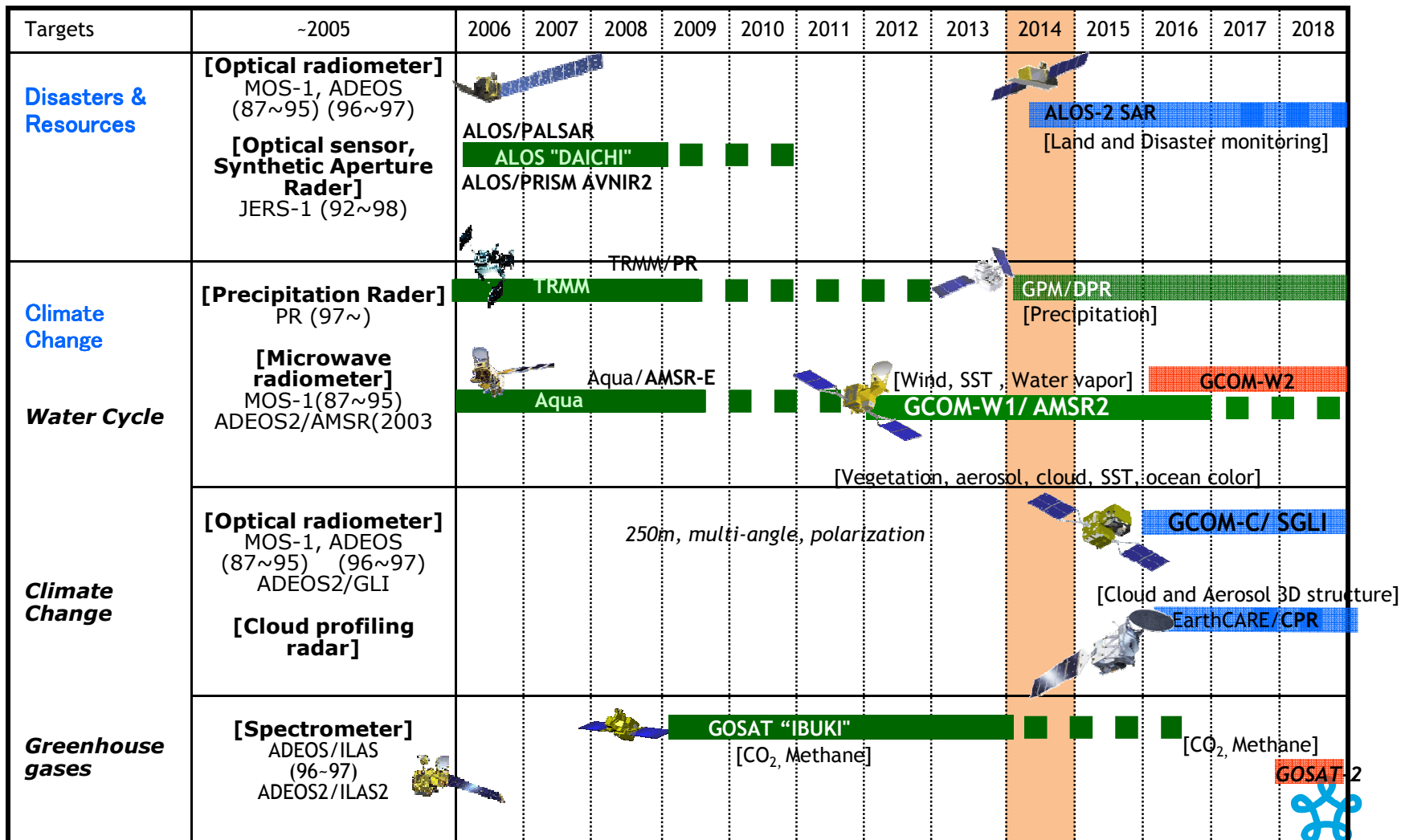


# Status report on the current and future satellite systems by JAXA

Presented to CGMS-42 plenary session, agenda item [D.2]

