

Status reports of JMA & JAXA

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1: JMA, 2: JAXA



JMA





MTSAT-1R and -2 Time Sequence

2005

- Feb 26 MTSAT-1R launched via H-IIA from Tanegashima
- Mar 1 New satellite data processing system
(50 Gflops WS x4, 12 TB disk, 0.5 PB tape, Gbits net x3)
- Mar 24 First image acquisition
- May 1 Placement at 140 E geosynchronous orbit
(GMS-5 moved to 120 E on May 19)
- Jun 28 Formal image observation and dissemination

2006

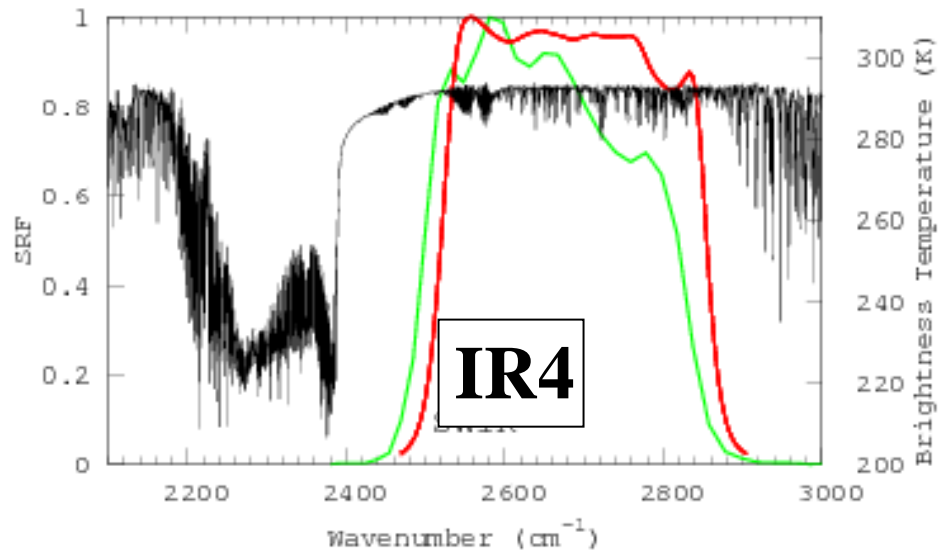
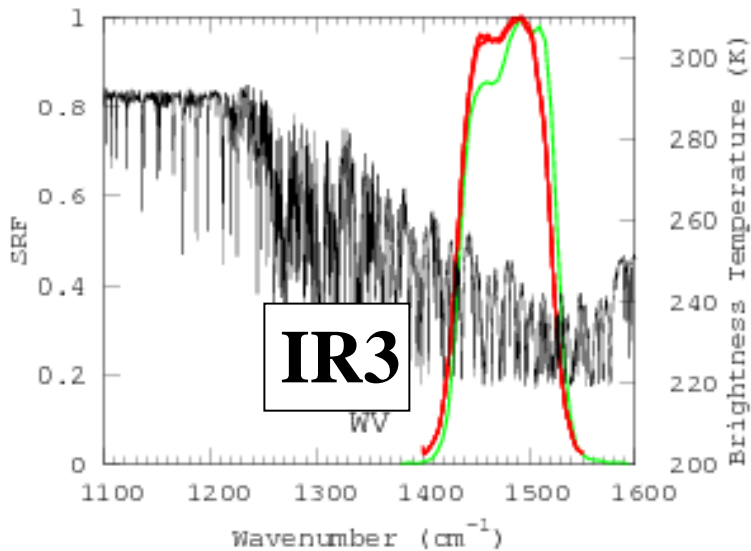
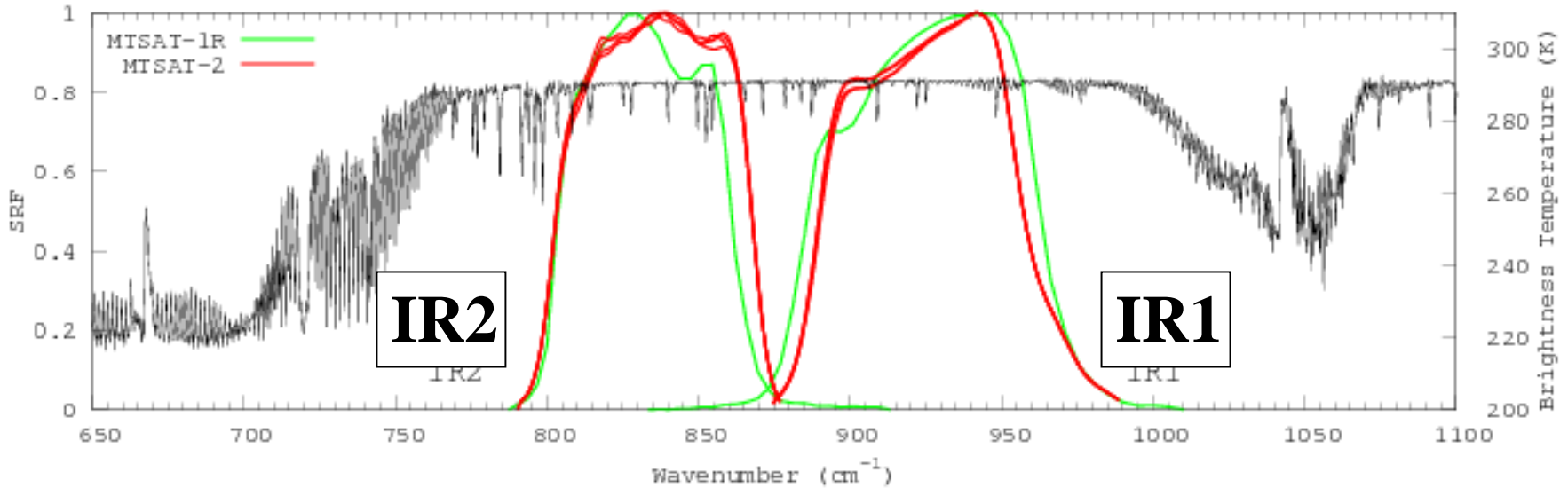
- Feb 18 MTSAT-2 launched via H-IIA from Tanegashima
- Feb 27 Placement at 145 E geosynchronous orbit
- May 11 First image acquisition
- Sep 4 Stand-by operation as the back up of MTSAT-1R



