Status report on the current and future satellite systems by CMA

Presented to CGMS-50 plenary session, agenda item [02]

Coordination Group for Meteorological Satellites

CGMS

- Congratulations on the 50th Anniversary of CGMS !
- CGMS has actively and pragmatically coordinated the cooperation among its members to effectively ensure the operational continuity of the Global Meteorological Satellite Observation System, which plays an important role in satellite product research and development, data sharing services, and space weather operation.
- CMA looks forward to working with CGMS to promote the support by the parties to the global community and the development of their application capability as new contributions to the global meteorological service!

Coordination Group for Meteorological Satellites

CGMS

Status of Current FengYun Satellite Systems

- Since CGMS-49, CMA's FengYun satellite status has been updated as follows:
  - **2 Recruit**: FY-4B and FY-3E
  - **2 Retired**: FY-3B and FY-2F

FY-4B
- launched on Jun. 3, 2021.
- **Pre-operation** since Jun. 1, 2022.

FY-3E
- launched on Jul. 5, 2021.
- **Pre-operation** since Jun. 1, 2022.

FY-3B
- stopped operation on Dec. 9, 2021.

FY-2F
- out of service on Apr. 1, 2022.

7 FengYun Satellites in orbit

GEO

FY-2G, -2H

FY-2G (99.5°E) and FY-2H (79°E)
Full disk every 30 min
FY-2H, last flight unit of FY-2 series.

FY-4A, -4B

China's second generation GEO meteorological satellites.

FY-4A (104.7°E) , Full disk every 15 min.

FY-4B (133°E), Full disk every 15 min, partial areas rapid scanning at 1 min.
Pre-operational

