

# Updates on CMA FENGYUN Meteorological Satellite Programs



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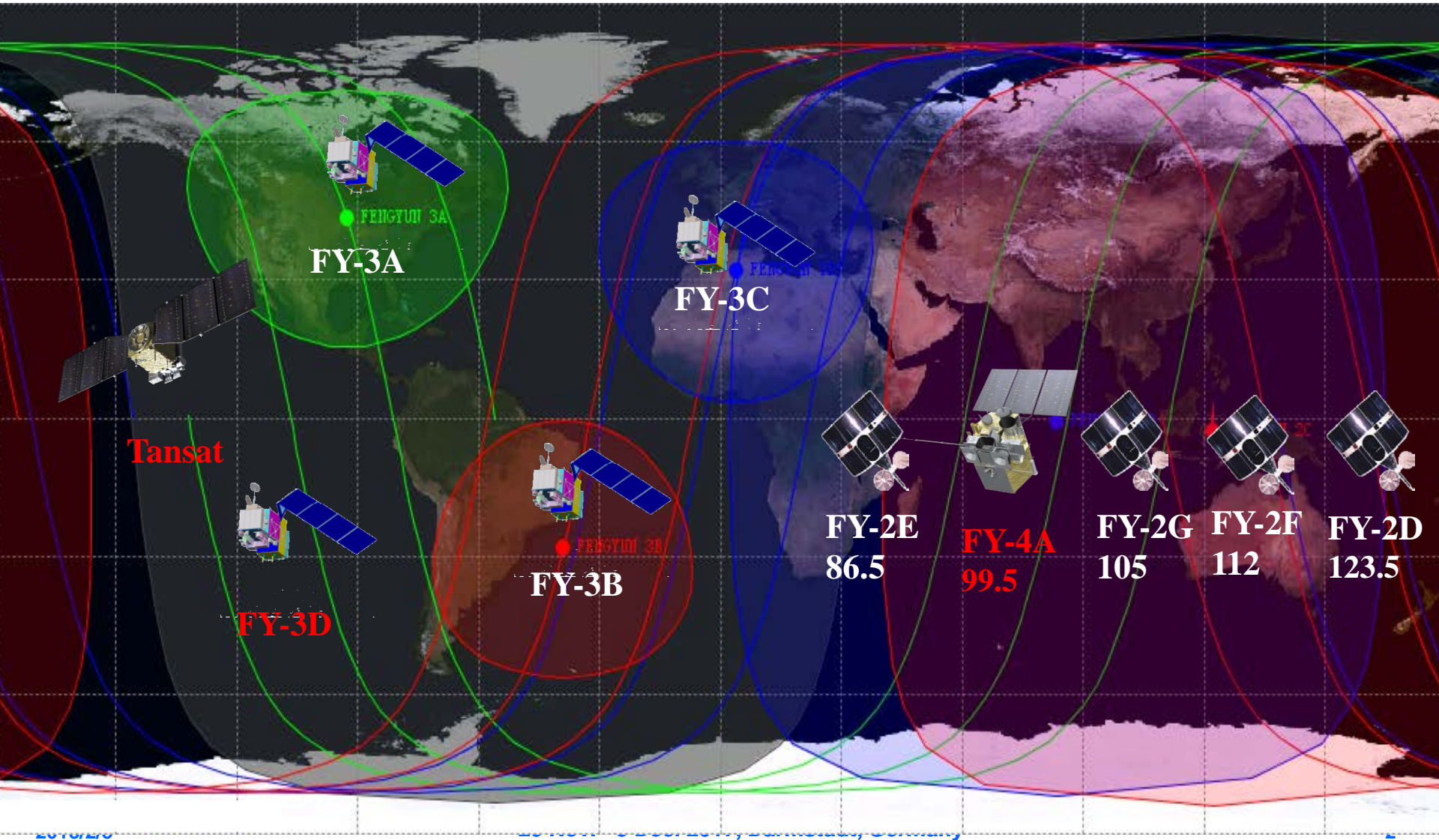


# 1. Missions on the orbit



**FY Program:** 9 on the orbit, 5 in operation, 1 in trial operation, 1 in on-orbit test

**Joint program:** TanSat in commission test



## 2. Latest Progress

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### ■ FY-4A

- Launched in Dec.11, 2016
- The commission test in first phase for instruments with geolocation and calibration have been completed this Sept.
- The commission test in second phase for retrieval products is ongoing.

