GROUP ON EARTH OBSERVATIONS

OPEN DATA & OPEN KNOWLEDGE Workshop

High-Resolution Satellite Data Sharing Cooperation for Africa and ASEAN

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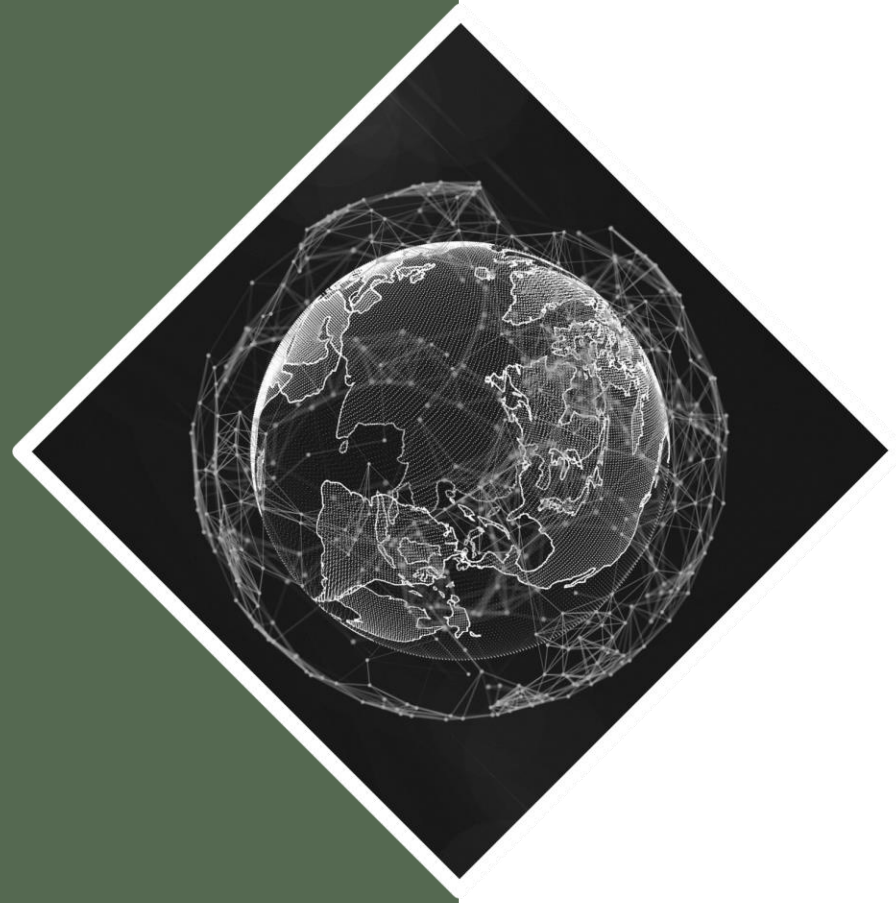

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1 China's Natural Resources Satellites

2 International Cooperation and Applications

3 Serve Africa and ASEAN

4 Perspectives

Progress of Chinese Remote Sensing Satellites

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ZY3-01
2.1m NAD，5.8m MUX，3.5m FWD/BWD

ZY3-02/03
2.1m NAD，2.7m MUX，2.7m FWD/BWD

TH01-1/2/3/4
2m PAN，10m MUX，5m TLS

HJ-2A/2B
16m MUX,48m HS/IR

Environmental Disaster Reduction Satellite (HJ Satellites)

HJ-1A/B
30m MUX，100m HS，150m/300m IR

GF7 1:10,000 Stereo Mapping Satellite

Resource Satellite (ZY Satellites)

ZY1 02C, 2.36m PAN，5/10m MUX

CBERS-04/04A
5m/10m PAN/MUX，20m MUX,73m WFI

2m /8m Constellation
2m PAN,8m MUX

GF Satellite

GF5
The world's first integrated atmospheric and terrestrial hyperspectral satellite