LEO

FY-3C

Mid-morning orbit
Operational with degraded performance

FY-3D

Afternoon orbit, ECT 13:45 local time
10 EO instruments

FY-3E

Early-morning orbit, ECT 5:41 LT
11 EO instruments
Pre-operational

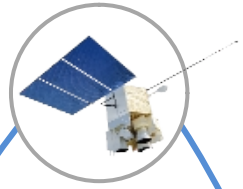
Highlights since CGMS 49

2021.07.01

NSMC 50th Anniversary

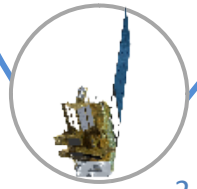
2022.06.01

NCSW 20th Anniversary



2021.06.01

FY-4B Launched



2021.07.05

FY-3E Launched

2022.05

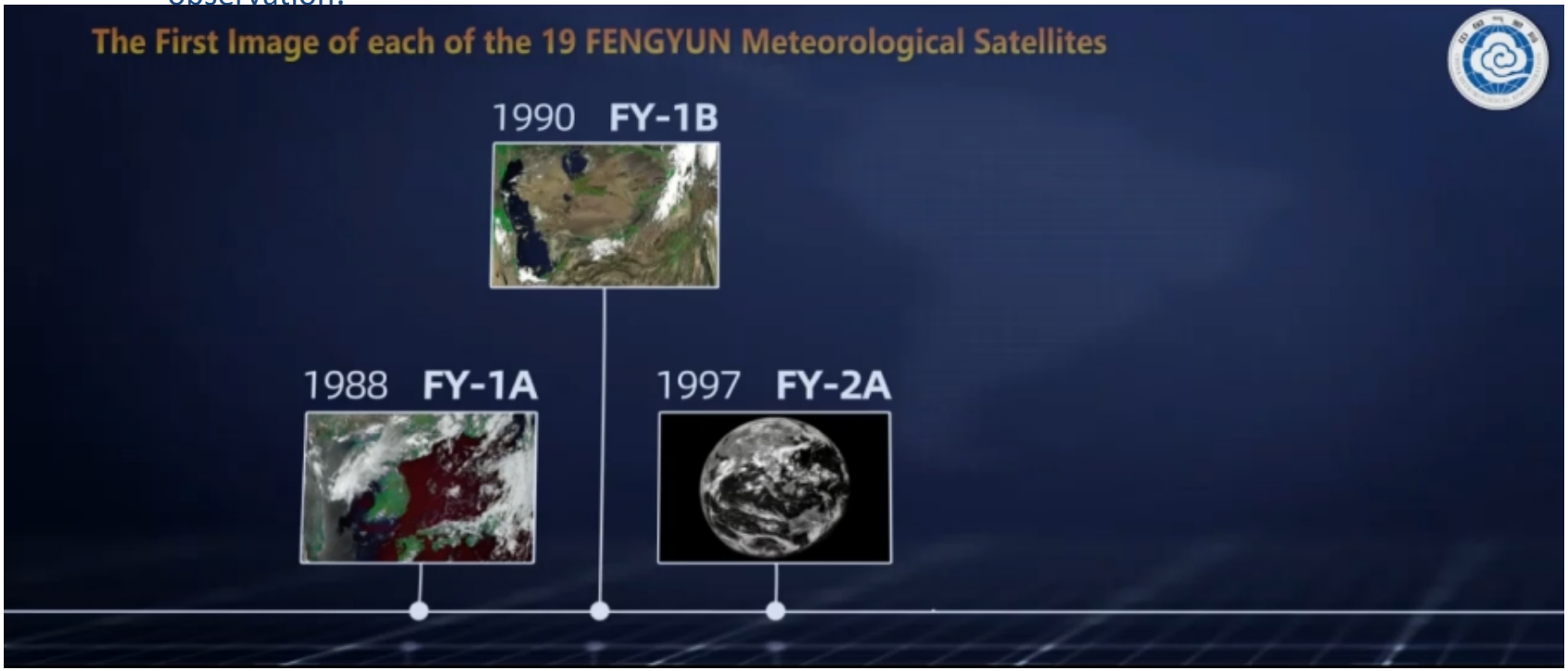
FengYun Earth Online

50th anniversary of the NSMC/CMA

- NSMC was founded on 1st July 1971.
- FengYun series :
  - Total 19 satellites
  - Two generations and Four types
- Capability:
  - Global weather, climate, environment, and space monitoring;
  - All weather, Full spectrum, and Three-dimensional observation.

National Satellite Meteorological Center

NSMC

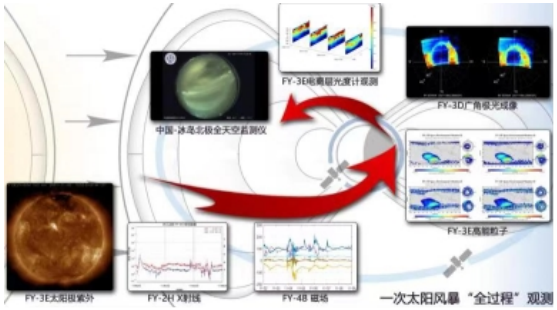


20th anniversary of the NCSW/CMA

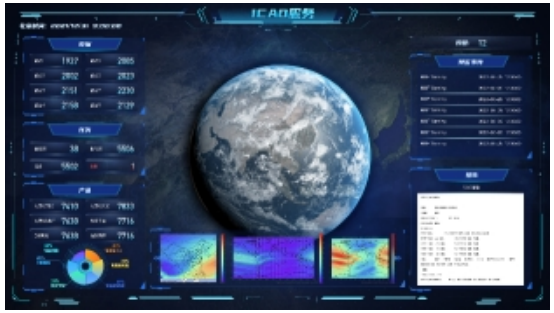
- National Center for Space Weather (NCSW) was founded on 1st June 2002.
- NCSW's achievements:
  - Space and ground integrated observation networks;
  - Quantitative forecast for solar-terrestrial connection chain;
  - Providing excellent services for users.
- International cooperation activities:
  - Co-chairing the WMO IPT-SWeISS ;
  - ICAO global space weather center.
- Space weather capability promotion vision:
  - Full time-space
  - Multi-elements
  - Multi-domain

