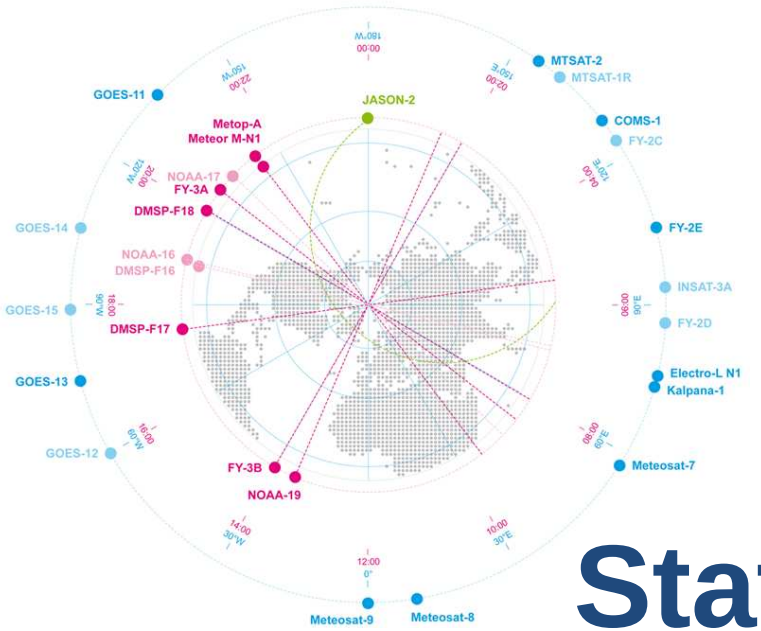

Status report on the current and future satellite systems by JAXA

Presented to CGMS-41 plenary session, agenda item [D.2]

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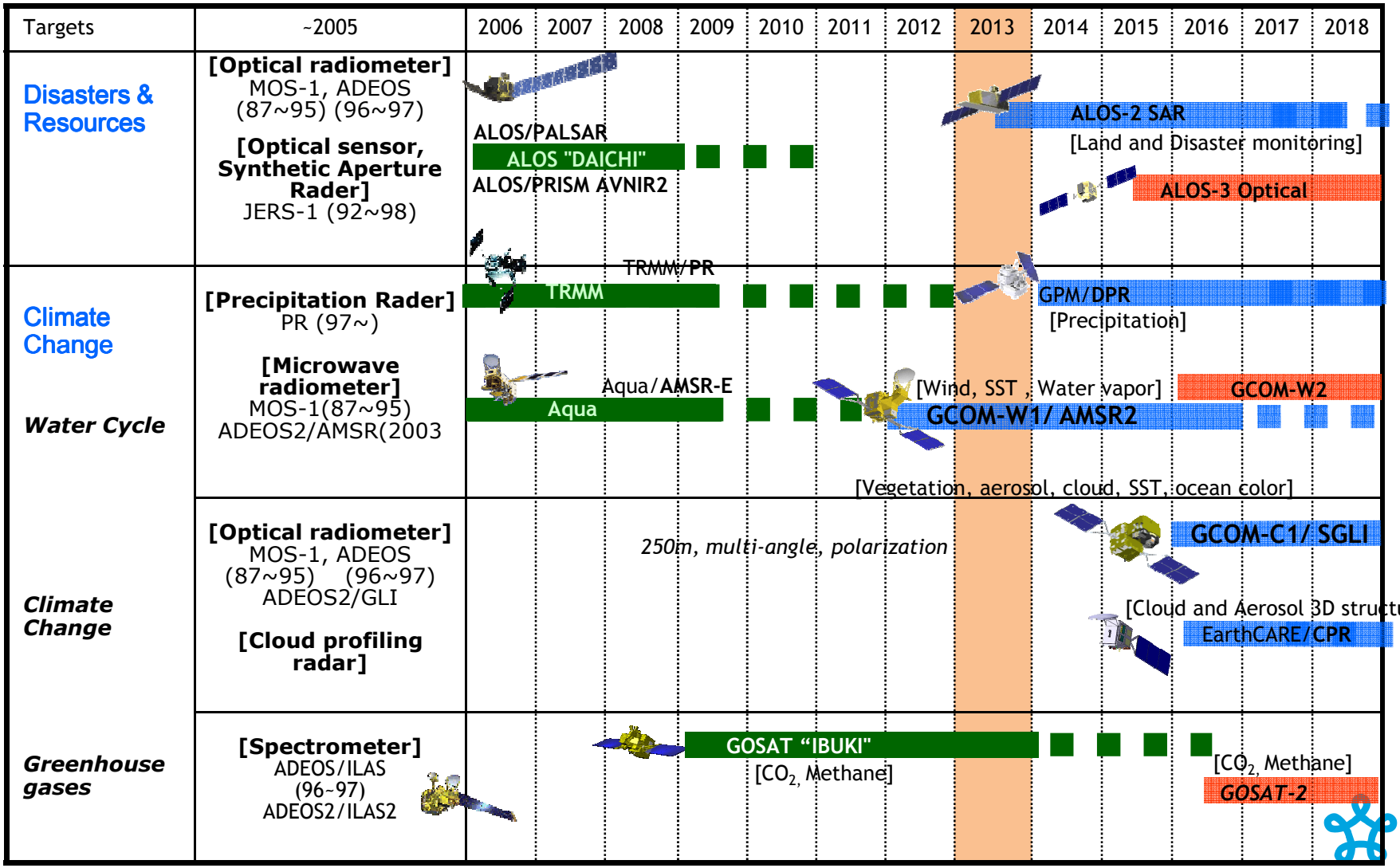
Overview - Planning of JAXA satellite systems