## Overview - Planning of JAXA satellite systems



## CURRENT R&D SATELLITES

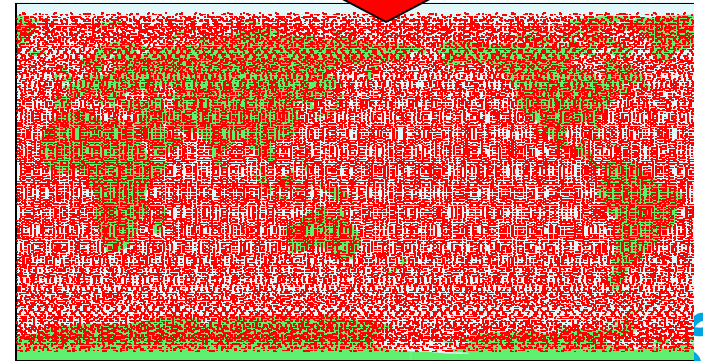
- GPM/DPR was successfully launched from Tanegashima Space Center on Feb. 27, and Initial calibration and check out of the DPR is ongoing.
- TRMM/PR is still working well. 15<sup>th</sup> anniversary symposium was held in Tokyo in November, 2012.
- JAXA currently operates GOSAT, Ibuki and GCOM-W1, Shizuku
- The GOSAT data products are distributed through the GOSAT User Interface Gateway (GUIG), a website for GOSAT data distribution.
- The AMSR2 products are available at the GCOM-W1 Data Providing Service website.

# GOSAT, Ibuki

GOSAT enables global (with 56,000 points) and frequent (at every 3 days) monitoring CO<sub>2</sub> and CH<sub>4</sub> column density. (Launched in Jan 2009)



Current Ground-based Observation Points  
(320pts) *Provided by WMO WDCGG*



Increase of Observation Points using GOSAT  
(56,000pts)



# AMSR2 onboard GCOM-W1 "SHIZUKU"



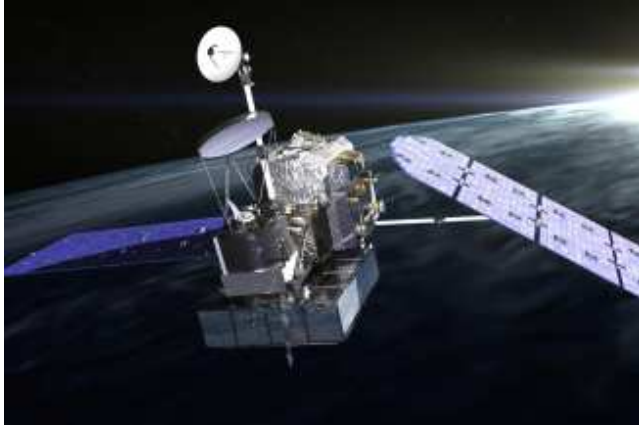
- Successor of AMSR-E on Aqua and AMSR on ADEOS-II.
- Deployable main reflector system with 2.0m diameter (1.6m for AMSR-E).
- Frequency channel set is identical to that of AMSR-E except 7.3GHz channel for RFI mitigation.
- Two-point external calibration with improved HTS (hot-load).
- Add a redundant momentum wheel to increase reliability.

GCOM-W1/AMSR2 characteristics	
Scan and rate	Conical scan at 40 rpm
Antenna	Offset parabola with 2.0m dia.
Swath width	1450km
Incidence angle	Nominal 55 degrees
Digitization	12bits
Dynamic range	2.7-340K
Polarization	Vertical and horizontal

AMSR2 Channel Set				
Center Freq. [GHz]	Band width [MHz]	Pol.	Beam width [deg] (Ground res. [km])	Sampling interval [km]
6.925/7.3	350	V and H	1.8 (35 x 62)	10
10.65	100		1.2 (24 x 42)	
18.7	200		0.65 (14 x 22)	
23.8	400		0.75 (15 x 26)	
36.5	1000		0.35 (7 x 12)	
89.0	3000		0.15 (3 x 5)	5