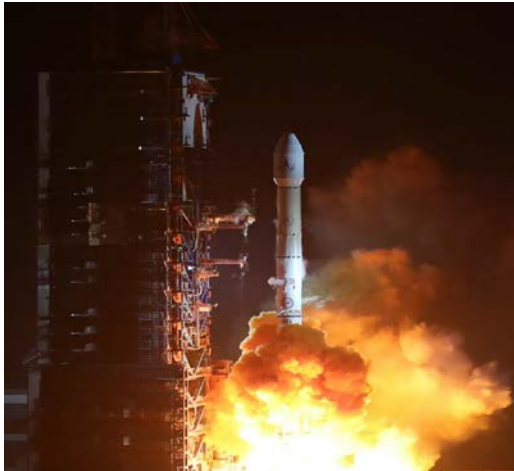
### ■ TANSAT

- Launched in Dec. 22, 2016
- A joint R&D satellite program initiated by MOST and supported by CMA and CAS.
- NSMC is responsible for data reception, processing and distribution, taking advantage of current FY-3 ground segment resources.

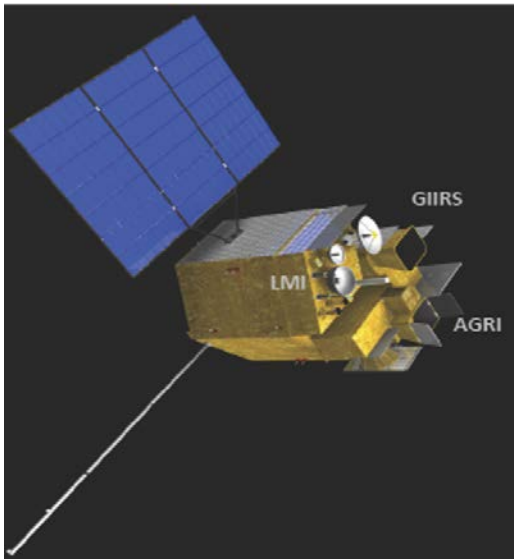
### ■ FY-3D

- Launched in Nov. 15, 2017
- The commission test started and is expected to be completed within 6 months.

# FY-4A: Launched on 11 Dec, 2016

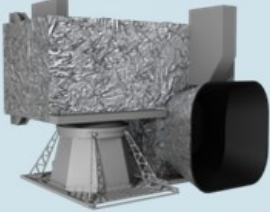
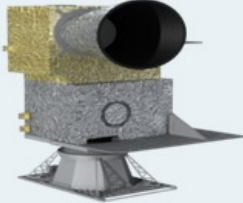




FY-4 is the CMA new generation meteorological geo-satellite series, expected to support various weather-related services, including weather forecasting, disaster prevention and reduction, and monitoring and warning of space weather.



## 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:  $\geq 3200W$
7. Design life: over 7 years

Instrument	Purposes	
	<p><b>AGRI:</b> <i>Advanced Geosynchronous Radiation Imager</i></p>	<p>14 -channel Earth images</p>
	<p><b>GIIRS:</b> <i>Geostationary Interferometric InfraRed Sounder</i></p>	<p>Clear-sky atmospheric temperature and humidity profiles</p>
	<p><b>LMI:</b> <i>Lightning Mapping Imager</i></p>	<p>Lightning distribution map in China area</p>
	<p><b>SEP:</b> <i>Space Environment Package</i></p>	<p>Space electric and magnetic environment information</p>