GF-4
Geosynchronous orbit satellite, 50m resolution

BJ-2
0.8m PAN，3.2m MUX

BJ-3
0.5m PAN
2.0m MUX

Commercial Satellite

GF-3
first C-band multipolarization synthetic aperture radar satellite data, 1m

JL-1Constellation
31 satellites in orbit

GF-2
0.8m PAN,3.2m MUX

Ocean Satellite

GF-1,GF6
2m PAN,8m MUX

SV1-01/02
0.5m PAN，2m MUX

Meteorological Satellite FY-2F/G/H,FY-4A/B,FY-3B/C/D/E,TANSAT

ORBIT Constellation OVS/OHS network operation of 12 satellites

China's Natural Resources Land Satellites

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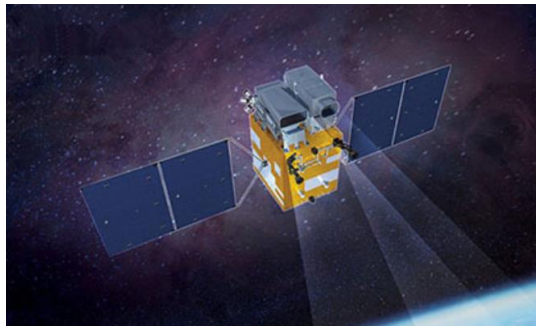
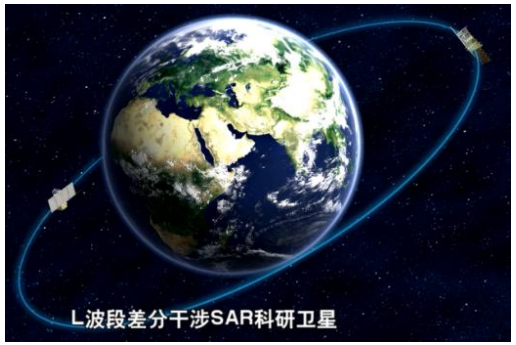
Optical (visible light satellite) — Multi-scale topographic surveying and mapping, natural resources monitoring

Hyper spectral satellite — Ground feature extraction, geological and lithological investigation, ecological environment monitoring



Radar satellite — Topographic surveying and mapping, monitoring of land cover for cloudy and rainy areas and surface deformation

Laser altimetry satellite — Elevation measurement, including the height measurement and monitoring of vegetation, glaciers, buildings, coastal zones and other topographic features



Gravity satellite — Earth gravity field measurement

China's Natural Resources Land Satellites

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Natural resources remote sensing satellite application system for visible light, hyperspectral and interferometry radar observation

Satellite Type	Satellite Name	Satellite Number	Launch Time	Main payload	Resolution (m)	Main Application
Optical RS Satellite	ZY-3	3	2012，2016，2020	Visible light, Near- infrared, Laser altimeter（ZY3-02，ZY3-03）	2/8	1:50,000 Stereo Mapping
	ZY1-02C	1	2011	Visible light, Near- infrared	2.36/20	Resources monitoring
	GF1,GF1-B/C/D, GF6	4	2013，2018	Visible light, Near- infrared	2/8	Map updating, Resources monitoring
	GF-2	1	2014	Visible light, Near- infrared	0.8/3.2	Map updating, Resources monitoring
	GF-7	1	2019	Visible light, Near- infrared, Laser altimeter	0.65/0.79	1:10,000 Stereo Mapping
	GFDM	1	2020年	Visible light, Near- infrared, Polarization detected, Atmospheric detector	0.41/1.64	Map updating, Resources monitoring
Hyper-spectral	ZY1-02D/02E	2	2019，2021	Visible light, Near- infrared, hyperspectral	2/20	Geological survey, Vegetation fine classification
InSAR	3m L-band SAR	2	2022	L-band Interferometric Radar	3/6/12/30	Surface subsidence , Topographic mapping

