

AGENCY REPORTS

JAXA

Hiroshi Murakami

JAXA/EORC

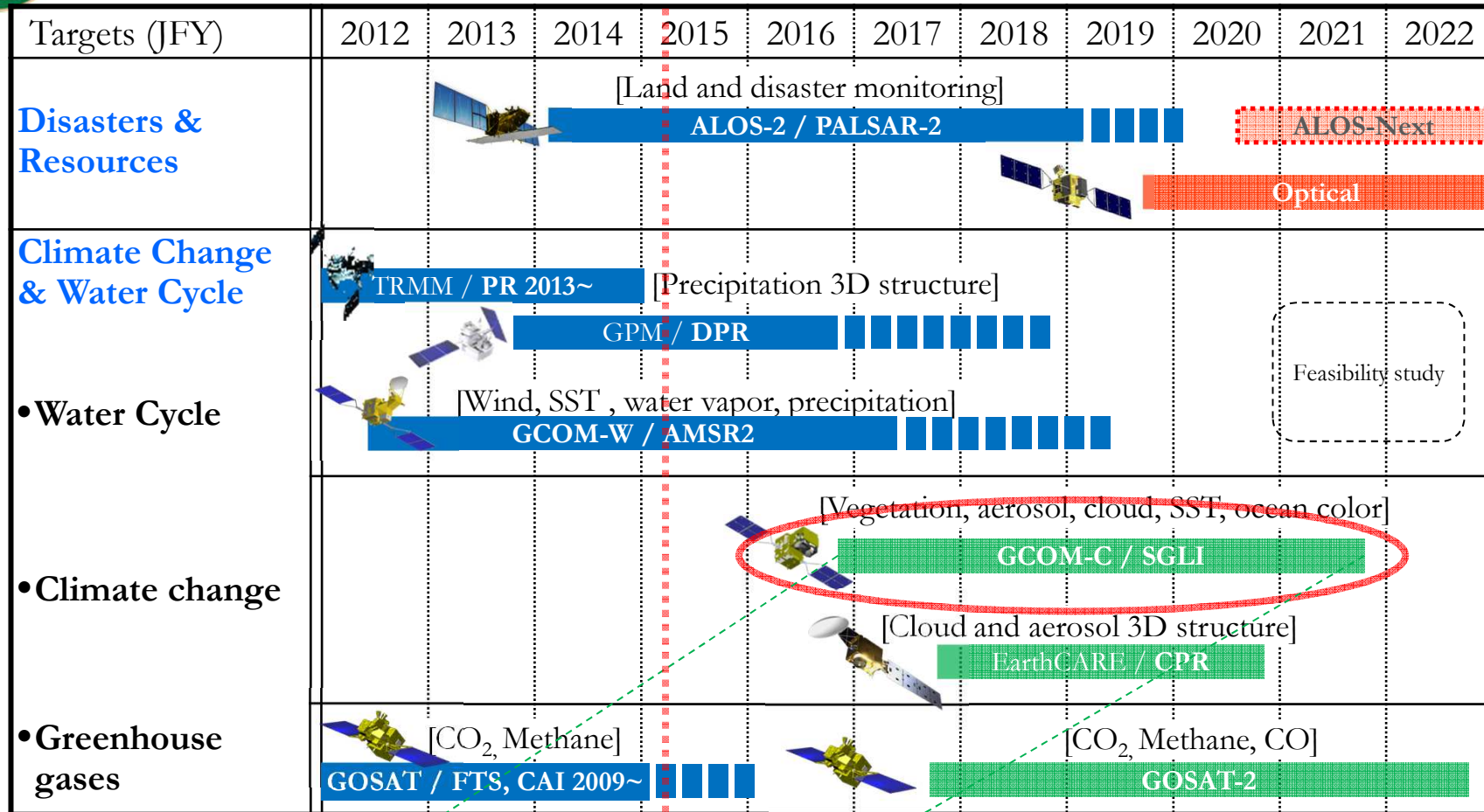


International Ocean Colour Science
Meeting 2015

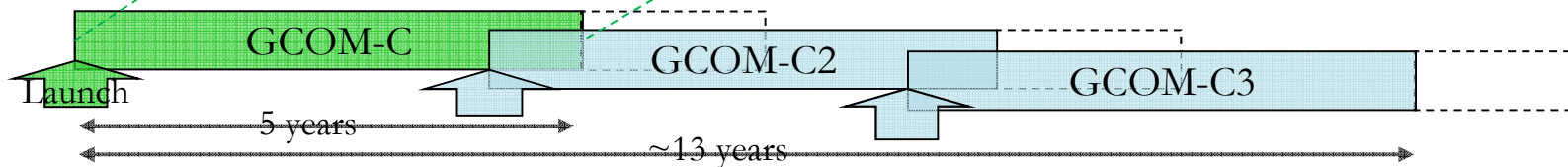
Advancing Global
Ocean Colour
Observations



