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COMMISSION FOR BASIC SYSTEMS
OPEN PROGRAMME AREA GROUP ON INTEGRATED OBSERVING SYSTEMS

INTER-PROGRAMME EXPERT TEAM ON SATELLITE UTILIZATION AND
PRODUCTS

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PREPARING USERS TO NEW GENERATION SATELLITES

FY-4 User readiness

(Submitted by Xiang Fang, CMA)

Summary and Purpose of Document

This document gives a brief introduction of FY-4A user readiness. Including the application platform development, application product development, data service, application demonstration and user training.

ACTION PROPOSED

The second session is invited to:

- (a) Take note and to comment on the FY-4A data application and user readiness;
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DISCUSSION

Introduction

1. FY-4 Program

FY-4A, the first spacecraft of Chinese second-generation geostationary meteorological satellites, was launched on December 11, 2016 from Xichang Satellite Launch Center. It is the first meteorological satellite with a three-axis stabilization structure on geostationary orbit for China.

The first satellite (FY-4A) of FY-4 series is considered experimental and will be followed by the operational FY-4 satellites. Four new instruments are aboard: the Advanced Geostationary Radiation Imager (AGRI), the Geostationary Interferometric Infrared Sounder (GIIRS), the Geostationary Lightning Mapping (GLM), and the Space Environment Package (SEP).

On February 27, 2017, CMA released the first set imagery from FY-4A. (fig.1)

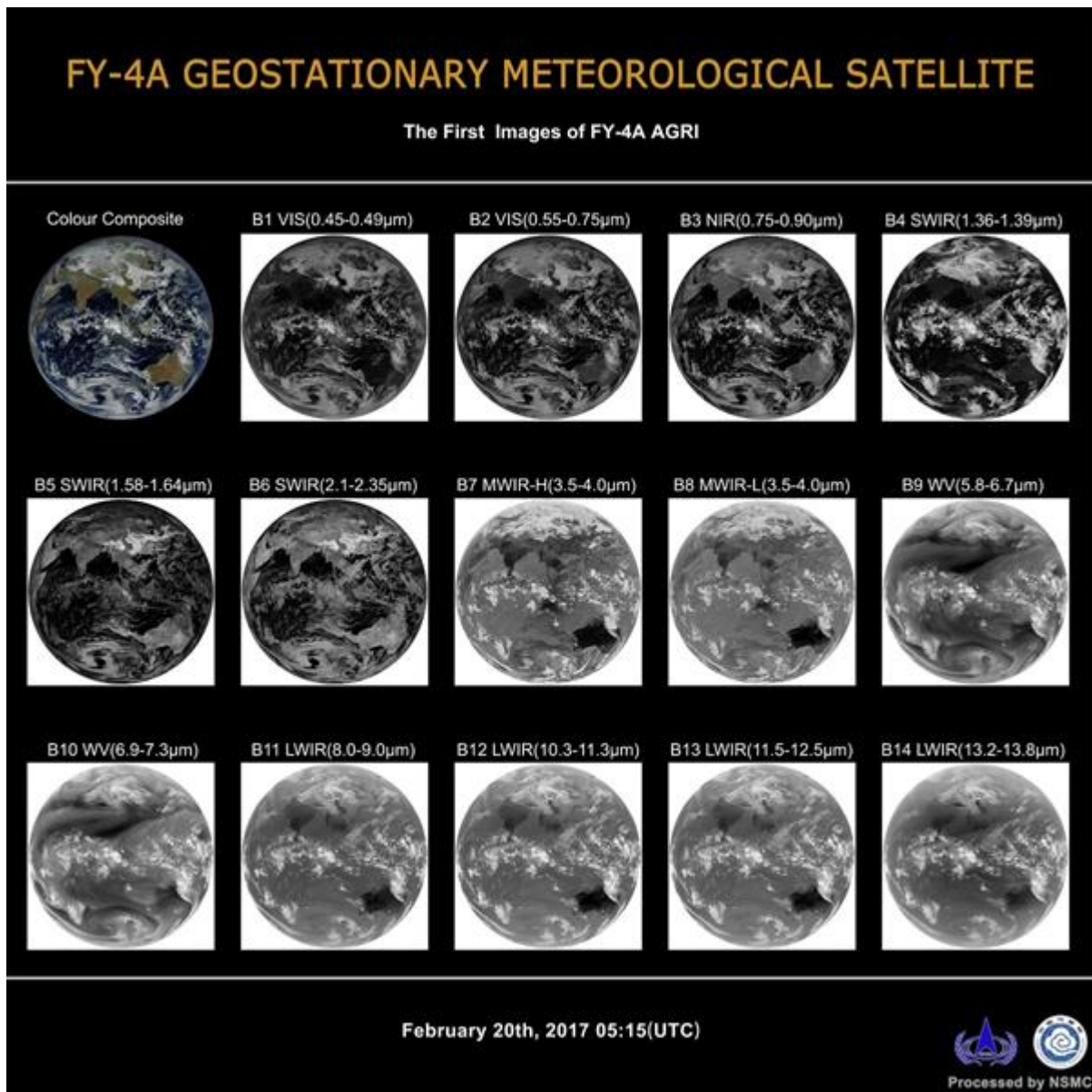


Figure1 The first images of FY-4A AGRI

Now, FY-4A is in orbital check out; the post launch test plan is as follows:

