



Committee on Earth Observation Satellites

JAXA Agency Report

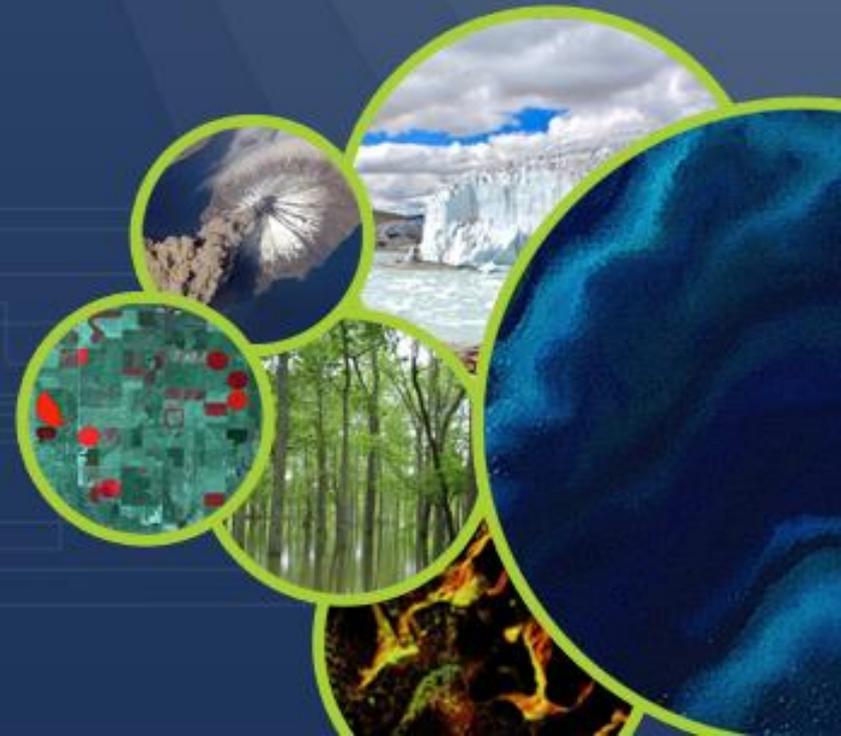
Akihiko KUZE

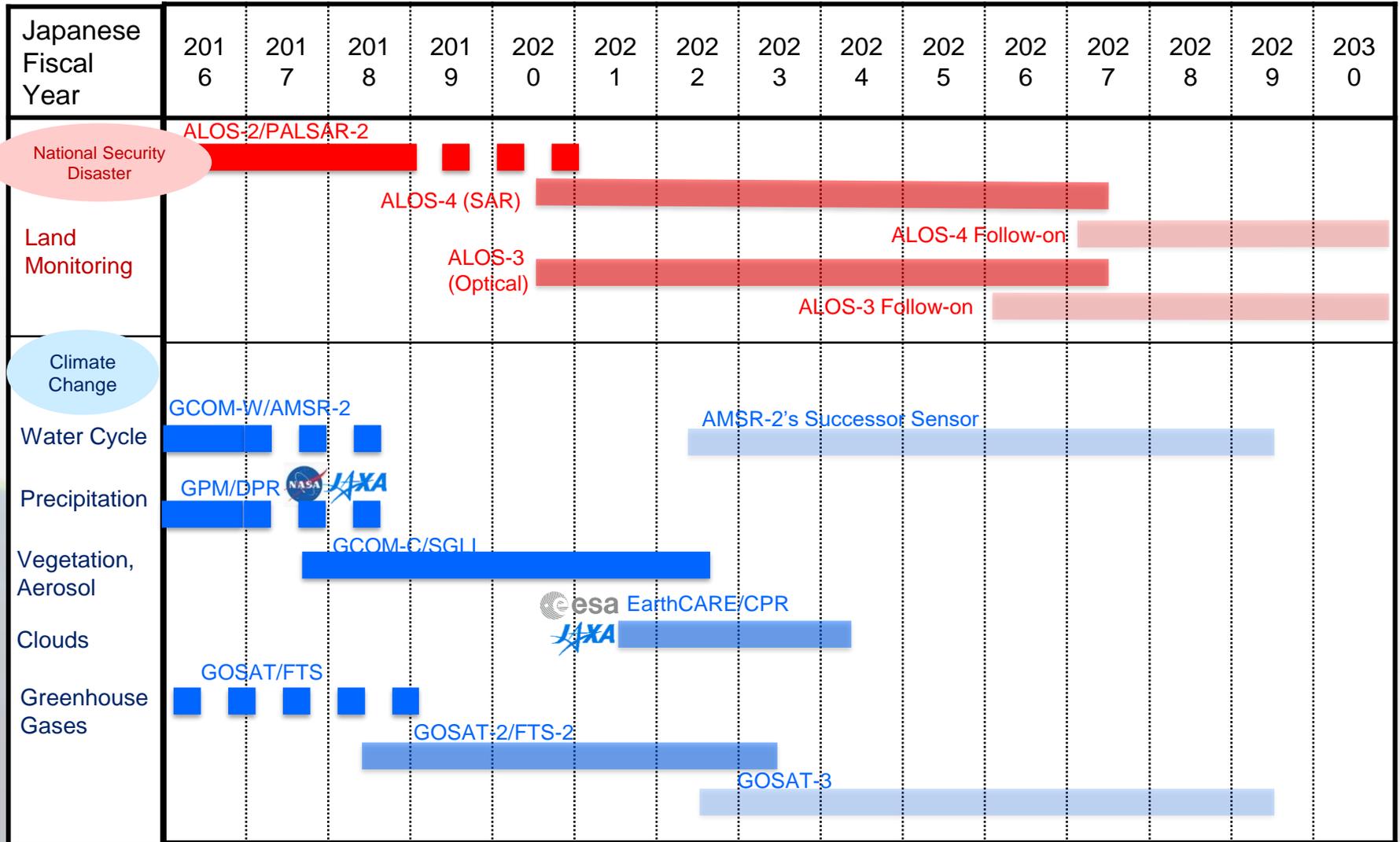
(Earth Observation Research Center, Japan Aerospace Exploration Agency)

CEOS WGClimate

Marrakech, Morocco

March, 2019







Climate Change

 Measured by GCOM-C
 Measured by GCOM-W
 Measured by GPM/DPR
 Measured by GOSAT

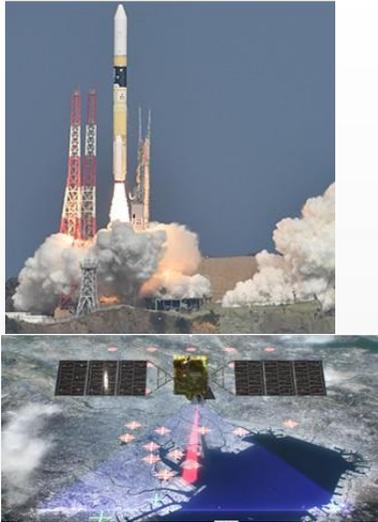
Atmospheric		
Surface	Upper-air	Composition
Air temperature	Temperature	Carbon dioxide
Wind speed & direction	Wind speed & direction	Methane
Water vapour	Water vapour	& other long-lived GHGs *
Pressure	Cloud properties	Ozone & Aerosol
Precipitation	Earth radiation budget (including ...)	supported by their precursors **
Surface		

* including N2O, CFCs, HCFCs, SF6, PFCs
 ** in particular NO2, SO2, HCHO, CO

Terrestrial
River discharge
Water use
Groundwater
Lakes
Snow cover
Glaciers and ice caps
Ice sheets
Permafrost
Albedo
Land cover (including vegetation type)
Fraction of absorbed photosynthetically active radiation (FAPR)
Leaf area index (LAI)
Above-ground biomass
Soil carbon
Fire disturbance
Soil moisture

Oceanic	
Surface	Sub-surface
Sea-surface temperature	Temperature
Sea-surface salinity	Salinity
Sea level	Current
Sea state	Nutrients
Sea ice	
Surface current	
Ocean colour	
CO2 partial pressure	CO2 partial pressure
Ocean acidity	Ocean acidity
Phytoplankton	
	Oxygen
	Tracers

Total Essential Climate Variables (ECVs) (ECVs largely dependent on satellite observations identified by CEOS and GCOS are shown in bold.)	50
ECVs measured by GCOM-C&W, GPM/DPR and GOSAT	23



GOSAT celebrated its 10th anniversary on Jan. 23, 2019.

