

## Current Status and Future Plan of Fengyun Meteorological Satellites



ZHANG Xingying  
(zxy@cma.gov.cn)

*National Satellite Meteorology Center (NSMC)*  
*China Meteorological Administration (CMA)*



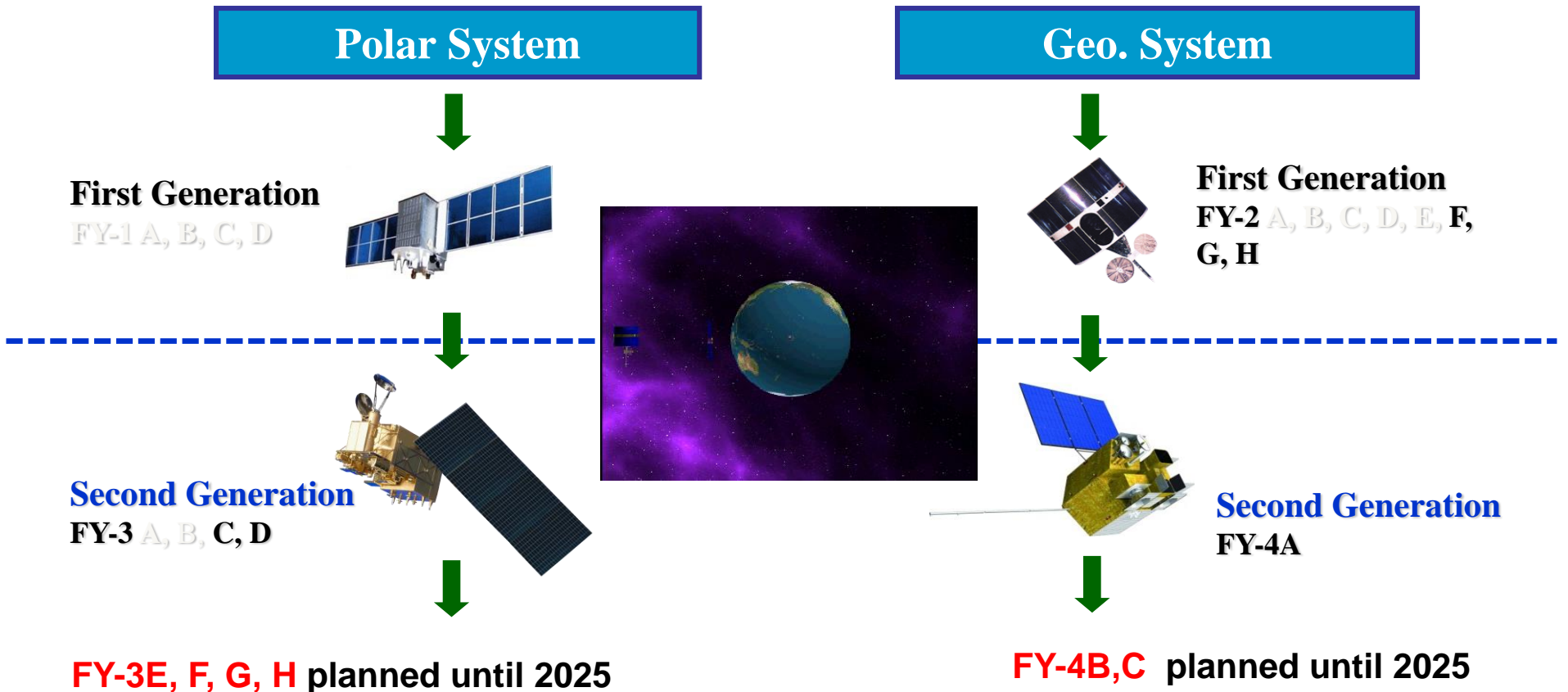
# Outline

- Fengyun Program Overview
- Current Status and Services
- Latest Progress
- Future Programs



## 1. Fengyun Program Overview

### FENGYUN Satellite Family



## Launched Satellites

**Since Jan. 1969, China began to develop his own meteorological Satellite**

| Leo   | Launch Data    |  | Geo   | Launch Data   |
|-------|----------------|--|-------|---------------|
| FY-1A | Sept. 7, 1988  |  | FY-2A | Jun. 10, 1997 |
| FY-1B | Sept. 3, 1990  |  | FY-2B | Jun. 25, 2000 |
| FY-1C | May 10, 1999   |  | FY-2C | Oct. 18, 2004 |
| FY-1D | May 15, 2002   |  | FY-2D | Dec. 8, 2006  |
| FY-3A | May 27, 2008   |  | FY-2E | Dec. 23, 2008 |
| FY-3B | Nov. 5, 2010   |  | FY-2F | Jan. 13, 2012 |
| FY-3C | Sept. 23, 2013 |  | FY-2G | Dec. 31, 2014 |
| FY-3D | Nov. 15, 2017  |  | FY-4A | Dec. 11, 2016 |
|       |                |  | FY-2H | Jun. 5, 2018  |

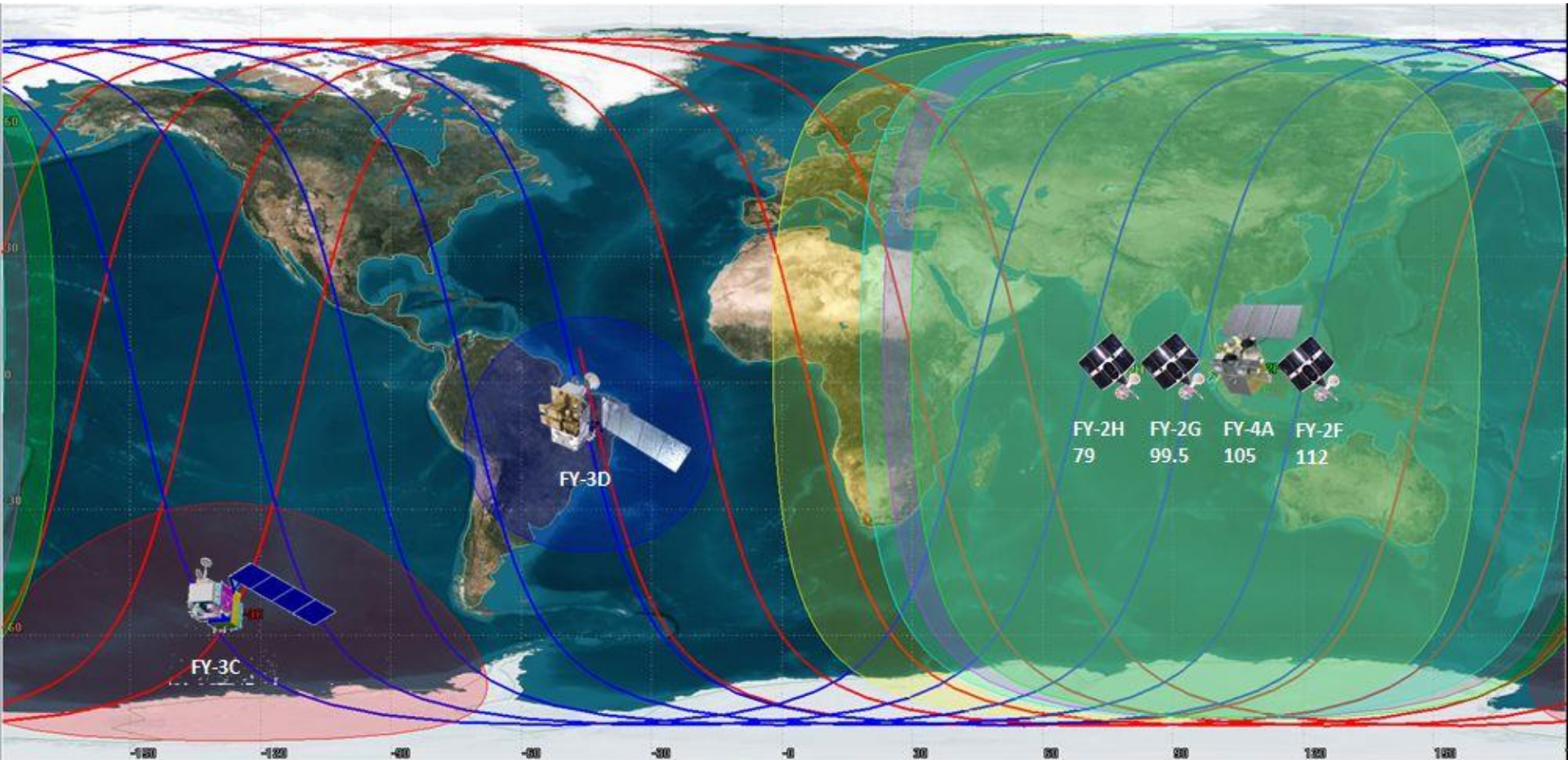
### Overall Development Strategy (4 stages):

- 1) 1970 - 1990: Conducting satellite research and development
- 2) 1990 - 2000: Implementing transition from R&D to operational
- 3) 2000 - 2010: Implementing transition from 1<sup>st</sup> generation to 2<sup>nd</sup> generation
- 4) 2010 - 2020: Pursuing accuracy and precision of satellite measurements



## 2. Current Status and Services

### 6 Fengyun satellites operating in orbit



## Global Data Receiving Network of Fengyun Satellites

Domestic: Beijing, Guangzhou, Urumqi, Jiamusi and Kashgar,  
5 ground stations

The Antarctic Pole: TrollSat station, Norway

The Antic Pole: Kiruna station, Sweden



北京地面站



广州地面



乌鲁木齐地面站



资料处理中心



瑞典基律纳地面站



喀什地面站



佳木斯地面站



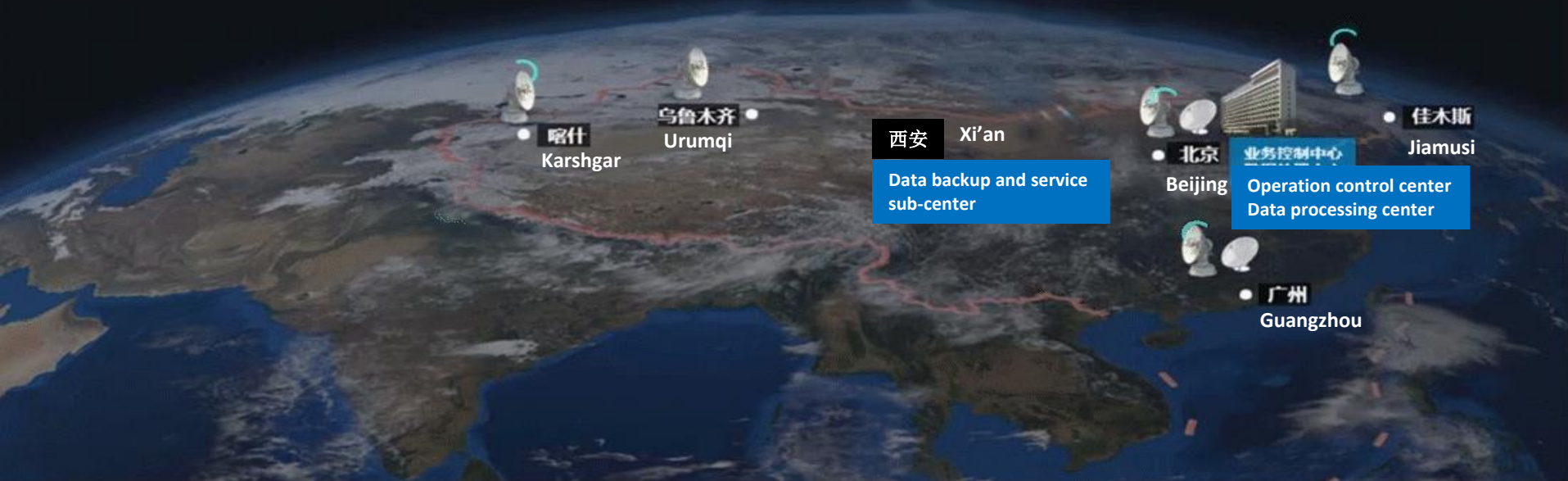
南极地面站

Global data access time  
is better than 2 hours.



