO utilization programs in April 2018.

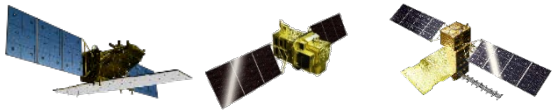
National Security



Disaster Risks Management

Climate Change

High Resolution Satellites



ALOS Series Missions

Global Monitoring Satellites

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

Challenges: Continuity and sustainability of earth observation data

⇒ 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

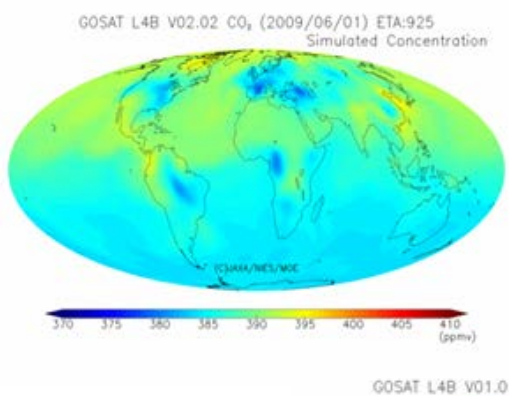
- As one of those, the “Unified Climate Change Program” will focus on

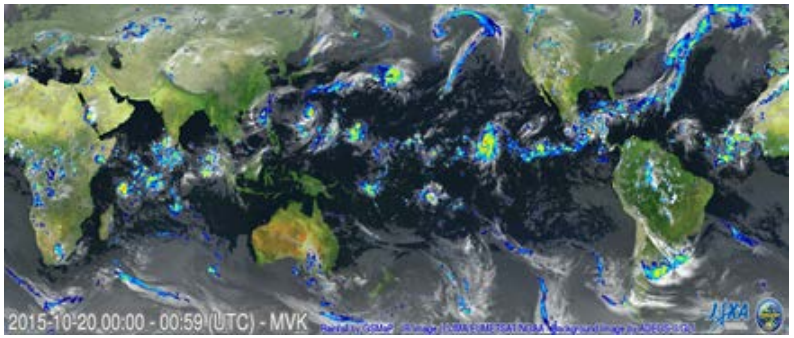
  (a) Green House Gases observation,

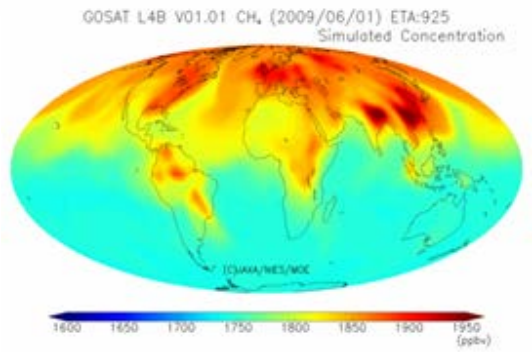
  (b) Global Satellite Precipitation Map (GSMaP),

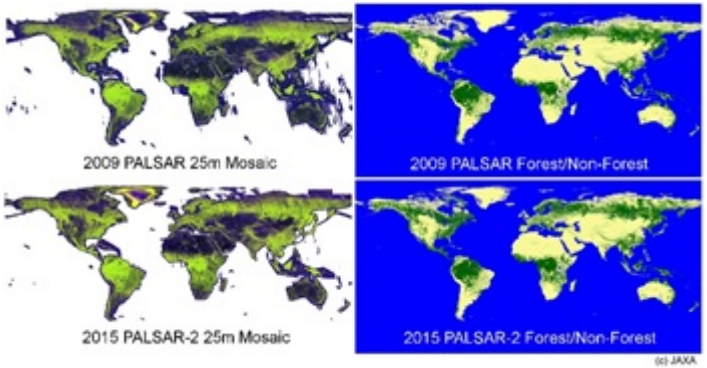
  (C) Global Forest Monitoring.

- JAXA will promote related activities through cooperation with CEOS.