One day RGB  
images animation  
from AGRI / 15  
minutes



# TANSAT: Launched on 22 Dec, 2016

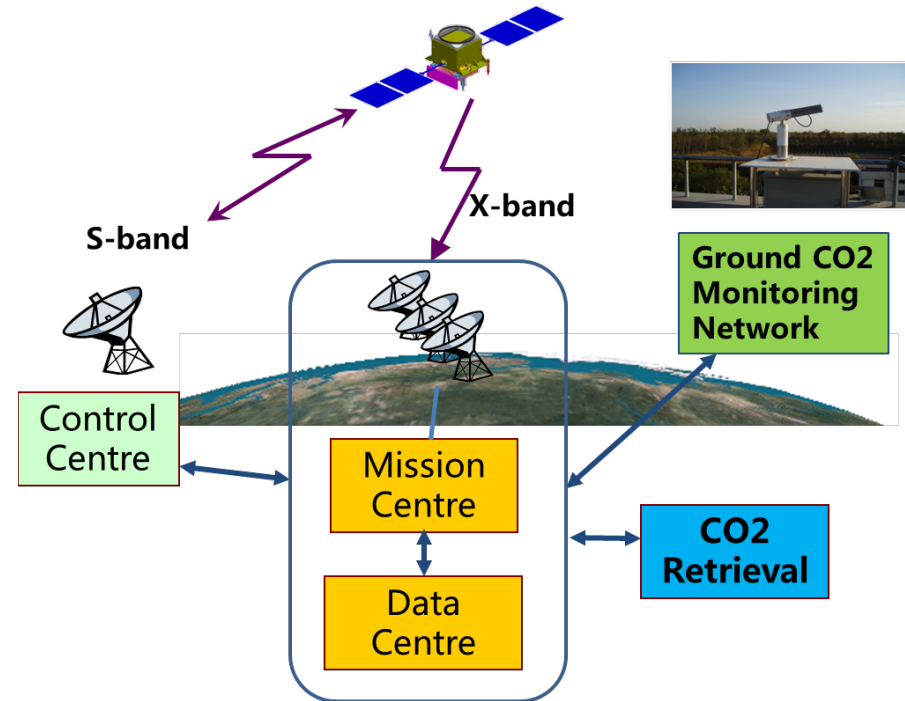
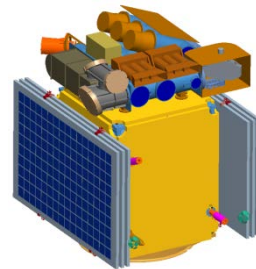


	Parameter
Orbit	700km,13:30, Ascending Local Time
Mass	600kg
Power	420 - 610W
Size	150cm(Ys) x 180cm(Zs) x 185cm(Xs)
Data Storage	128 Gb
Designed Lifetime	3 years
Spacecraft stabilization	3-axis, Pointing stability: $\leq 0.001^\circ/s$ ;

**Mission objectives** to acquire global atmosphere column-averaged CO<sub>2</sub> dry air mole fraction

## Instruments

- 1) CO<sub>2</sub> spectrometer
- 2) Cloud and Aerosol Polarize Instrument (CAPI)