National Center for Space Weather

NCSW



CMA coordinated observations for solar storm

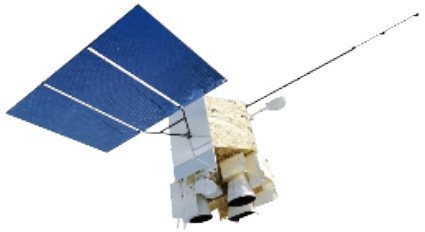


ICAO space weather information system

IPT-SWeISS-2 , Tokyo, 2018

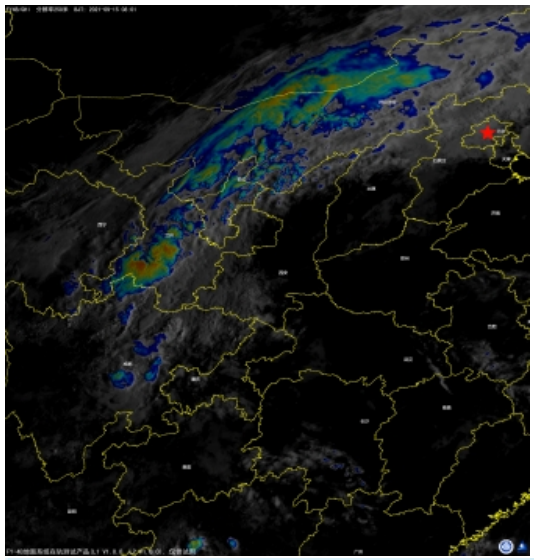
FY-4B Status

- Launched on Jun. 3rd, 2021. Located at 133°E now.
- Satellites with 4 instruments onboard have passed the post-launch test.
- Satellite data is available on NSMC website for trial application since June 1, 2022.
- 52 baseline products(L2) have been developed.
- Key Improvement :
  - GHI: High-speed imager, 1miniute interval;
  - GIIRS: Improved calibration;
  - SEP/FGM: Wide-range energetic and multi-direction particles, high-time resolution magnetic field.

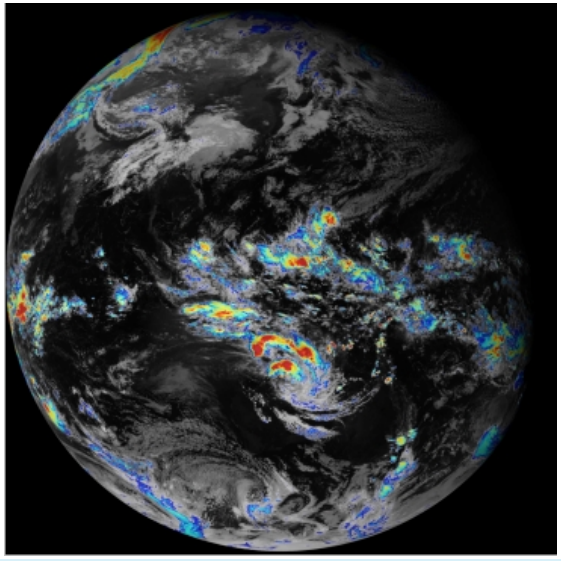


	Instruments
1	Advanced Geostationary Radiation Imager(AGRI)
2	Geostationary Interferometric Infrared Sounder(GIIRS)
3	Geostationary High Speed Imager(GHI)
4	Space Environment Package(SEP)