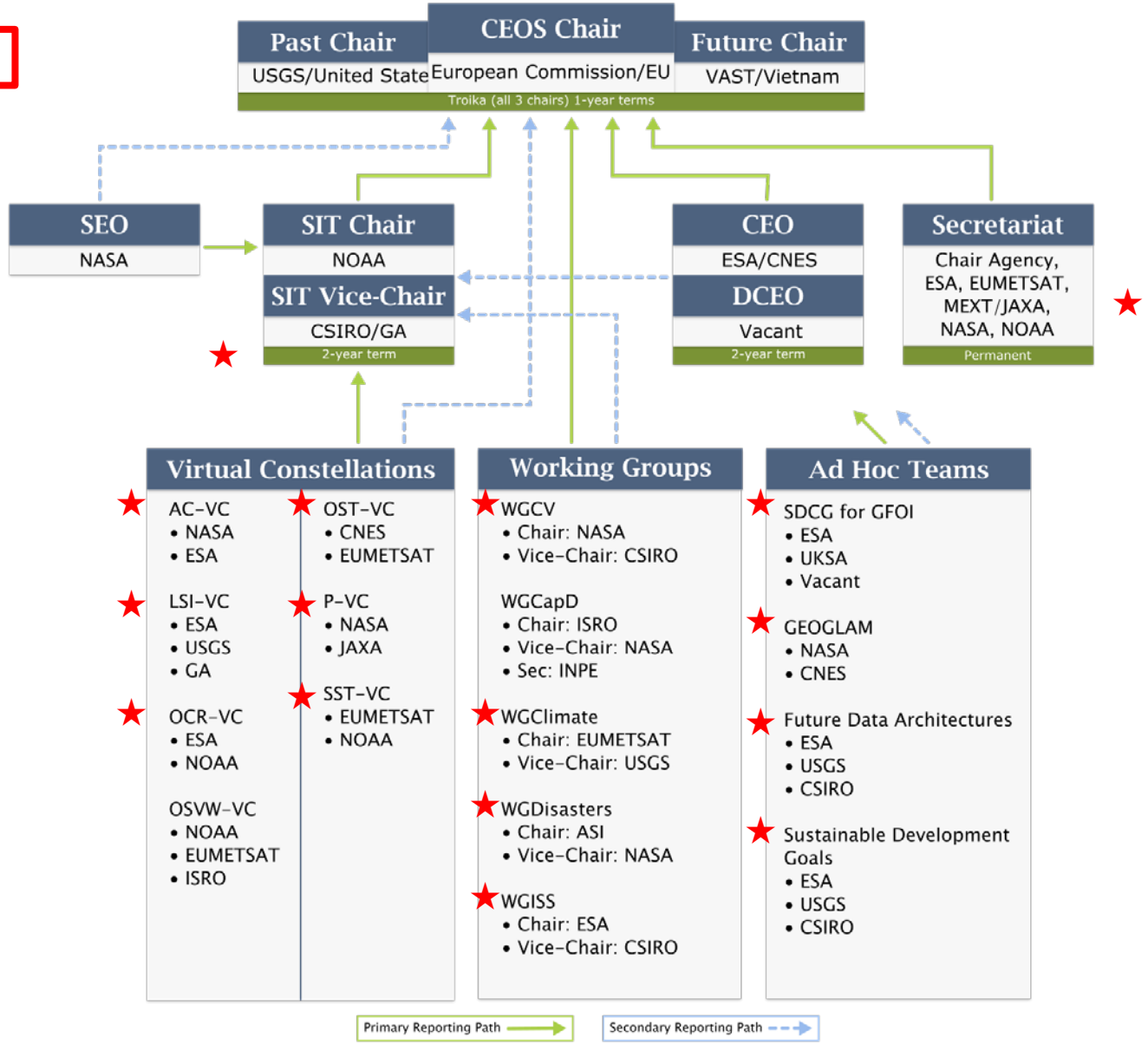






JAXA Cooperation with CEOS

★ JAXA

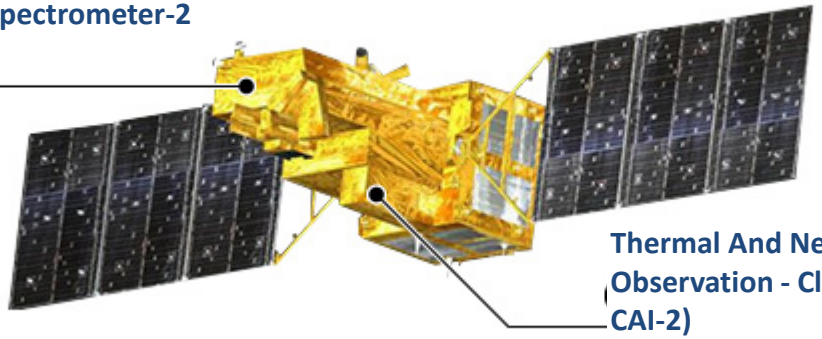


GOSAT-2 "IBUKI-2"

- GOSAT-2 (Greenhouse gases Observing SATellite-2) is a joint mission with Ministry of the Environment (MOE) and National Institute for Environmental Studies (NIES)
- **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
- **L1 products will be released from Aug., 2019 and L2 ones will be done in Nov., 2019 from GDAS operated by NIES.**