JAXA Earth Observation Satellite missions

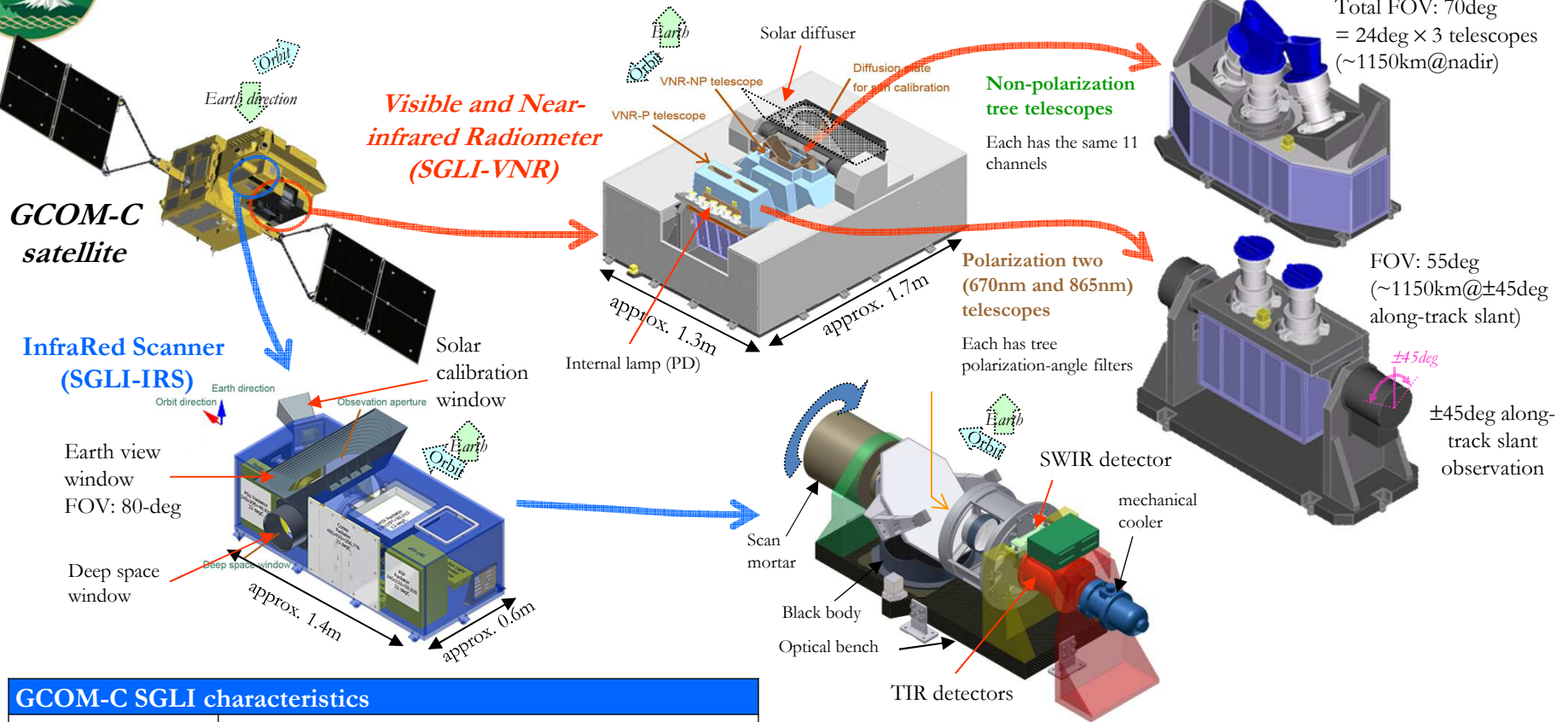


Mission status On orbit Development Study Pre-phase-A





GCOM-C/SGLI



GCOM-C SGLI characteristics	
Orbit	Sun-synchronous (descending local time: 10:30), Altitude: 798km, Inclination: 98.6deg
Launch Date	JFY 2016
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)
Spatial resolution	250m, 500m, 1km
Polarization	3 polarization angles for POL
Along track tilt	Nadir for VN, SW and TIR, & +/-45 deg for P



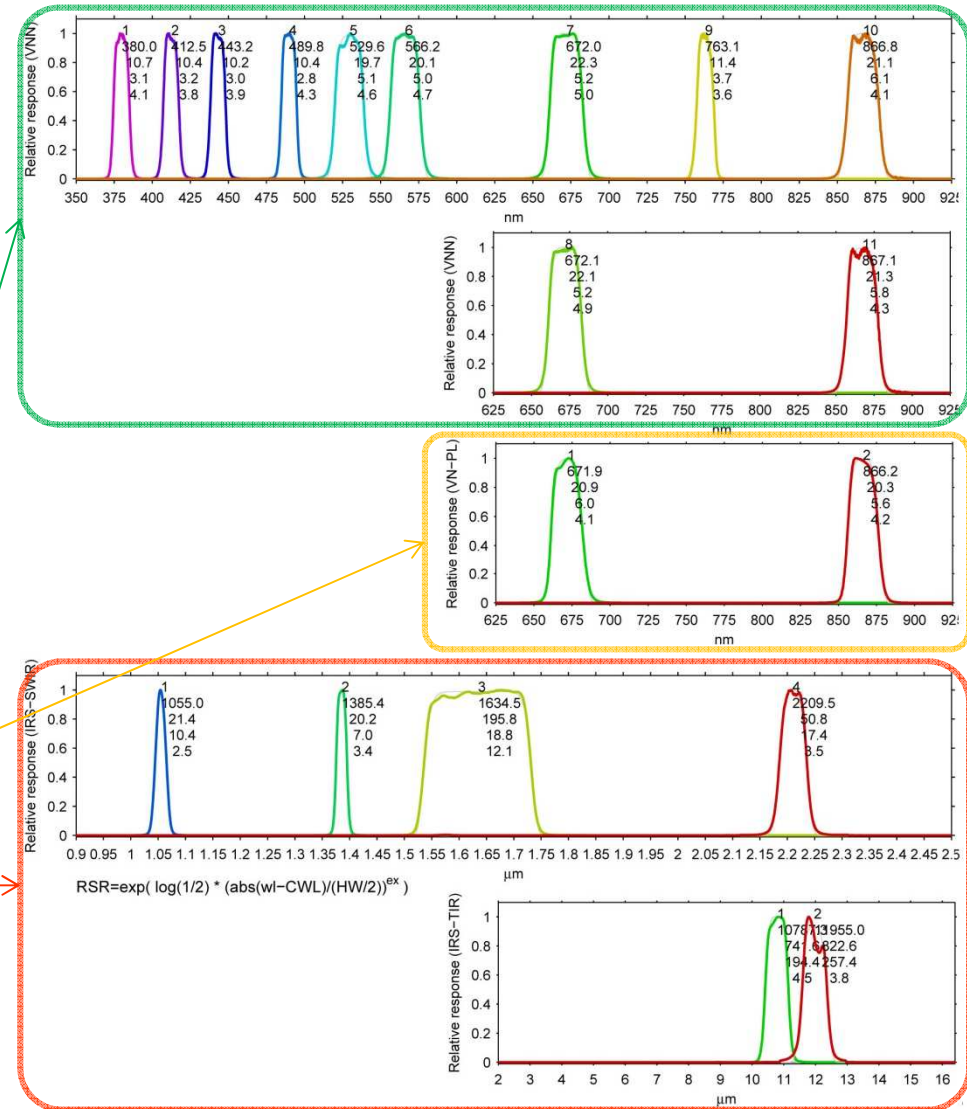


SGLI Bands

http://suzaku.eorc.jaxa.jp/GCOM_C/about/c_sgli_prod_01.html

Characteristics of SGLI spectral bands						
CH	λ	$\Delta\lambda$	L_{std}	L_{max}	SNR@ L_{std}	IFOV
	nm		W/m ² /sr/ μ m K: Kelvin		- K: NEAT	m
VN1	380	10	60	210	250	250 /1000
VN2	412	10	75	250	400	250 /1000
VN3	443	10	64	400	300	250 /1000
VN4	490	10	53	120	400	250 /1000
VN5	530	20	41	350	250	250 /1000
VN6	565	20	33	90	400	250 /1000
VN7	673.5	20	23	62	400	250 /1000
VN8	673.5	20	25	210	250	250 /1000
VN9	763	12	40	350	1200*	250 /1000*
VN10	868.5	20	8	30	400	250 /1000
VN11	868.5	20	30	300	200	250 /1000
POL1	673.5	20	25	250	250	1000
POL2	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 /1000
SW4	2210	50	1.9	20	211	1000
TIR1	10800	700	300K	340K	0.2K	250/500/1000
TIR2	12000	700	300K	340K	0.2K	250/500/1000

Multi-angle obs. for 674nm and 869nm



Uchikawa, T., K. Tanaka, Y. Okamura, S. Tsuida, and T. Amano, "Proto Flight Model (PFM) performance and development status of Cisible and Near Infrared Radiometer (VNR) on the Second-generation Global Imager (SGLI)", SPIE Asia-Pacific Remote sensing, Beijing, China, 9264-27, 2014.