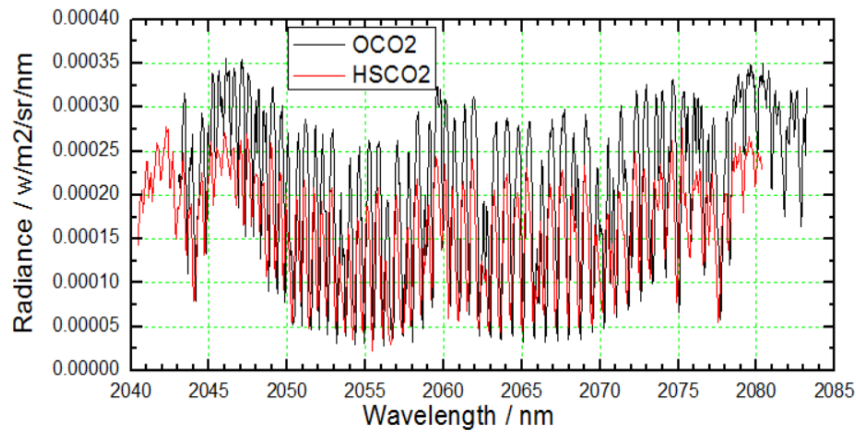
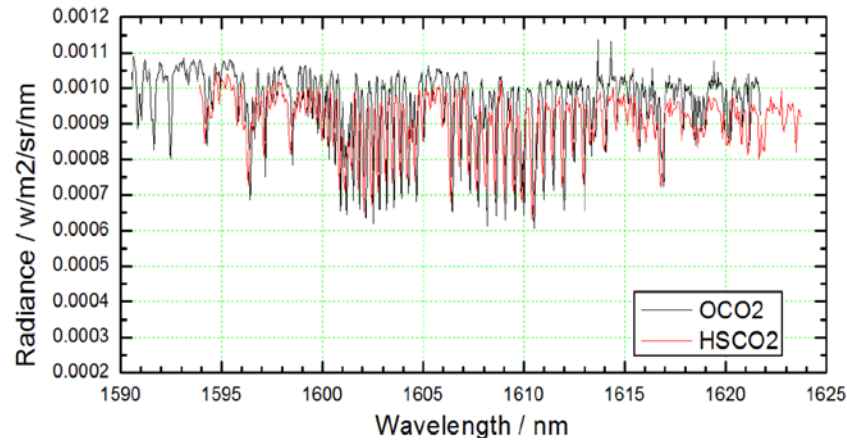
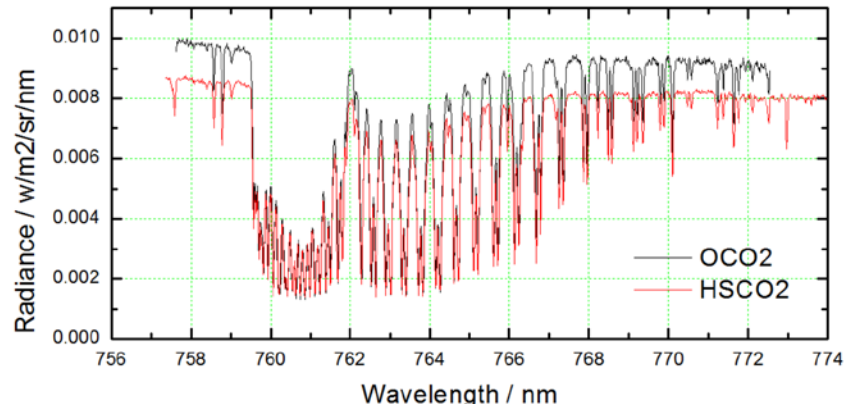
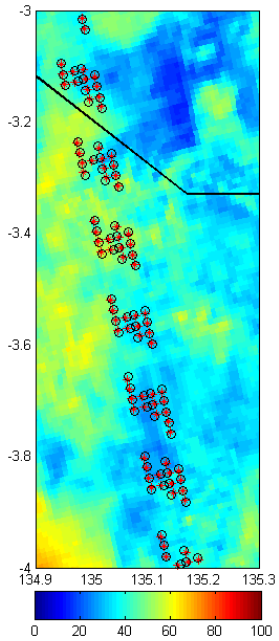
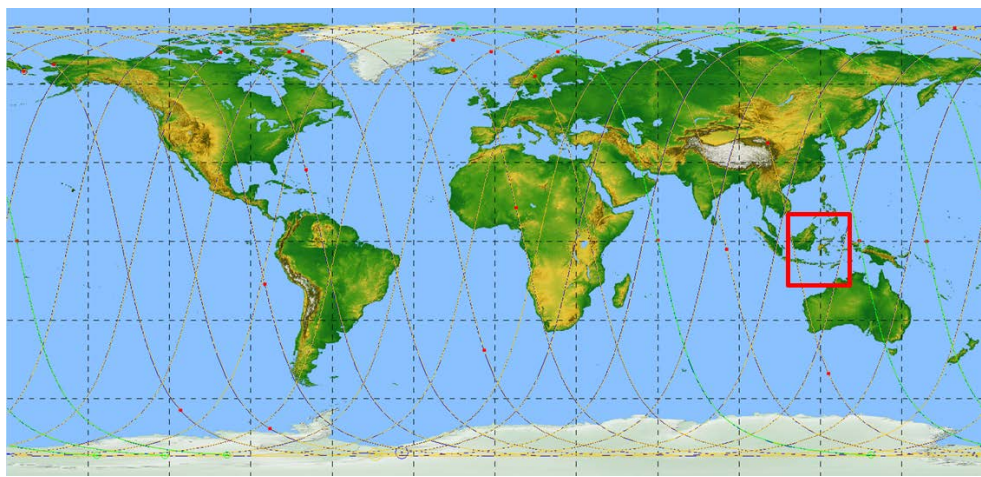