China's Natural Resources Land Satellites

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Satellite Management

Satellite Product and Application

Satellite Pre-research → Operational Management → Calibration Validation → Data Processing → Quality Inspection → Application Service

Application Service:
- Resource Survey
- Ecological Survey
- Comprehensive Survey

Satellite Pre-research

Overall design of application system construction

- Operating System Top-level Design
- Standard Specification & System design
- Satellite Application Simulation
- Testing Platform

Operational Management

Operation Management and Scheduling

- Satellite Observation & Receiving Planning
- Business Operation Scheduling
- Data Archiving & Services
- Data Storage and Circulation

Calibration Validation

Calibration& accuracy verification

- Satellite Geometry Calibration
- Satellite Accuracy Verification
- Satellite Radiometric Calibration
- Level 1-2 standard data production

Data Processing

Satellite data processing and basic product production

- Optical Satellite Data Production
- Hyperspectral Satellite Data Production
- Radar satellite Data Production
- Laser Altimetry Data Production

Quality Inspection

Quality inspection and control of satellite data products

- Quality Inspection Supporting System
- Product Quality Inspection System

Application Service

- Normalized Monitoring
- Automatic Feature Extraction
- Feature Parameter Inversion
- Monitoring Analysis
- Ground Feature Spectrum Library
- Index product
- Fine Classification
- Disaster Information extraction
- Special Monitoring Production
- Comprehensive Monitoring
- Land Planning Monitoring
- Analysis & Evaluation

Satellite Remote Sensing Cloud Service Platform

- Image data Query and Statistics
- Data Push Services
- Land Cover Monitoring Service
- Natural Resources Monitoring & Supervision

China's Natural Resources Land Satellites

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Sensor Type	Standard Product		Basic Product				Thematic Product	
	Level 1	Level 2	Level 3	Level 4	Level 5		Level 6	Level 7
visible light	Sensor Corrected Image	System geometry corrected image	Geometric precision corrected image	Orthorectified image	Digital orthophoto	Digital Surface Model	Automatic classification products	…
Laser altimetry		Standard Laser altimetry			Advanced Laser altimetry Products			
Hyper-spectral	Radiometric corrected image	Sensor Corrected Image	Single-Scene Orthorectified image	Regional Orthorectified image	Single scene reflectance	Regional reflectance	Hyperspectral index product	…
Radar	Single view complex image	Geometric calibration	Deformation field	Deformation Rate field	Deformation sequence		Geological hazard monitoring	…
	Single view complex image pairs	Interference calibration			Digital orthophoto	Digital Surface Model / Digital elevation model	Land Cover Classification	…

