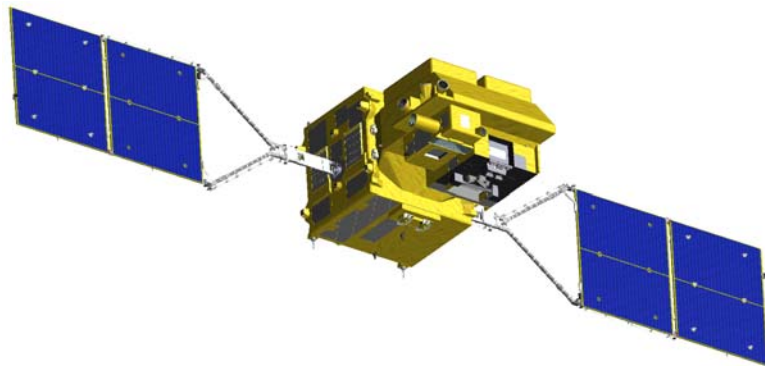
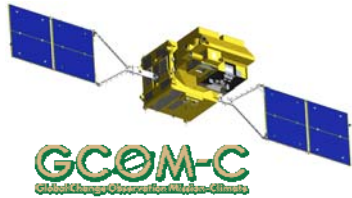


GCOM-C/SGLI and its Lunar Calibration

Lunar Calibration Workshop
December 1-4, 2014



JAXA/GCOM Proj.
Yoshihiko Okamura
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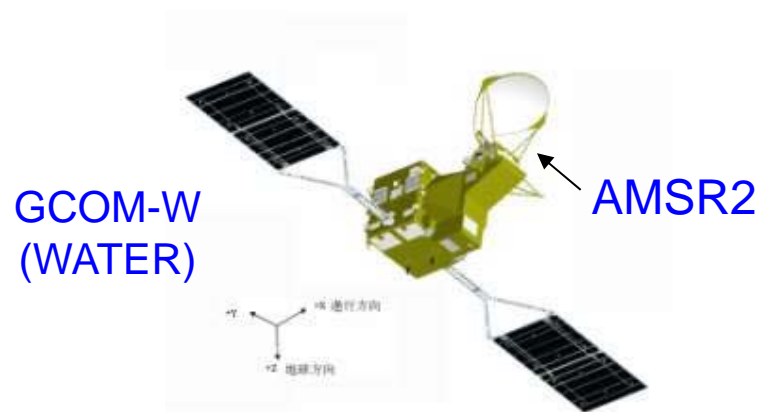


1. Overview of GCOM-C satellite and SGLI

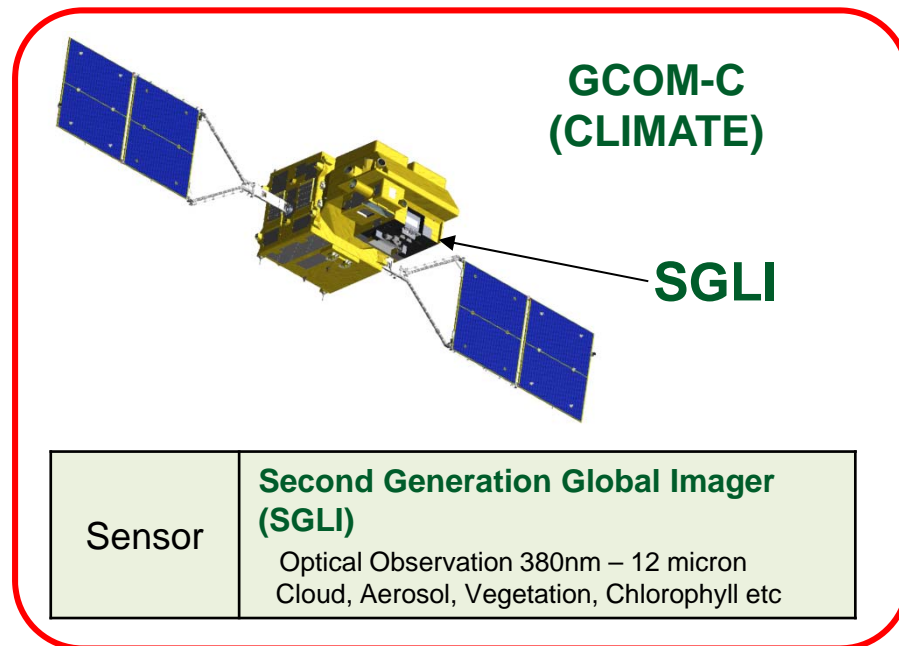
(1) Global Change Observation Mission(GCOM)