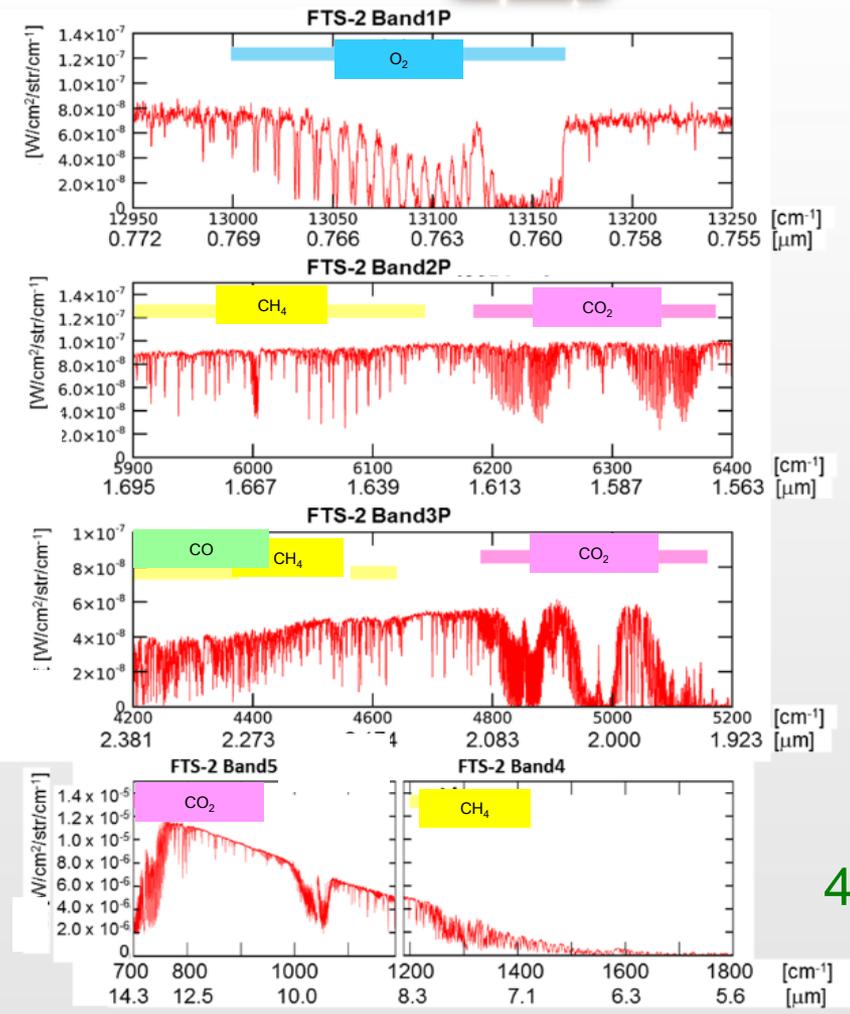
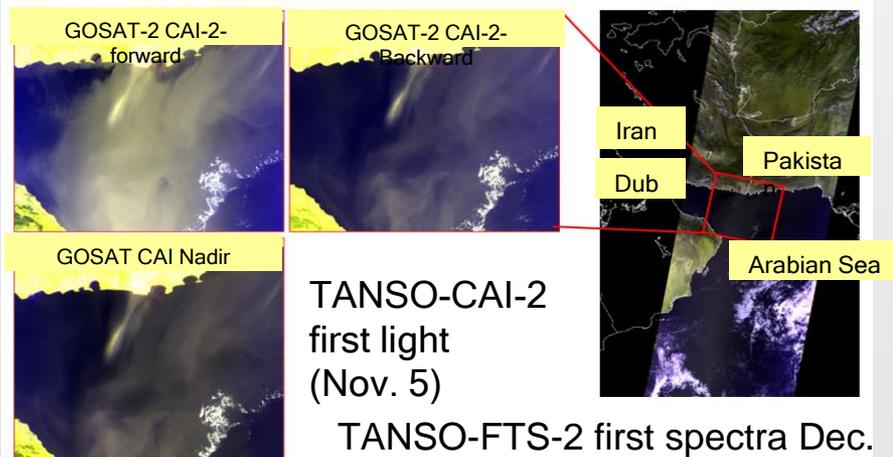