International Cooperation on Data and Application

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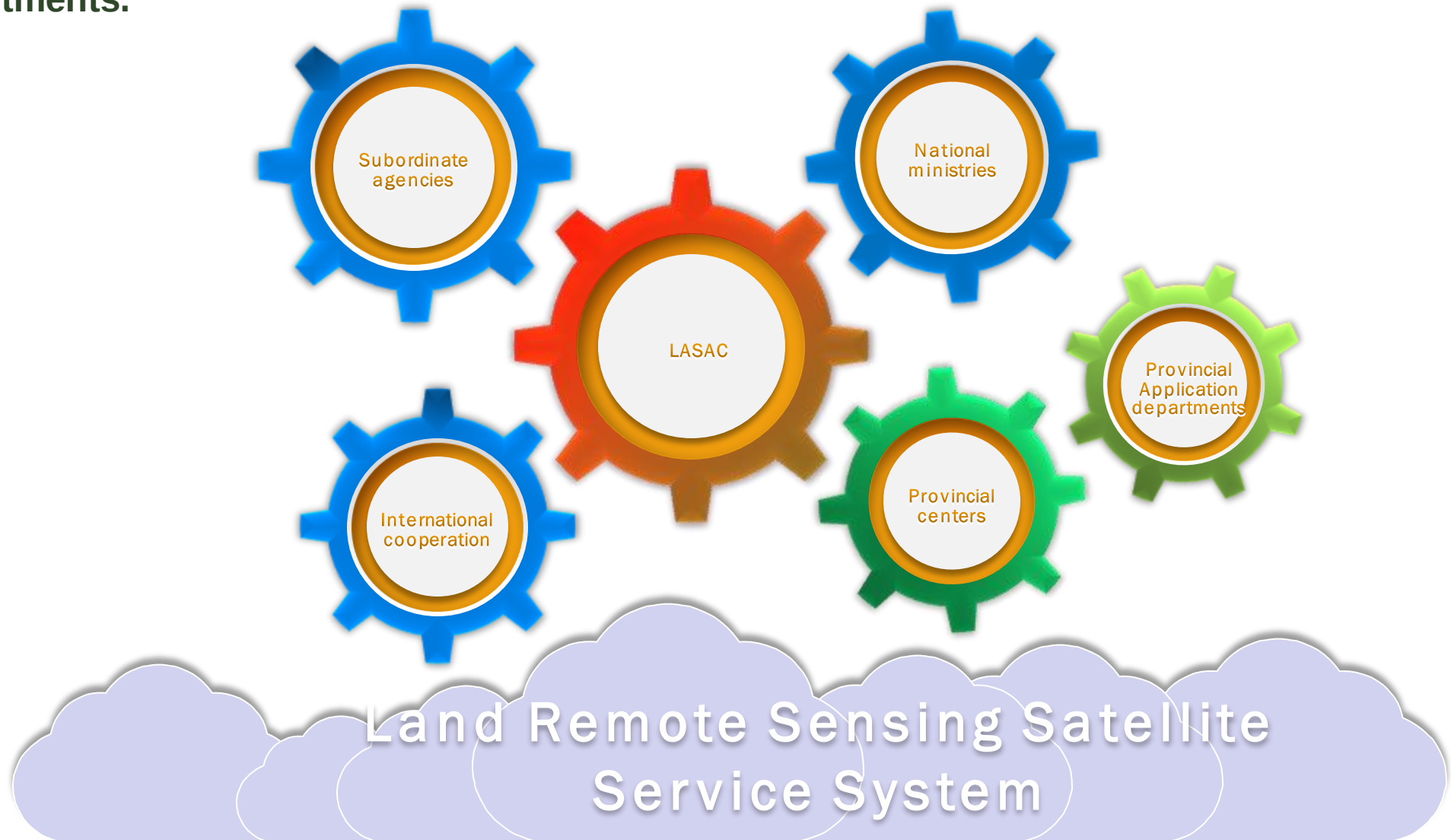
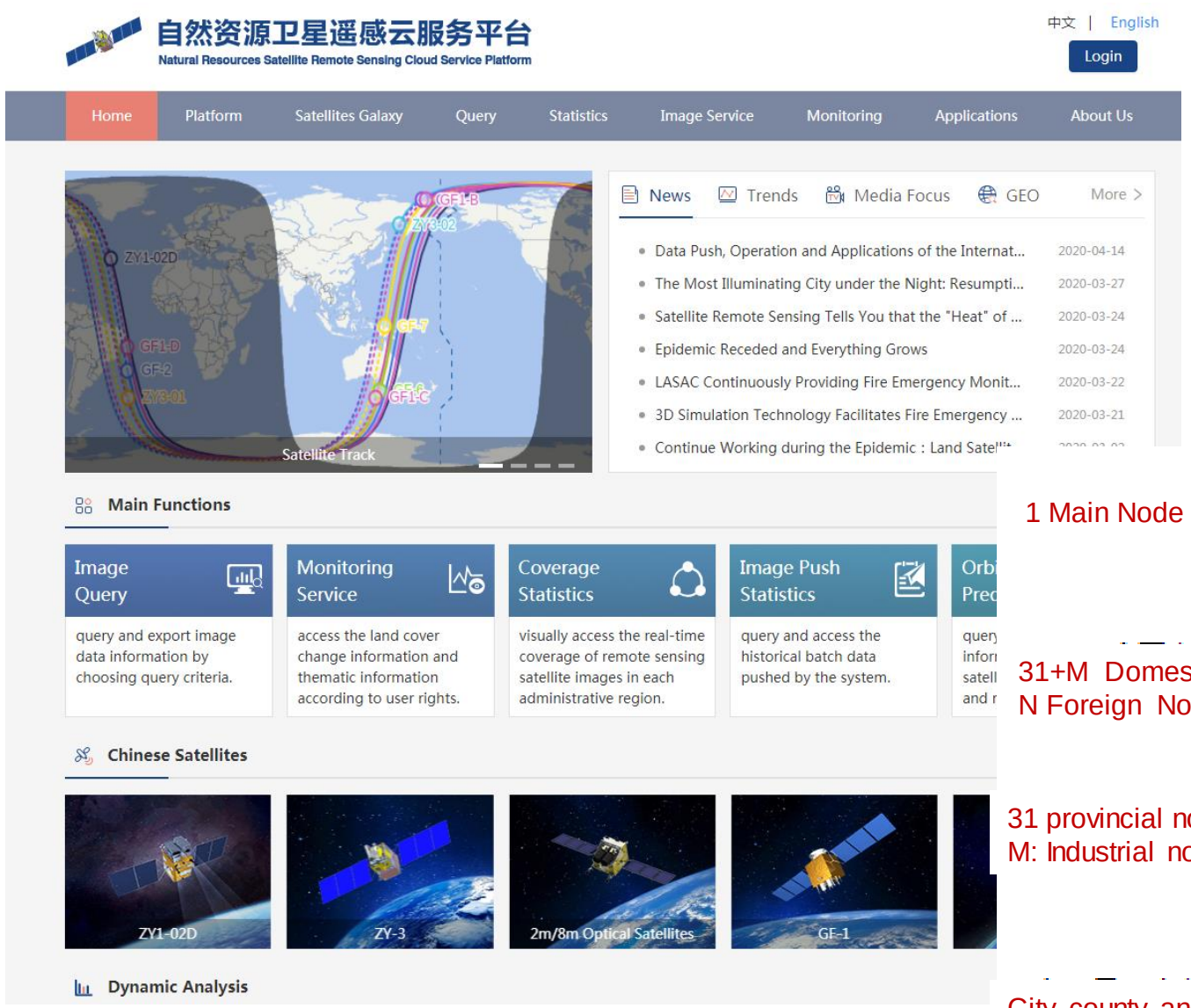
Established a comprehensive service system featuring multi-level interaction, among the satellite centers and subordinate agencies, provincial centers, provincial centers, and provincial application departments.