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

Thermal And Near Infrared Sensor for carbon Observation - Fourier Transform Spectrometer-2 (TANSO-FTS-2)



Thermal And Near Infrared Sensor for carbon Observation - Cloud and Aerosol Imager-2 (TANSO-CAI-2)

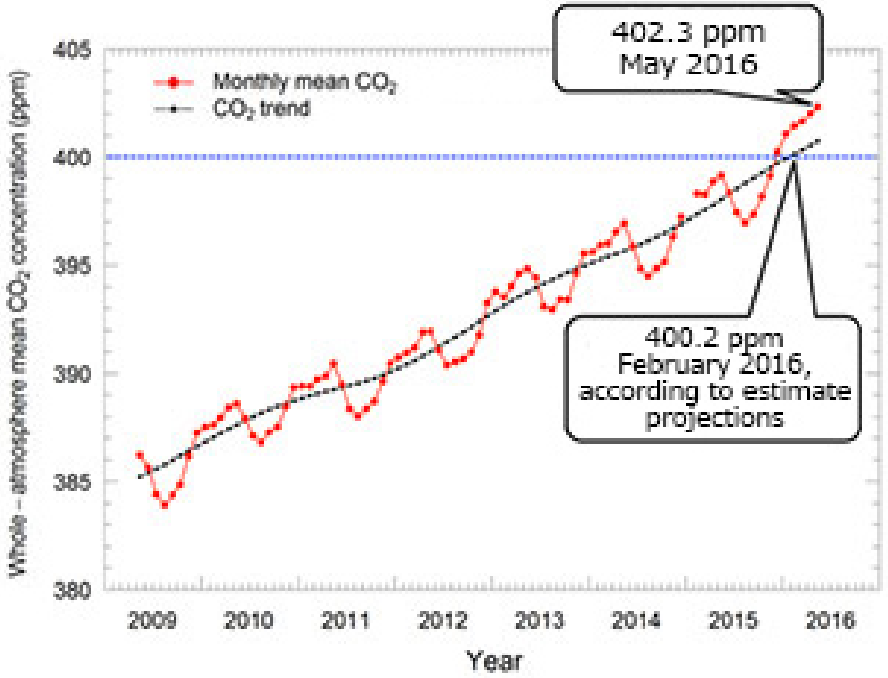
GDAS : GHG
https://data2.gosat.nies.go.jp/gallery/L4B/concmov/concmov.html
By National Institute for Environmental Studies

GOSAT-2 "IBUKI-2"