TANSAT Ground segment by CMA



# CO2 and O2 Absorption Spectra

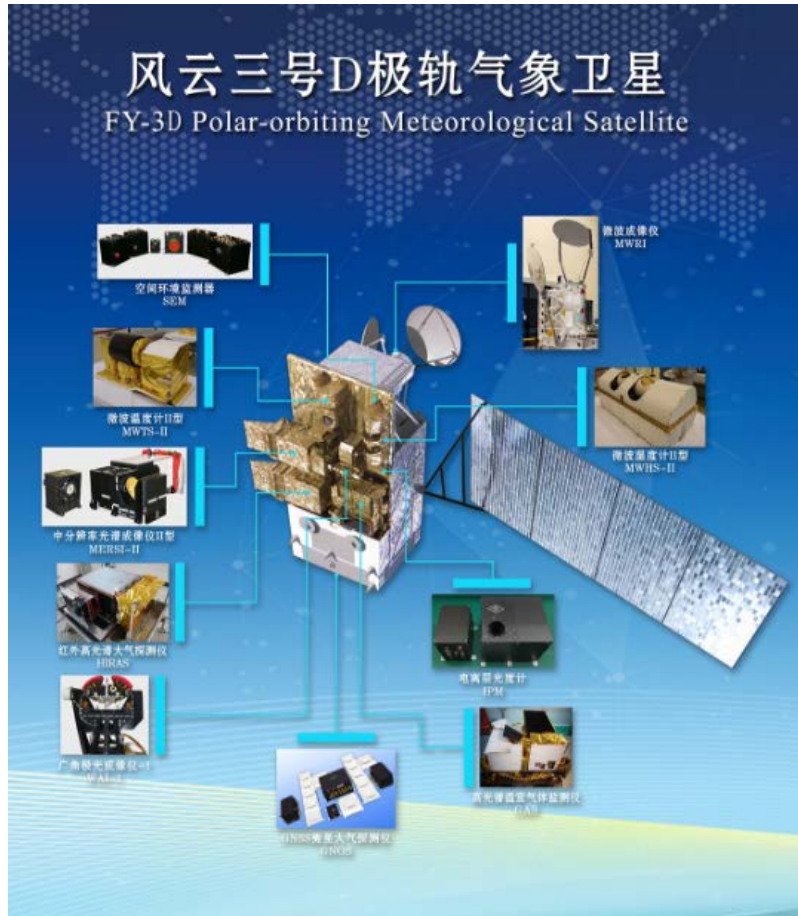
## Comparison with OCO-2



# FY-3D: Launched on 15 Nov, 2017



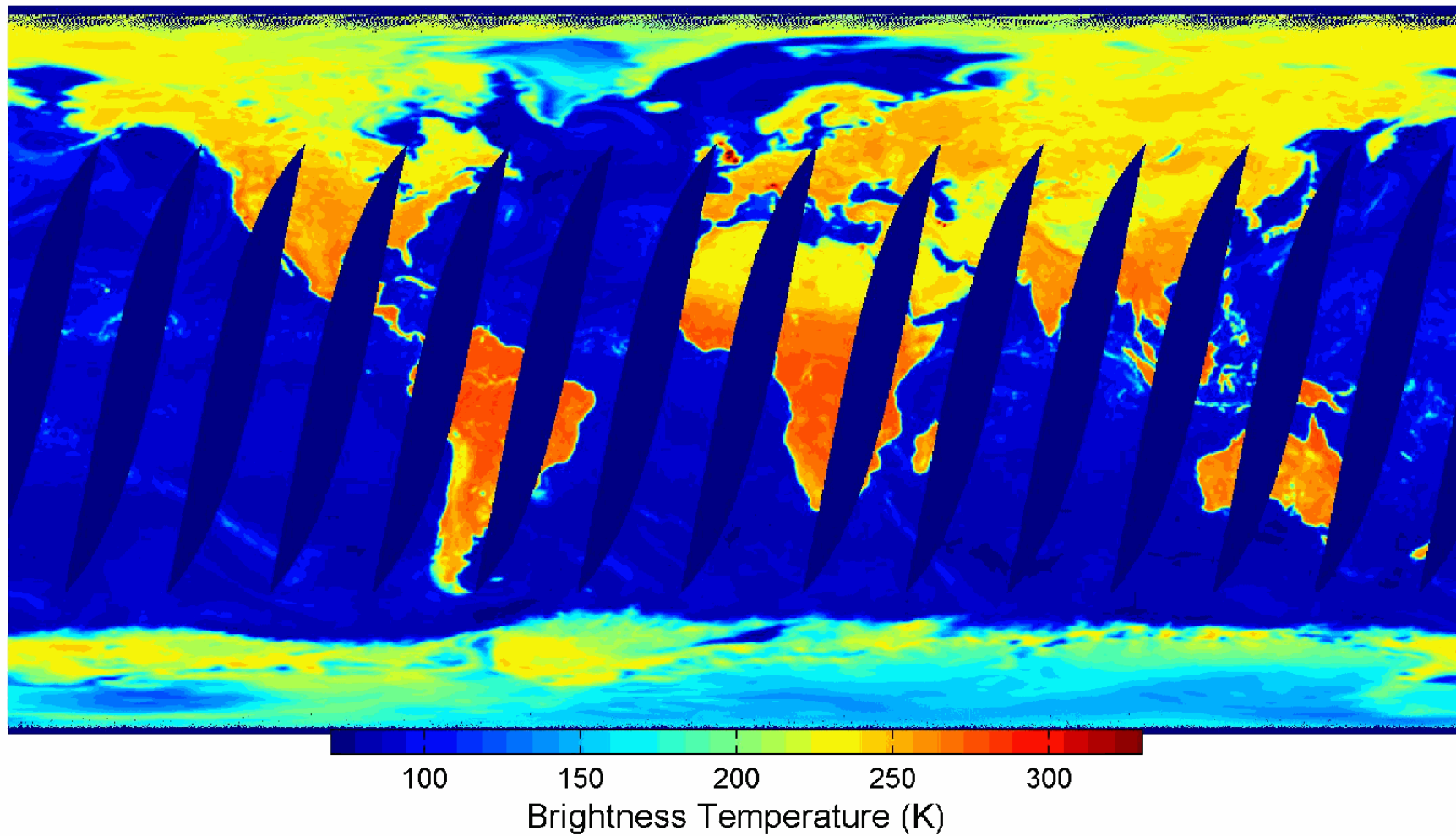
Parameters	Satellite Specification
Orbit type	Near-polar sun-synchronous orbit
Orbital altitude	836 Km
Orbital inclination	98.75°
Precision orbit	Semi-major axis deviation: $ \Delta a  \leq 5\text{Km}$
	Orbital inclination deviation: $ \Delta i  \leq 0.1^\circ$
	Orbital eccentricity $\leq 0.003$
Repeat cycle	5.5d (Design range is in 4-10 d)
Eccentricity	$\leq 0.0025$
Local time drift at ascending node	15 min within 4 yrs
Launch window	local time at ascending node: 13:40 – 14:00
Design lifetime	5 yrs for design, 4 yrs for assessment



Payload Name	Channel Numbers with Spectral Coverage
MEdium Resolution Spectral Imager (MERSI-2)	25 (0.413 – 12 μm)
Hyperspectral Atmospheric Sounder (HIRAS)	1370 (3.92 – 15.38 μm)
MicroWave Radiation Imager (MWRI)	10 (10.65 – 89 GHz)
MicroWave Temperature Sounder (MWTS-2)	13 (50.3 – 57.29 GHz)
MicroWave Humidity Sounder (MWHS-2)	15 (89.0 – 183.31 GHz)
GNSS Occultation Sounder (GNOS)	29 (--)
Greenhouse-gases Absorption Spectrometer (GAS)	5540 (0.75 – 2.38 μm)
Wide angle Aurora Imager (WAI)	1 (140 – 180 nm)
Ionospheric PhotoMeter (IPM)	3 (130 – 180 nm)
Space Environment Monitor (SEM)	25 (--)

- **Four brand new instruments added (HIRAS, GAS, WAI, IPM)**
- **One Successive instrument updated (MERSI-2)**
- **All the successive Instruments performance are improved significantly**

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- **15 Nov, 2017: Launch day**
- **24 Nov, 2017: Afternoon orbit adjustment as constellation with morning orbit (FY-3C)**
- **25 ~ 26 Nov, 2017: All instruments except infrared channels have been switched on**
- **27 Nov, 2017: DPT has been switched on and global data have been acquired from SSC Kiruna station and KSAT Troll station**
- **6 months are expected for commission test**
- **FY-3 international preprocessing software package will be released to support DB users for MERSI-2, MWTS-2, MWHS-2, HIRAS, MWRI**
- **All the data will be released and users can access the FY-3D data through our web portal freely after commission test**

*Together*  
**For Better**

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