Data Service and Cloud Platform



http://www.sasclouds.com/english/home

"1+31+M+N"Service Network

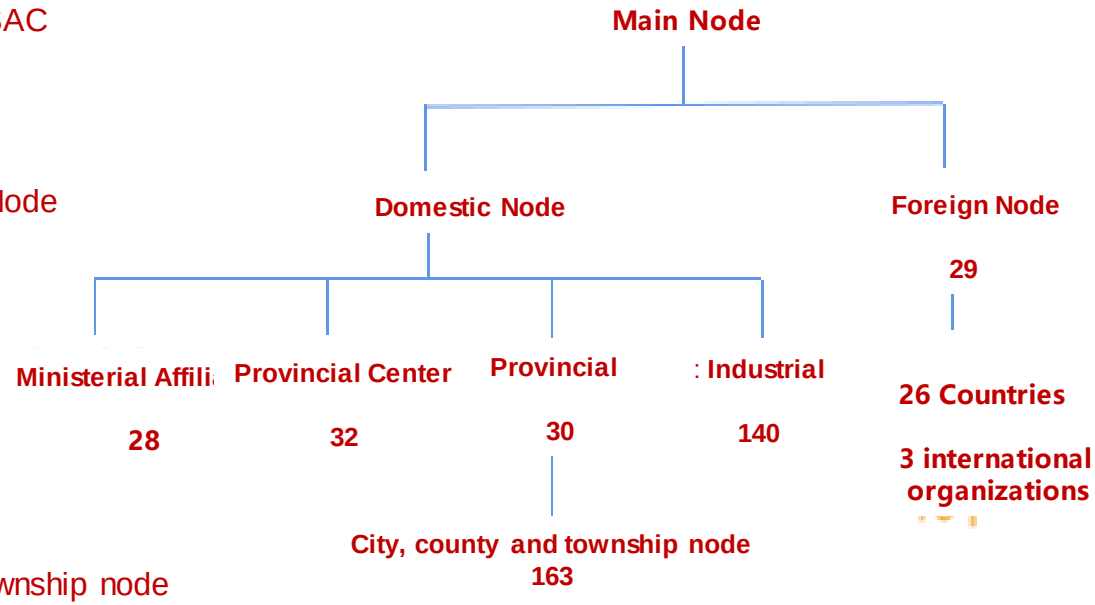
286 Nodes

1 Main Node LASAC

31+M Domestic Node
N Foreign Node

31 provincial node
M: Industrial node

City, county and township node



Data Service and Cloud Platform

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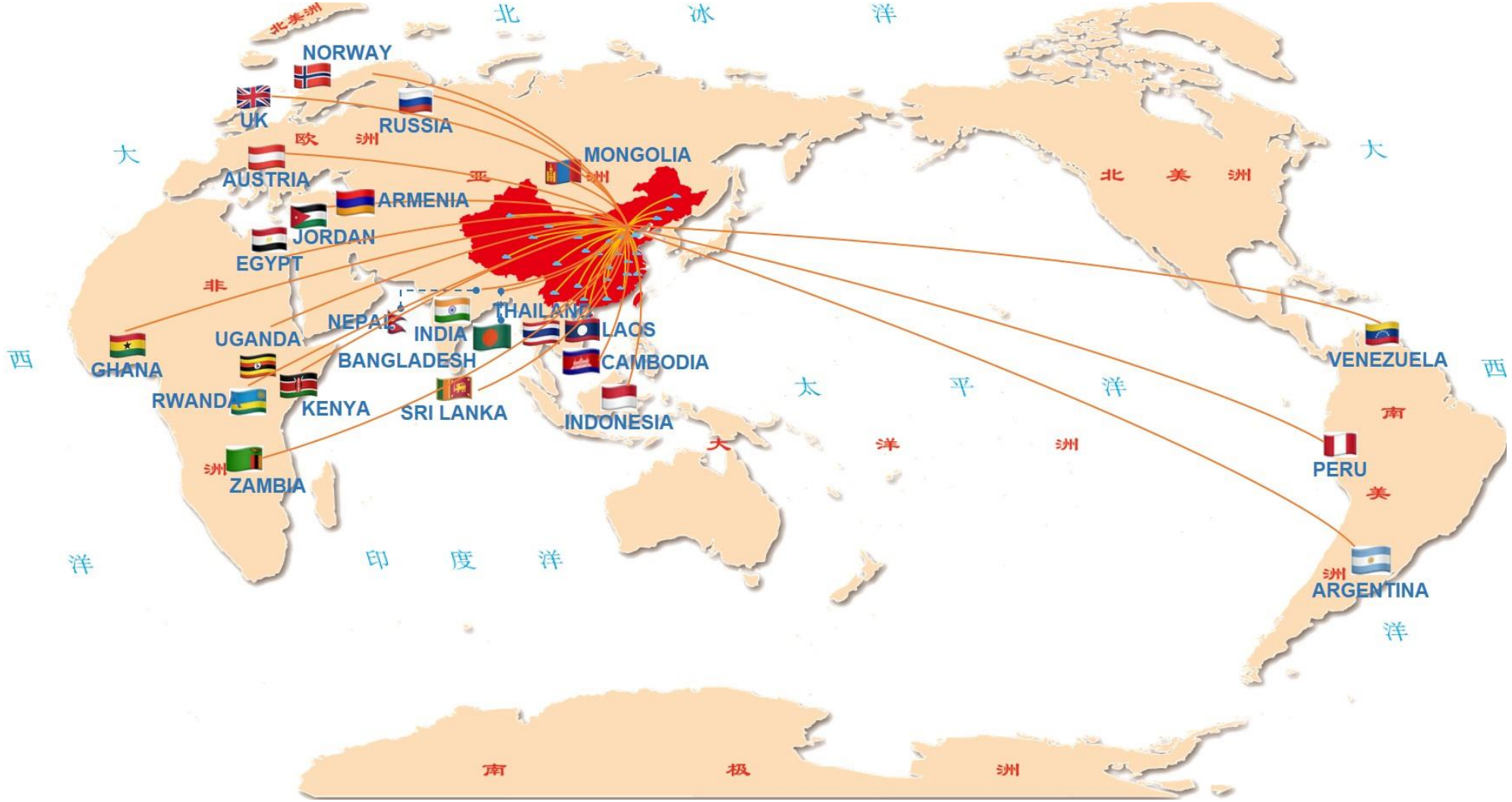
29 international nodes, data for 91 countries and 18 territories（as of 1st June 2023）