## Layout of FY Ground Segment

- 极轨卫星数据接收 Leo Satellite data receiving
- - - 静止卫星轨道测距 Geo Satellite Ranging
- ↔ 静止卫星指令和数据获取 Geo Satellite command and data receiving



## Fengyun Products

### Atmosphere (33)

- Aerosol
- *Aerosol optical thickness*
- Aerosol over Land Surface
- Total Precipitable Water
- Precipitation
- Rain Type
- Rain Phase
- Radar Rain Rate
- Atmospheric bending angle
- Atmospheric refractive index
- *Atmospheric density*
- Electron density profile
- *total sulfur dioxide column*
- *Total Nitrogen Dioxide column*
- Atmospheric humidity profile (GNOS)
- Atmospheric temperature profile (MWTS, MWRI, GNOS)
- Atmospheric temperature and humidity Profile (MWHS-II)
- Atmospheric temperature and humidity Profile (HIRAS/MWHS-II/MWTS-III)
- Atmospheric temperature and humidity Profile (MWHS-III/HIRAS)
- Atmospheric temperature and humidity Profile (MWTS-III/HIRAS)
- Atmospheric temperature and humidity Profile (MWHS-II/MWTS-III/MWRI)
- ***Total oxygen column***
- ***Carbon dioxide mixing ratio***
- ***Methane mixing ratio***
- total ozone column
- ***Nadir Ozone vertical profile***
- ***Limb Ozone vertical profile***

### Cloud & Radiation (17)

- Equivalent emission radiation for clear sky
- *OLR of HIRAS*
- *Cloud Top Parameters*
- Top-up Radiation and Clouds
- Surface radiation budget
- ***Total solar irradiance downward from the atmospheric top***
- ***solar band irradiance at the top of the atmosphere***
- Cloud Mask
- Cloud Amount
- Cloud Classification
- *Cloud Top Temperature/Cloud Top Pressure*
- *Cloud Optical Depth*
- *the Effective Radius of Cloud*
- Outgoing Longwave Radiation
- *Polar Winds*
- *Water leaving Reflectance*
- *Cloud Liquid Water Content*

### Space Weather (13)

- *zeta potential*
- *Radiation dose*
- *Magnetic field*
- *particle (Medium and high energy proton, Electronic three-directional flow, Particle throw angle)*
- *scan imaging*
- *Push-broom scan imaging*
- *Aurora egg morphology*
- *Particle sedimentation*
- *IPM night product*
- *IPM daytime product*
- *IPM multi-angle product*
- *Solar extreme ultraviolet imager*
- *solar x ray imager*

### Ocean (7)

- Aerosol over Ocean
- Total *Precipitable Water over Ocean*
- MERSI Sea Surface Temperature
- *MWRI Sea Surface Temperature*
- *MWRI Sea surface wind direction*
- GNOS Sea surface wind Speed
- PR Sea surface wind Speed
- PR Sea surface wind direction

### Ice&Snow (4)

- Sea ice
- Snow Cover
- Snow Depth
- SWE
- Polar Sea Ice Cover

### Biology (4)

- *Leaf area index*
- Fraction of Photosynthetically Active Radiation
- Net Primary Production
- *Chlorophyll fluorescence*

### Land (12)

- Land Reflectance Factor
- Land Surface Temperature
- *Land Surface Bidirectional Reflection/ Albedo*
- *Land Cover*
- *Dust Product*
- *Near-Constant Contrast Image*
- *City Light/Urban low-light background mosaic*
- *Land Surface Temperature*
- *Soil moisture content*
- *Surface pressure*
- *surface reflectance*

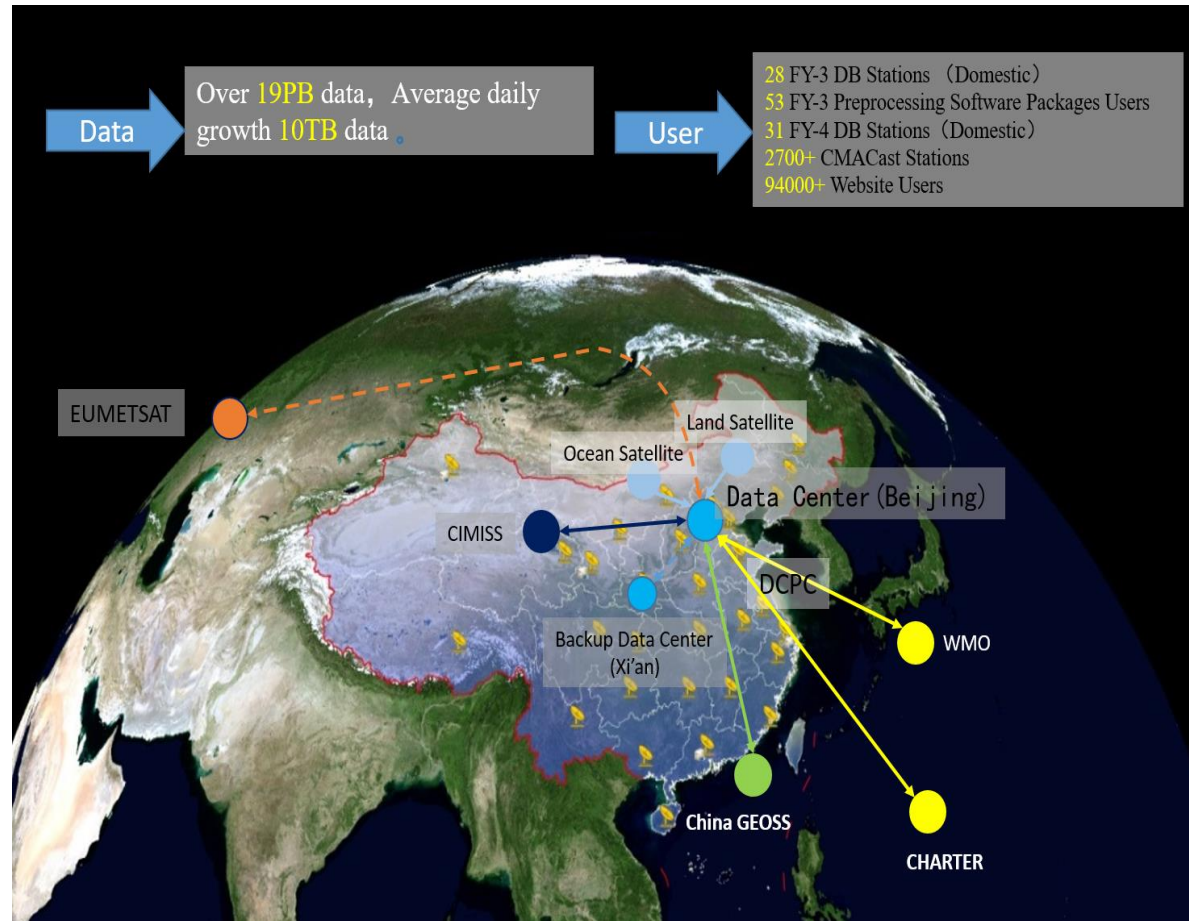
# FENGYUN Satellite Data Sharing and Service Capability

## NSMC:

One of the largest satellite data sharing centers in China.

Over 19PB data,  
Average daily growth  
10TB data, Total data  
services about 5.4PB in  
2019.

Global Openness, Real-  
time Sharing



# Integrated Space and Ground Based FY Satellite Data Service System

## ❖ Real time

- Direct Broadcast
- CMACast

## ❖ Non-Real Time

- Website
- Cloud Service
- FTP Service
- Manual Service



## Fengyun Data and Products Service

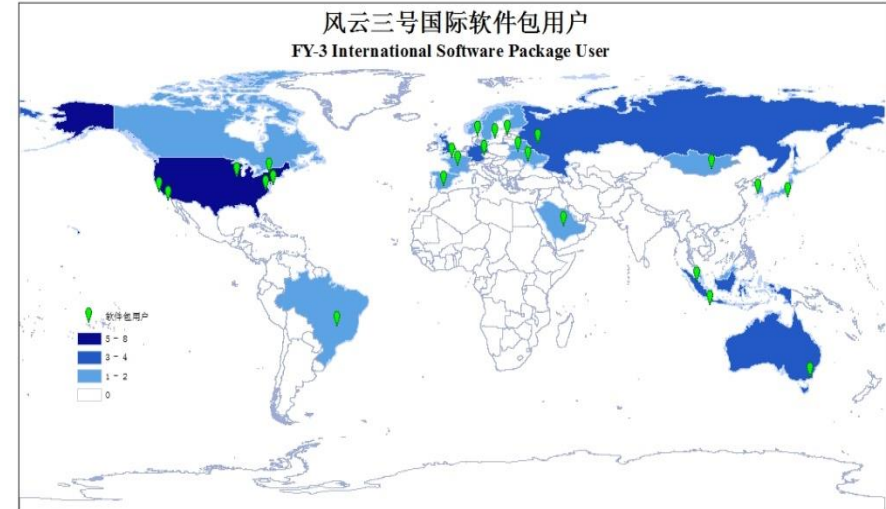
| Services                                 | Countries   |
|--|---|
| Fengyun Data Center                      | 108 countries, including 75 Belt & Road countries   |
| Fengyun Direct Broadcasting Station (DB) | 35 countries (6 FY-2 DB Station, 2 FY-3 DB Stations, 53 FY-3 Preprocessing Software packages users from 29 countries) |
| CMACast Stations                         | 20 countries  |
| SWAP 2.0 Website and Stand-alone         | 58 countries  |
| Direct Data Download users               | 30 countries  |
| FY_ESM members                           | 29 countries  |



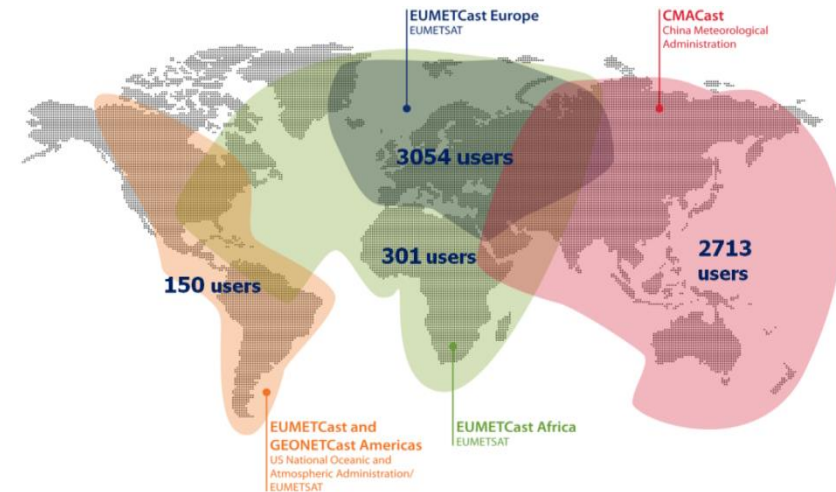
## Space-based Services



## FENGYUN DB Users (**29 countries**)



## CMACast Users (**20 countries**)



- Over **2700** DVB-S users
- Over **500** Utilization Stations of Geostationary Meteorological Satellite
- Over **3000** Data User Terminals
- Over **billions** people viewing Satellite Cloud Images through TV and Internet
- Over **100** countries and regions



## Web Portal Service

<http://www.nsmc.org.cn/en>

**NSMC** National Satellite Meteorological Center  
China Meteorological Administration

Home About NSMC Satellite Program Operation Imagery and Product Data Access Support

