

JAXA updates since CGMS-53 and report on the medium to long-term future plans on Earth observation

Presented to CGMS-54 Plenary, agenda item 3

Executive summary

- **JAXA's New Mid- to long-term plan**
 - Starting in April 2025, JAXA embarked on a new Mid- to Long-term plan until 2031. Within this plan, the Earth observation program is guided by the vision "Envision the Future." Under this vision, JAXA aims to observe our planet wider, faster, deeper, and smarter than before. And we will act together with partner organizations for the safe and resilient world.
 - Based on these visions, JAXA has identified **four thematic priorities** as its focus areas. Efforts will be accelerated to achieve tangible outcomes within each theme. The thematic priorities are: "**Global Water Disaster Risk and Water Resource Management,**" "**Carbon Stocks,**" "**Maritime Observation,**" and "**Infrastructure and Disaster Management.**"
- **Major updates since mid-2025:**
 - The first images from **TANSO-3 and AMSR3 onboard GOSAT-GW were released in August and September 2025,** respectively. Both missions are currently under the Initial Calibration and Validation Operations Phase.
 - Standard products from EarthCARE and ALOS-4, which were launched in 2024, have been publicly available since 2025.
 - JAXA is developing the Precipitation Measuring Mission (PMM) to build on and further advance its long-standing heritage in precipitation radar satellites, and the Critical Design phase is currently ongoing.