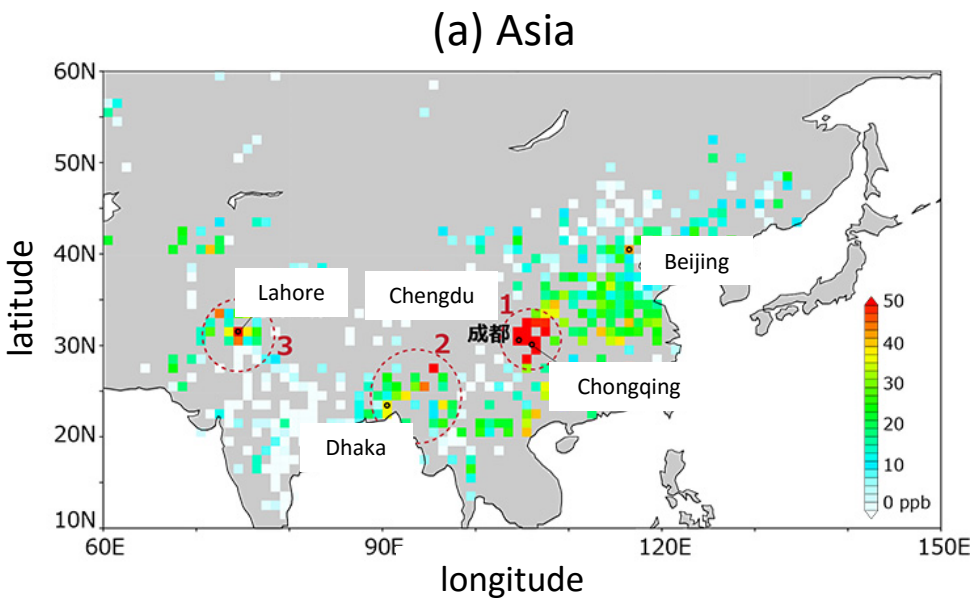
	GOSAT-2	GOSAT
Observation Targets	Carbon dioxide, methane, carbon monoxide -> Examine the feasibility of the estimation of the anthropogenic emission	Carbon dioxide, methane
Instruments	Thermal And Near Infrared Sensor for carbon Observation - Fourier Transform Spectrometer-2 (TANSO-FTS-2)	Thermal And 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