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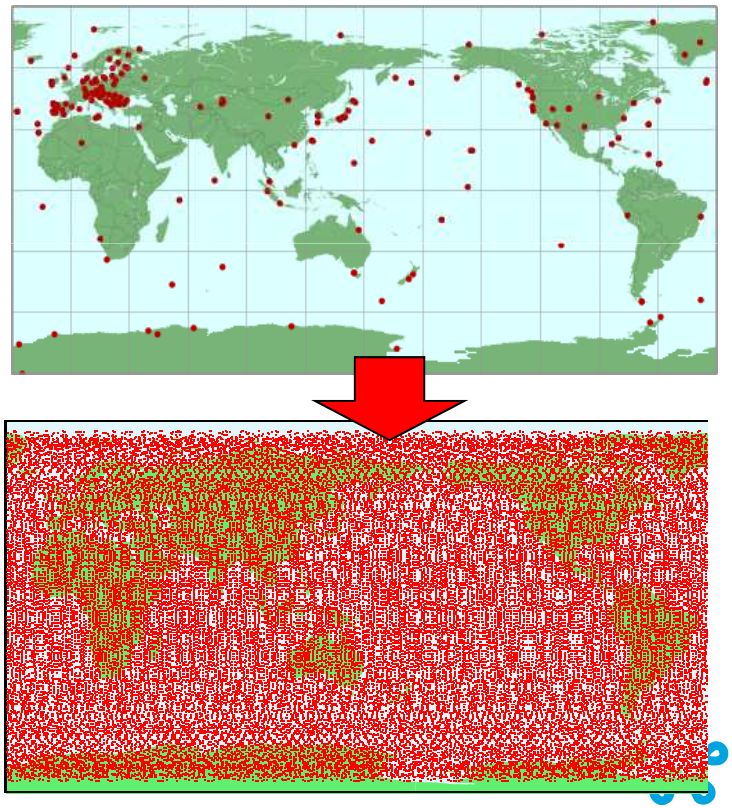
CURRENT R&D SATELLITES

- JAXA currently operates GOSAT, Ibuki and GCOM-W1, Shizuku
- TRMM/PR is still working well. 15th anniversary symposium was held in Tokyo in last November.
- All types of the GOSAT data products are to be provided for general users. Data users can search and order the Level 1 data and the higher level data products. The Level 1 data and the Level 2 data products whose uncertainties have been evaluated in the instrument calibration and data validation activities are open to the general users. Carbon dioxide flux estimates based on the observational data by GOSAT are released to general users as the Level 4 data products.
- The initial calibration and checkout of GCOM-W1, Shizuku was successfully conducted. 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 CO2 and CH4 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

FUTURE R&D SATELLITES

- The developments of ALOS-2, GPM/DPR, EarthCARE/CPR and GCOM-C1 are under way.
- Both ALOS-2 and GPM core satellite will be launched in JFY2013.
- GPM observatory will be shipped to Japan around in October 2013 for launch. Both NASA/GSFC and JAXA are developing ground system to process GPM standard products. At JAXA's GPM Mission Operation System in Tsukuba, software development and test, including internal and external interface test, was completed. Mission Simulation Test and End-To-End test is under way at GSFC and at JAXA
- Both ALOS-2 and GPM core satellite will be launched in JFY2013. While EarthCARE and GCOM-C1 will be launched in JFY2016.

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 in 2013

Orbit		Sun-Synchronous Sub-Recurrent
		Altitude: Approx. 630km
		LST: 12：00 in descending orbit
Design Life		5 years
Launch	Target	JFY2013
	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.