Tanaka, K., Y. Okamura, T. Amano, T. Hosokawa, and T. Uchikita, "The development status of Second Generation Global Imager Infrared Scanning Radiometer (SGLI-IRS)", SPIE Asia-Pacific Remote sensing, Beijing, China, 9264-15, October, 2014.

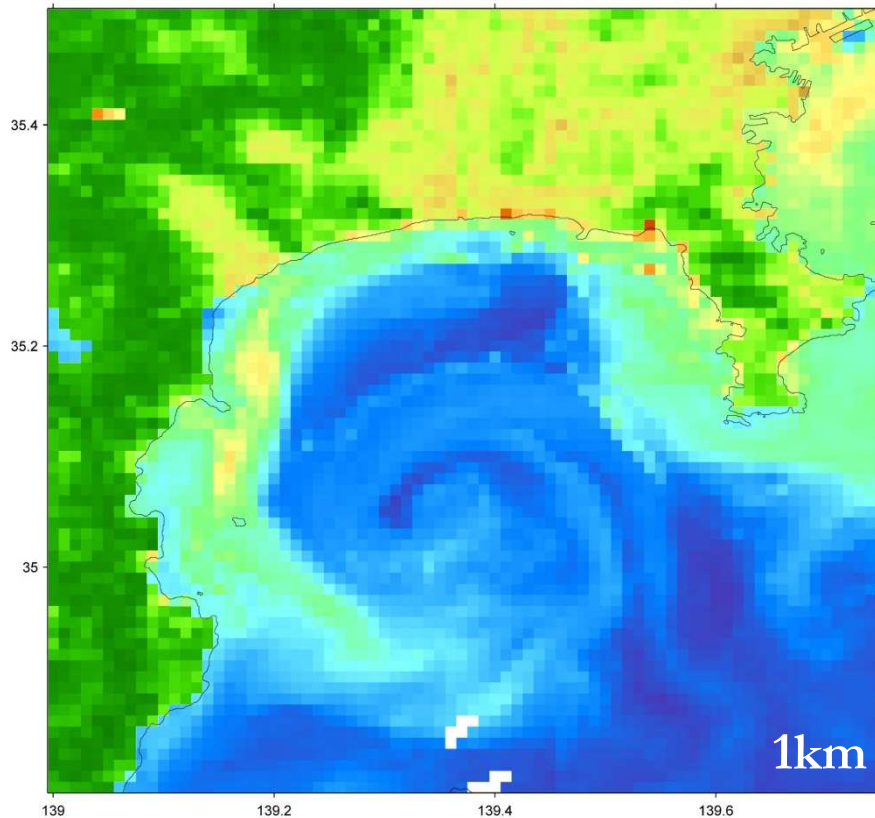


SGLI 250m Visible-SWIR observation

250m resolution to detect finer structure in the coastal area such as river outflow, regional blooms, small current, and redtide

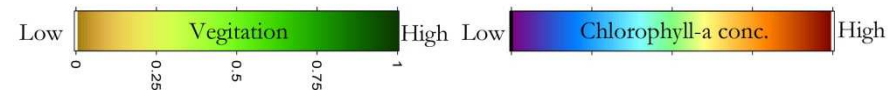
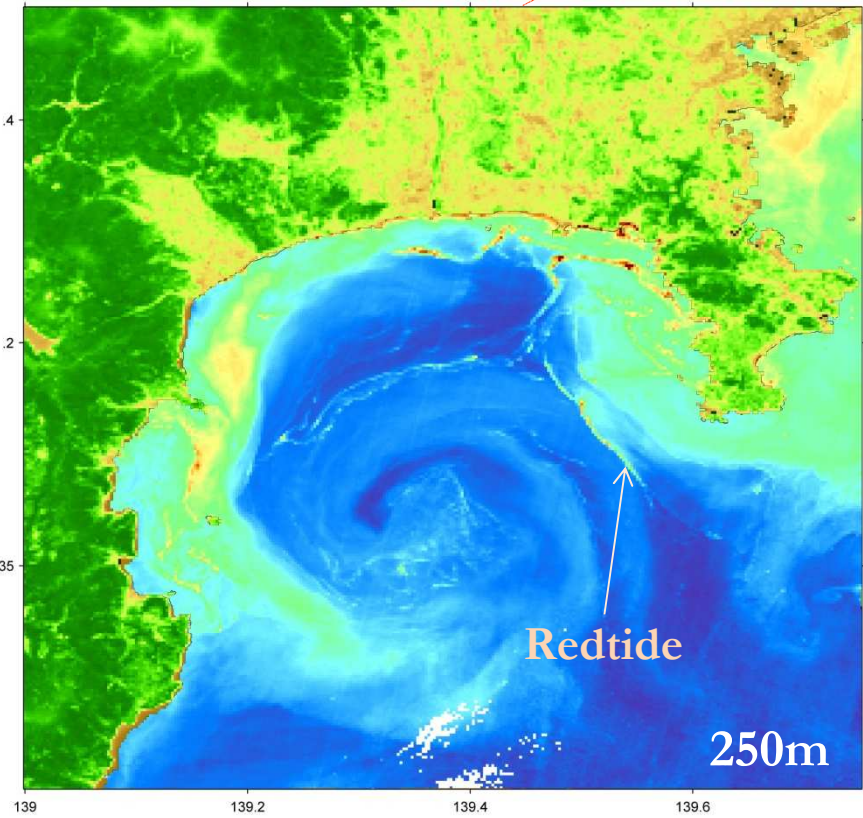


1-km resolution



(a) 250m Sagami-Bay (2 May 2015, CHL by LCI)

250-m resolution



(b) 1km Sagami-Bay (2 May 2015, CHL by LCI)