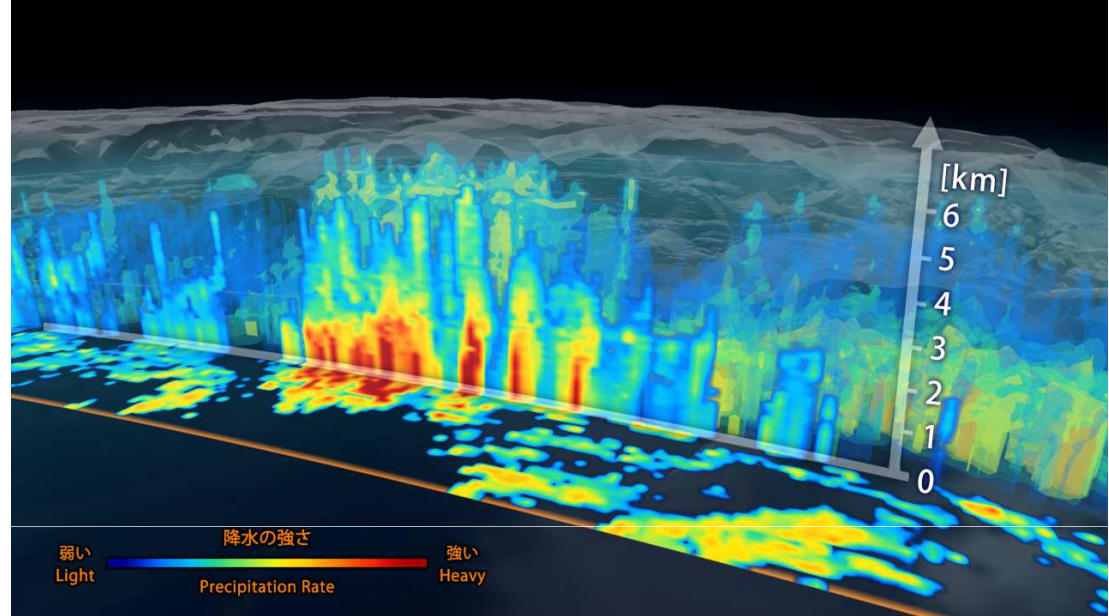
# GPM/DPR



GPM Core Observatory on orbit  
(Image Credit: NASA)



GPM Launch Seen From the Tanegashima Space Center (Image Credit: NASA/Bill Ingalls)



First light of GPM/DPR ((Image Credit : NASA/JAXA)

- GPM/DPR was successfully launched from Tanegashima Space Center on Feb. 27.
- Initial calibration and check out of DPR is ongoing.
- First light of GPM/DPR have released.

## FUTURE R&D SATELLITES

- The developments of ALOS-2, EarthCARE/CPR and GCOM-C are under way.
- ALOS-2 will be launched in May 24, 2014. While EarthCARE and GCOM-C will be launched in JFY2016.
- GOSAT-2 project was officially initiated in this April as a GOSAT, Ibuki follow-on. The target launch date is in JFY2017.

# ALOS-2 Specification



## ALOS-2: SAR Satellite

- ✓ August, 2009: Project Team was established
- ✓ December 2009: Preliminary Design Phase
- ✓ October 2010: Critical Design Phase
- ✓ Planned to be launch on May 24th 2014

Orbit		Sun-Synchronous Sub-Recurrent
		Altitude: Approx. 630km
		LST: 12:00 in descending orbit
Design Life		5 years
Launch	Target	May 24 <sup>th</sup> , 2014
	Rocket	H-2A
Satellite	Mass	Approx. 2 ton
	Solar Paddle	Two-wings type panel
Mission Data Transmission		Direct / via. Data Relay Satellite
Mission Sensor		Synthetic Aperture Radar (SAR)
Frequency		L-band (1.2GHz)
Major Observation Mode	Fine	Resolution: 1-3 m, Width: 25 km
	Basic	Resolution: 3 / 6 / 10 m Width: 50 / 50 / 70 km
	Wide	Resolution: 100 m, Width: 350 km
Mission Objectives		Crustal change, volcano monitoring, surface deformation
		Sea ice, river, forest and agriculture monitoring etc.



