



# Report on the status of current and future satellite systems

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# Outline

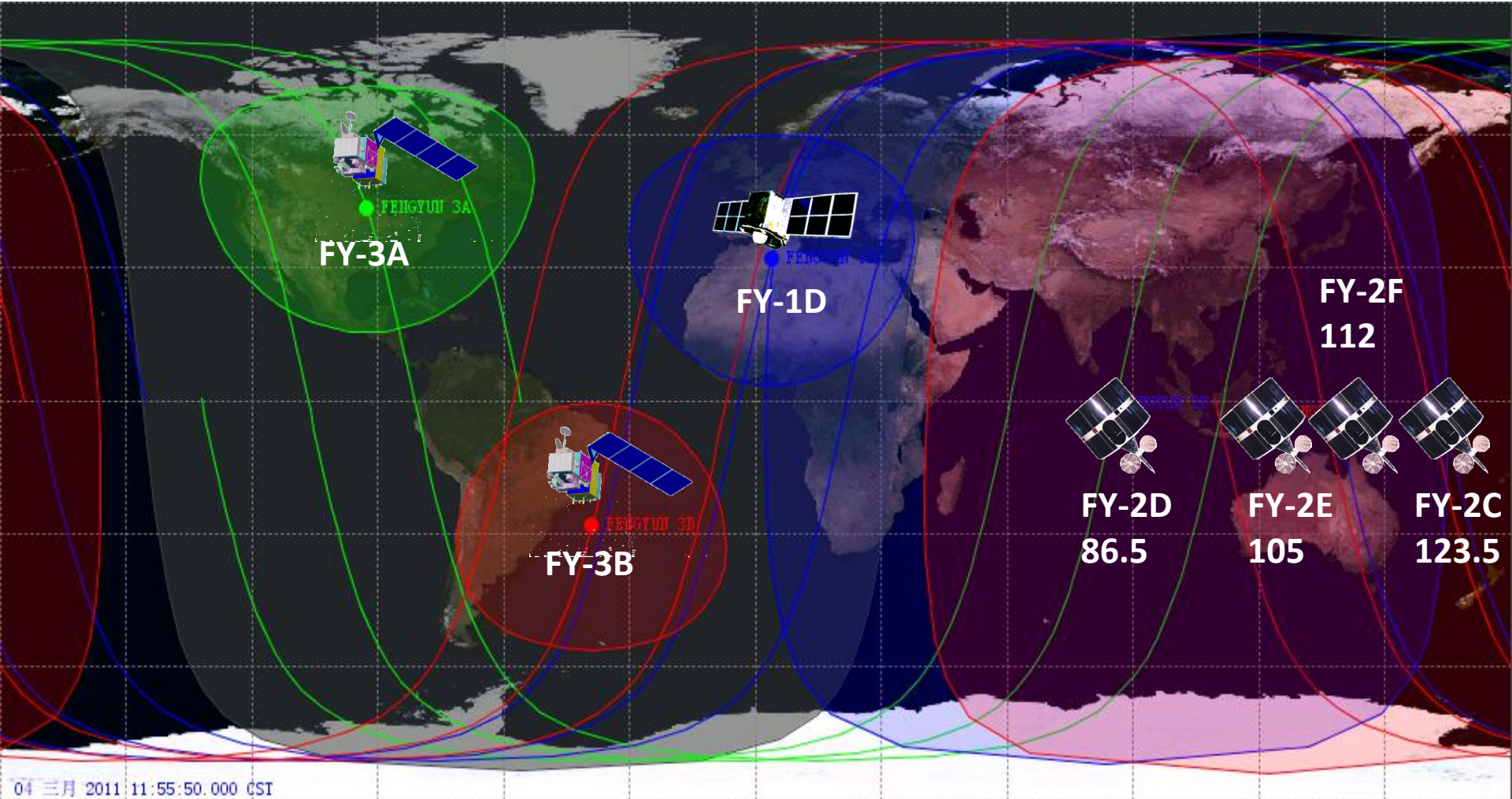
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- Current Status
- Future Plan
- Latest Progress of FY-3C