250m SGLI products simulated by Landsat image on 2 May 2015

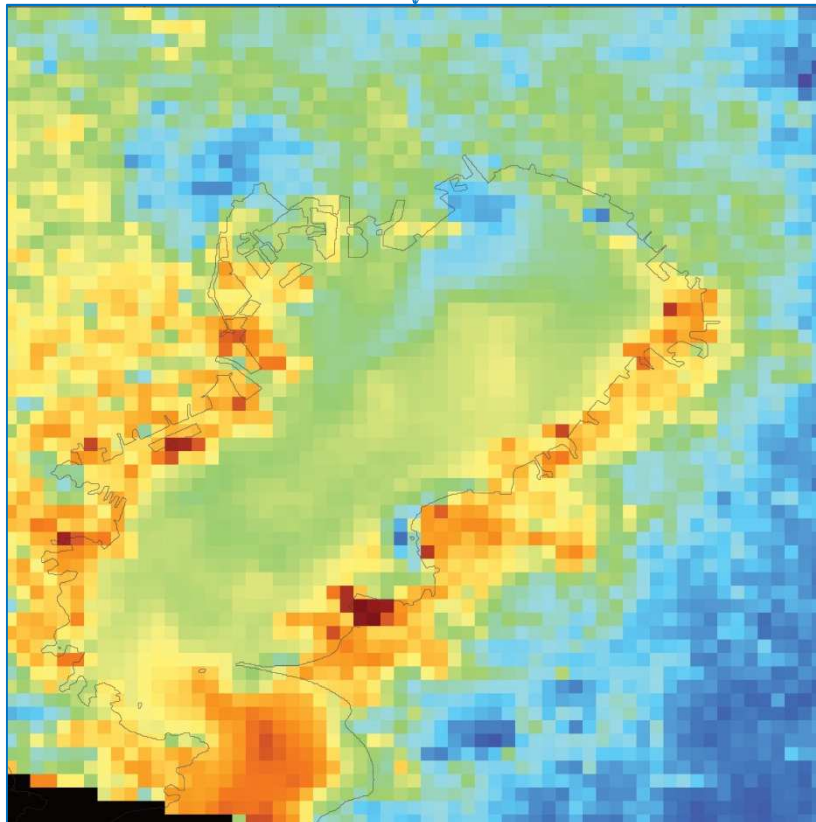


SGLI 250m Thermal infrared observations

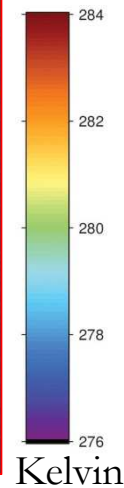
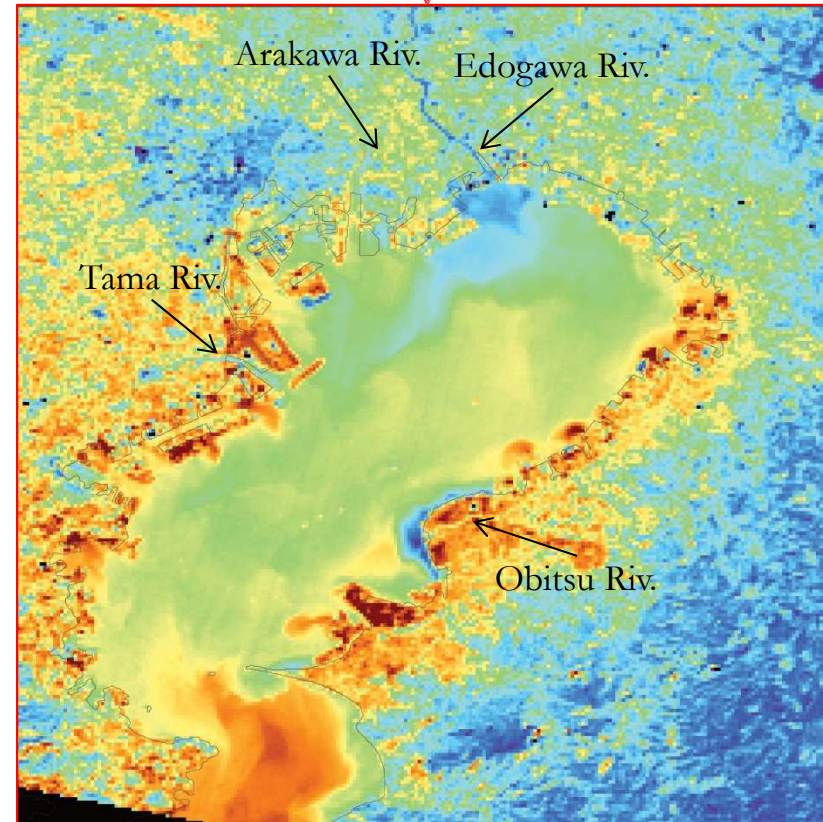
Simulated by LANDSAT-8/TIRS
11 μ m 100m data on 23 Jan. 2014