Position: Home

**FY Emergency Support**

**Fengyun Satellites**

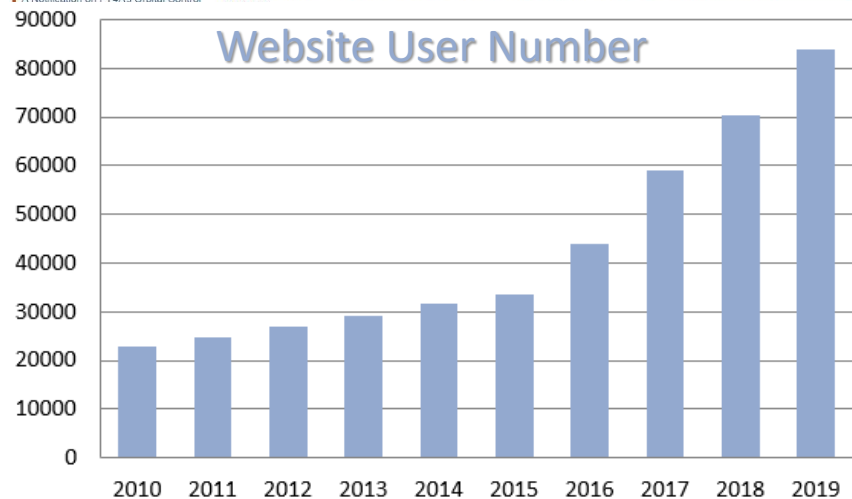
Legend

| Category | Satellite | Status     | Time Table |
|----------|-----------|------------|------------|
| LEO      | FY-3D     | TBUS       | ✓          |
|          | FY-3B     | TBUS       | ✓          |
|          | FY-3C     | TBUS       | ✓          |
| GEO      | FY-4A     | Time Table | ✓          |
|          | FY-2H     | Time Table | ✓          |
|          | FY-2G     | Time Table | ✓          |
|          | FY-2F     | Time Table | ✓          |

Updated: 18 Feb 2019 02:00 UTC

**Announcements**

- A Notification on FY2H's Orbital Control
- A Notification on FY4A's Orbital Control
- A Notification on FY2G's Orbital Control
- A Notification on FY4A's Orbital Control



<http://data.nsmc.org.cn>

Welcome to FENGYUN Satellite Data Center, Please Sign in Register NSMC Contact us Help 中文

**FENGYUN Satellite Data Center**  
NATIONAL SATELLITE METEOROLOGICAL CENTER

Home SATELLITES DATA IMAGES PRODUCTS DOCUMENTS TOOLS

**FY Satellite Data Download Toolkit is released!**

**Archive**

| Satellites | File count | Volume(TB) |
|------------|------------|------------|
| FY-3D      | 12542270   | 1545.6     |
| FY-3C      | 26012532   | 649.8      |
| FY-4A      | 101296761  | 2373.3     |
| FY-3B      | 42003361   | 2678.6     |
| FY-3A      | 32620430   | 1633.6     |
| FY-2H      | 1358446    | 19.8       |
| TANSAT     | 902446     | 86.1       |
| FY-2G      | 4049207    | 35.4       |
| FY-2F      | 5403131    | 51.9       |
| FY-2E      | 5819580    | 53.3       |
| FY-2D      | 4755434    | 58.2       |

**Statistics**

**DOWNLOAD SINCE 2005 ( MB )**

| Category      | Count     |
|---------------|-----------|
| Satellites    | 25        |
| Products      | 122       |
| Data          | 9464.4 TB |
| Users         | 94,618    |
| Download(24h) | 883.1 GB  |

**TRACK**

ALL FY-3D FY-3C FY-3B FY-4A FY-2H FY-2G FY-2F

**Orbit Parameters**

TBUS FY-3D FY-3C FY-3B

Two Line FY-3D FY-3C FY-3B

One Line FY-3D FY-3C FY-3B

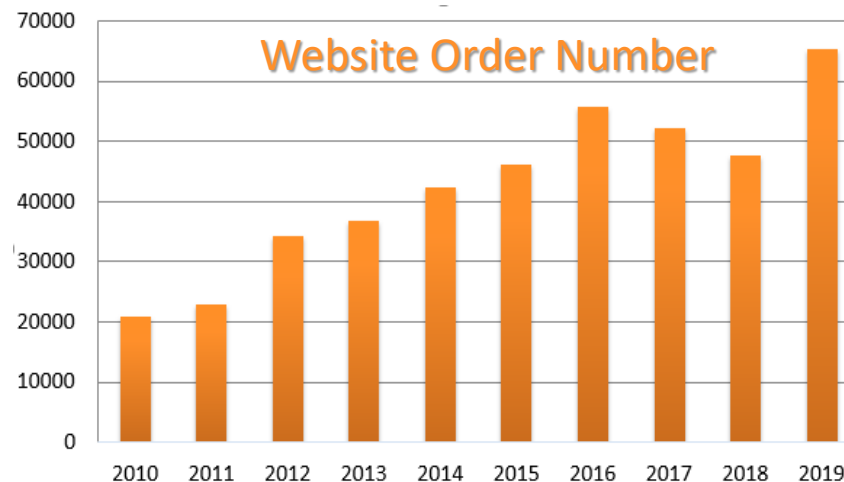
Time Table FY-3D FY-3C FY-3B

FY-4A FY-2H FY-2F

CAL FY-3D FY-3C FY-3B

FY-2

DCPC/NSMC



## Application Tools

**SATs:** New  
Observation Capability

Weather monitoring and  
analysis  
---Geostationary Satellite data  
(FY-2/FY-4)

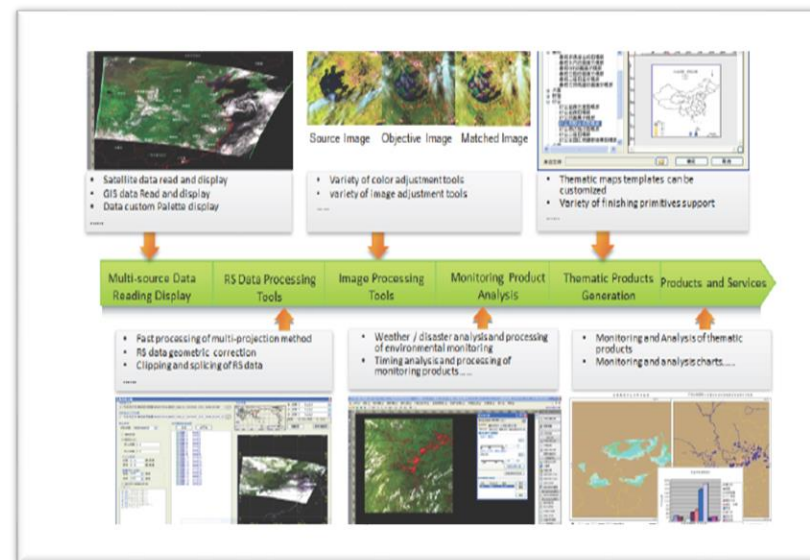
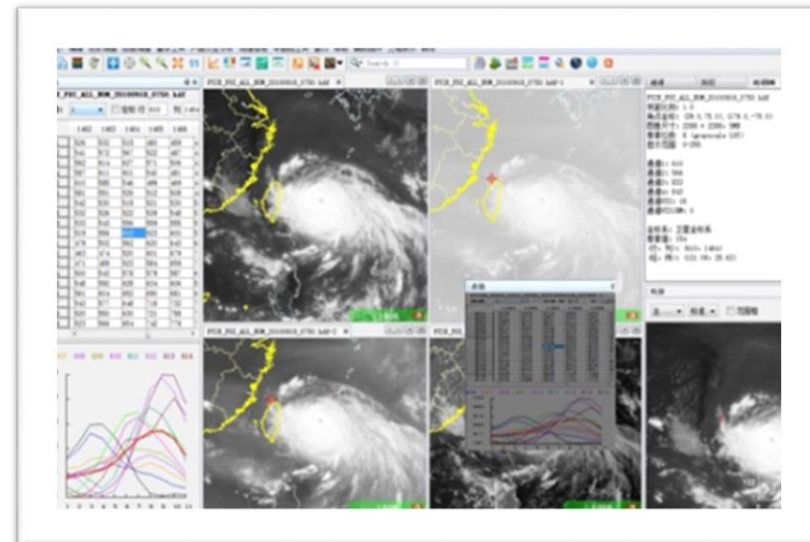
Satellite Weather  
Application Platform  
**SWAP**

Application  
tools

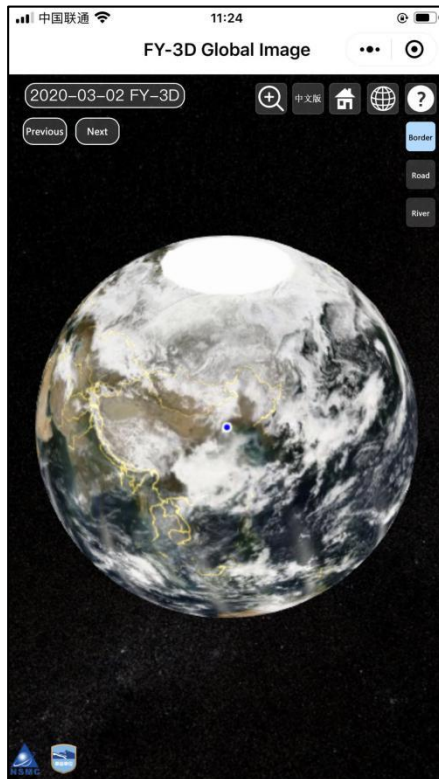
Natural disaster and  
environment monitoring and  
analysis  
---Polar orbiting Satellite data

**Users:** New  
Applications

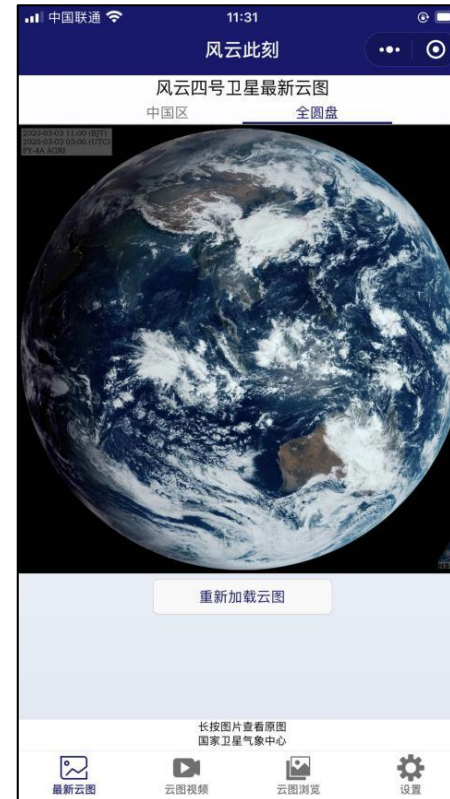
Satellite Monitoring  
Application Remote  
sensing Toolkit  
**SMART**



- NSMC has launched 2 mobile applications on WeChat platform in 2018, **FengYun Earth View** for LEO satellites and **FengYun Live** for GEO satellites.



FengYun Earth View WeChat Applet release the latest 7 days global true color earth image captured by the MERIS-II instrument onboard FY-3D.