# 1. Current Status



## On Orbit Satellite

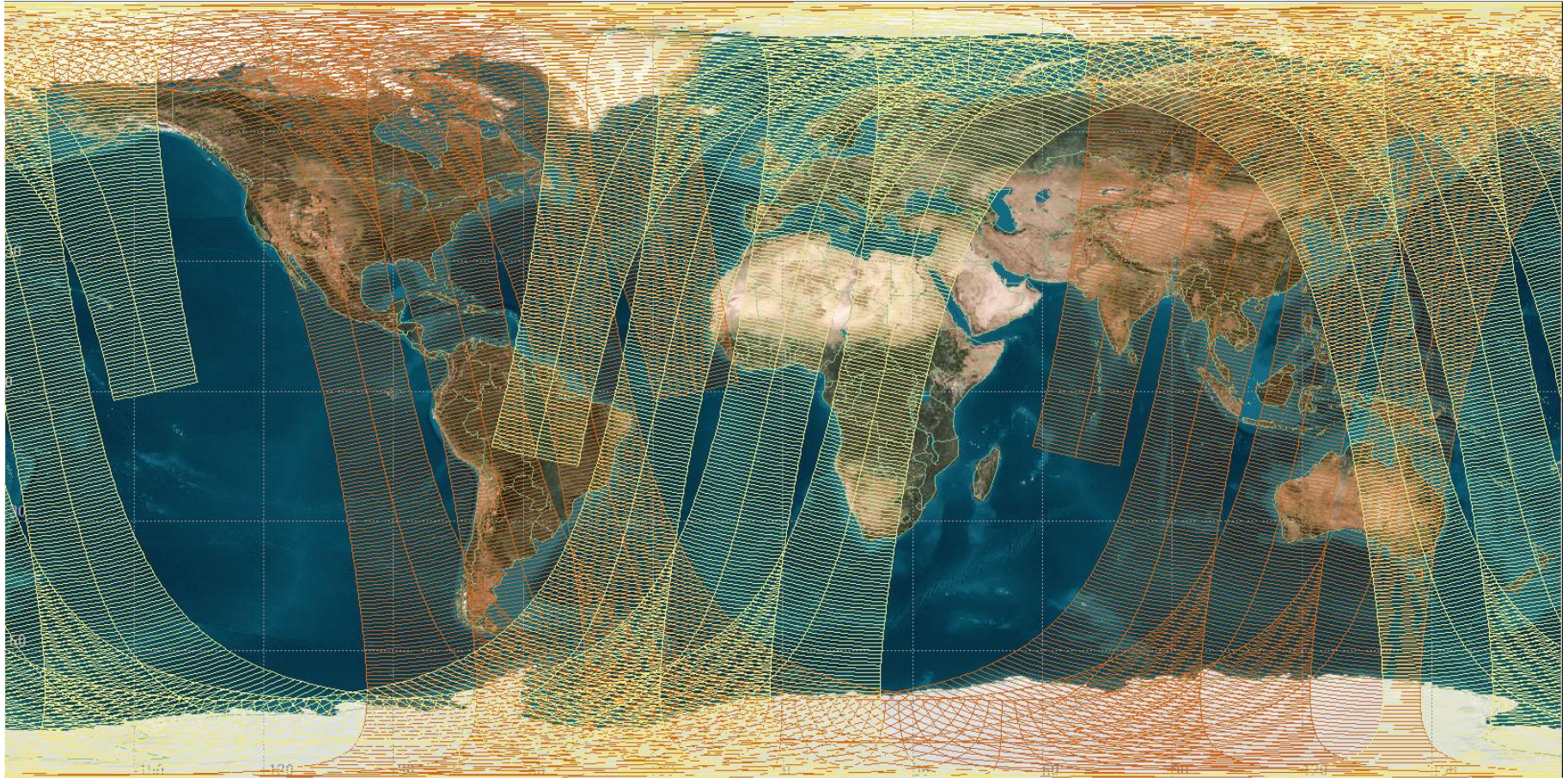





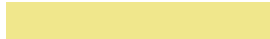
# Fengyun Polar



- Retired: FY-1D
- In operation: FY-3A + FY-3B



 **FY-3A LTC 10:00 AM**

 **FY-3B LTC 13:40 PM**

# Instruments Status

Instrument	Status	
	FY-3A	FY-3B
<b>VIRR</b>	Operating normally	Operating normally
<b>MERSI</b>	Operating normally	Operating normally
<b>IRAS</b>	Failed to work since Oct., 2008	Operating normally
<b>MWTS</b>	Failed to work since Dec., 2012	Operating normally
<b>MWHS</b>	Operating normally	Operating normally
<b>MWRI</b>	Stop to work after launch	Operating normally
<b>TOU</b>	Operating normally	Operating normally
<b>SBUS</b>	Failed to work since Dec., 2008	Operating normally
<b>ERM</b>	Failed to work since May, 2010	Failed to work since Aug., 2011
<b>SIM</b>	Operating normally	Operating normally
<b>SEM</b>	Operating normally	Operating normally