1-km resolution

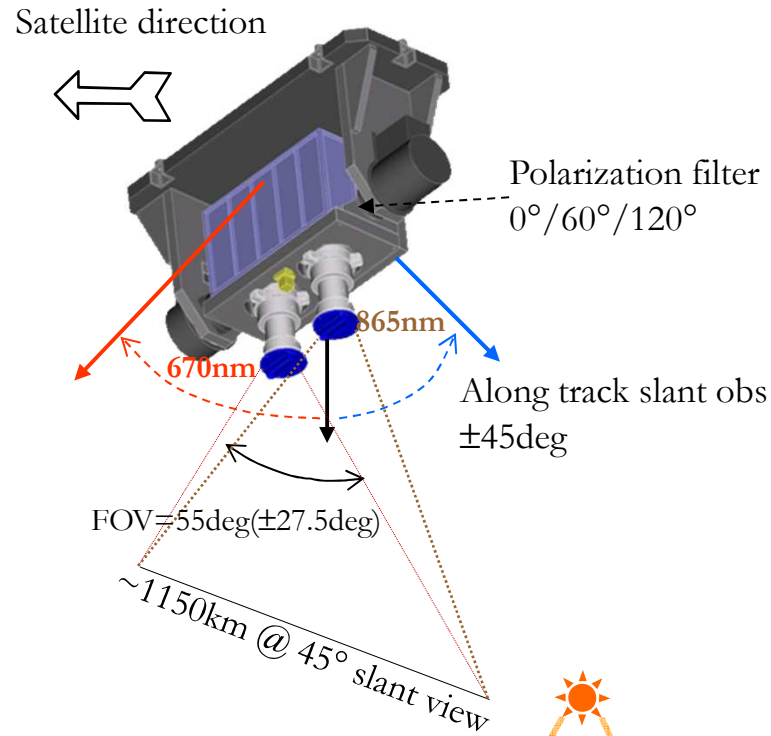


250-m resolution

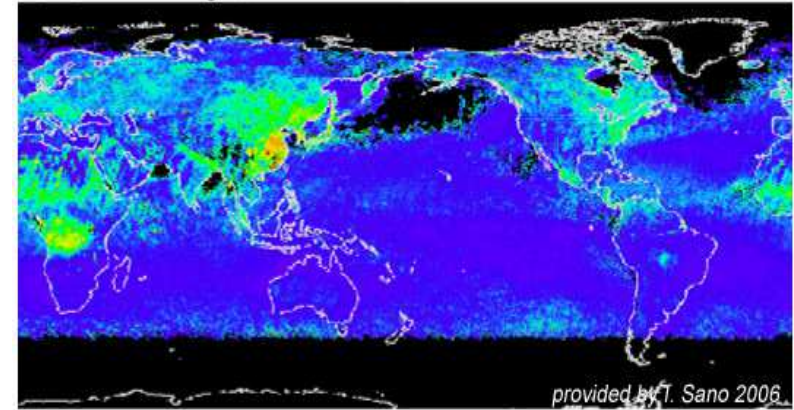




SGLI slant-view polarization observation



AOT June 2003 using POLDER-2

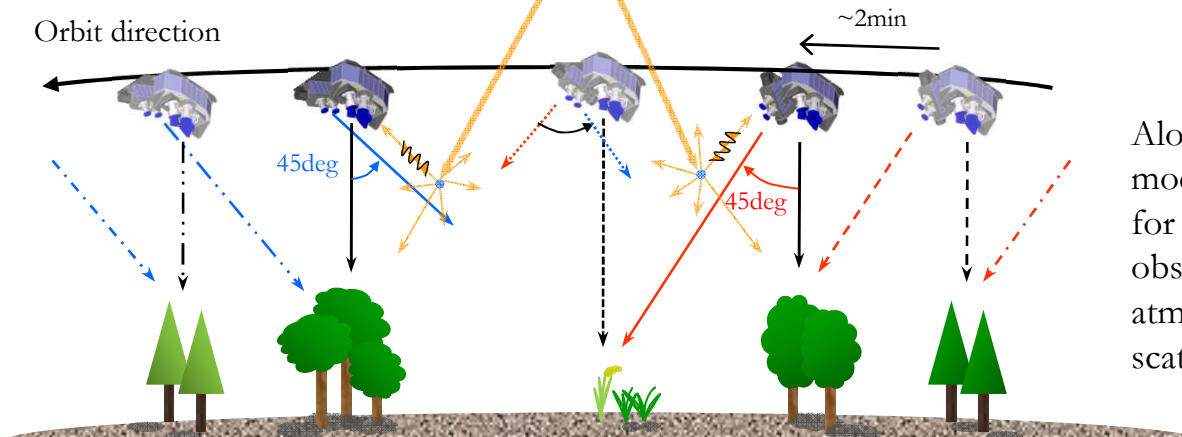


Aerosol optical thickness

0.0 0.5 1.0

A horizontal color scale bar for aerosol optical thickness, ranging from 0.0 (blue) to 1.0 (red), with a midpoint at 0.5 (green).

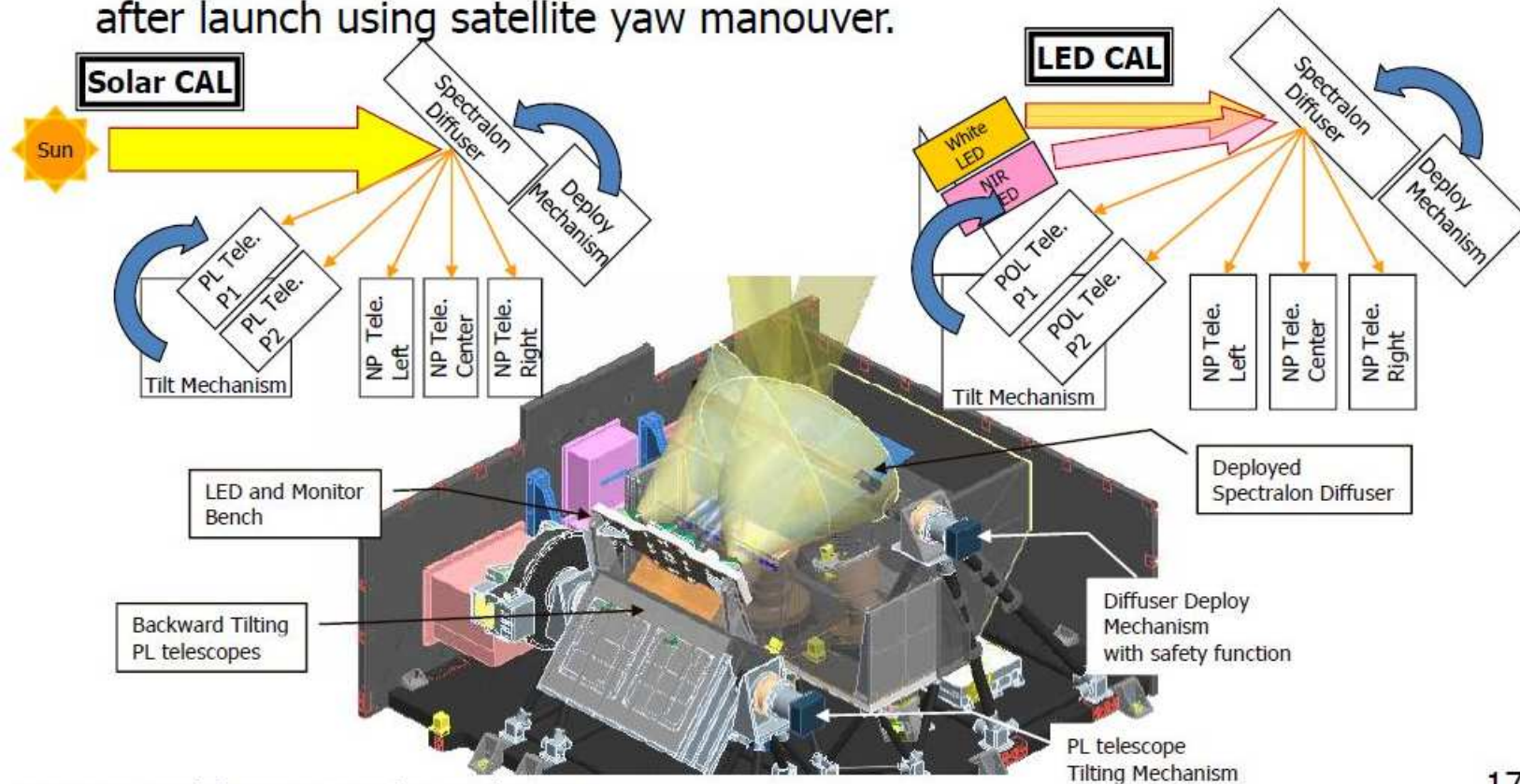
Global aerosol optical thickness in June 2003 using POLDER-2 polarization reflectance (provided by T. Sano, Kinki Univ.)