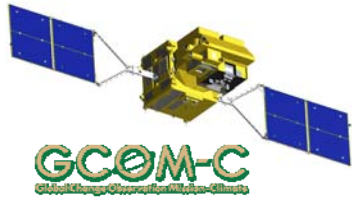
- Long-term observation of the earth's environment
 - ✓ 5 years of each satellite's mission life and 13 years in total.
- Two satellite series;
 - ✓ GCOM-W : Microwave observation for WATER CYCLE using AMSR2 (AMSR-E follow on)
 - ✓ GCOM-C : Optical multi-channel observation for RADIATION BUDGET and CARBON CYCLE using SGLI (GLI follow on)



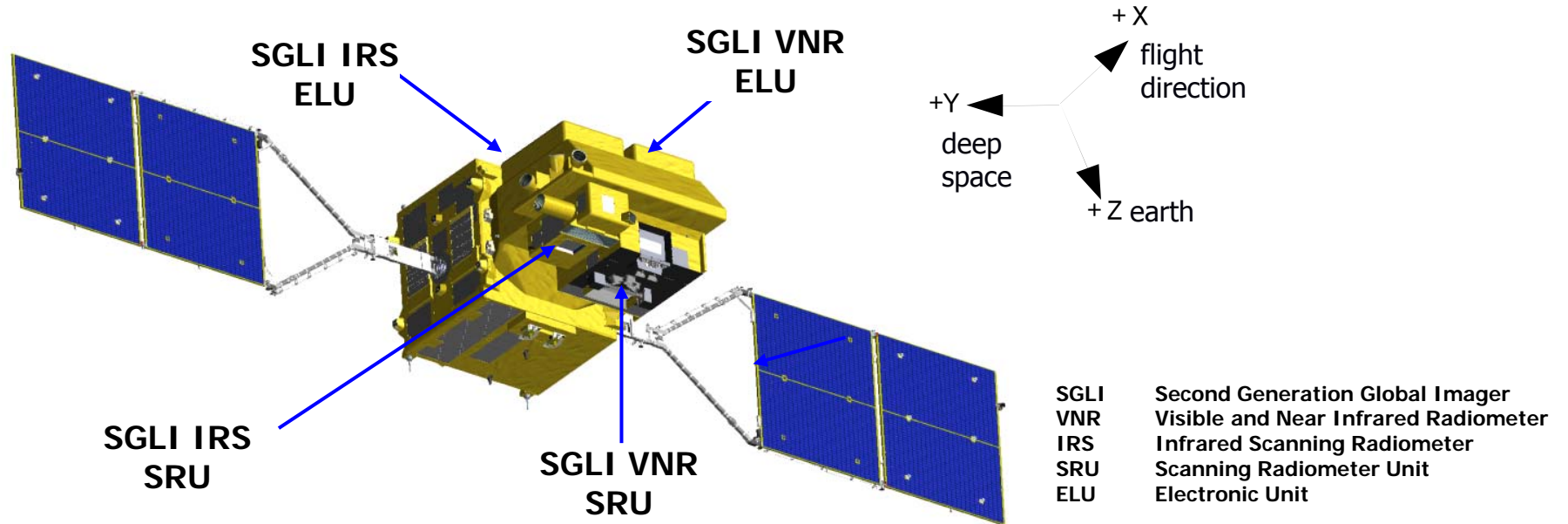
Sensor	Advanced Microwave Radiometer 2 (AMSR2) Passive Microwave Observation Water vapor, soil moisture etc
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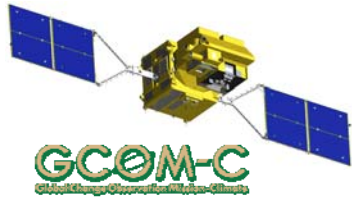
Sensor	Second Generation Global Imager (SGLI) Optical Observation 380nm – 12 micron Cloud, Aerosol, Vegetation, Chlorophyll etc
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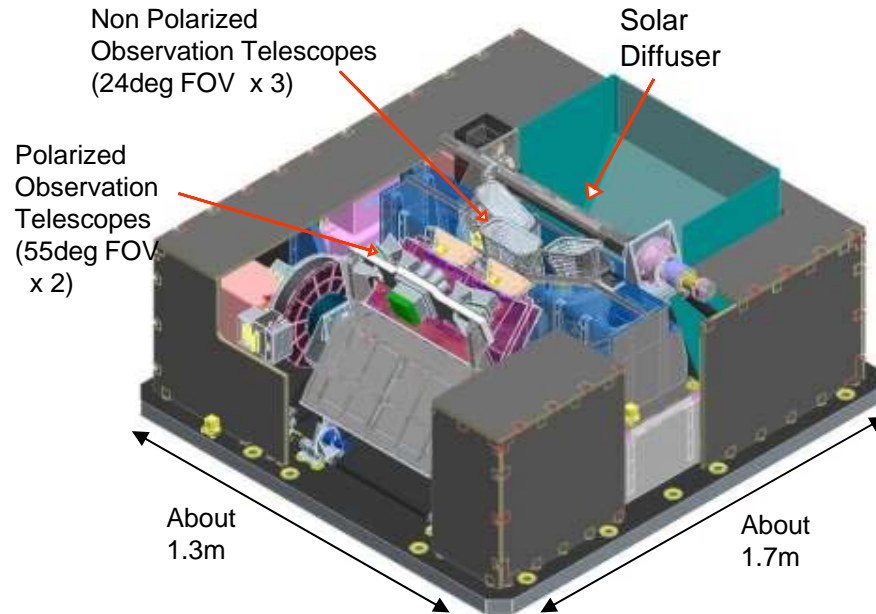
1. Overview of GCOM-C satellite and SGLI (2) GCOM-C satellite