	International Organization						
1	Bangladesh	4	716	299.97	98	2018.06.08	
2	Mongolia	1005	36626	37314.8	99.98	2017.07.17	
3	Thailand	252	6844	6273.59	100	2017.02.16	
4	Indonesia	193	3799	5654.55	72.20	2019.12.10	
5	Cambodia	143	1942	1474.44	100	2018.12.24	
6	Laos	263	4967	3926.04	100	2017.04.20	
7	Nepal	545	7741	7172.81	100	2018.11.07	
8	Sri Lanka	15	236	345.63	97.11	2018.01.08	
9	Jordan	27	463	809.88	100	2019.07.29	
10	Armenia	5	132	188.62	100	2022.11.15	
11	India	1	22	38.04	0.33	2023.01.18	
12	Tajikistan	7	292	456	31.56	2023.05.26	
13	Ghana	50	777	1025.18	100	2018.05.06	ZY3-01/02/03 ZY1-02C/ZY1-02D GF1-B/C/D
14	Uganda	59	975	971.14	99.48	2017.10.19	
15	Zambia	106	4178	5756.87	100	2019.11.15	
16	Rwanda	8	44	111.32	93.60	2021.02.26	
17	Egypt	45	3558	4664.81	100	2021.09.30	
18	Ethiopia	5	391	665.76	65.58	2023.05.04	
19	Nigeria	4	1593	2365.19	99.47	2023.05.16	
20	Austria	75	670	807.47	100	2017.01.22	
21	Russia	2	102	126.82	1.27	2020.11.16	
22	Norway	12	1199	452.91	90.81	2017.05.22	
23	UK	6	271	110.37	46.19	2017.01.16	
24	Venezuela	71	2369	4001.55	94.75	2018.11.27	
25	Peru	26	2087	3567.98	96.28	2021.04.23	
26	Argentina	29	2696	4627.13	88.43	2022.08.10	
27	RCMRD(Kenya)	235	16563	26551.49	92.04	2016.08.30	
28	RCSSTEW A(Jordan)	33	490	811.71	100	2020.04.15	
29	FAO(Italy)	13	4879	10289.69	84.05(PICTs)	2021.06.05	
	Total	4232	134327	163466.16			