# ALOS-2 Satellite

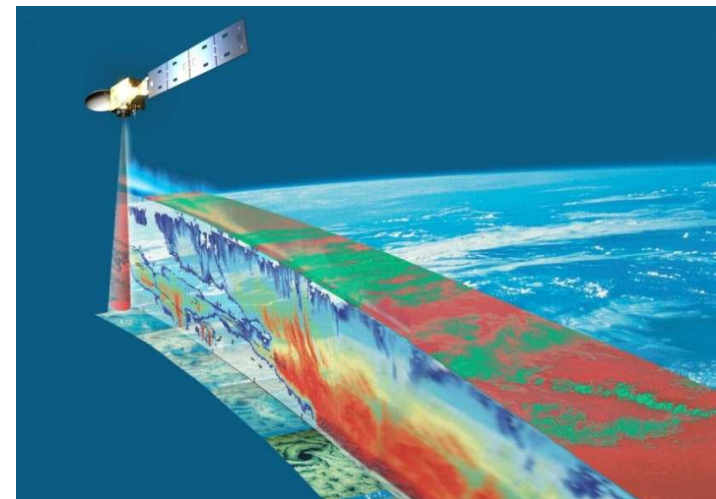
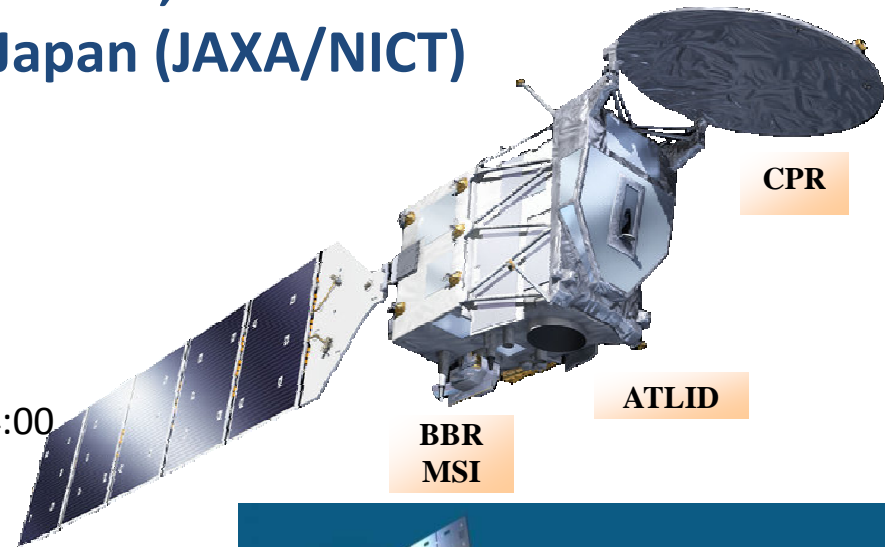


Press Conference on March 28, 2014

# EarthCARE/CPR

## Climate monitoring of earth radiation, cloud and aerosol Cooperation between ESA and Japan (JAXA/NICT)

- **Mission**
  - Vertical profile of clouds, aerosol
  - Interaction between clouds and aerosol
  - Cloud stability and precipitation
- **Orbit**
  - Sun synchronous
  - Local Sun Time at Descending Node 14:00
  - Altitude 400km
- **Instrument**
  - CPR (Cloud Profile Radar)
  - ATLID (Atmospheric LIDAR)
  - MSI (Multi-Spectral Imager)
  - BBR (Broad Band Radiometer)
- **Task sharing**
  - JAXA/NICT (CPR)
  - ESA (ATLID, MSI, BBR, Spacecraft)
- **Launch target**
  - JFY2016