Dec, 2016: FY-4A satellite Launch

Dec, 2016: Satellite and instrument adjustment
 Jan, 2017: Post launch test starts; Payload test
 Mar, 2017: Calibration & INR test ; Release FY-4A first set imagery
 Jun, 2017: L1 products test; Release FY-4A first set L1 products Jun, 30 2017
 July-Sept, 2017: L2/L3 products; Application system test
 Sept-Dec, 2017: Pre-operation of ground segment
 Dec, 31 2017 : Test finishes, system is ready for operation

2. User readiness for FY-4A

For wide-range application of FY-4 satellite, a series of activities for user readiness was implemented by CMA, including the application platform development, application product development, data service, application demonstration and user training.

As for the application platform, CMA developed SWAP (Satellite Weather Application Platform) for weather monitoring and analysis. This platform has been upgraded for the new generation satellites. For example, new version SWAP is able to support Himawri-8 data and FY-4 simulation products, which was applied in monitoring typhoon and strong convections in 2015-2016.

In product development, NSMC/CMA uses proxy data such as MODIS, H8, and other profile data in research for new algorithms. Product development has gone through three stages: key algorithm design (2010-2013), prototype software development and validation (2014), algorithm engineering and testing (2015). Algorithms of 41 baseline products have been generated, including cloud, aerosol, downward and upward Longwave Radiation, precipitation, wind, SST, atmospheric temperature, humidity and ozone profiles, lighting detection, LST, fire, etc.(table1-4)

Table1: Baseline Products of AGRI

No.	Products	No.	Products
1	Clear Sky Masks	15	Outgoing Longwave Radiation
2	Cloud Type	16	Downward Longwave Radiation
3	Cloud Optical Depth	17	Upward Longwave Radiation
4	Cloud Liquid Water	18	Reflected Shortwave Radiation
5	Cloud Particle Size Distribution	19	Land Surface Temperature
6	Cloud Phase	20	Sea Surface Temperature
7	Cloud Top Temperature	21	Land Surface Temperature
8	Cloud Top Height/Pressure	22	Land Surface Albedo
9	Fog Detection	23	Land Surface Emissivity
10	Aerosol Detection	24	Snow Cover
11	Aerosol Optical Depth	25	Fire/Hot Spot
12	Tropopause Folding Turbulence Prediction	26	Atmosphere Motion Vector
13	Surface Solar Irradiance	27	Quantitatively Precipitation Estimate
14	Blackbody Brightness Temp.	28	Rapid Developing Convective clusters

Table2: Baseline Products of GIIRS

No.	Products	No.	Products
1	Temperature Profile	6	Lifted Index
2	Moisture Profile	7	CAPE index
3	Ozone Profile	8	K index
4	Total Ozone	9	SI index
5	Total Precipitable Water	10	TT index

Table3: Baseline Products of LMI

No.	Products	No.	Products	No.	Products
1	Flash	2	Group	3	Event

Table4: Baseline Products of SEP

No.	Products	No.	Products	No.	Products
1	Distribution of High Energy Particle	2	Intensity of Magnetic Field	3	Effects of Spatial Environment

For data service, there are several ways for user to get FY-4A data. User with appropriate receiving equipment can directly receive real time L1 data transmission of FY-4A satellite. The CMACast user can receive L2 or L3 product with DVB-S equipment in near real time. The full FY-4A dataset, both real time and historical data will be available on the NSMC satellite data service website (<http://satellite.nsmc.org.cn>). For domestic users, NSMC is working on a new solution that delivers near real time FY-4A data by using public cloud service. User can get the near-real-time data at his own spatial and temporal choice via internet without special equipment.

In application demonstration, CMA has set up more than 30 demonstration projects in key application fields, such as weather analysis, environment monitoring, climate monitoring and NWP. Moreover, a system for FY-4 application and demonstration (ADS) will be established to give more attention on localization of method, user feedback and promotion of new application.

In user training, CMA has organized a number of international and domestic training courses in past years, which help users understand data format and product properties of FY-4 and learn to utilize the analysis toolkits. The training adopted three forms: on-line support, site training at request, themed training class at home and abroad.