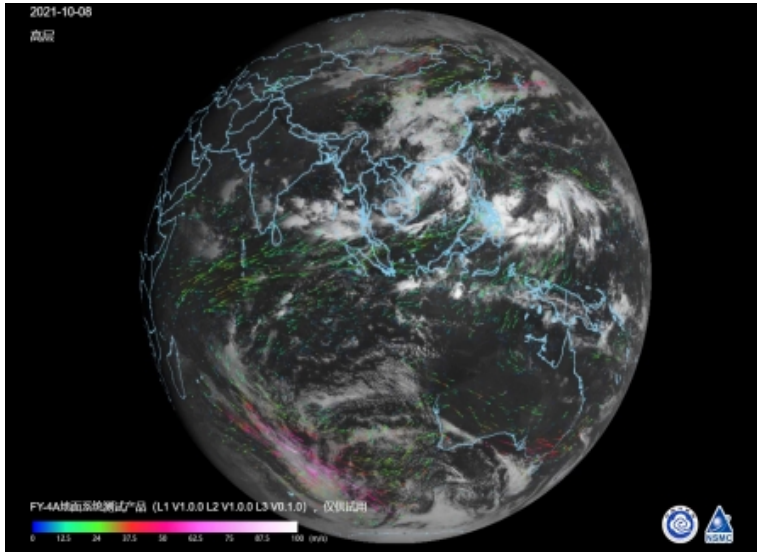
GHI 1 Minute Interval Cloud Animation



Fusion convection (Sandwich) image



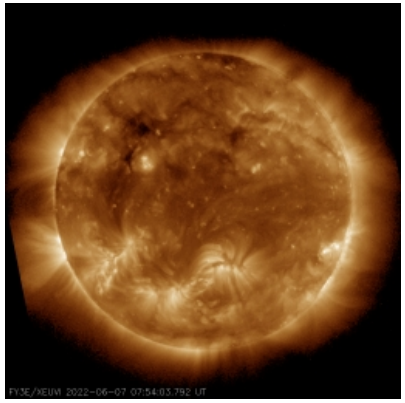
Atmosphere Motion Vectors（High level）



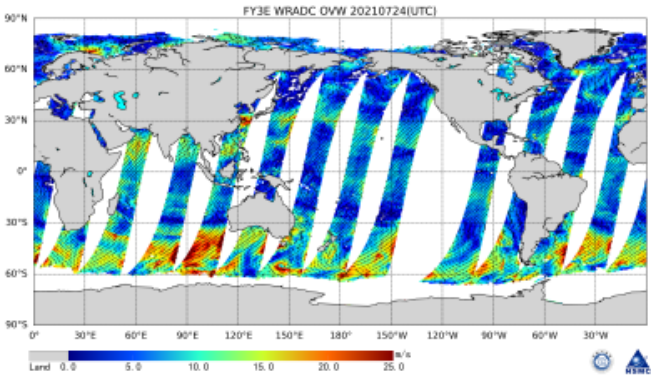
FY-3E Status

- Launched on July 5th,2021, local Equator Crossing Time: 5:40 desc.
- First operational meteorological satellite in EM orbit for civil use.
- Post-launch Tests for FY-3E satellite platform and instruments are completed.
- Satellite data is available on NSMC website for trial application since June 1, 2022.
- FY-3E provides an optimal temporal distribution with the mid -morning and afternoon satellites. NWP communities will significantly benefit.
- 46 baseline products(L2) have been developed.

X-EUV Animation



Ocean Vector Winds (WnidRAD)



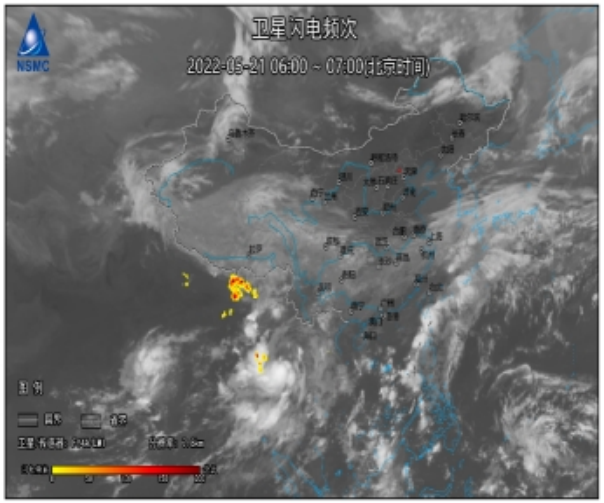
Nighttime Lights (MERSI-LL)

FengYun Earth

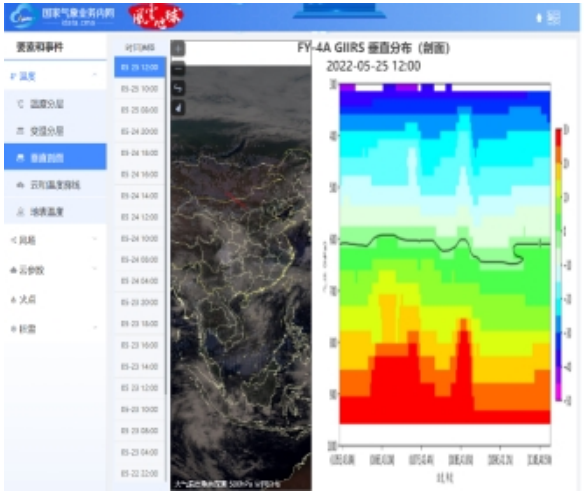
- FengYun Earth is a satellite weather application platform designed for weather forecasters in CMA;
- Developed in Q1 2022, now starting the trial application in National, Provincial, City-level, and County-level Meteorological Services of CMA.

FengYun Earth

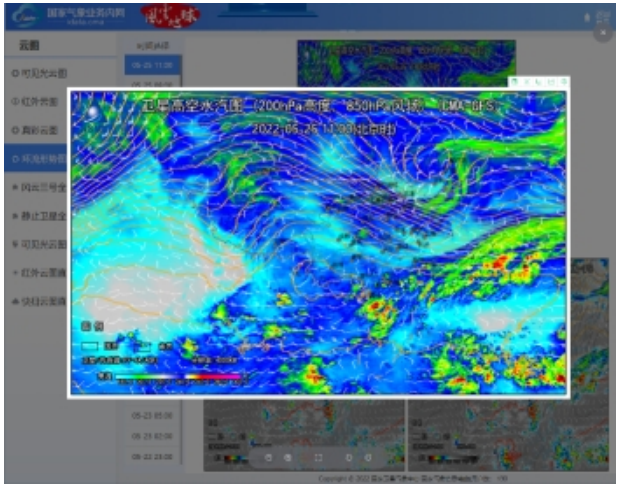
Lighting frequency



FY-4A GIIRS temperature profile



High-altitude water vapor map



Future FengYun Satellite System

2025

5 FY satellites are planned be launched.

LEO

- **FY-3F (AM)** and **FY-3G (RM)**, in the end of 2022.
- **FY-3H (PM)**, planned for launch in 2023.