MTSAT-1R/JAMI and MTSAT-2/Imager



SRFs of MTSAT2/IMAGER and MTSAT-1R/JAMI





New Products and Applications in 2005-2006

- for NWP
 - Hourly Atmospheric Motion Vectors (AMV)
 - Clear Sky Radiance (CSR)

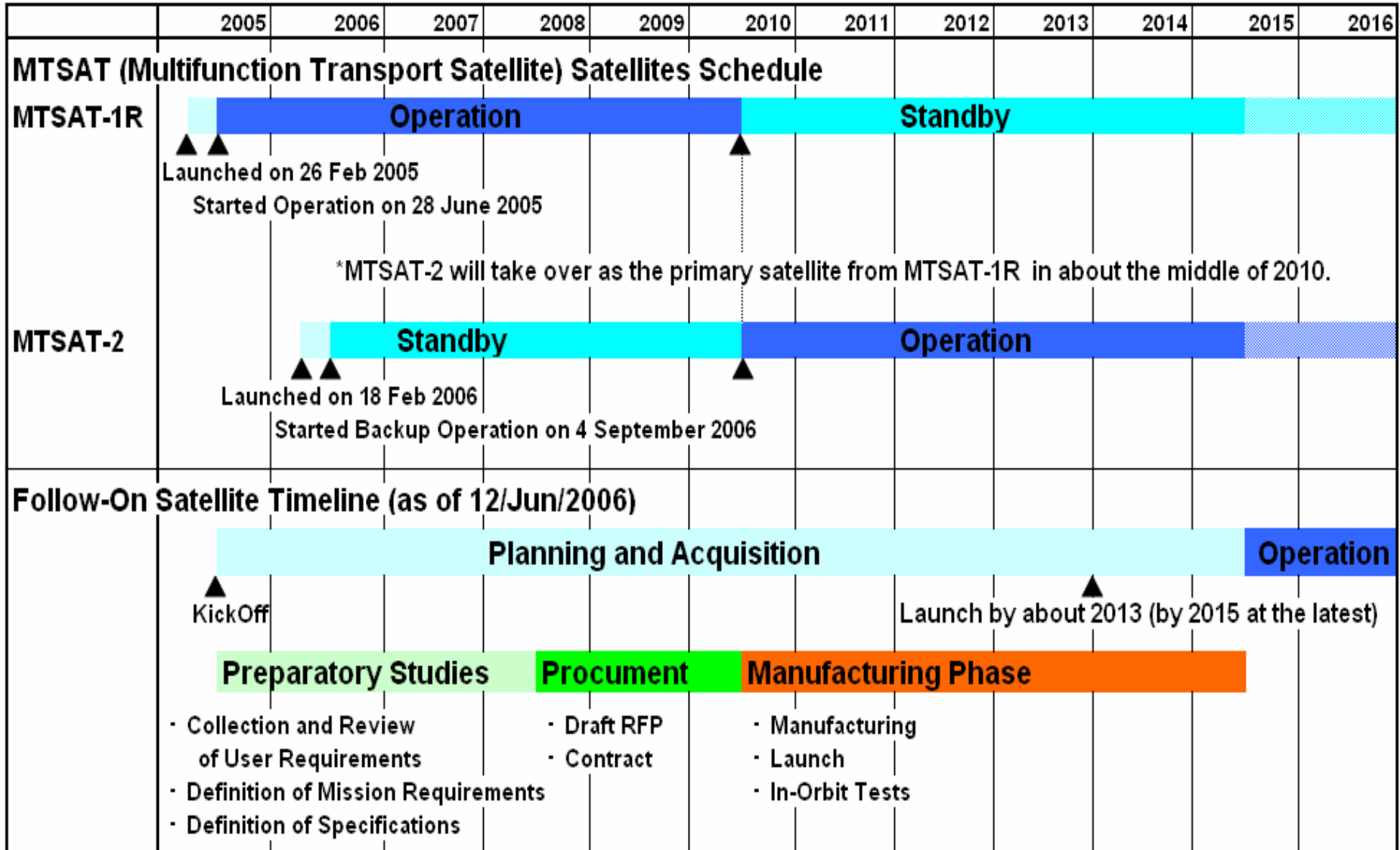
- for Japanese Reanalysis Project (JRA-25)
 - AMVs from GMS 3-5 with latest algorithms

- Applications for environment monitoring
 - Dust detection product

- Asia-Pacific Regional ATOVS Retransmission Service (AP-RARS)



Tentative schedule of MTSAT-1R/-2 and follow-on satellite





Follow-On Satellite

- Launch in 2013 hopefully, by 2015 at the latest
- Carry SEVIRI-like Imager
 - (Also Sounder)
- JMA users' requirement
 - high resolution, frequent observation, rapid scan
 - Climate and NWP application, particularly
- Problems ...
 - High data rate
 - Various product development



JAXA





Current Operation Status

- TRMM ('97.11-) almost 9 years old
 - Post-Operations Phase
 - Operation has been extended
 - tropical cyclone data base was built by using TRMM/PR, TMI, VIRS, Aqua/AMSR-E
 - <http://www.eorc.jaxa.jp>
- Aqua/AMSR-E ('02.5-)
 - Post-Operations Phase
- ALOS ('06.1-)
 - Initial CAL/VAL Phase
 - 3 instruments
 - PALSAR : Phased Array type L-band Synthetic Aperture Radar
 - PRISM : Panchromatic Remote-sensing Instrument for Stereo Mapping
 - AVNIR-2 : Advanced Visible and Near Infrared Radiometer type 2