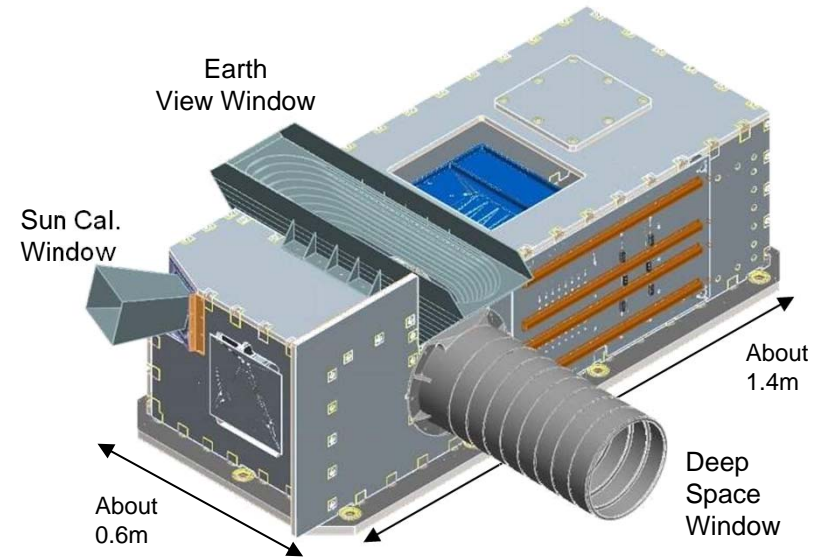
		GCOM-C
Orbit Parameters	Orbit Type	sun-synchronous, ground track repeat, near-circular orbit
	Local sun time	10:15 – 10:45 at descending node
	Altitude above equator	798 km at Equator
	Inclination	98.6 degrees
Mission Life		> 5 years



1. Overview of GCOM-C satellite and SGLI (3) SGLI (Second Generation Global Imager)

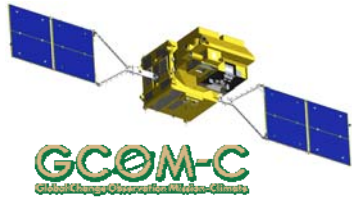


Visible and Near Infrared Radiometer (SGLI-VNR)



Infrared Scanning Radiometer (SGLI-IRS)

Sensor Unit	features
SGLI VNR	Non Polarized Observation (11ch), IFOV 250m, Swath 1150km Polarized Observation (2ch), IFOV 1km, Swath 1150km
SGLI IRS	Shortwave Infrared (SWI 4ch), IFOV 250m/1km, Swath 1400km Thermal Infrared (TIR:2ch), IFOV 500m, Swath 1400km



1. Overview of GCOM-C satellite and SGLI

(4) SGLI performances



- The SGLI features are **250m (VNR-NP & SW3) and 500m (TIR) spatial resolution** and **polarization/along-track slant view** channels (VNR-PL), which will improve land, coastal, and aerosol observations.