# Fengyun GEO



## Retired

FY-2C

## In operation

FY-2D: Full Disk

FY-2E: Full Disk

FY-2F: Regional

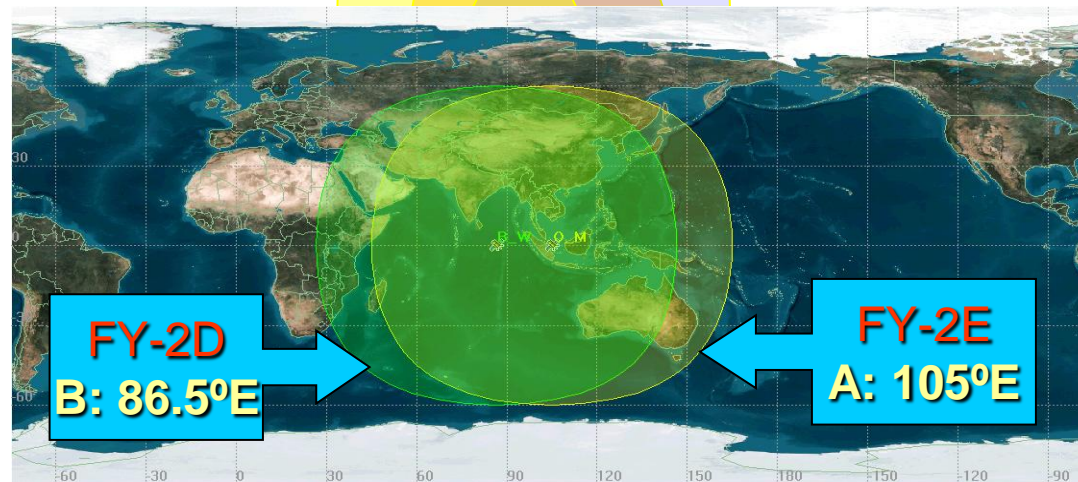
Operation

Back-up

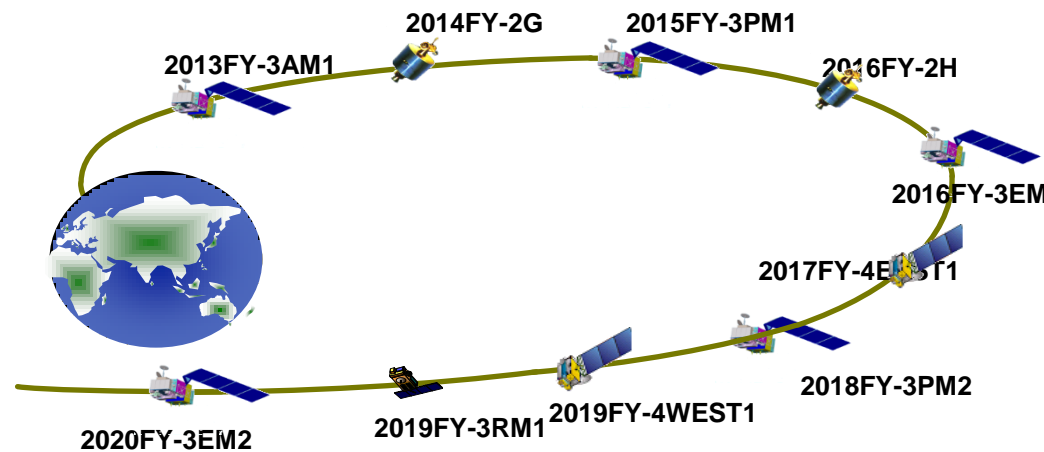


Full Disk Scan

Regional Scan



# 2. Future Plan



## Tentative Schedule for Future FY Series

Schedule	GEO.		LEO.
	FY-2	FY-4	FY-3
2011			
2012			
2013			Operational (A.M. Orbit)
2014	Operational		
2015			Operational (P.M. Orbit)
2016	Operational		Operational (E.M. Orbit)
2017		Operational (Optical SAT)	
2018			Operational (P.M. Orbit)
2019		Operational (Optical SAT)	Operational (Rain Fall Mission)
2020			Operational (E.M. Orbit)

# FY-3A/B follow-on



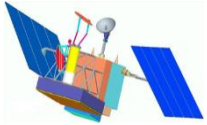
FY-3 OPERATIONAL SATELLITE INSTRUMENTS	FY-3C	FY-3D	FY-3E	FY-3F
MERSI – Medium Resolution Spectral Imager (I, II)	√(I)	√(II)	TBD	√(II)
MWTS – Microwave Temperature Sounder (II)	√	√	√	√
MWHS – Microwave Humidity Sounder (II)	√	√	√	√
MWRI – Microwave Radiation Imager	√	√		√
WindRAD - Wind Radar			√	
GAS - Greenhouse Gases Absorption Spectromete		√		√