JAXA's future program

- ❑ **GOSAT** (Aug.2008) Greenhouse gasses Observing SATellite
 - Observe greenhouse effect gasses globally
- ❑ **GPM** (2013) Global Precipitation Measurement
 - Observe global precipitation every 3 hours
 - Core satellite will carry DPR + GMI
- ❑ **GCOM-W/-C** (2010/2011) Global Climate Observation Mission
 - **GCOM-W** carries a AMSRE-like MWR (AMSR2)
 - ❑ observe water-energy cycle.
 - **GCOM-C** carries a high spatial resolution imager (SGLI)
 - ❑ observe surface and atmospheric variables related to carbon cycle and radiation budget
 - 3 satellites in series, 5 years (total 13 years)
- ❑ **EarthCARE** (2012) Earth Cloud, Aerosol and Radiation Explorer
 - retrieve vertical profiles of cloud and aerosol, and characteristics of the radiative and micro-physical properties

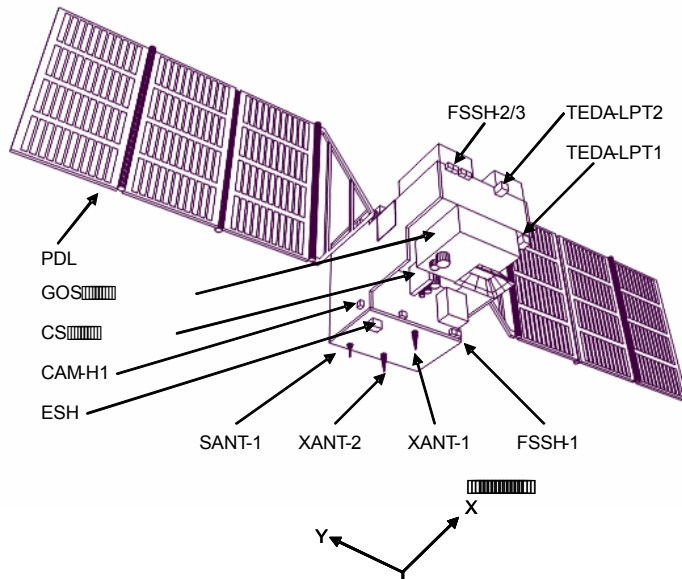


GOSAT overview



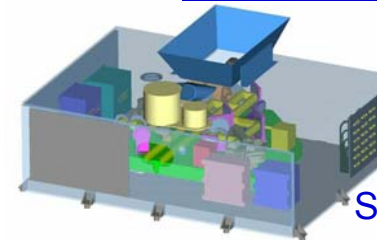
□ Mission

- To observe greenhouse effect gasses globally

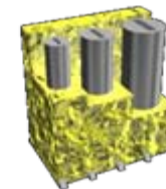


TANSO-FTS

(Greenhouse gasses observing Sensor)
Atmospheric absorption observation by Fourier Theorem Spectroscopy



Wavelength band1 0.38 μ m
 band2 0.67 μ m
 band3 0.87 μ m
 band4 1.62 μ m
 Spectrum resolution 0.2 – 1cm