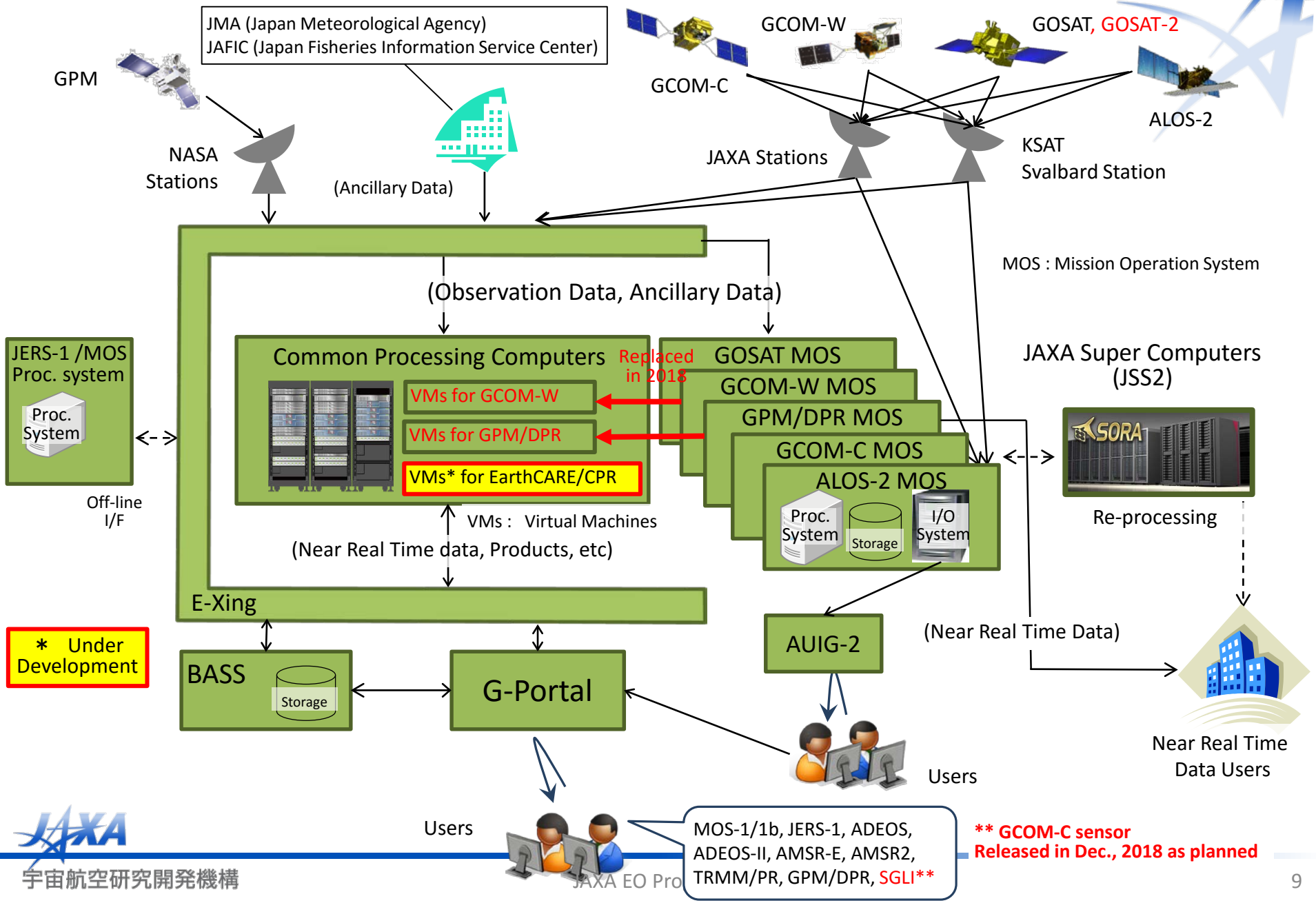
Global monitoring of GHGs
-> Assessment data for Paris Agreement



Monitoring of the GHGs emissions and inventories due to human activities

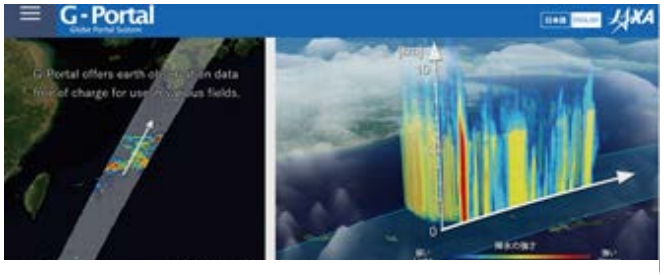
-> acquire longer-time trends and higher accuracy with GOSAT-2

Ground Segments for the JAXA EO Satellites



G-Portal and JAXA EO Portals

Total Archived Data … 6.4PB, Data Provision in JFY2018 … 21,051,270 scenes



G-Portal

https://gportal.jaxa.jp/gpr/
Primary Portal for JAXA Standard Produces

AUIG-2

ALOS/ALOS-2 ProductS

Thematic Portals

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

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

GDAS : GHG
https://data2.gosat.nies.go.jp/gallery/L4B/concmov/concmov.html
By National Institute for Environmental Studies