Envision the Future

Look WIDER

Look FASTER

Look DEEPER

Look SMARTER

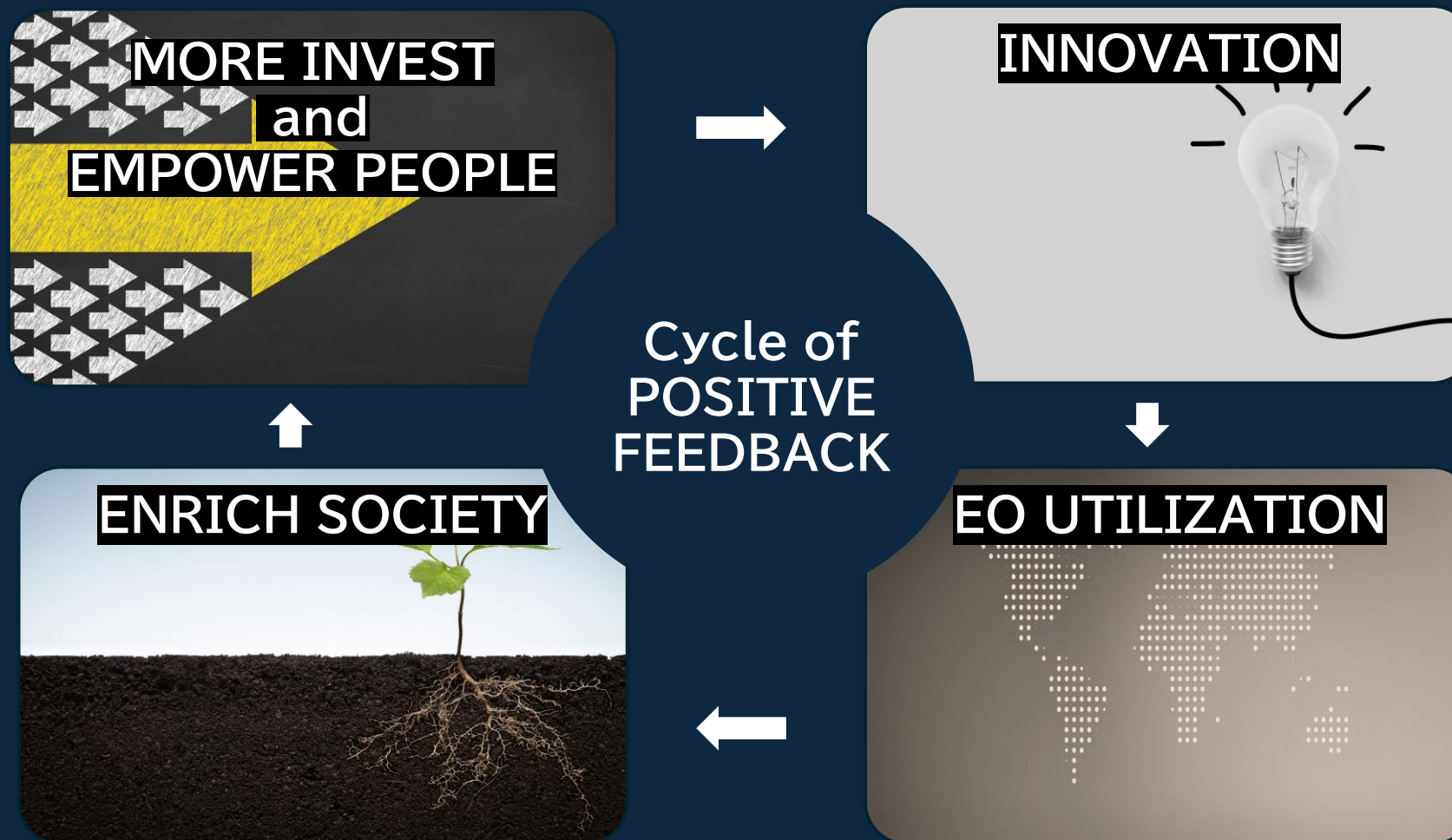
and

ACT TOGETHER

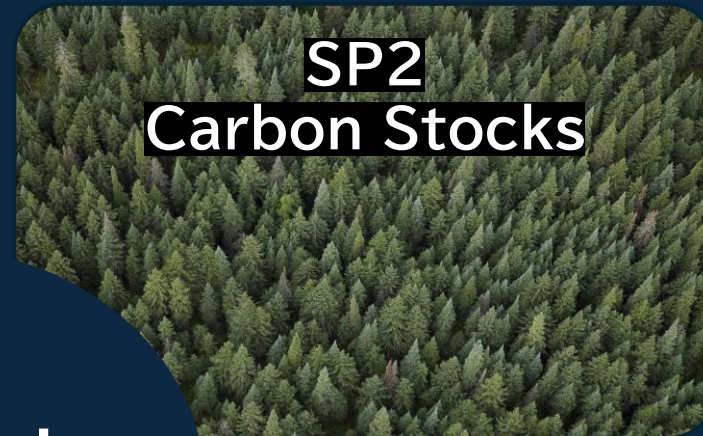
For the

SAFE and RESILIENT WORLD

SUSTAINABLE EO ECOSYSTEM



Four Thematic Strategic Priorities

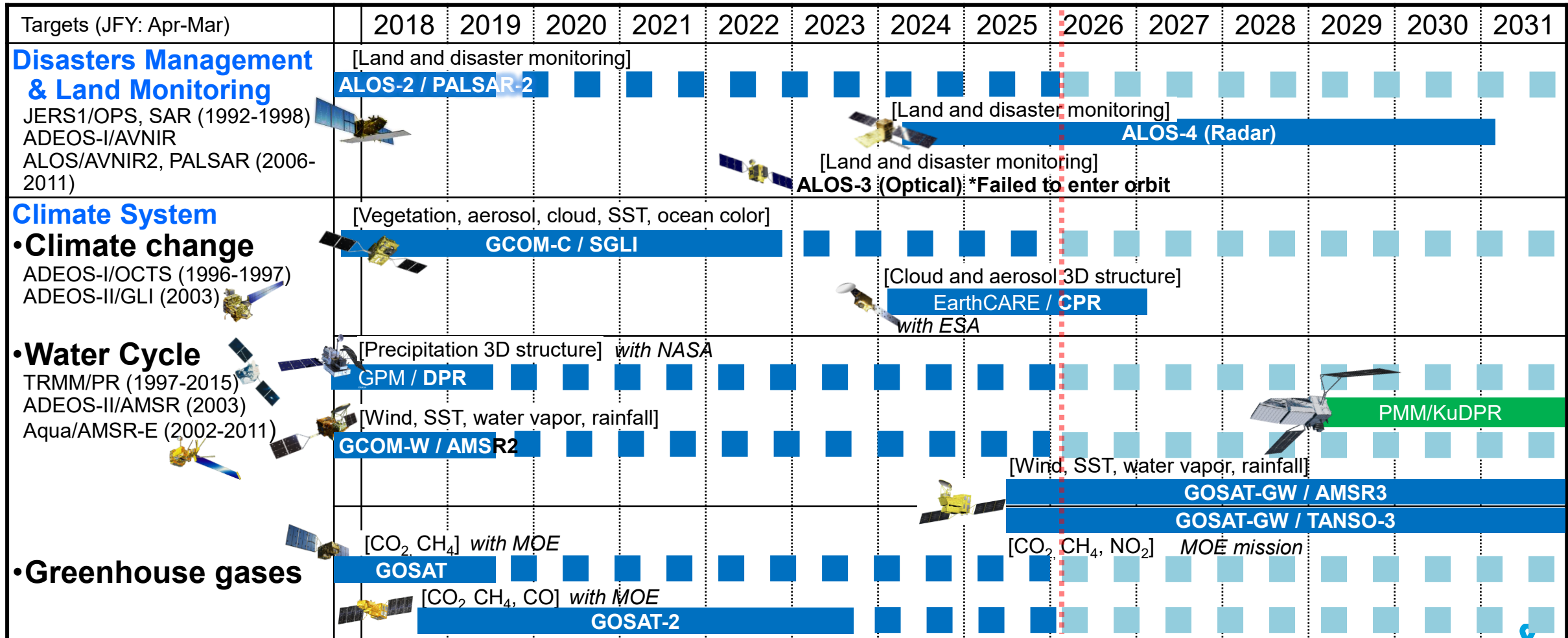


Strategic Priorities

Societal Benefit

-  Disaster Resilience
-  Infrastructure Management
-  Climate Action
-  Safety and Security
-  Resource Management
-  Urban Development
-  Business

JAXA's Earth Observation Satellites/Sensors

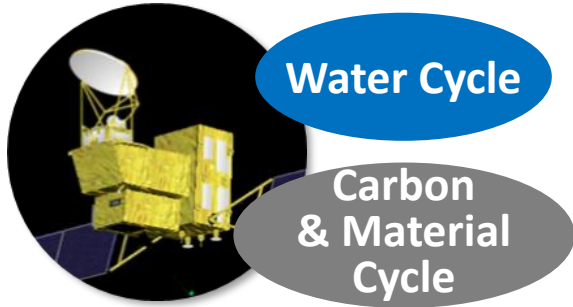