Along-track $\pm 45^\circ$ modes will be planned for polarization observation of the atmospheric scattering

VNR Onboard CALIBRATION

- Deployable Spectralon diffuser is used for both Solar and LED calibration. Calibration coefficient will be traced using this solar calibration data.
- β angle dependency for solar calibration will be characterized shortly after launch using satellite yaw manouver.



Operation Concept of the SGLI, SPIE Incheon, October 13, 2010

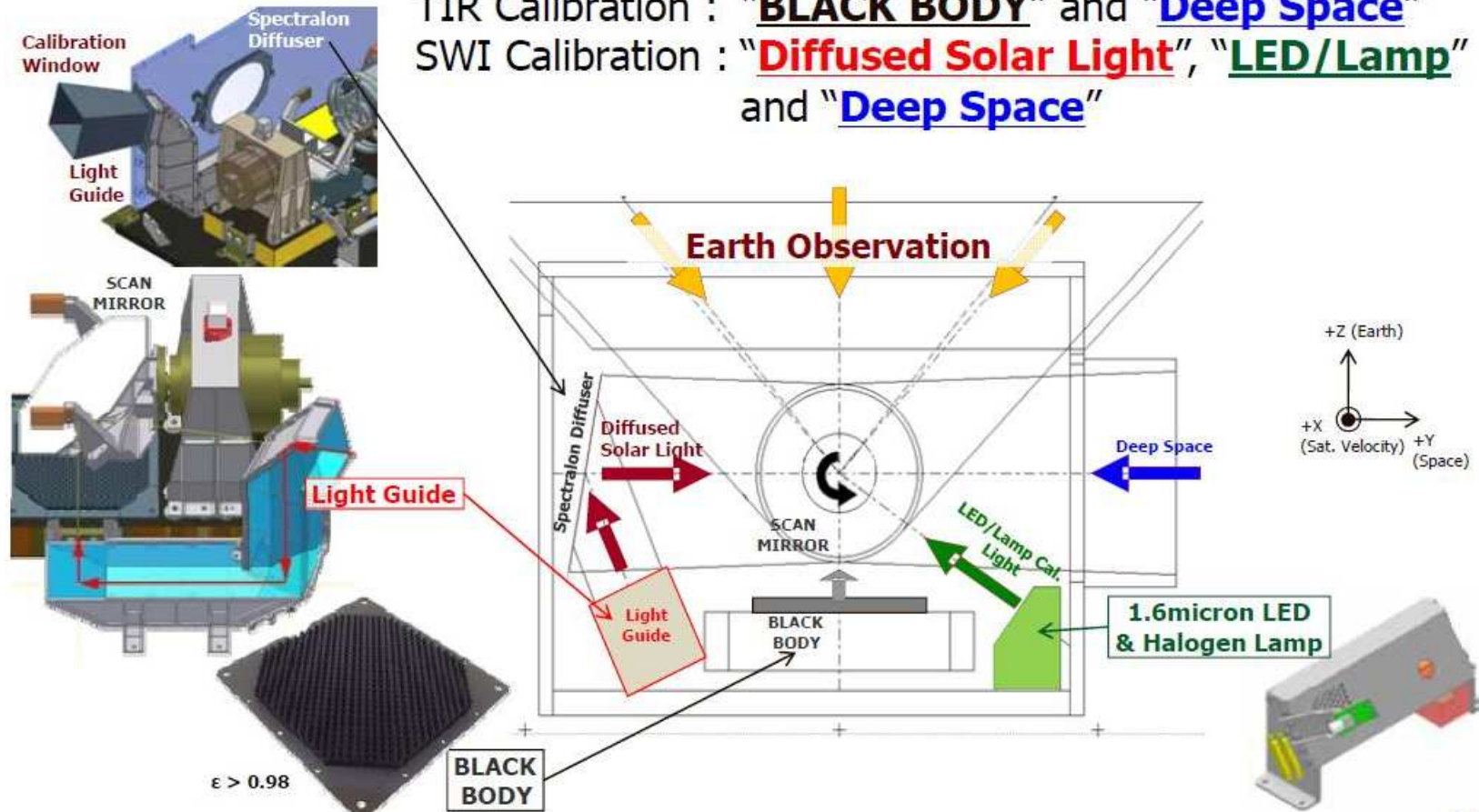


IRS Onboard calibration

■ IRS 81rpm rotating for both "Earth Observation" and "Calibration".

TIR Calibration : "BLACK BODY" and "Deep Space"

SWI Calibration : "Diffused Solar Light", "LED/Lamp" and "Deep Space"



$\epsilon > 0.98$

Operation Concept of the SGLI, SPIE Incheon, October 13, 2010



Calibration Manouever



Lunar Calibration Manouever

- ✓ Moon reflecting solar light is a stable light source as a long term calibration reference of the optical sensors.
- ✓ Lunar calibration manouever is done at every 29 days interval (= synodic period of the moon and the sun)
- ✓ SGLI observes same phase angle moon (7deg) during 5 years mission for the integral lunar calibration.



ADEOS-II/GLI 250m

Operation Concept f the SGLI, SPIE Incheon, October 13, 2010

Sun Angle Correction Manouever

- ✓ As earth rotates around the sun, solar direction gradually change because of the elliptical and inclined orbit of the earth.
- ✓ The local sun time tolerance is another factor for this solar angle change.
- ✓ Solar angle calibration manouever is done to establish the solar angle dependency database for this calibration.