Disaster Portals

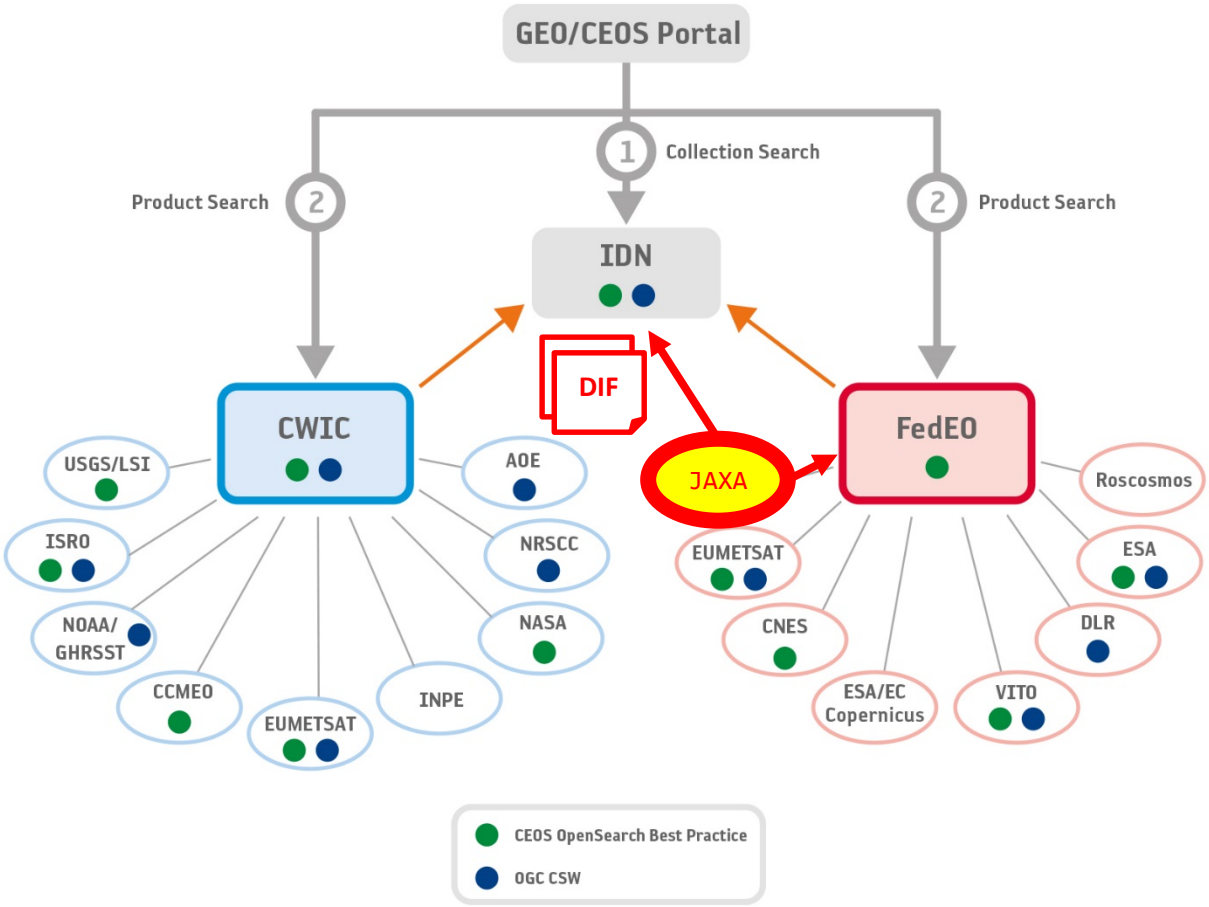
Daichi Bousai WEB
http://jaxa-dis.maps.arcgis.com/home/index.html