GOSA-2 launch on Oct. 29, 2018
TANSO-FTS-2

- (1) Adding Carbon Monoxide (CO) measurement to identify CO₂ enhancement by combustion
- (2) Wider pointing angles
- (3) Fully customized observation pattern
- (4) Cloud avoiding pointing

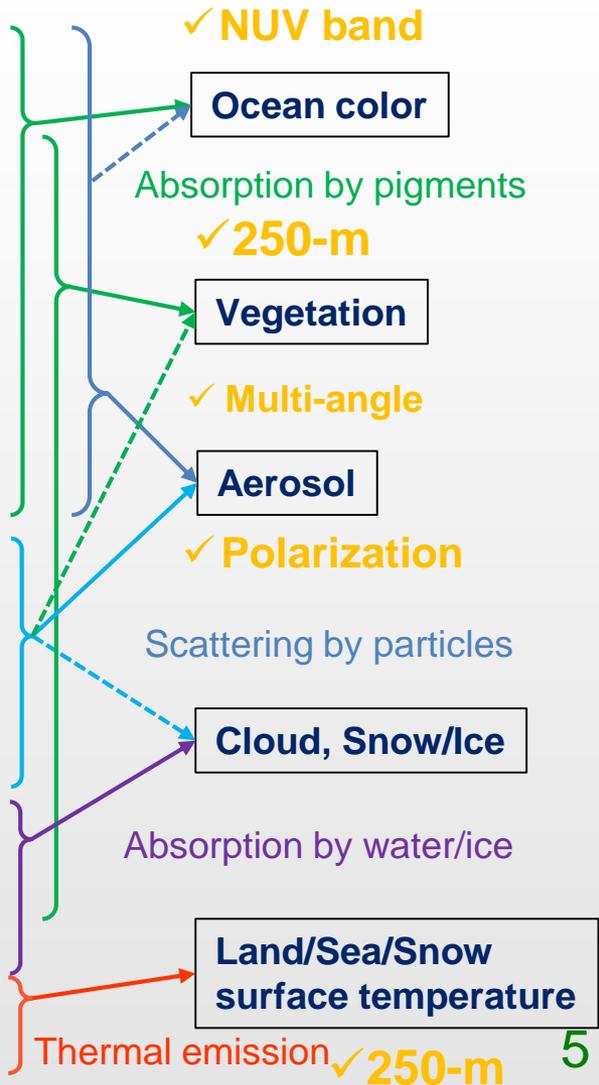
TANSO-CAI-2 (1) 10 bands

(2) Multi-viewing capability improved aerosol detection

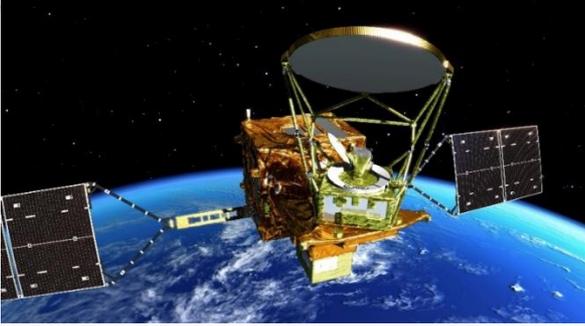




Sub-system	channel	Center wavelength	width	Standard radiance	Saturation radiance	SNR	Pixel size
		nm		W/m ² /sr/μm or Kelvin	TI: NEΔT		
VNR	VN01	379.9	10.6	60	240-241	624-675	250/1000
	VN02	412.3	10.3	75	305-318	786-826	250/1000
	VN03	443.3	10.1	64	457-467	487-531	250/1000
	VN04	490.0	10.3	53	147-150	858-870	250/1000
	VN05	529.7	19.1	41	361-364	457-522	250/1000
	VN06	566.1	19.8	33	95-96	1027-1064	250/1000
	VN07	672.3	22.0	23	69-70	988-1088	250/1000
	VN08	672.4	21.9	25	213-217	537-564	250/1000
	VN09	763.1	11.4	40	351-359	1592-1746	250/1000
	VN10	867.1	20.9	8	37-38	470-510	250/1000
	VN11	867.4	20.8	30	305-306	471-511	250/1000
Polarization	PL01 +60	672.2	20.6	25	295	609	1000
	PL01 +0				315	707	
	PL01 -60				293	614	
	PL02 +60	866.3	20.3	30	396	646	1000
	PL02 +0				424	763	
	PL02 -60				400	752	
IRS	SW01	1050	21.1	57	289.2	951.8	1000
	SW02	1390	20.1	8	118.9	347.3	1000
	SW03	1630	195.0	3	50.6	100.5	250/1000
	SW04	2210	50.4	1.9	21.7	378.7	1000
	TI01	10785	756	300K	340K	0.08K	250/500/1000
	TI02	11975	759	300K	340K	0.13K	250/500/1000



Global Change Observation Mission - Water "SHIZUKU" (GCOM-W)



- Successor of Aqua/AMSR-E (launched in May 2002), providing continuous data for climate studies and operational applications
- Joining A-train constellation and also GPM constellation
- Carrying AMSR2, a multi-polarization and multi-frequency microwave imager
- Observing various water-related ECVs over atmosphere, land, ocean and cryosphere in high spatial resolution
- Improving on-board calibration target has resulted reduction of annual TB variation due to calibration and improvement of TB stability