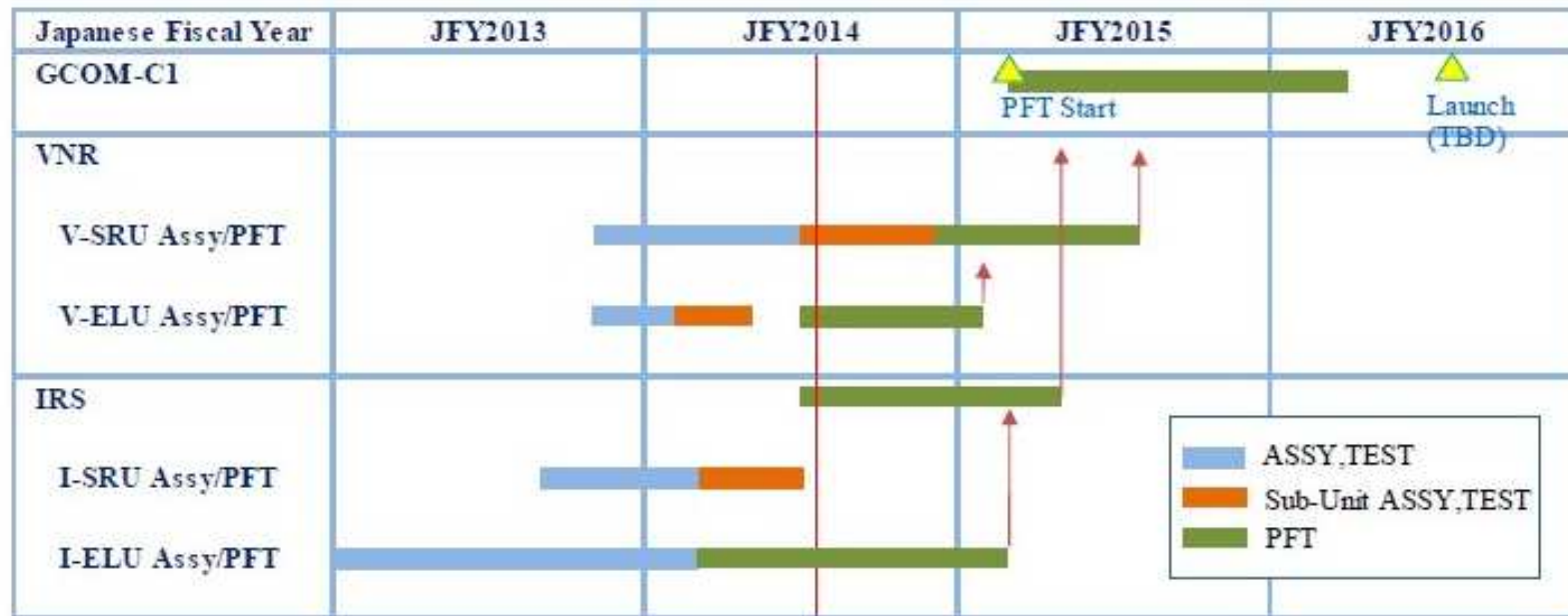
Obs. Angle Correction Manouever

- ✓ Because VNR uses wide FOV's pushbroom type CCD sensor, the satellite observation angle dependency is another key calibration factor.
- ✓ The satellite yaw axis is 90deg rotated to observe the almost same earth target with different CCD detectors.
- ✓ The homogeneous target is used for this calibration.



GCOM-C/SGLI

- ✓ VNR (telescopes) and IRS (scanner) assembly and preflight tests have been done
- ✓ Satellite-system integration test will be started in this summer.



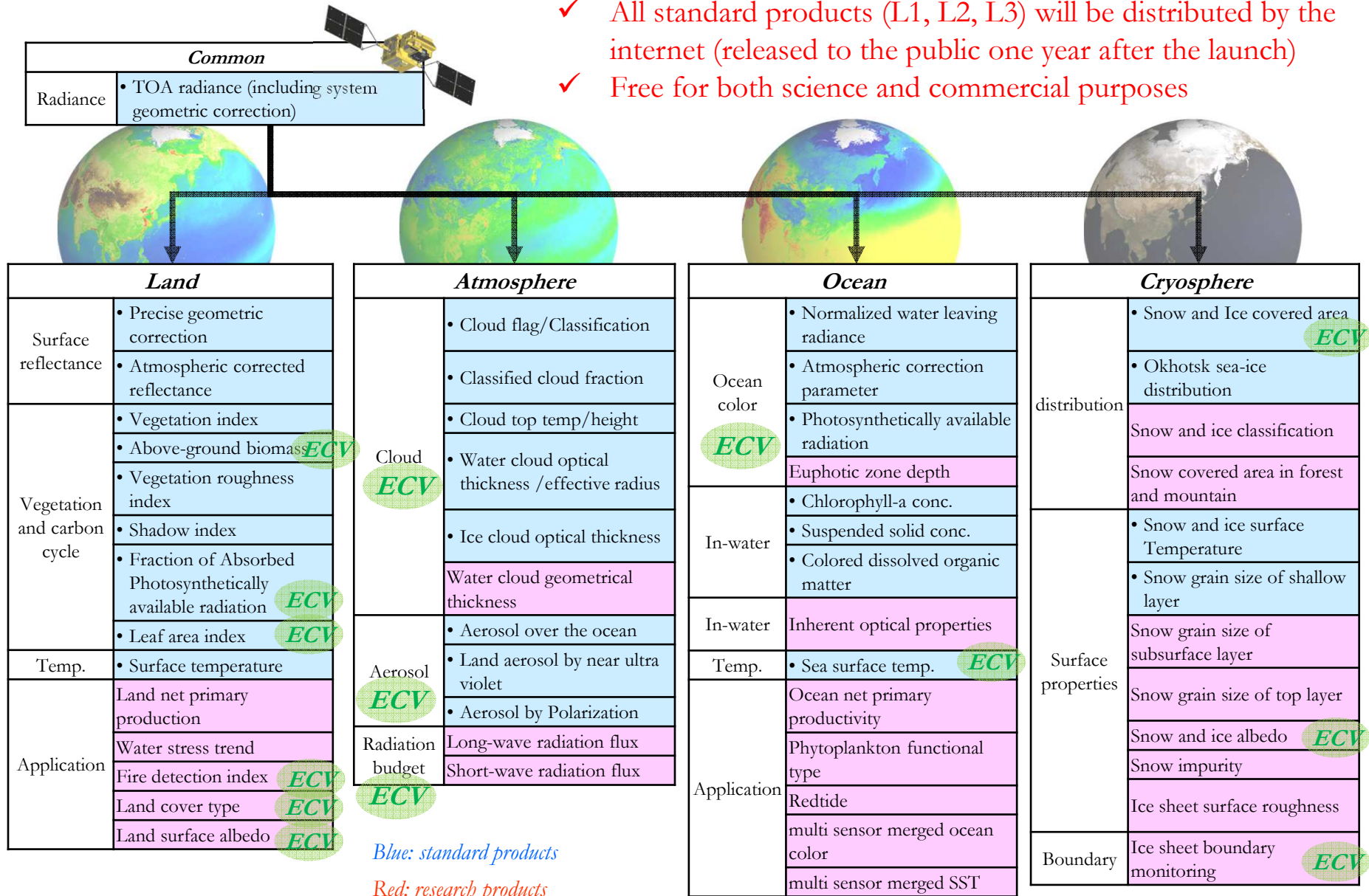
Uchikawa, T., K. Tanaka, Y. Okamura, S. Tsuida, and T. Amano, "Proto Flight Model (PFM) performance and development status of Cisible and Near Infrared Radiometer (VNR) on the Second-generation Global Imager (SGLI)", SPIE Asia-Pacific Remote sensing, Beijing, China, 9264-27, 2014.