GEO

- **FY-4C**, planned for launch in 2024.
- **FY-4 MW1**, 1st GEO MW satellite, planned for launch in 2025.

2035

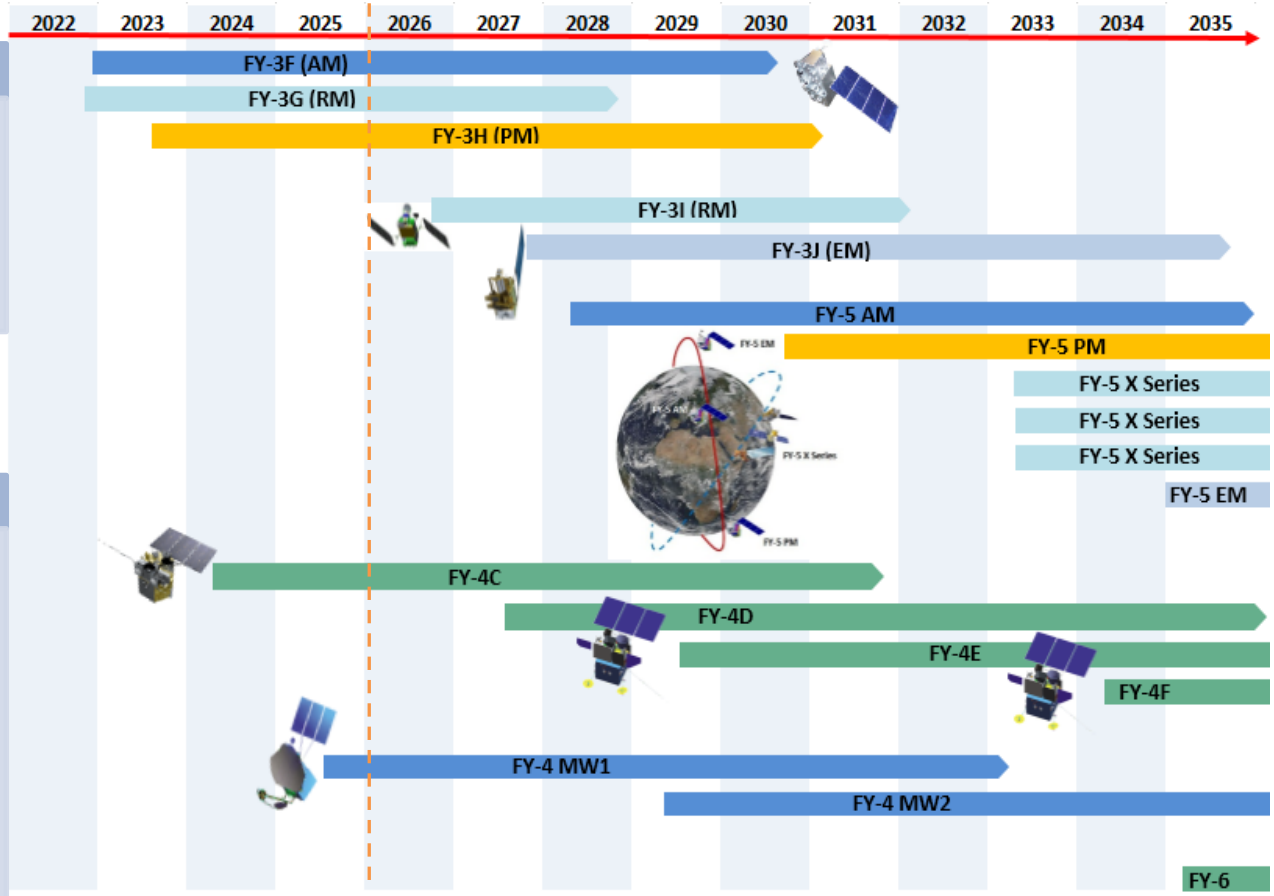
13 FY satellites are planned.

LEO

- **FY-3I**, 2nd RM satellite.
- **FY-3J**, EM orbit, FY -3E follow-on mission.
- **FY-5 series**, FY LEO **THIRD** generation. Including AM, PM, EM and maneuvering orbit (for rain monitoring and atmospheric dynamic)

GEO

- **FY-4D, -4E, -4F**, FY-4 GEO follow-on mission.
- **FY-4 MW2**, 2nd GEO MW satellite.
- **FY-6** , FY GEO **THIRD** generation. Research satellite will be planned before 2035.



Thanks for your attention

Coordination Group for Meteorological Satellites

CGMS