TANSO-CAI

(Cloud/Aerosol Sensor)
Imager

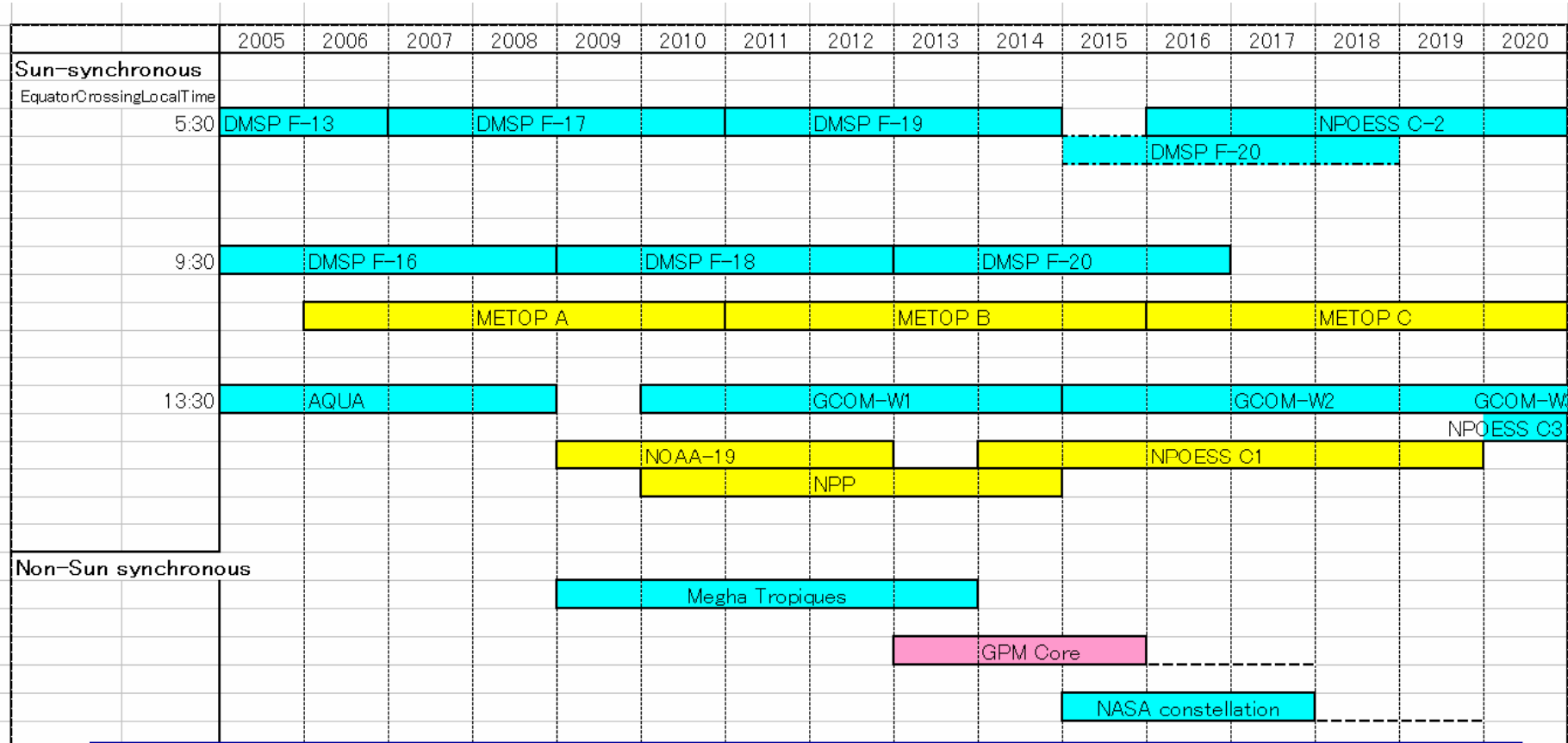
Wavelength band1 0.38 μ m
 band2 0.67 μ m
 band3 0.87 μ m
 band4 1.62 μ m

Designed Life Span: 5 years
 Orbit Plan: Altitude 666km
 Sun-Synchronous Sub-Recurrent Orbit
 Orbit Inclination: 98deg.
 Launch: Aug.2008 by H-IIA (TBD)



GPM: Overlap of satellite operation

□ How to collect 8 MWRs for GPM?

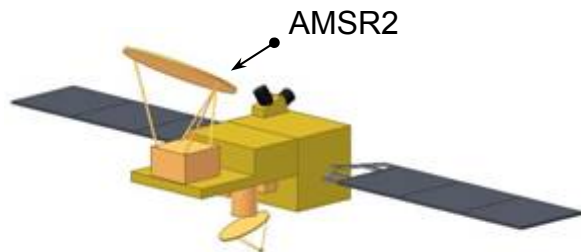


In order to achieve the GPM mission, JAXA hopes to know more details of constellation candidate.

- Possibility of FY-3 data use.
- Korea (KMA/KARI) will plan to have satellite with microwave radiometer or not?
- NPOESS update information. etc.