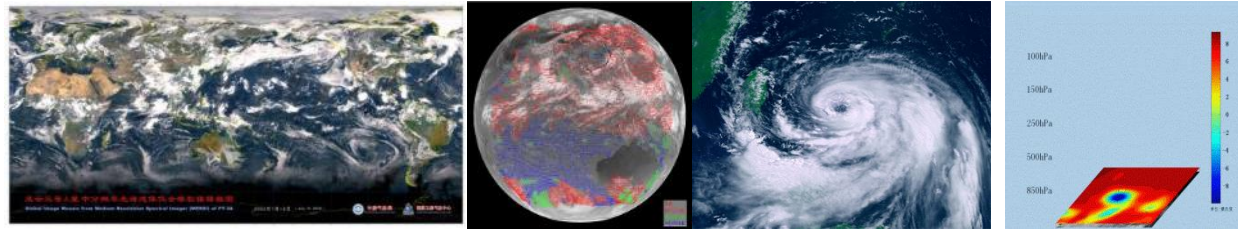


FengYun Live WeChat Applet shows the time-series live cloud images taken by AGRI onboard FY-4A.

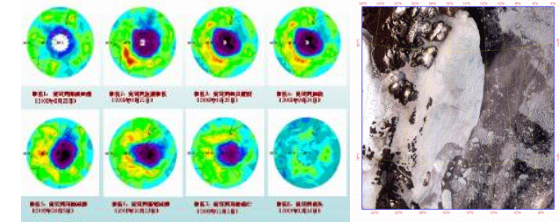


## Fengyun Applications

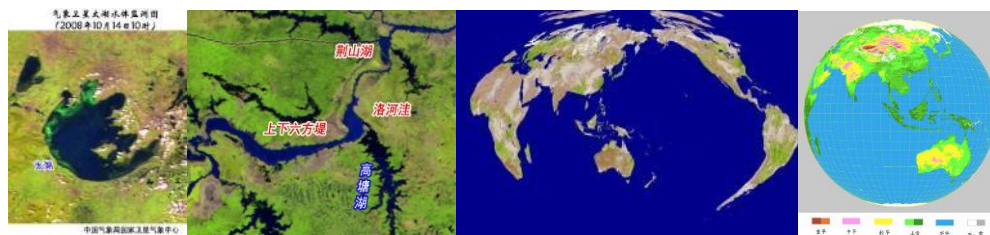
### Weather



### Climate



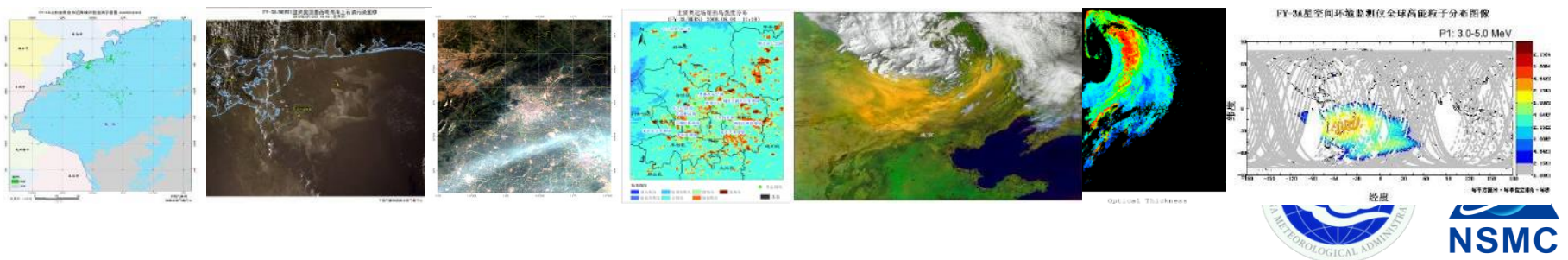
### Resource



### Disaster



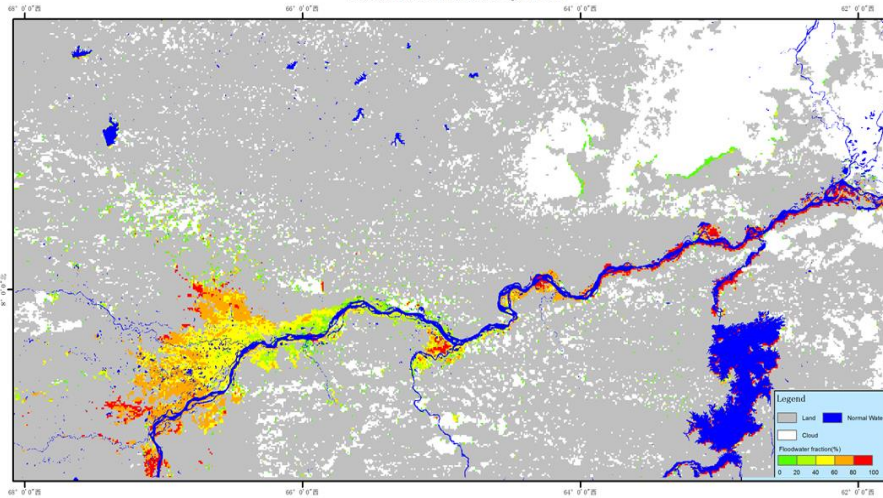
### Environment



## FY-3D monitoring flood in Venezuela

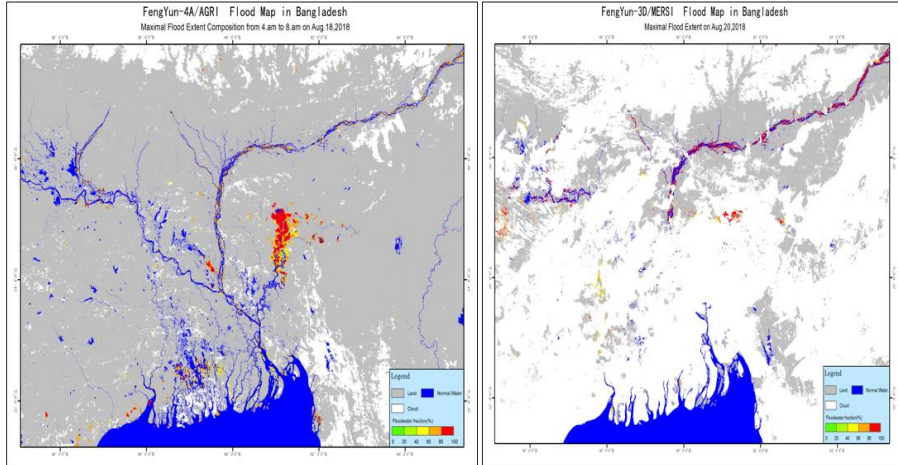
The flood of Venezuela in August of 2018 was monitored based on FY-3D data. The different colour represent the different water fraction value.

FengYun-3D/MERSI Flood Map in Venezuela  
Maximal Flood Extent on Aug.20,2018



## FY-3D and FY-4A monitoring flood in Bangladesh

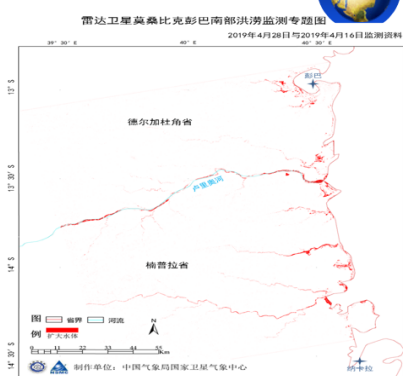
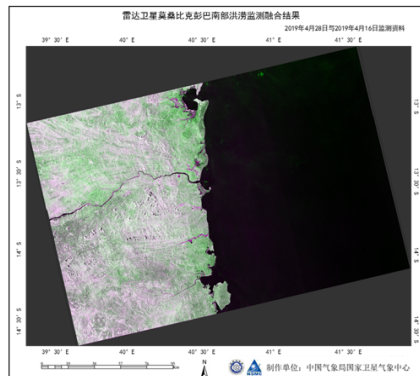
The flood of Bangladesh in August of 2018 was monitored based on FY-3D and FY-4A data.



The spatial distribution information of flood can be obtained by using the 1 km resolution FY-4 satellite at 12:00-16:00.

The flood was monitored by the 250m spatial resolution data of FY-3D, showing more refined river water distribution, but less clear sky area.

## Monitoring flood using high spatial resolution satellites



Super typhoon Kenneth landed on the coast of Cape Delgado Province in northern Mozambique around 2230 hours on April 25, causing floods in northern Mozambique.

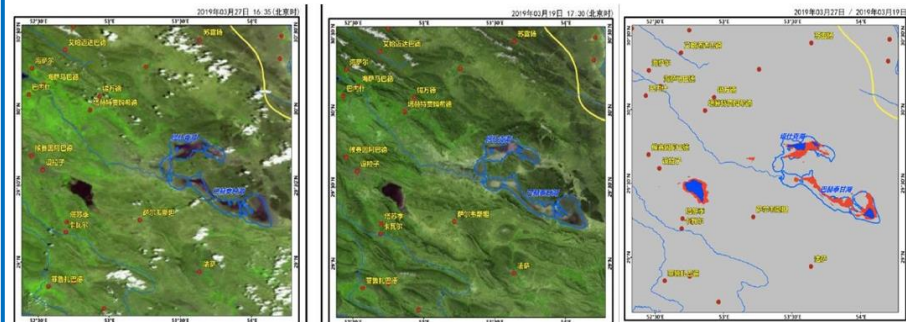
The results of Sentinel-1 data fusion on April 28, 2019 and April 16, 2019 show that a number of rivers in Cape Delgado and Nampula provinces have enlarged their water bodies. The widening of the Lurio River is obvious. It is estimated that the expanded water area in the above-mentioned areas is about 185 square kilometers.

## FY-3D monitoring flood in Iran's southern province

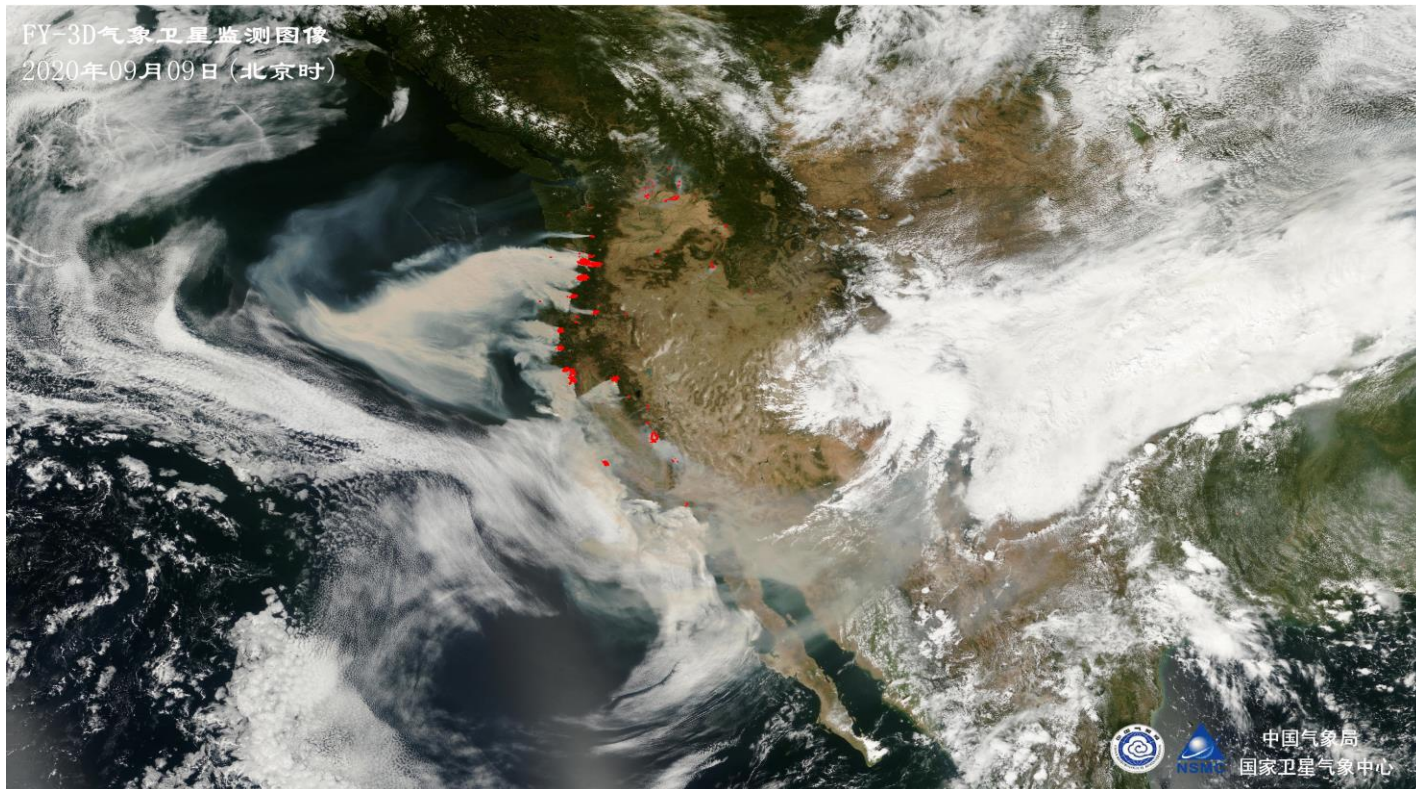
There were flash floods in Iran's southern province of Fars on 25 March, following devastating floods in the north.