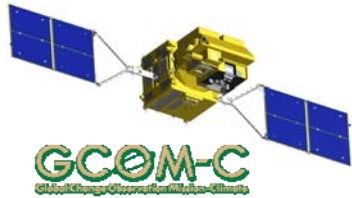
250m over the Land or coastal area, and 1km over offshore

GCOM-C SGLI characteristics	
Orbit	Sun-synchronous (descending local time: 10:30) Altitude 798km, Inclination 98.6deg
Mission Life	5 years (3 satellites; total 13 years)
Scan	Push-broom electric scan (VNR) Wisk-broom mechanical scan (IRS)
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, LED, Lunar cal maneuvers, and dark current by masked pixels and nighttime obs. SW: Solar diffuser, LED, Lunar, and dark current by deep space window T: Black body and dark current by deep space window

Multi-angle obs. for 674nm and 869nm

SGLI channels						
CH	λ	$\Delta\lambda$	L_{std}	L_{max}	SNR at Lstd	IFOV
	VN, P, SW: nm T: μm		VN, P: W/m ² /sr/ μm T: Kelvin		VN, P, SW: SNR T: NE Δ 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	250/1000
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	250/1000
T2	12.0	0.7	300	340	0.2	250/1000

TIR: 500m resolution is also used

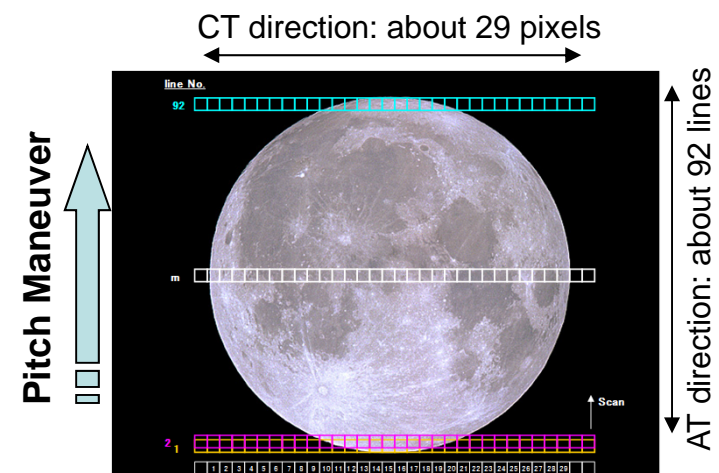
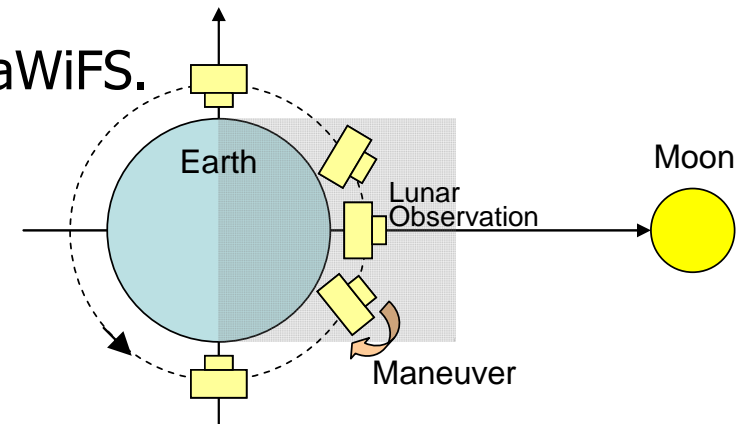


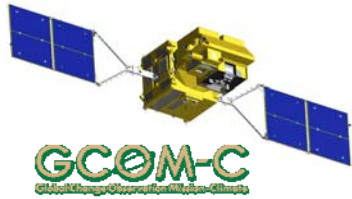
2. SGLI Calibration Plan (1) Lunar Calibration



- Moon reflecting solar light is a stable light source as a long term calibration reference of the optical sensors.
- GCOM-C lunar calibration maneuvers are planned to be conducted every 29.5 days during 5 years mission.
- Lunar calibration concept is similar to SeaWiFS.

Calibration interval	Every 29.5 days (= synodic period of the moon and the sun)
Lunar phase angle	7deg +/-3deg
SGLI lunar observation	All bands (VNR & IRS) 250m resolution
Satellite Maneuver Requirement	- Pitch rate of 0.15 deg/s with high stability - Selectable roll angle (lunar image in SGLI swath)





3. Summary and future plan



- GCOM-C/SGLI
 - Target launch of GCOM-C is JFY2016.
 - Lunar calibration operations are planned to be conducted once per month.

- Expectation on GIRO
 - Regarding the GCOM-C/SGLI, we are very interested in usage of the GIRO application as a common evaluation tool for our lunar calibration data.
 - SGLI lunar calibration data can be shared in the range of the GIRO community once available, when we use the GIRO for SGLI evaluation.