Mission status

On orbit
 Developing
 Planning

GOSAT-GW (Global Observation SATellite for Greenhouse gases and Water cycle)

**Launched in
June 2025!!**



Satellite specification

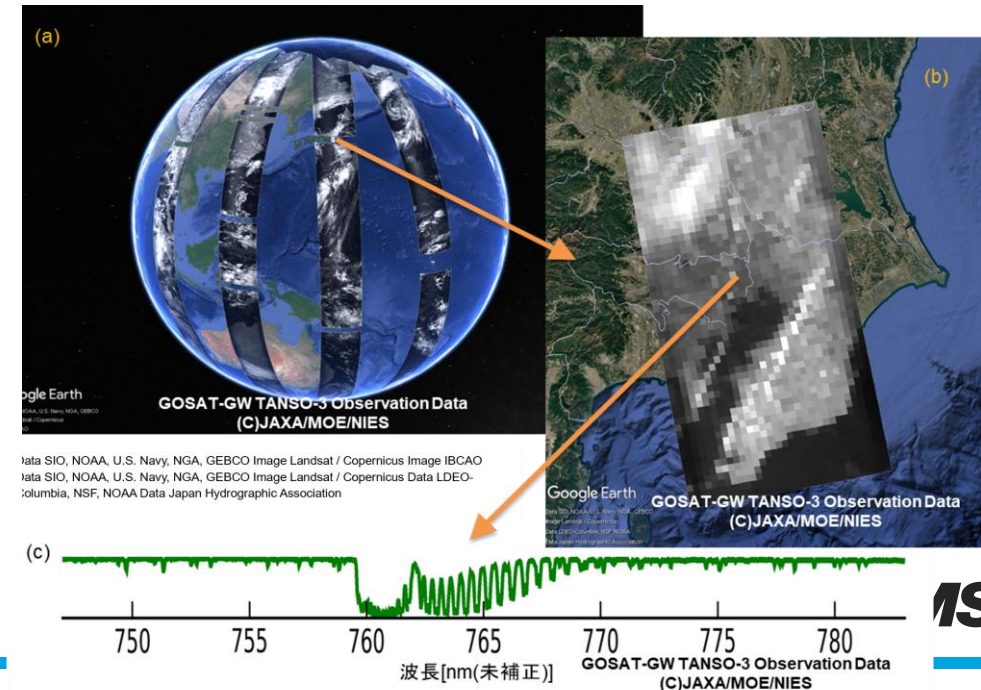
Mission Instruments		AMSR3 (JAXA) TANSO-3 (MOE/NIES)
Orbit	Type	Sun-synchronous, Sub-recurrent orbit
	Altitude	666km, recurrent cycle 3days (same as GOSAT)
	Local sun time at ascending	13:30±15min (same as GCOM-W)
	Revisit time	3 days
Satellite Mass		2.6 tons (including propellant)
Designed lifetime		> 7 years
Launch		June 29, 2025 (JST) by H-IIA #50 rocket