HIRAS – Hyperspectral Infrared Atmospheric Sounder		√	√	√
OMS – Ozone Mapping Spectrometer				
GNOS – GNSS Occultation Sounder	√	√	√	√
ERM – Earth Radiation Measurement (I, II)	√(I)			
SIM – Solar irradiation Monitor (II)	√			
SES – Space Environment Suite	√	√	√	√
IRAS – Infrared Atmospheric Sounder	√			
VIRR – visible and Infrared Radiometer	√			
SBUS – Solar Backscattered Ultraviolet Sounder	√			
TOU – Total Ozone Unit	√			

FY-3 series is expected to last its measurements at least 15 years with additional four satellites. There are 16 improved or new instruments will be configured from FY-3C to FY-3F in the schedule.

**FY-3C/D/E/F Payload Configuration**

↑ 2016





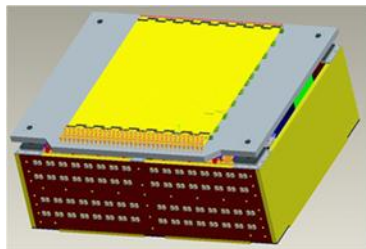
# FY-3 Rain Fall Mission



- Consist a Global observation constellation system with FY3-2 AM and PM satellites, as well as GPM satellite
- Improve the severe convective system monitoring ability in china together with GPM satellite
- Provide 3D precipitation structure over both ocean and land
- Improve the sensitivity and accuracy of precipitation measurement over china and surrounding area