# GCOM-C and SGLI

- Improvement of land, coastal, and aerosol observations.
  - [fine \(250m\) spatial resolution](#)
  - [polarization/along-track slant view](#)



GCOM-C SGLI characteristics (Current baseline)	
Orbit	Sun-synchronous (descending local time: 10:30) Altitude: 798km, Inclination: 98.6deg
Launch Date	Jan. 2014 (HII-A)
Mission Life	5 years (3 satellites; total 13 years)
Scan	Push-broom electric scan (VNR: VN & P) Wisk-broom mechanical scan (IRS: SW & T)
Scan width	1150km cross track (VNR: VN & P) 1400km cross track (IRS: SW & T)
Digitalization	12bit
Polarization	3 polarization angles for P
Along track direction	Nadir for VN, SW and T, +45 deg and -45 deg for P
On-board calibration	VN: Solar diffuser, Internal lamp (LED, halogen), Lunar by pitch maneuvers (~once/month), and dark current by masked pixels and nighttime obs. SW: Solar diffuser, Internal lamp, Lunar, and dark current by deep space window T: Black body and dark current by deep space window All: Electric calibration

Multi-angle obs. for 674nm and 869nm

SGLI channels						
CH	$\lambda$	$\Delta\lambda$	$L_{std}$	$L_{max}$	SWR at Lstd	IFOV
	VN, P, SW: nm T: $\mu\text{m}$	VN, P: W/m <sup>2</sup> /sr/ $\mu\text{m}$ T: Kelvin	VN, P, SW: - T: NE $\Delta$ T			m
VN1	380	10	60	210	250	250
VN2	412	10	75	250	400	250
VN3	443	10	64	400	300	250
VN4	490	10	53	120	400	250
VN5	530	20	41	350	250	250
VN6	565	20	33	90	400	250
VN7	673.5	20	23	62	400	250
VN8	673.5	20	25	210	250	250
VN9	763	12	40	350	1200(@1km)	250
VN10	868.5	20	8	30	400	250
VN11	868.5	20	30	300	200	250
P1	673.5	20	25	250	250	1000
P2	868.5	20	30	300	250	1000
SW1	1050	20	57	248	500	1000
SW2	1380	20	8	103	150	1000
SW3	1630	200	3	50	57	250
SW4	2210	50	1.9	20	211	1000
T1	10.8	0.7	300	340	0.2	500/250
T2	12.0	0.7	300	340	0.2	500/250

250m-mode possibility

# GOSAT-2

GOSAT-2 monitor CO<sub>2</sub>, CH<sub>4</sub> and CO column density. The satellite will be launched in JFY2017.



## Specifications of FTS-2

	Band1	Band2	Band3	Band4	Band5
Spectral coverage (um)	0.754-0.772	1.56-1.69	1.92-2.38	5.6-8.4	8.4-14.3
Targeted gases	O <sub>2</sub>	CO <sub>2</sub> , CH <sub>4</sub>	CO <sub>2</sub> , H <sub>2</sub> O, CO	CH <sub>4</sub>	CO <sub>2</sub>
Polarization observation	Yes	Yes	Yes	No	No
Sampling resolution (cm <sup>-1</sup> )	0.2				
IFOV (mrad)	15.8				

## Specifications of CAI-2

	Forward viewing					Backward viewing				
	Band1	Band2	Band3	Band4	Band5	Band6	Band7	Band8	Band9	Band10
Spectral coverage (nm)	333-353	433-453	664-684	859-879	1585-1675	370-390	540-560	664-684	859-879	1585-1675
Target	Cloud and Aerosol									
Spatial resolution (m)	500				1000	500				1000
Tilt angle (deg)	+20					-20				
Swath (km)	1000									

**Thank you for your attention**