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GPM Core Observatory with DPR

DPR mechanically integrated to the core observatory (photo provided by NASA)

GPM core observatory in GMI and HGA deployed configuration
(photo provided by NASA)

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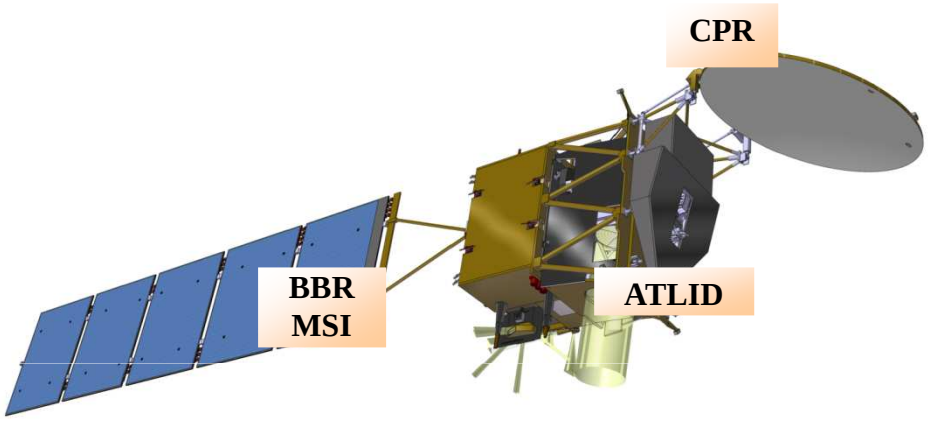
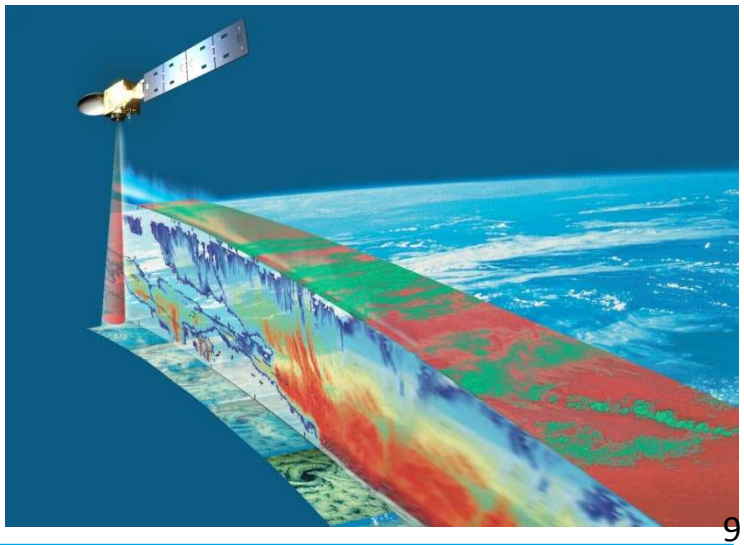
EarthCARE/CPR

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

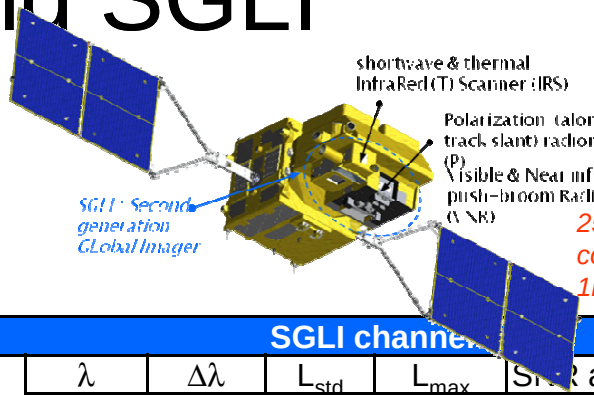
- **Mission**
  - Vertical profile of clouds, aerosol
  - Interaction between clouds and aerosol
  - Cloud stability and precipitation
- **Orbit**
  - Sun synchronous
  - Equator crossing time 13:45
  - Altitude 400km
- **Instrument**
  - CPR (Cloud Profile Radar)
  - ATLID (Atmospheric LIDAR)
  - MSI (Multi-Spectral Imager)
  - BBR (Broad Band Radiometer)
- **Task sharing**
  - JAXA/NICT (CPR)
  - ESA (LIDAR, MSI, BBR, Spacecraft)
- **Launch target**
  - JFY2016





GCOM-C1 and SGLI

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



250m over land or coastal area, and 1km over offshore

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 channel						
CH	λ VN, P, SW: nm T: μm	Δλ	L_{std} VN, P: $W/m^2/sr/\mu m$ T: Kelvin	L_{max}	SNR at Lstd VN, P, SW: - T: NEΔT	IFOV 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

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Thank you for your attention
Enjoy your stay in Japan