Flood map using FY-3D showed that in the southwestern Iran, the range of water body of the Lake Tashk and Bakhtaigan Lake has increased.

It is estimated that the impact of floods in the above areas is about 350 square kilometers, an increase of about 36%.



### FY-3 D monitoring fire in US

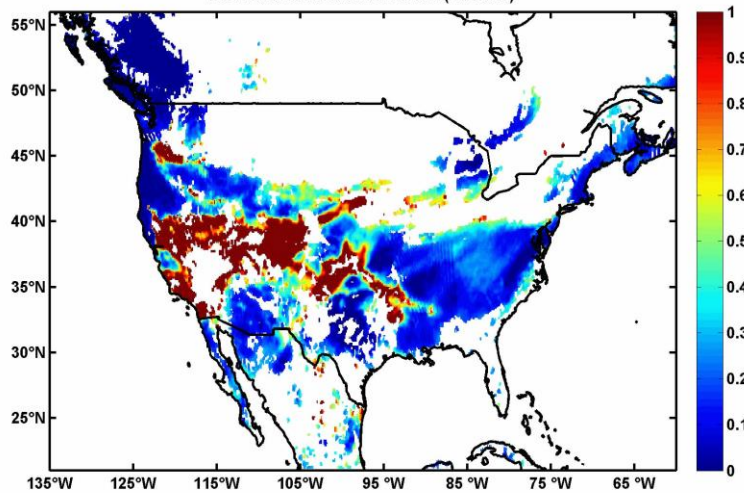


In late August 2020, a rare wildfire occurred in the western United States. According to the monitoring of FengYun-3D satellite, a large area of fire occurred along the west coast of the United States in September. The smoke diffused outward obviously, which affected the Pacific ocean, southern and northern parts of the United States. The Aerosol Optical Depth (AOD), Aerosol Index, NO<sub>2</sub>, CO is high in the polluted areas.

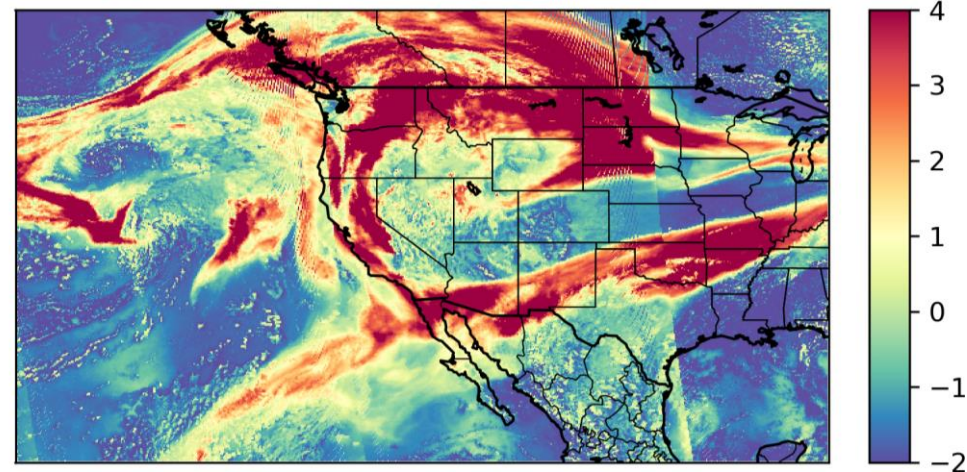


# 2020 Community Meeting on NOAA Satellites

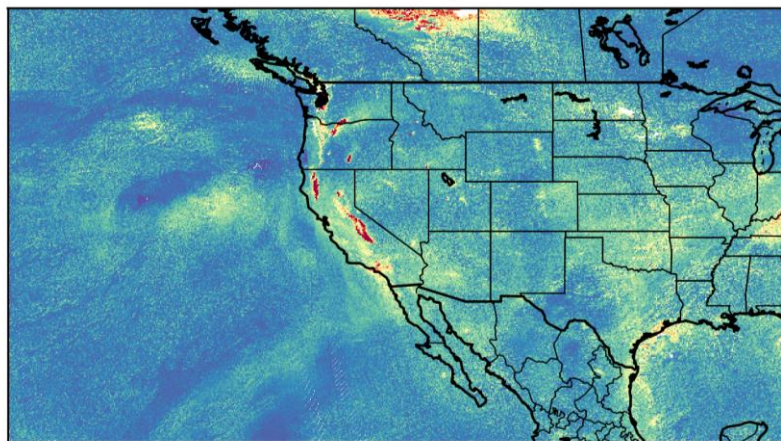
FY3D MERIS AOD on 20200908 (BJ Time)



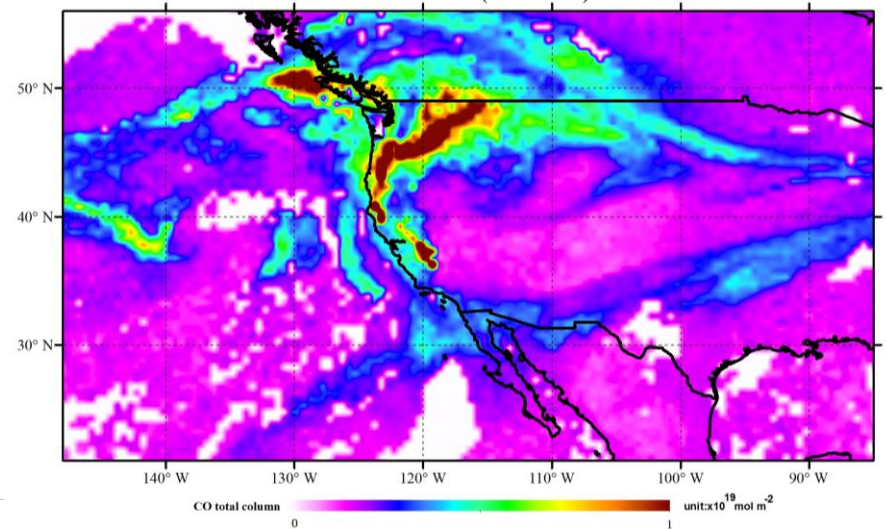
气溶胶指数



NO<sub>2</sub> column

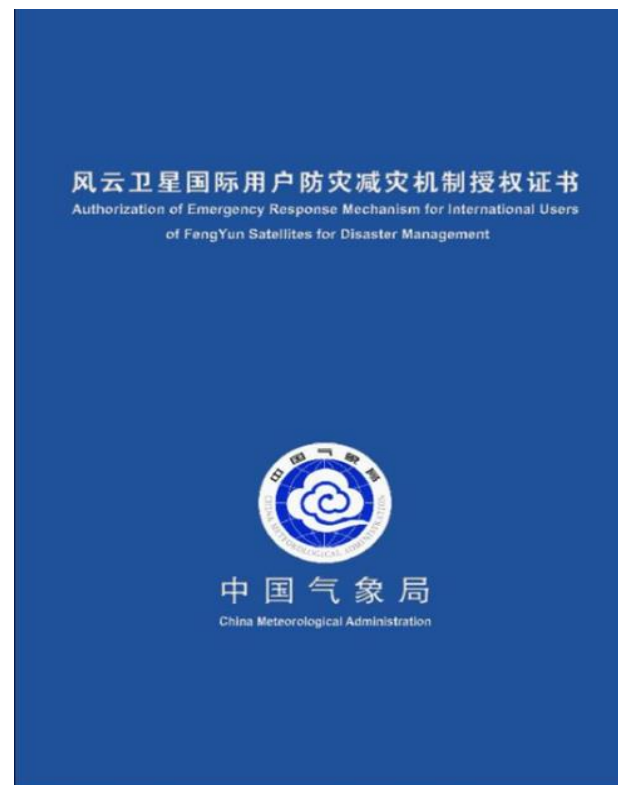
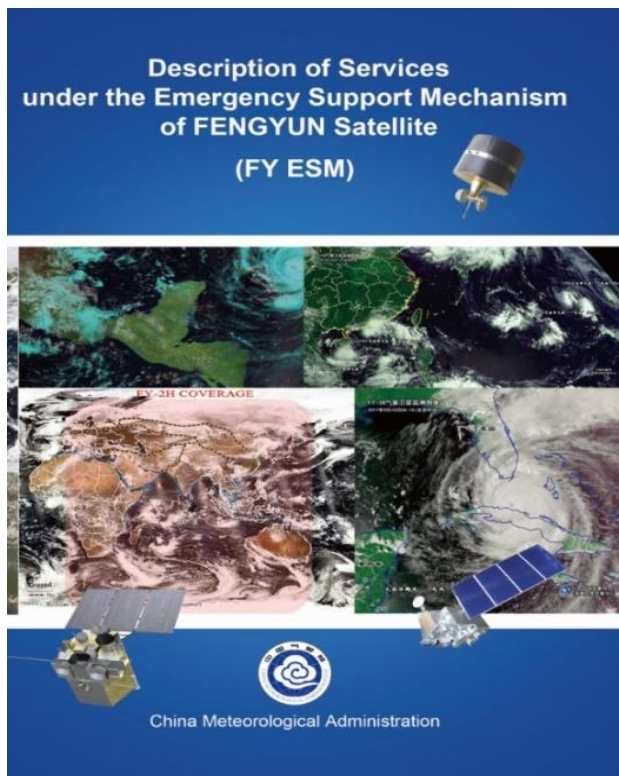


CO



## FY-ESM: the Belt & Road Initiative

CMA Announced “Emergency Support Mechanism for International Users of Fengyun Meteorological Satellites in Disaster Prevention and Mitigation” on April 24, 2018

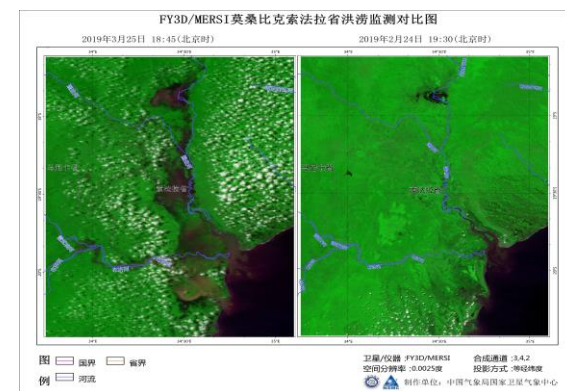
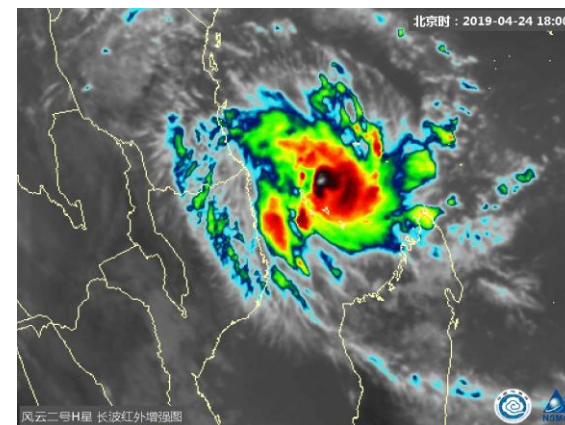