GCOM-W overview



Targets of GCOM-W/AMSR2 are water-energy cycle.

GCOM-W AMSR2 characteristics	
Scan	Conical scan microwave radiometer
Swath width	1450km
Antenna	2.0m offset parabola antenna
Digitalization	12bit
Incident angle	Apporox. 55 degree
Polarization	Vertical and Horizontal
Dynamic range	2.7-340K

AMSR-2 will **continue AMSR-E observations** (water vapor, cloud liquid water, precipitation, SST, wind speed, sea ice concentration etc.).

Band (GHz)	Band width (MHz)	Polarization	Beam width [deg] (Ground resolution [km])	Sampling interval [km]
6.925	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

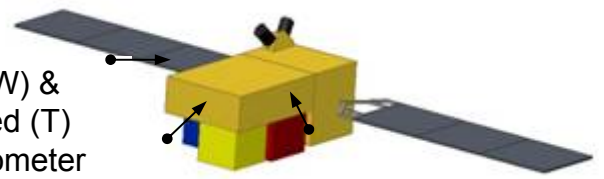
If GCOM-W2, W3 has scatterometer,

GCOM-W scatterometer in afternoon orbit will increase time resolution and data coverage in **combination with the METOP/ASCAT** in morning orbit (to achieve every 6 hours observation).



GCOM-C overview

- **Targets of GCOM-C/ SGLI is surface and atmospheric variables related to carbon cycle and radiation budget.**
- SGLI will follow the GLI observations (sea surface temperature, ocean color, aerosols, cloud, vegetation, snow/ ice, and so on).
- The new SGLI features, 250m (VN) and 500m (T) channels and two polarization/ multi-direction channels (P), will enable to improve **land and coastal monitoring** and retrieval of **aerosol over land**.



Shortwave (SW) & thermal infrared (T) scanning radiometer

Polarization multi-angle radiometer (P)

Visible & near infrared (VN) push-broom radiometer

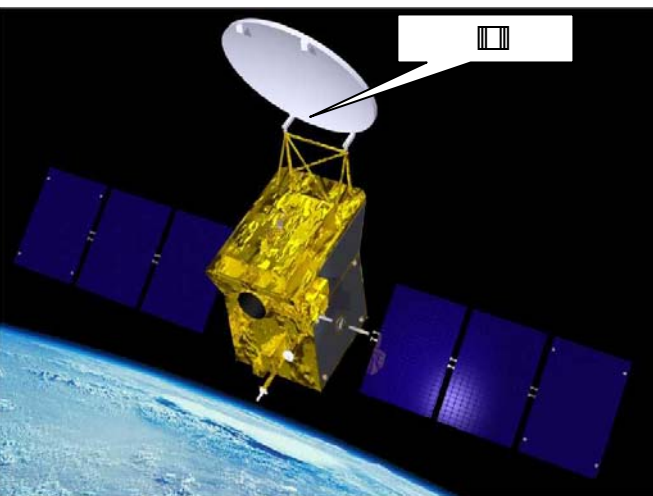
GCOM-C SGLI characteristics	
Scan	Push-broom electric scan (VN & P) Wisk-broom mechanical scan (SW & T)
Scan width	1150km cross track (VN & P) 1400km cross track (SW & T)
Digitalization	12bit
Polarization	3 polarization angles for P
Along track direction	+45 deg and -45 deg for P Nadir for VN, SW and T

SGLI channels					
CH	λ	Δ	L_{std}	L_{max}	IFOV
	VN, P, SW: nm T: μ m		VN, P: W/m ² /sr/ m T: Kelvin		m
VN1	380	10	60	210	250
VN2	412	10	75	250	250
VN3	443	10	64	400	250
VN4	490	10	53	120	250
VN5	530	20	41	350	250
VN6	565	20	33	90	250
VN7	670	10	23	62	250
VN8	670	20	25	210	250
VN9	763	8	40	350	1000
VN10	865	20	8	30	250
VN11	865	20	30	300	250
P1	670	20	25	250	1000
P2	865	20	30	300	1000
SW1	1050	20	57	248	1000
SW2	1380	20	8	103	1000
SW3	1640	200	3	50	250
SW4	2210	50	1.9	20	1000
T1	10.8	0.7	300	340	500
T2	12.0	0.7	300	340	500