TANSO-3

TANSO-3, led by Japanese Ministry of the Environment (MOE), improves observation capability of greenhouse gases from GOSAT-2/TANSO-2 (chooses grating spectrometer to enable spatially detailed observation)

- In the global observation using the wide-swath obs. mode, a swath width of more than 900 km is measured with a spatial resolution of 10 km.
- In the high-resolution observation mode, a swath width of more than 90 km is measured at a spatial resolution of 1-3km.
- It is currently in initial calibration phase for public data release (Ver.101) in the end of June/early Jul. 2026.



GOSAT-GW (Global Observation SATellite for Greenhouse gases and Water cycle)

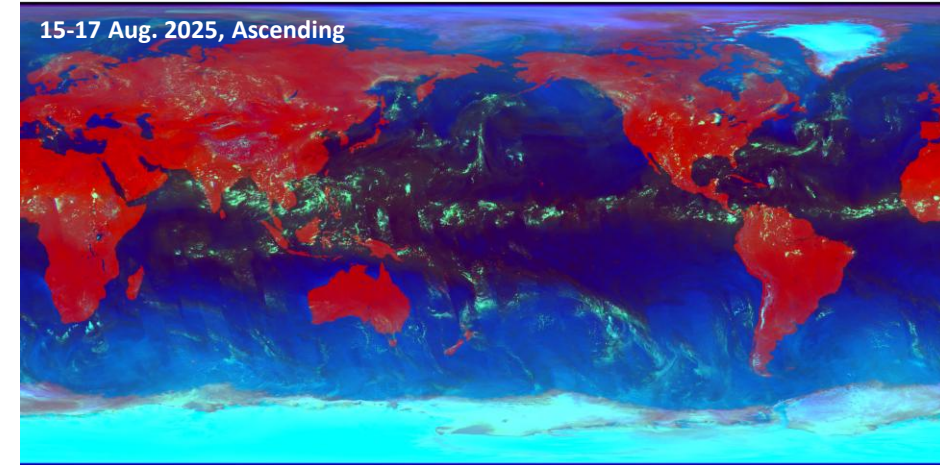
AMSR3

AMSR3, developed by JAXA, succeeds the AMSR series observations (AMSR/AMSR-E/AMSR2) adding new high-frequency channels for solid precipitation retrievals and water vapor analysis in NWP.