10/19/2020



# Examples of Emergency support for 9 countries, 2019

| Date       | Country    | Disaster         | Requestor   |
|------------|------------|------------------|-------------|
| 30/01/2019 | Brazil     | Dam break        | China-GEOSS |
| 28/03/2019 | Iran       | Flood            | China-GEOSS |
| 06/04/2019 | Korea      | Wildfire         | CHARTER     |
| 25/04/2019 | Mozambique | Tropical Cyclone | FY_ESM      |
| 28/06/2019 | Russia     | Flood            | CHARTER     |
| 21/08/2019 | Bolivia    | Wildfire         | CHARTER     |
| 19/09/2019 | Mozambique | Early waring     | FY_ESM      |
| 10/10/2019 | India      | Flood            | CHARTER     |
| 14/11/2019 | Australia  | Wildfire         | CHARTER     |



## 2019 FENGYUN Satellite User Conference

- 15–17 November 2019, Haikou
- 37 countries, 78 representatives



### 3. Latest Progress

---

**1. FY-4A The first GEO. meteorological satellite of new generation**

- Launched on Dec.11, 2016
- Official operation on May 1, 2018

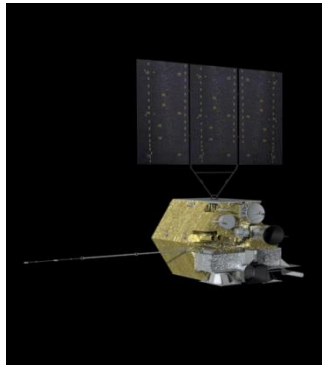
**2. FY-3D A new operational afternoon orbit LEO. satellite, will co-work with FY-3C in morning orbit**

- Launched on Nov. 15, 2017.
- Official operation on Jan 1, 2019
- Contracted South polar ground station (Troll) in operation

**3. FY-2H The last one of FY-2 series to support IOC and serve for the belt & road countries**


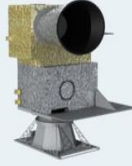
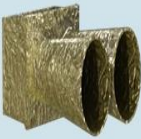

- Launched on June 5, 2018
- Official operation on Jan 1, 2019

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



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

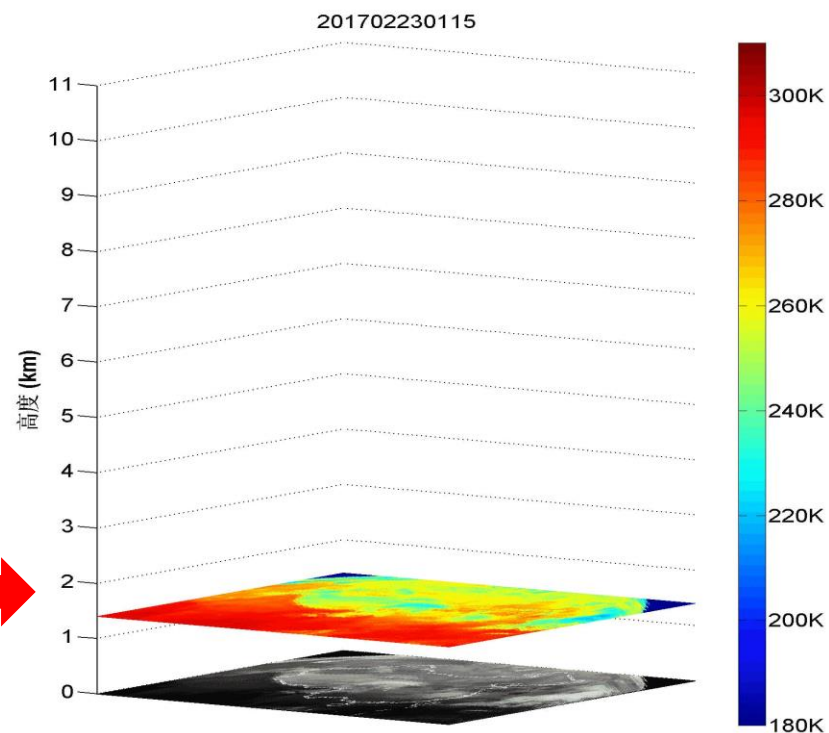
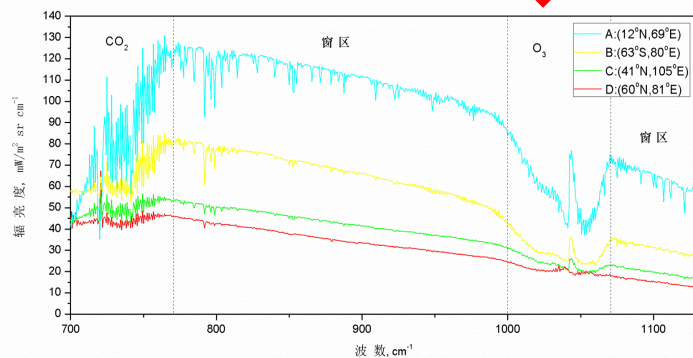
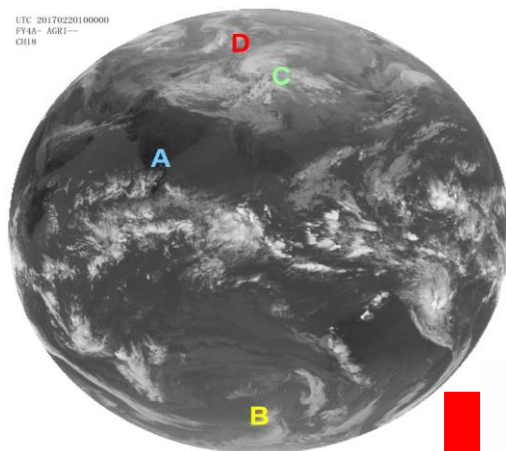
| Instrument  | Purposes  |
|---|---|
|  <b>AGRI: Advanced Geosynchronous Radiation Imager</b>        | 14 -channel Earth images                                |
|  <b>GIIRS: Geostationary Interferometric InfraRed Sounder</b> | Clear-sky atmospheric temperature and humidity profiles |
|  <b>LMI: Lightning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

10/19/2020



# GIIRS:

## First Geo. Interferometric Infrared Sounder



10/19/2020



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

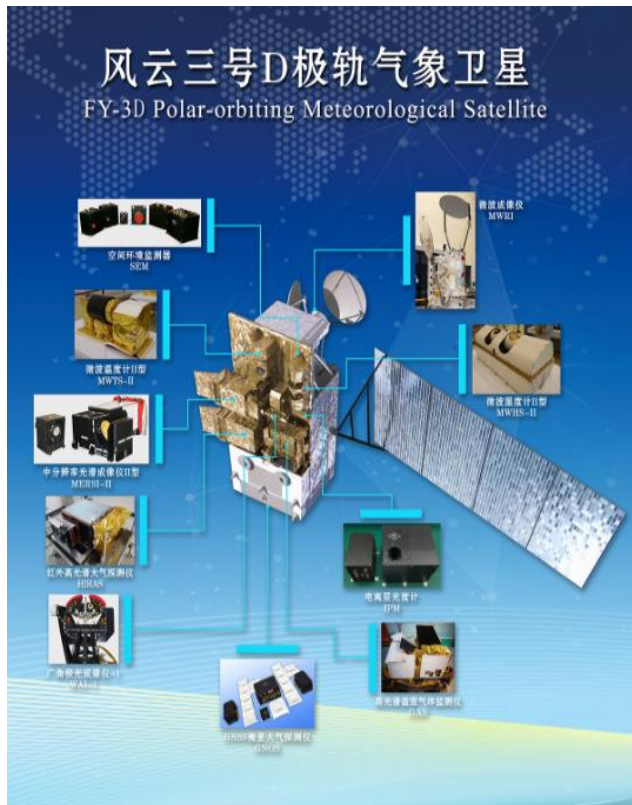


| Parameters                         | Satellite Specification                                    |
|------------------------------------|--|
| Orbit type                         | Near-polar sun-synchronous orbit                           |
| Orbital altitude                   | 836 Km   |
| Orbital 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                     |

10/19/2020



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

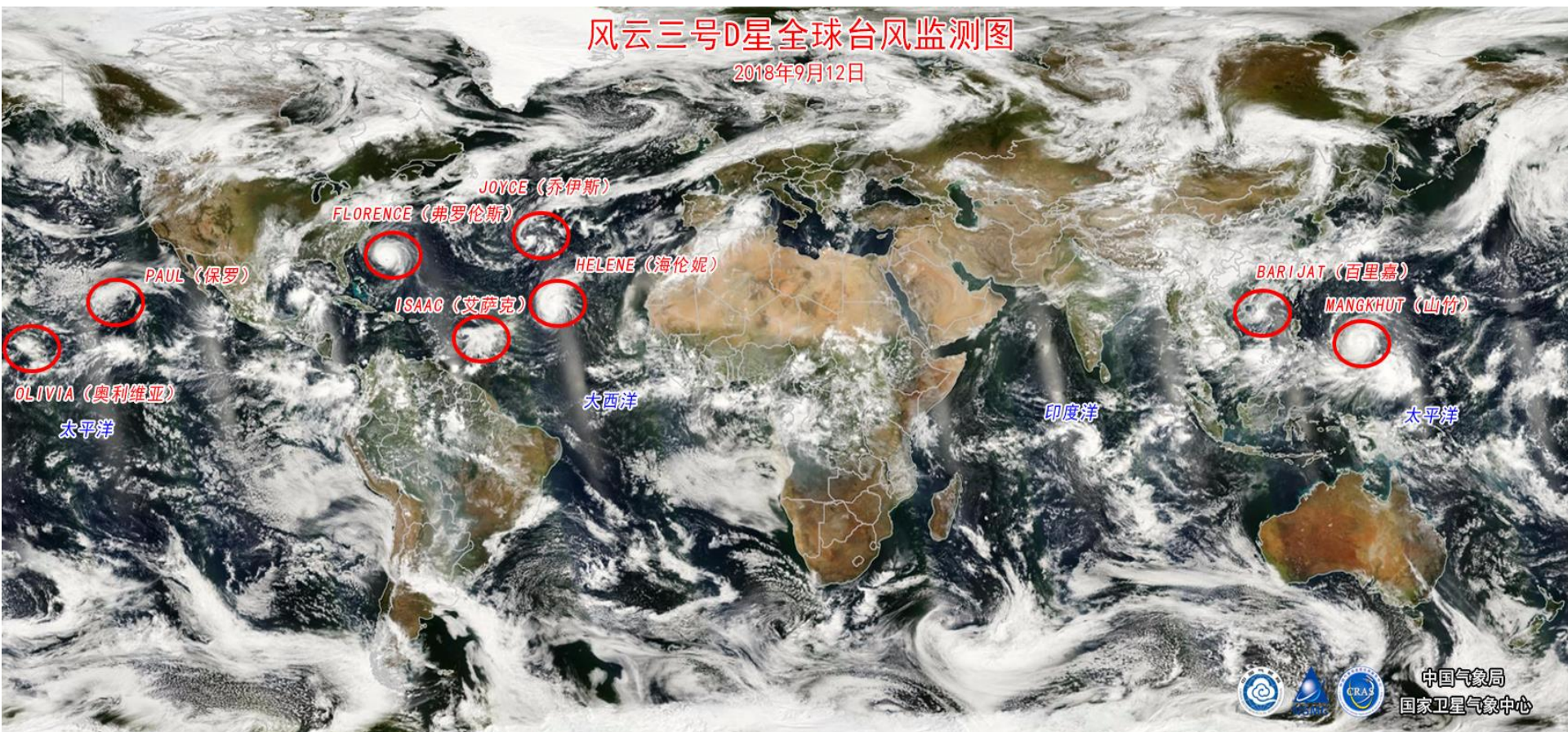


10/19/2020

| Payload Name                                       | Channel Numbers with Spectral Coverage |
|--|--|
| MEdium Resolution Spectral Imager (MERSI-2)        | 25 (0.413 – 12 $\mu\text{m}$ )         |
| Hyperspectral InfraRed Atmospheric Sounder (HIRAS) | 1370 (3.92 – 15.38 $\mu\text{m}$ )     |
| 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 $\mu\text{m}$ )      |
| Wide angle Aurora Imager (WAI)                     | 1 (140 – 180 nm)                       |
| Ionospheric PhotoMeter (IPM)                       | 3 (130 – 180 nm)                       |
| Space Environment Monitor (SEM)                    | 25 (–)                                 |