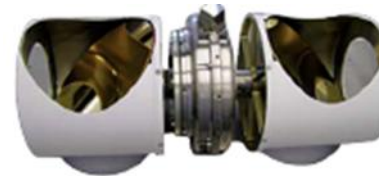
MWTS



KaPR



KuPR

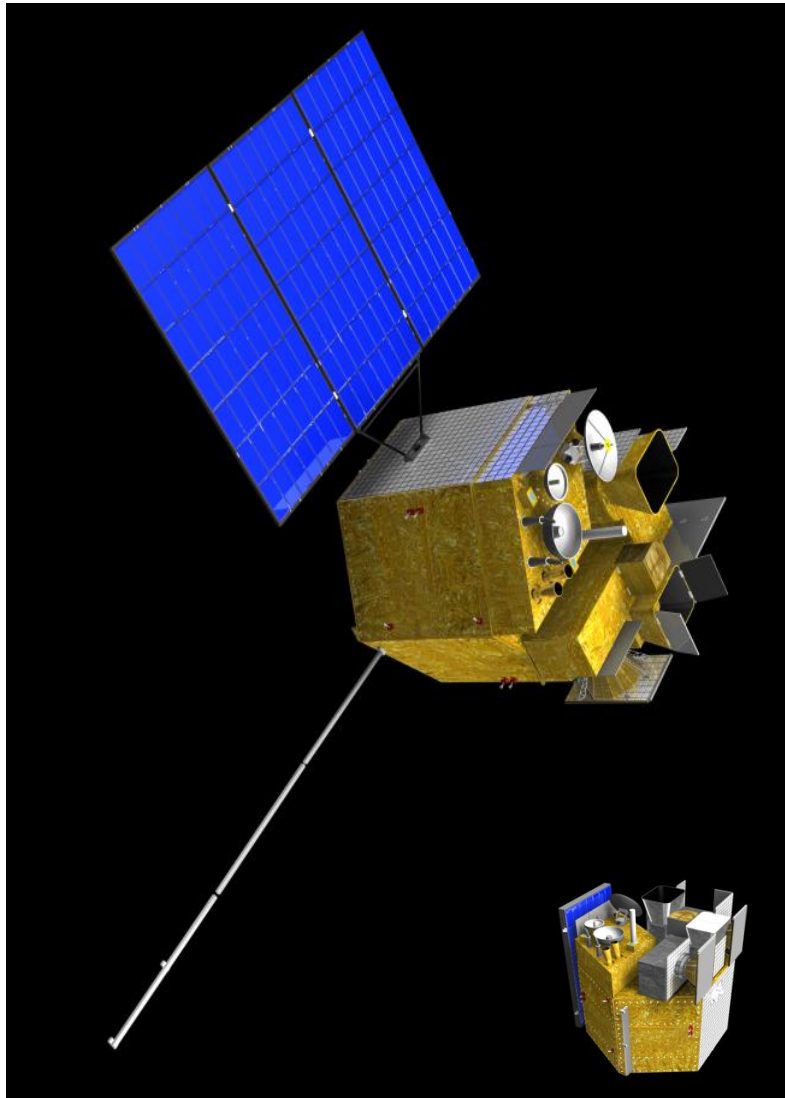


MWHS



MWRI

# FY-4 Optical SAT



## Main Instruments

- 1) **GIIRS**: Geo. Interferometric Infrared Sounder
- 2) **AGRI**: Advanced Geosynchronous Radiation Imager
- 3) **LMI**: Lightning Mapping Imager
- 4) **SEP**: Space Environment Package

## Spacecraft:

1. Launch Weight: approx 5300kg
2. Stabilization: Three-axis
3. Attitude accuracy: 3"
4. Bus: 1553B+Spacewire
5. Raw data transmission : X band
6. Output power:  $\geq 3200W$

# 3. Latest Progress of FY-3C

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- Launch date has been fixed: Sept. 23 ~ 24, 2013

- New Instrument

**GNOS**

- Improved Instrument

**MWTS II**: 4 channels to 13 channels

**MWHS II**: 5 channels to 15 channels, 15 pixels per line to 90 pixels per line

**SIM II**: without the solar tracking function to with the solar tracking function



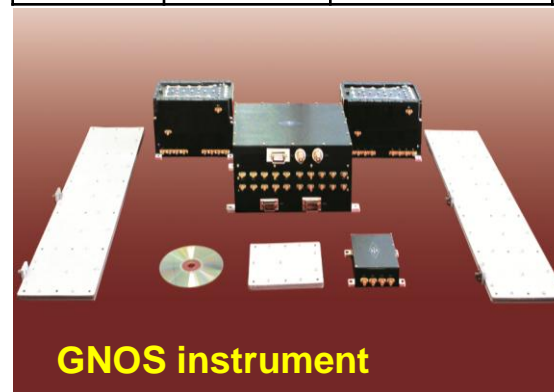
GNOS will receive two types of signal from GPS and China BeiDou-2. GNOS will observe over 1000 occultations per day with GPS and BD satellites,