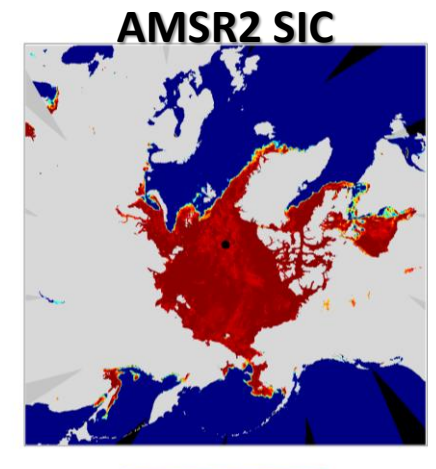
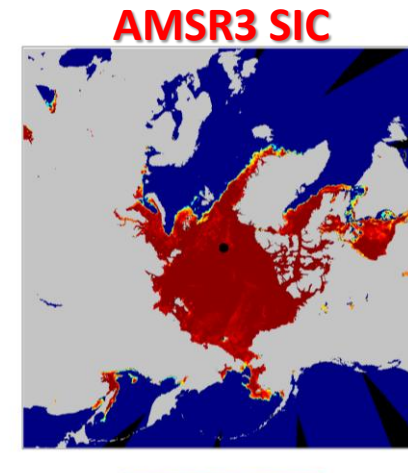
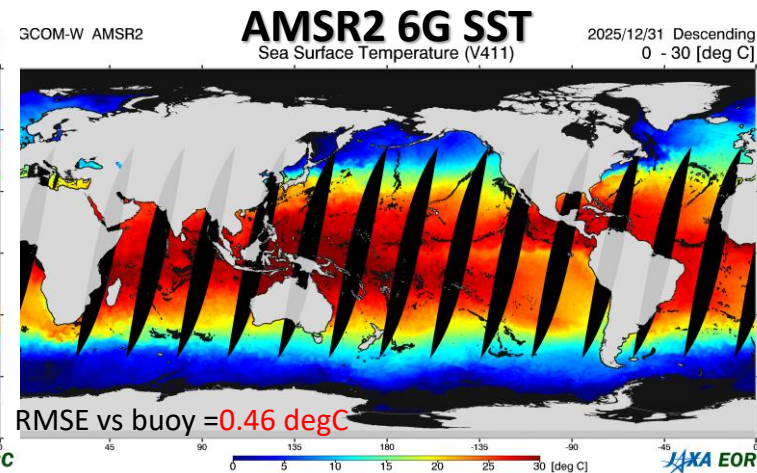
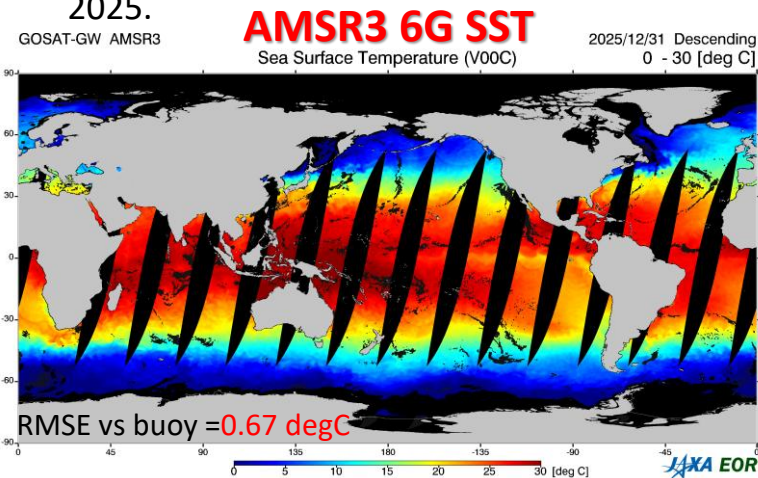
- Additional **166 & 183 GHz** channels to enable monitoring of global precipitation (rain & snow) and contribute to water vapor analysis in NWP
- Additional **10.25 GHz channels with improved NEDT** to enable robust SST retrievals in higher spatial resolution

AMSR3 started scientific observation from Aug. 11 and released first images on Sep. 5.

- It is currently in calibration/validation phase for public data release (Ver.1.0) in the end of June/early Jul. 2026.
- AMSR3 early data has been provided to partner agencies for testing and evaluation since Nov. 2025.