## Global Imaging from MERSI

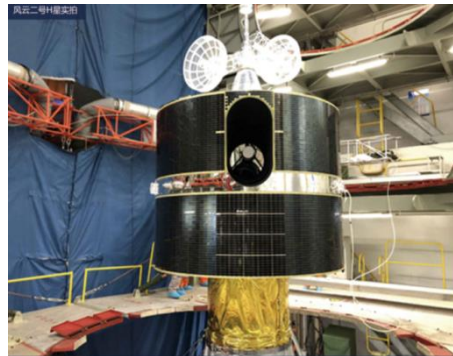


10/19/2020



## FY-2H: Launched on 5 Jun, 2018

**FY-2H :** To better support IOC and serve the Belt & Road countries



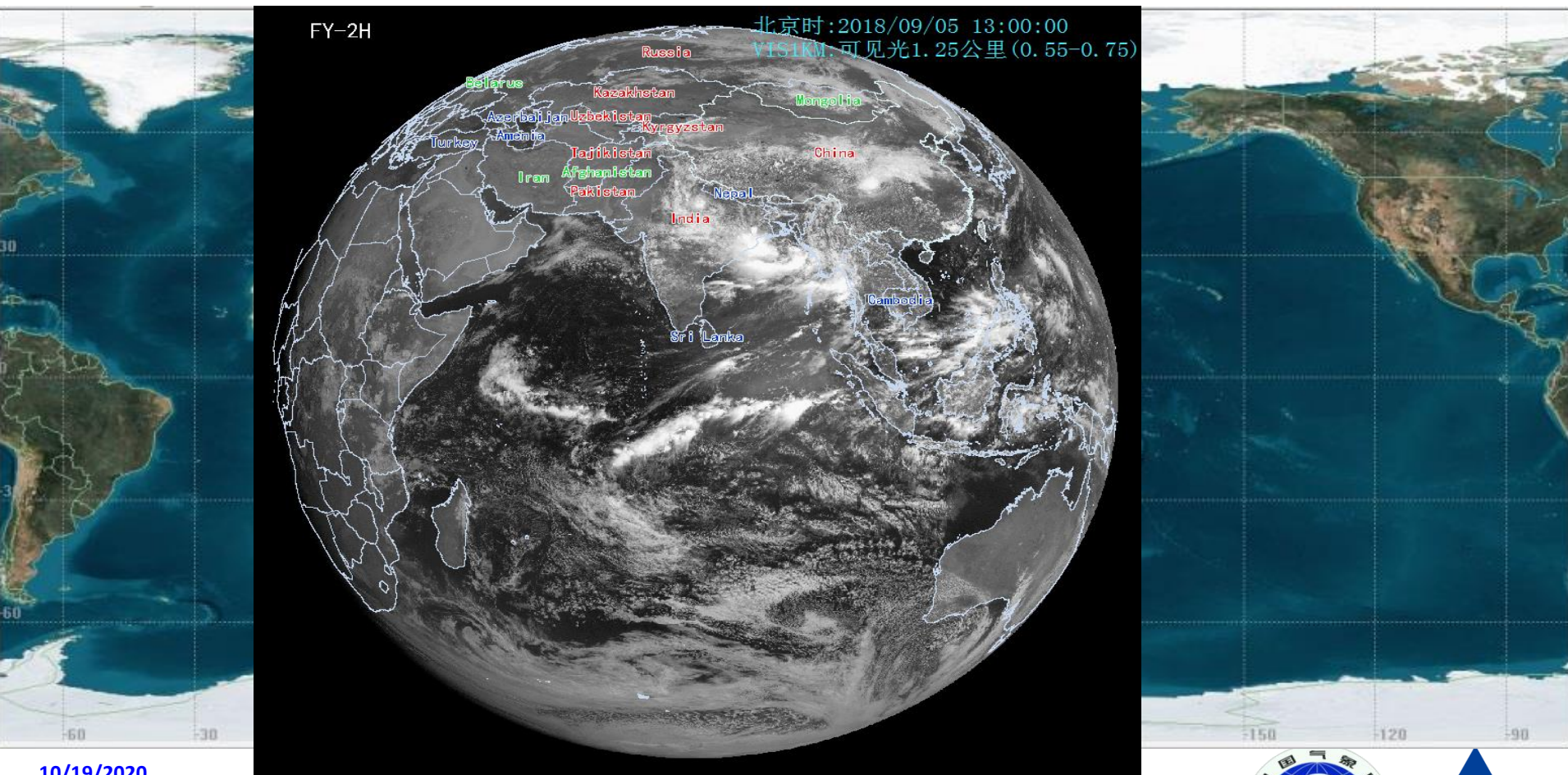
- Launched on June 5, 2018
- positioned at  $79^{\circ}$  E and operational *by September, 2018*



10/19/2020



## FY-2H coverage at 79° E



10/19/2020



## Latest progress on CMA satellite programs

### 1. FY-3B

- Out of service from Jun. 1, 2020
- Launched on Nov. 5, 2010

### 2. FY-3C

- Some instruments on-board FY-3C were forced to suspend for the sake of the energy failure on the satellite platform.
- Launched on Sep. 23, 2013

### 3. FY-3E

- Scheduled to be launched on Jan. 2021

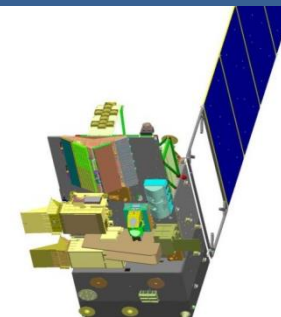
### 4. FY-4B

- Scheduled to be launched on Apr. 2021



FY-3E

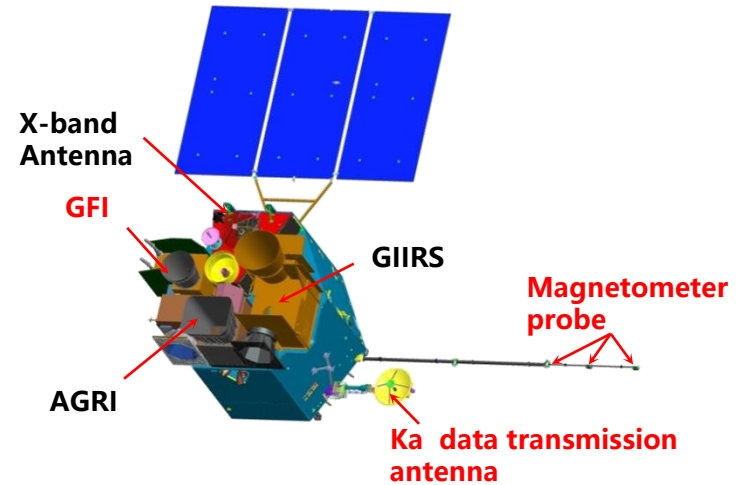
## FY-3E satellite instrument configuration



| Payloads Type                       | Instrument Name          | Remarks  |
|-------------------------------------|--------------------------|----------|
| Optical imager                      | MERSI-LL                 | Improved |
| Passive microwave sounder           | MWTS                     | Improved |
|                                     | MWHS                     | succeed  |
| IR Hyper-spectral Sounder           | HIRAS-II                 | Improved |
| Active microwave                    | Wind RAD                 | New      |
| Radio occultation instrument        | GNOS                     | Improved |
| Solar Radiation observation package | SIM-II                   | Improved |
|                                     | SSIM                     | New      |
| Space weather package               | SEM                      | Improved |
|                                     | Ionospheric spectrometer | Improved |
|                                     | XEUVI                    | New      |



FY-4B

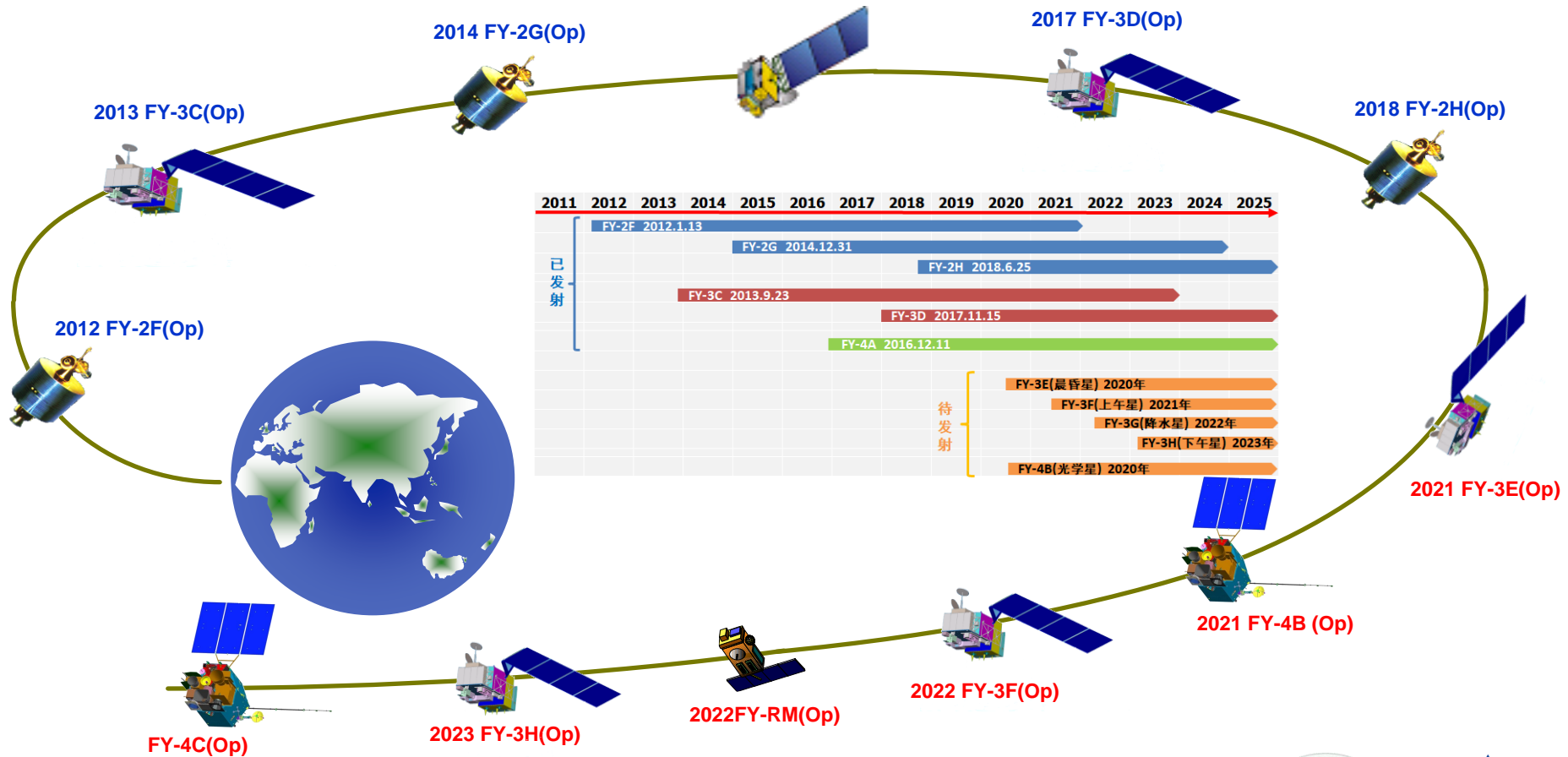


| satellite | Scheduled launch | Planned Location | Instruments                 |
|-----------|------------------|------------------|-----------------------------|
| FY-4B     | Apr. 2021        | 105°E            | AGRI<br>GIIRS<br>GFI<br>SEP |