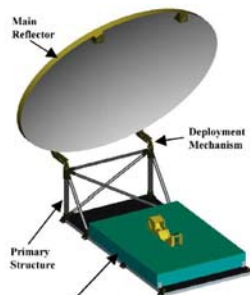


EarthCARE overview

To retrieve vertical profiles of cloud and aerosol, and characteristics of the radiative and micro-physical properties so as to determine flux gradients within the atmosphere and fluxes at the Earth's surface, as well as to measure directly the fluxes at the top of the atmosphere and also to clarify the processes involved in aerosol-cloud and cloud-precipitation-convection interactions.



Cloud Profiling RADAR (CPR)

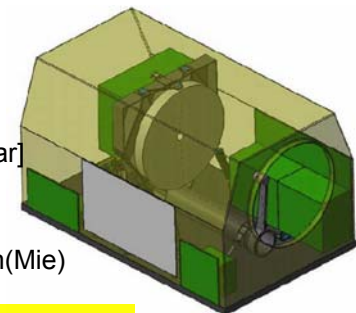


Frequency:94.05GHz
Peak Power:1.5kW
VPRF:6000~7200Hz
Reflector Dia.:2.5m
Resolution(H/V):500/100m
Height:-0.5~20km
Field of View:650m
Dynamic range:-36~+20dBZ
Doppler :-10~+10m/s

Cloud / light precipitation vertical profiles
Convective updraft / ice fall in cloud

Atmospheric LIDAR (ATLID)

λ_c :355nm(1ch)
Power:78mJ
PRF:70Hz
3 channels
-Mie[Co/Cross-Polar]
-Rayleigh
Height:-0.5~30km
Resolution(V):100m(Mie)
FOV:80urad



Aerosol vertical profiles
Thin cloud vertical profiles

Multi-spectral Imager (MSI)

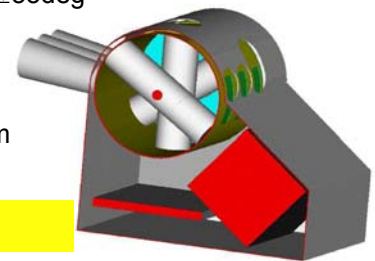


7 channels:
(0.659,0.865,1.61,2.2,8.8,10.8,12.0[μ m])
-SNR
>500(VNIR),>250(SWIR)
@ $\rho=1.0$
-NEdT < 0.25K@293K
-FOV:0.5kmx0.5km
-Swath:150km

Horizontal structure
of cloud and aerosols

Broadband Radiometer (BBR)

Direction:Nadir, ± 55 deg
2 channels:
- 0.4~4.0 μ m
- 4.0~50 μ m
FOV:10kmx10km



SW/LW flux at TOA

EarthCARE Satellite (ESA)
Mass: approx. 1300kg
Orbit: Sun-synchronous Polar (13:30)
Instruments
- Cloud Profiling RADAR (JAXA/NICT)
- Atmospheric LIDAR (ESA)
- Multi-spectral Imager (ESA)
- Broadband Radiometer (ESA)
Launcher
- Dnepr/PSLV/Vega (TBD)
Operation (ESA)
2012 Launch for 2+1year mission



Summary



□ JMA

- MTSAT-1R started dissemination of formal image observation data in June 2005. Hourly AMV and CSRs are generated.
- MTSAT2 was successfully launched in Feb.2006, and is in stand-by operation.
- Follow-on satellite will be launched in 2013 - 2015. Preparatory studies are underway.

□ JAXA

- TRMM/PR, Aqua/AMSR-E and ALOS are operating well.
- GOSAT is developing for the launch in 2008.
- GPM project is studying the new possibility of MW sounder utilization to achieve the original objective of frequent precipitation observation.
 - *JAXA needs your cooperation!
- GCOM-W/AMSR2 project will be approved in JAXA soon.