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

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

Connections with GEO/CEOS Portals

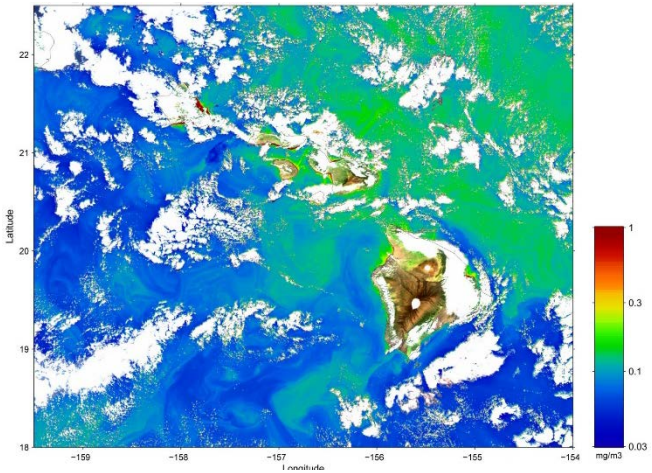
- JAXA considers GEO/CEOS portals as primary gateways to the global users.
- JAXA has already connected G-Portals with GEOSS portals through IDN and FedEO.
- JAXA registered DIF-10 to IDN and updated it to add GCOM-C information.
- JAXA had an ad-hoc meeting with FedEO during the last WGISS meeting and had another with GEOSS during a GEO meeting in Kyoto, Japan to establish more efficient interfaces.



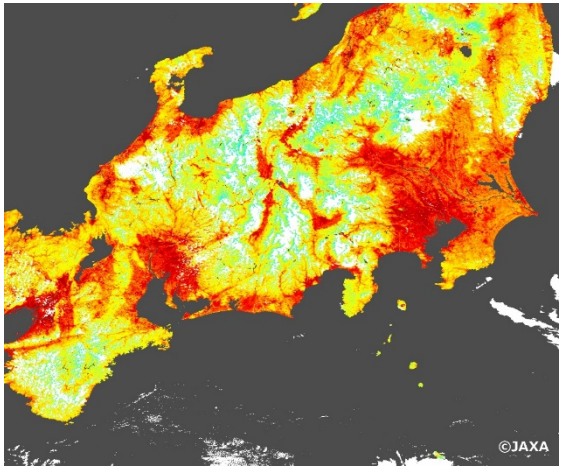
GCOM-C Product Release

- **GCOM-C products have started to be distributed from G-Portal since Dec., 2018.**

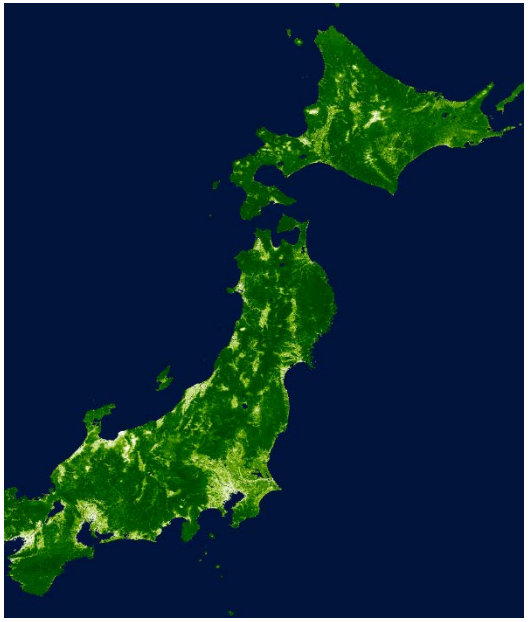
GCOM-C (Global Climate Observation Mission – Climate)
SGLI (Second generation GLobal Imager)



Chlorophyll-a at 250m resolution



Land Surface Temperature



NDVI

GCOM-C Product Release

Common	
Radiance	• TOA radiance (including system geometric correction)

✓ **GCOM-C products 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

- **An open and free platform for EO data “Tellus” developed by METI (Ministry of Economy, Trade and Industry) has started to be operated since Feb. 2019.**
- **JAXA is supporting the activities by providing ALOS/AVNIR-2, ALOS/PALSAR, AW3D30, and GSMaP data to the platform.**

https://www.tellusxdp.com/

Long-term Plan

https://www8.cao.go.jp/space/plan/plan2/kaitei_fy30/kaitei_fy30.pdf