# 4. Future Program

## National Program for Fengyun Meteorological Satellite from 2011-2020



6 satellites will be launched within this decade



## Payloads Coming FY-3 Successor

| NO. | Sensor                       | Satellite                                      | FY-3E<br>(05)     | FY-3F<br>(06) | FY-3R<br>(07)      | FY-3G<br>(08) |
|-----|------------------------------|--|-------------------|---------------|--------------------|---------------|
|     |                              | Sensor   | EM Satellite      | AM Satellite  | Rainfall Satellite | PM Satellite  |
|     |                              | Scheduled Launch Date                          | 2021              | 2022          | 2022               | 2023          |
| 1   | Optical Imagers              | MERSI  | √ (III-Low Light) | √ (III)       | √ (III-Simplified) | √ (III)       |
| 2   | Passive Microwave Sensors    | MWTS   | √                 | √             |                    | √             |
|     |                              | MWHS   | √                 | √             |                    | √             |
|     |                              | MWRI   |                   | √             | √                  | √             |
| 3   | Occultation Sounder          | GNOS   | √                 | √             | √                  | √             |
| 4   | Active Microwave Sensors     | WindRAD  | √                 | √             |                    |               |
|     |                              | Rainfall RAD                                   |                   |               | √                  |               |
| 5   | Hyperspectral Sensors        | HIRAS  | √                 | √             |                    | √             |
|     |                              | GAS (Greenhouse Gases Absorption Spectrometer) |                   |               |                    | √             |
|     |                              | OMS (Ozone Mapping Spectrometer)               |                   | √             |                    |               |
| 6   | ERB Observation Sensor Suite | ERM  |                   | √             |                    |               |
|     |                              | SIM  | √                 | √             |                    |               |
|     |                              | SSIM (Solar Spectral Irradiation Monitor)      | √                 |               |                    |               |
| 7   | Space Weather Sensor Suite   | SEM  | √                 |               |                    |               |
|     |                              | Wide Angle Aurora Imager                       |                   |               |                    | √             |
|     |                              | Ionosphere photometer                          | √(Multi-angle)    |               |                    | √             |
|     |                              | Solar X-EUV Imager                             | √                 |               |                    |               |

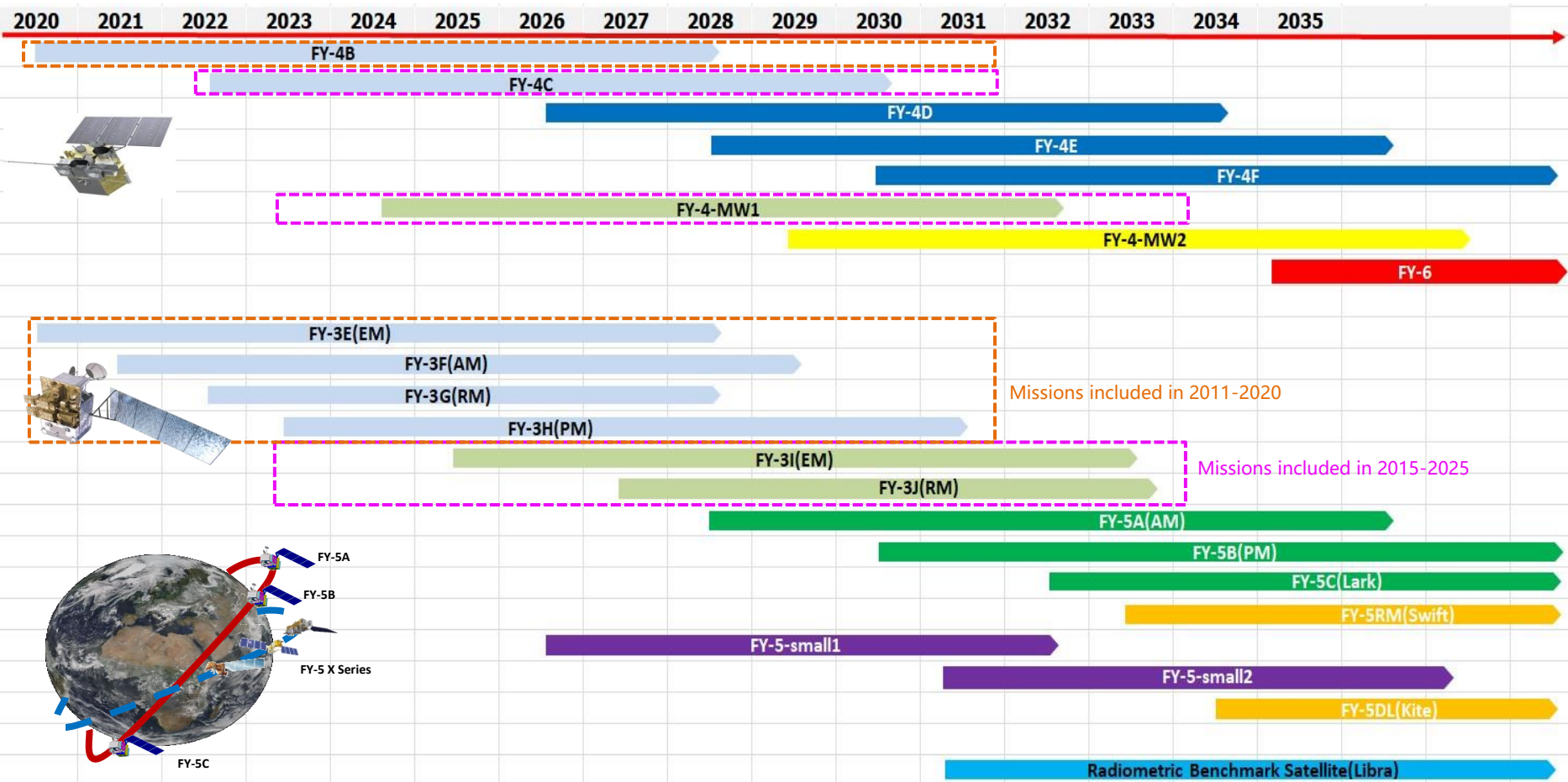
10/19/2020



| Future additional satellite | Scheduled launch | Planned Location | Instruments   |
|-----------------------------|------------------|------------------|---|
| FY-4C                       | 2022             | TBD              | AGRI<br>GIIRS<br>LMI<br>SEP<br>MUSI<br>SUVI<br>SXUS |



## Vision for Future Fengyun in 2035



10/19/2020



## Lark series: EM Orbit (Optimal sounding mission, 5:30 am)

- **Mission description:** Fill in the gap of NWP sounding in Early morning orbit for composing global virtual constellation with METOP(AM) & JPSS (PM)
- **Application:** NWP
- **Major sensors:**
  - IR hyperspectral sounder
  - MW sounder
  - Scatterometer
  - GNSS radio occultation

## PM Orbit (2:30 pm )

- **Mission description:** Imaging +sounding mission
- **Application:**
  - Meteorological & environment disaster
  - Ecological environment
  - NWP
- **Major sensors:**
  - VIS/IR imagery
  - MW imagery
  - IR hyperspectral sounder
  - MW sounder
  - GNSS radio occultation

10/19/2020

## Fengyun 5: 3<sup>rd</sup> generation polar satellites

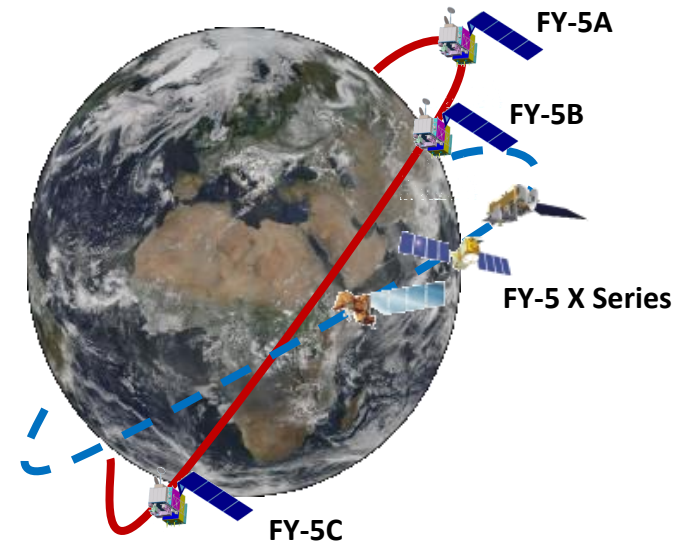
### AM Orbit (10:30 am )

- **Mission description:** Imaging and cloud/aerosol measurement
- **Application:**
  - climate
  - Meteorological & environment disaster
  - Ecological environment
- **Major sensors:**
  - Lidar
  - Cloud radar
  - VIS/IR multi-angle imagery
  - MW imagery
  - Sub-mm imagery
  - UV/VIS/NIR sounder (nadir & limb)



## ■ Vision for Future Fengyun in 2035

- Consistent with WIGOS in 2040 for the space-based observing system component, an integrated observing system of Fengyun weather and climate satellites will be established by 2040, which is a backbone system with specified orbital configuration and measurement approaches, will fill in the blanks of space-based profiling of global wind as atmospheric dynamical fields, climatic variables, fill in the gaps of spatial and temporal coverage by optimizing the constellation configuration, promote space/ground co-observing capability to better meet the requirements for emergency response to meteorological disasters.
- The Radiometric Benchmark Satellite mission aiming to establish stable and traceable space calibration reference will be developed as well.
- A backbone system with open orbit configuration and flexibility to optimize the implementation will be developed, which is composed of some small/ large satellites programs for dedicated-objective mission with the capabilities of higher temporal and spatial resolution and fast sampling, global cloud, aerosol, wind etc. dedicated observation, to meet the requirements of weather forecasting, meteorological risk reduction and emergency response promotion.
- Furthermore, the operational pathfinders, technology and science demonstrators will be explored to respond to R&D needs.



## 5. Summary

---

- With the open data policy, reliable and sustained satellite, good data accuracy, **FY series** have be one important components of global observation system.
- Current **FY-3** series are expected to work until 2030 with Early Morning orbit, Morning orbit, and Afternoon orbit and Rainfall mission.
- Current **FY-4** series are expected to work until 2035 with FY-4 East (133E) and FY-4 West (79E).
- Future **FY-5** and **FY-6** are expected to provide service since 2030 and 2035 respectively.
- Fengyun Meteorological Satellites will contribute to WMO members and serve **the belt and road countries** operationally and continuously.

*Together*  
**For Better**

谢

谢!