## Expected Products

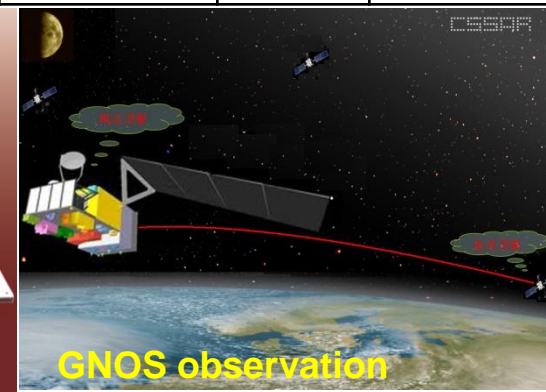
- Temperature profiles
- Humidity profiles
- Refractivity profiles
- Electronic content profiles

<b>Frequency</b>	GPS L1/L2; BD2
<b>Receiver Channels</b>	8 (Navigation) 4 (Occultation)
<b>Sampling rate</b>	1 ~ 50 Hz
<b>Crystal oscillator</b>	1e-11 (100s)
<b>Real-time position</b>	10m (RMS)
<b>Real-time velocity</b>	0.1m/s(RMS)
<b>Phase center accuracy</b>	2 mm (RMS)
<b>Antenna number</b>	1 (Navigation) 2 (Occultation)

		Temperature	Humidity	Refracti vity	Electronic Content
<b>RMS Accuracy</b>	Low Tropos.	0.5-3 k	0.25-1.0 g/kg	0.1-0.5%	(100-600 km) < 20%
	High Tropos.	0.5-3 k	0.05-0.2 g/kg	0.1-0.2%	
	Low Stratos.	0.5-3 k	-----	0.1-0.2%	
	High Stratos.	0.5-5 k	-----	0.2-2.0%	



**GNOS instrument**

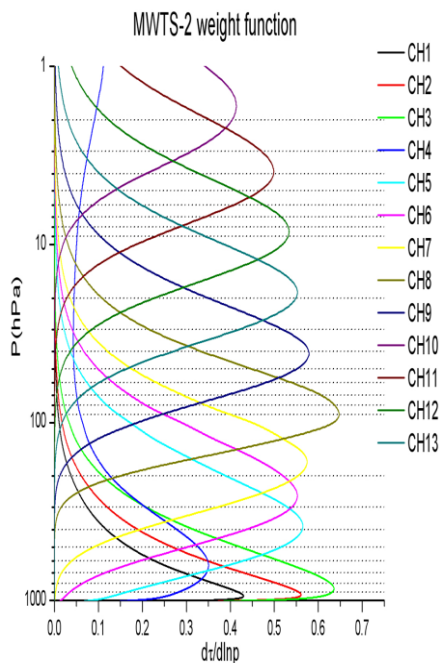


**GNOS observation**



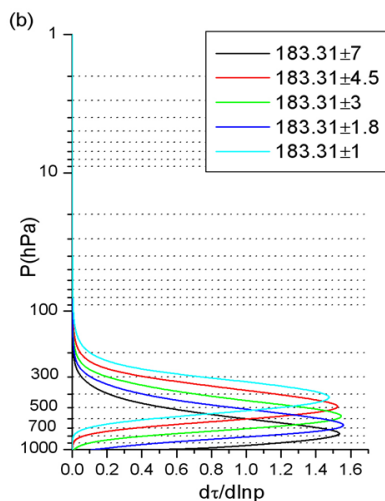
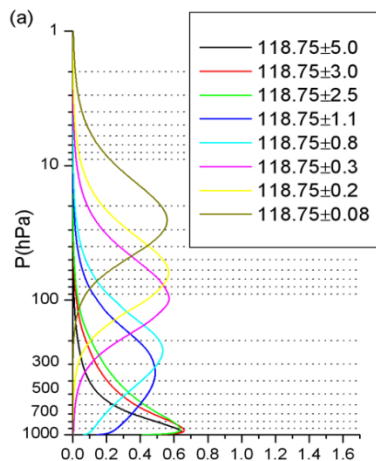
Parameter	Specification
Scan Angle	$\pm 49.5^\circ$
Pixels Per Scan Line	90
Quantization	13 bits