AMSR3 RGB composite image using 18.7, 89.0, and 165.5 GHz V-Pol. TB to highlight cloud/precipitation area in light green



Sea Ice Concentration (SIC) on Dec. 31, 2025, Descending

EarthCARE (Earth Cloud Aerosol and Radiation Explorer)



Launched
in May 2024

Cloud/
Aerosol
Radiation
Budget

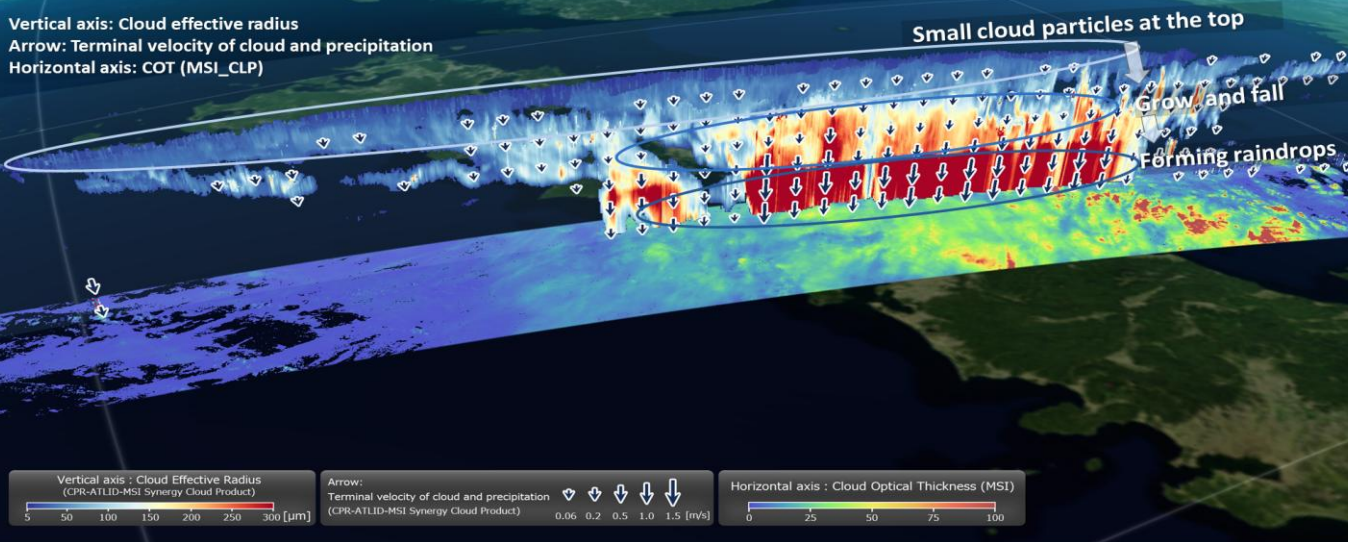
- Europe-Japan joint mission
- 3-dimensional global distributions of cloud and aerosol to contribute to precise understanding of climate change
- JAXA and NICT provides world's first satellite-based cloud vertical motion by the Cloud Profiling Radar (CPR) with 94 GHz with Doppler Capability at 0.8 km spatial resolution.

Orbit	Sun-synchronous sub-recurrent orbit Altitude: approx. 400km Inclination angle: 97.05° Local Sun Time at Desc.: 14:00 Revisit time: 25 days
Instruments	- Cloud Profiling Radar (CPR) by NICT & JAXA - Atmospheric Lidar (ATLID) by ESA - Multi-Spectral Imager (MSI) by ESA - Broad-Band Radiometer (BBR) by ESA
Mass	Approx. 2.2 tons at launch
Designed lifetime	3 years

- **L1 products released in January 2025.**
- **L2 products (single-sensor & CPR-ATLID combined) released in March 2025.**
- **All standard EarthCARE products publicly available since December 2025.**

Three-sensor synergy Product "ACM_CLP"

Vertical axis: Cloud effective radius
Arrow: Terminal velocity of cloud and precipitation
Horizontal axis: COT (MSI_CLP)



ALOS-4 (Advanced Land Observing Satellite-4)