3. GCOM-C Observation Product Development

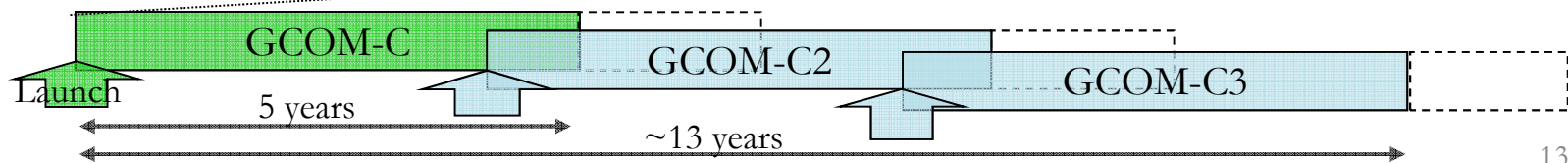
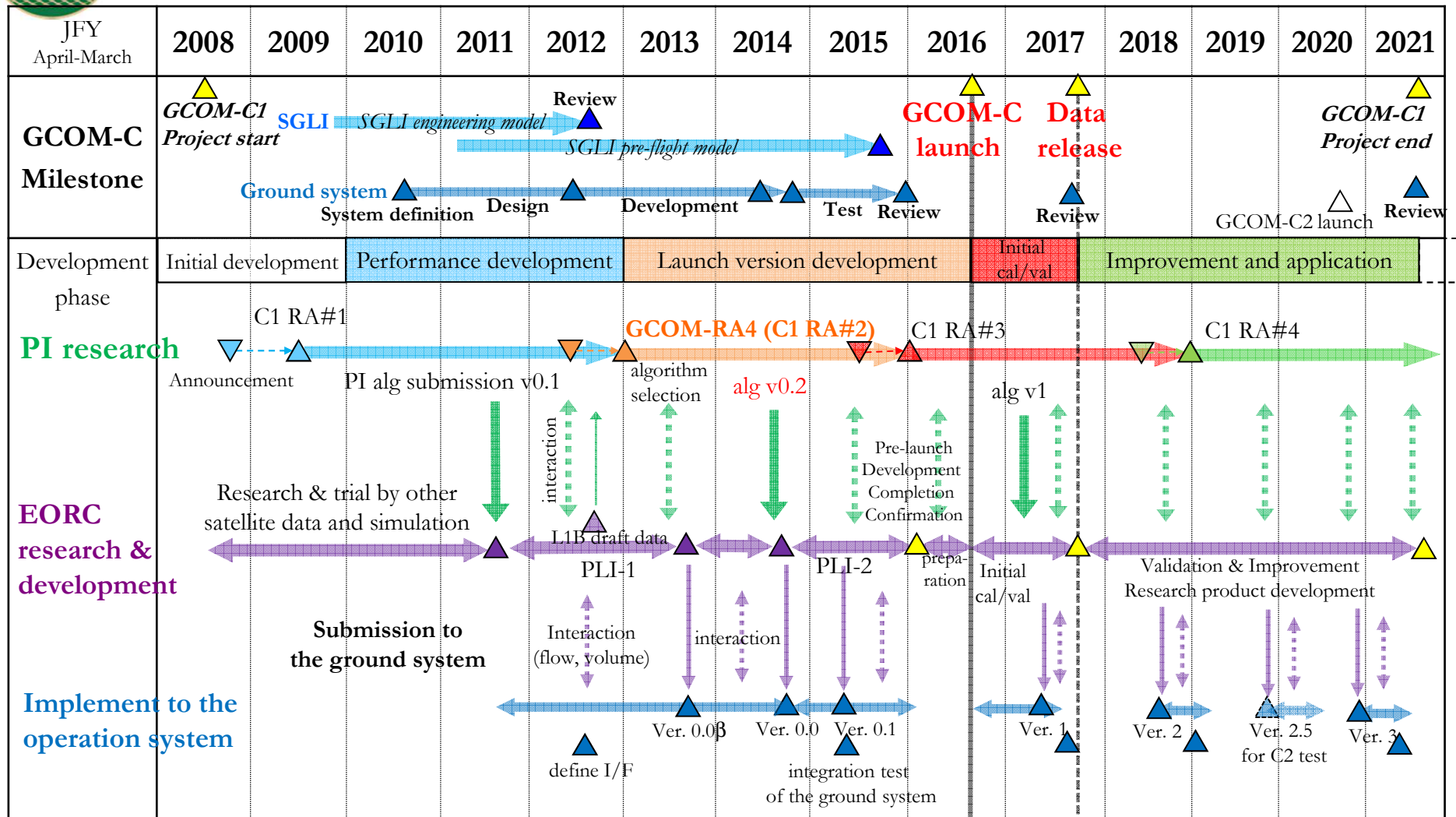
Standard and research products

- ✓ All standard products (L1, L2, L3) will be distributed by the internet (released to the public one year after the launch)
- ✓ Free for both science and commercial purposes





3. Product development: schedule





5. Summary

- The mission targets are contribution to the climate system researches, the carbon cycle and the radiative forcing, through series of satellites, GCOM-C, C2 and C3.
 - It has **250-m resolution** and **along-track slant-view polarization observation** to improve the land and coastal monitoring, and aerosol estimation.
 - On-orbit calibrations: diffuser (sun, lamp) with monthly moon observation
- GCOM-C/SGLI will be launched in **Japanese Fiscal Year 2016.**
- SGLI manufacturing and characterization, algorithms and ground processing system, and post-launch cal/val planning are being conducted by JAXA and GCOM-C PI team
- **The next RA will be announced in the summer 2015**
 - at-launch version algorithms, and post-launch improvement
 - vicarious calibration and product validation
 - application