Ch No.	Central Frequency (GHz)	3dB Bandwidth (MHz)	NEAT (K)	Main Beam Eff.	Dynamic Range (K)	Cal. Acc. (K)	Purpose
1	50.3	180	1.20	>90%	3 ~ 340	1.5	Surface Emiss.
2	51.76	400	0.75	>90%	3 ~ 340	1.5	Atmospheric Temperature Profile
3	52.8	400	0.75	>90%	3 ~ 340	1.5	
4	53.596	400	0.75	>90%	3 ~ 340	1.5	
5	54.40	400	0.75	>90%	3 ~ 340	1.5	
6	54.94	400	0.75	>90%	3 ~ 340	1.5	
7	55.50	330	0.75	>90%	3 ~ 340	1.5	
8	$57.290344 (f_0)$	330	0.75	>90%	3 ~ 340	1.5	
9	$f_0 \pm 0.217$	78	1.20	>90%	3 ~ 340	1.5	
10	$f_0 \pm 0.3222 \pm 0.048$	36	1.20	>90%	3 ~ 340	1.5	
11	$f_0 \pm 0.3222 \pm 0.022$	16	1.70	>90%	3 ~ 340	1.5	
12	$f_0 \pm 0.3222 \pm 0.010$	8	2.40	>90%	3 ~ 340	1.5	
13	$f_0 \pm 0.3222 \pm 0.0045$	3	3.60	>90%	3 ~ 340	1.5	



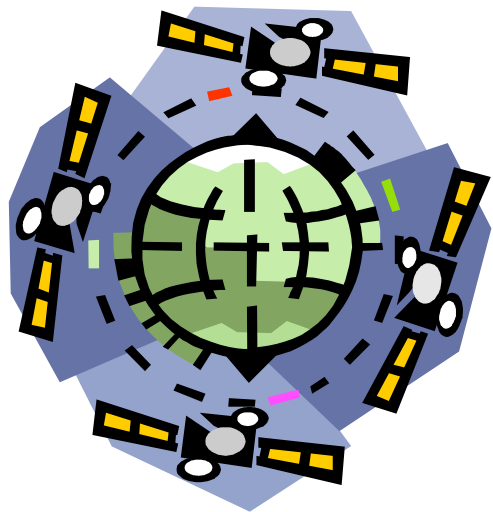


Parameter	Specification
Scan Angle	$\pm 53.35^\circ$
Pixels Per Scan Line	98
Quantization	14 bits



Ch No.	Central Frequency (GHz)	Polarization	Bandwidth (MHz)	Freq. Stability (MHz)	Dynamic Range (K)	NE $\Delta T$ (K)	Cal. Acc. (K)	Main Beam Width	Main Beam Eff.	Purpose
1	89.0	V	1500	50	3–340	1.0	1.3	2.0°	>92%	Surface and Precipitation
2	118.75 $\pm$ 0.08	H	20	30	3–340	3.6	2.0	2.0°	>92%	Atmospheric Temperature Profile
3	118.75 $\pm$ 0.2	H	100	30	3–340	2.0	2.0	2.0°	>92%	
4	118.75 $\pm$ 0.3	H	165	30	3–340	1.6	2.0	2.0°	>92%	
5	118.75 $\pm$ 0.8	H	200	30	3–340	1.6	2.0	2.0°	>92%	
6	118.75 $\pm$ 1.1	H	200	30	3–340	1.6	2.0	2.0°	>92%	
7	118.75 $\pm$ 2.5	H	200	30	3–340	1.6	2.0	2.0°	>92%	
8	118.75 $\pm$ 3.0	H	1000	30	3–340	1.0	2.0	2.0°	>92%	
9	118.75 $\pm$ 5.0	H	2000	30	3–340	1.0	2.0	2.0°	>92%	
10	150.0	V	1500	50	3–340	1.0	1.3	1.1°	>95%	Surface and Precipitation
11	183.31 $\pm$ 1	H	500	30	3–340	1.0	1.3	1.1°	>95%	Atmospheric Moisture Profile
12	183.31 $\pm$ 1.8	H	700	30	3–340	1.0	1.3	1.1°	>95%	
13	183.31 $\pm$ 3	H	1000	30	3–340	1.0	1.3	1.1°	>95%	
14	183.31 $\pm$ 4.5	H	2000	30	3–340	1.0	1.3	1.1°	>95%	
15	183.31 $\pm$ 7	H	2000	30	3–340	1.0	1.3	1.1°	>95%	





Thank you!