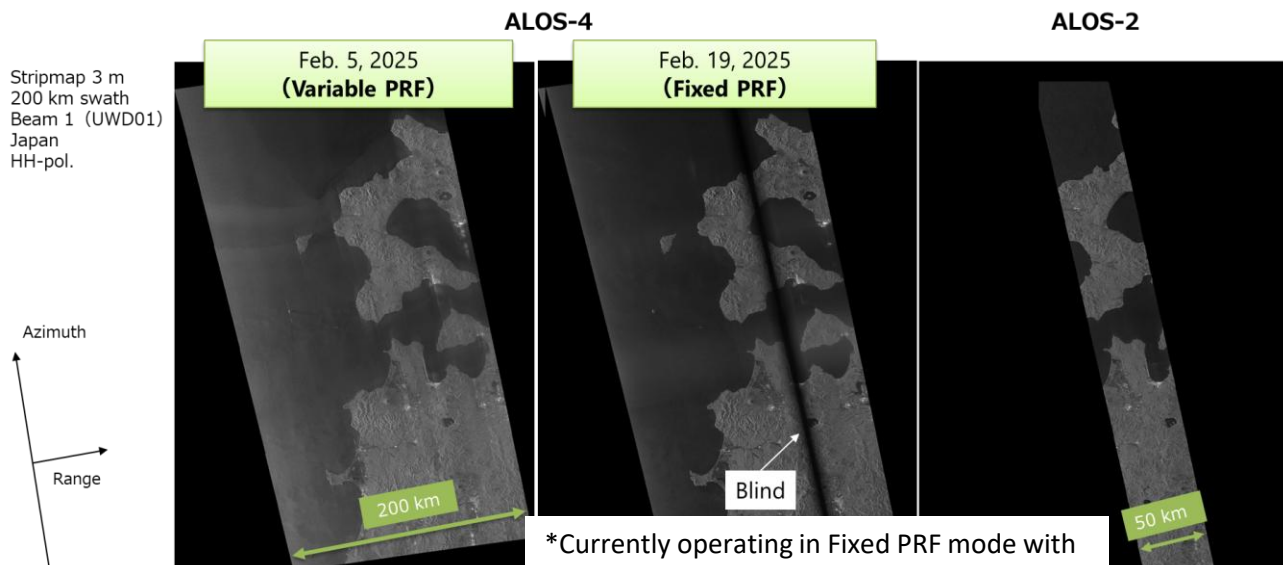


Orbit	Same orbit as ALOS-2 Altitude: 628 km at the equator Inclination angle: 97.9° Local sun time at Desc.: 12:00 +/- 15 min Revisit time: 14 day (15-3/14 rev/day)
Instruments	- PALSAR-3 (Phased Array type L-band Synthetic Aperture Radar-3) - SPAISE3 (SPace based AIS Experiment 3)
Satellite Mass	Approx. 3 tons at launch
Designed lifetime	7 years

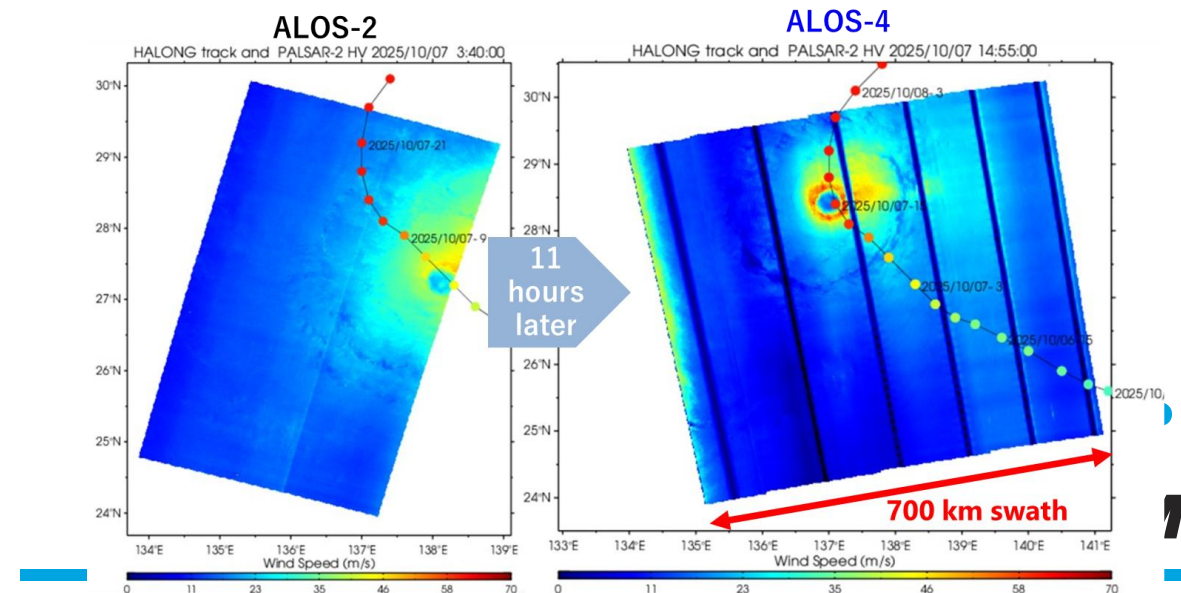
- ✓ Successfully observed over a **200 km swath width with 3 m resolution**. PALSAR-3 can observe 4 times wider than the 50 km swath of PALSAR-2.
- ✓ Use of the new Ka-band data transmission enabling observations of large volumes of dual-polarization data.
- ✓ **The standard products of PALSAR-3 have been released since 2025.**