- **Achieved designed mission life (5-year) on May 18, 2017**, and continues observation.
- **AMSR2 follow-on (AMSR3) has been in Pre-project phase (Phase A) since Sep. 2018.**

AMSR2 Products	
S T D	Brightness Temperature
	Total Precipitable Water (over Ocean)
	Total Cloud Liquid Water Content
	Precipitation
	Sea Surface Temperature
	Sea Surface Wind Speed
	Sea Ice Concentration
	Snow Depth
	Soil Moisture Content
R E S	All-weather Sea Surface Wind Speed
	10-GHz Sea Surface Temperature
	Land Surface Temperature
	Thin Ice Detection
	Total Precipitable Water over Land



- AMSR2 is now flying more than six years exceeding designed life, and JAXA have received strong requests from both domestic and international communities about needs of the AMSR3 in recent years.
- In response to those requirements, AMSR3 has been in pre-project phase since September 1, 2018.
 - Mission Definition Reviews (MDR): April to June 2018 - COMPLETED
 - Project Preparation Review (management): July 2018 - COMPLETED
 - System Requirement Review (SRR): January 2019 - COMPLETED
 - System Definition Review (SDR): Autumn 2019
 - Project Transition Review (management): Autumn 2019
- The new satellite (tentatively called as GOSAT-3) will become a joint mission of GOSAT-2/TANSO-2 successor sensor (advanced spectrometer to monitor greenhouse gases) and AMSR3 (advanced microwave radiometer).
 - Orbit will be **666 km altitude** (same as GOSAT-1) and **13:30 LT in Ascending node** (same as GCOM-W)
- AMSR2 follow-on sensor specification
 - Almost equivalent sensor specification to the current AMSR2 (antenna size, channels) except additional higher frequency channels of **166 & 183 GHz** for snowfall retrievals
 - New products including snowfall, TPW over land, high-resolution SST, all-weather sea surface wind speed & high-resolution sea ice concentration
 - Near-real-time data distribution capability will be the same as AMSR2