Swath width of ALOS-2 and ALOS-4

Sea surface wind estimation over 2025 Typhoon HALONG

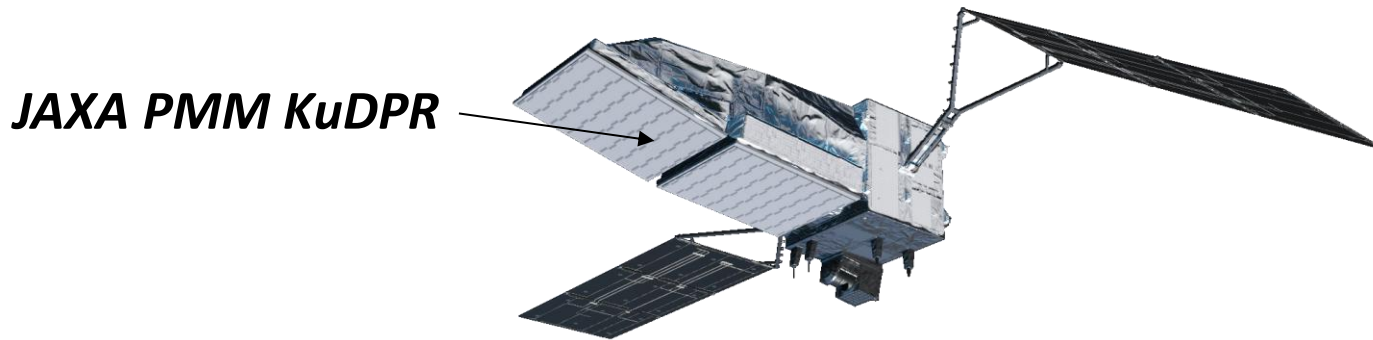


*Currently operating in Fixed PRF mode with good image quality despite blind occurring.



PMM (Precipitation Measuring Mission)

- **JAXA is developing the Precipitation Measuring Mission (PMM) to build on and further advance its long-standing heritage in precipitation radar satellites, established through TRMM and GPM.**
- In June 2023, JAXA's Precipitation Measuring Mission (PMM) Project Team was established on for the Spacecraft carrying the Ku-band Doppler Precipitation Radar.
- **Preliminary Design Review (PDR) was completed in Jan. 2026.**



The Ku-band Doppler Precipitation Radar (KuDPR) will be two-antenna system that adopts Displaced Phase Center Antenna (DPCA) approach (Durden et al. 2007, Tanelli et al. 2016).

→ The DPCA approach can lead to **more accurate Doppler measurement.**

PMM specifications

Instrument	Ku-band Doppler Precipitation Radar Microwave radiometer (CNES)
Weight	2900kg (Max)
Mission life	5 years after launch
Power	4000W (Max)
Launcher	TBC (NASA)
Orbit	Altitude is similar to GPM, 55° inclined

**JAXA's KuDPR will focus on advanced observation of precipitation:
Doppler velocity observation &
High sensitivity observation**

KuDPR major characteristics

Frequency	13.6 GHz
Observation modes	<ul style="list-style-type: none"> ▪ Doppler obs. mode ▪ Dense sampling obs. mode ▪ Normal scan obs. mode