Data Service Platform

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1. Windows 7 or Windows Server 2008/2012 64 bit operating system;

2. One Server with a minimum configuration of 4-core CPU and 8GB of memory;

3. Data storage Disk: > 20T ;

4. Internet Bandwidth: >20 M (100m is preferred)

5.Installation by Self-service or remote assistance within 5 days

Early Stage: by FTP

Later: transmission through Ocean Satellite Data Distribution Platforms

Sign MOU with institutions States

Sign MOU

Deployment of Land Satellite Data Node and Receive Land Satellite Data

Receive Ocean satellite data products

For Africa and ASEAN

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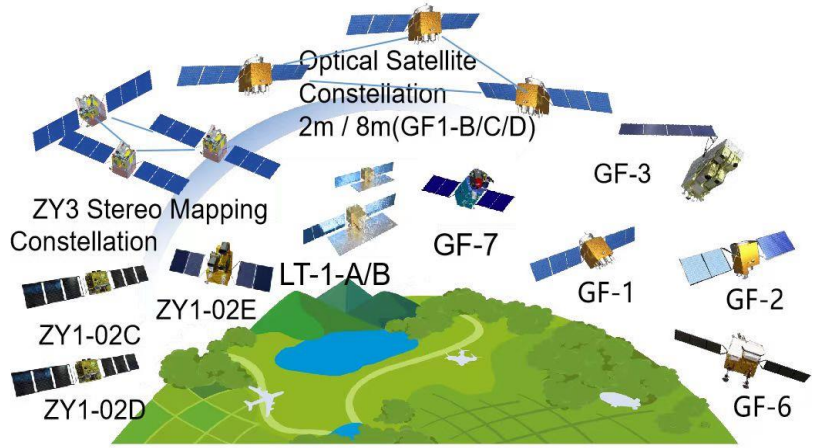
1. China's land and ocean satellite remote sensing technology has developed rapidly.

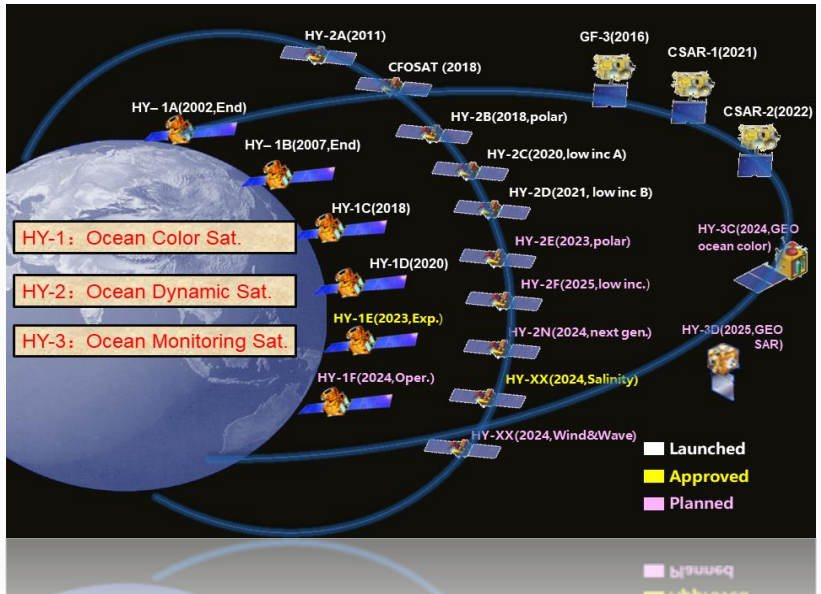
Land Satellites

15 land satellites in orbit, taking MNR as legal representatives and leading user, covering optical, hyperspectral, laser, SAR and other payload types, initially forming a multi-scale, multiple payload operational and stable satellite earth observation system.

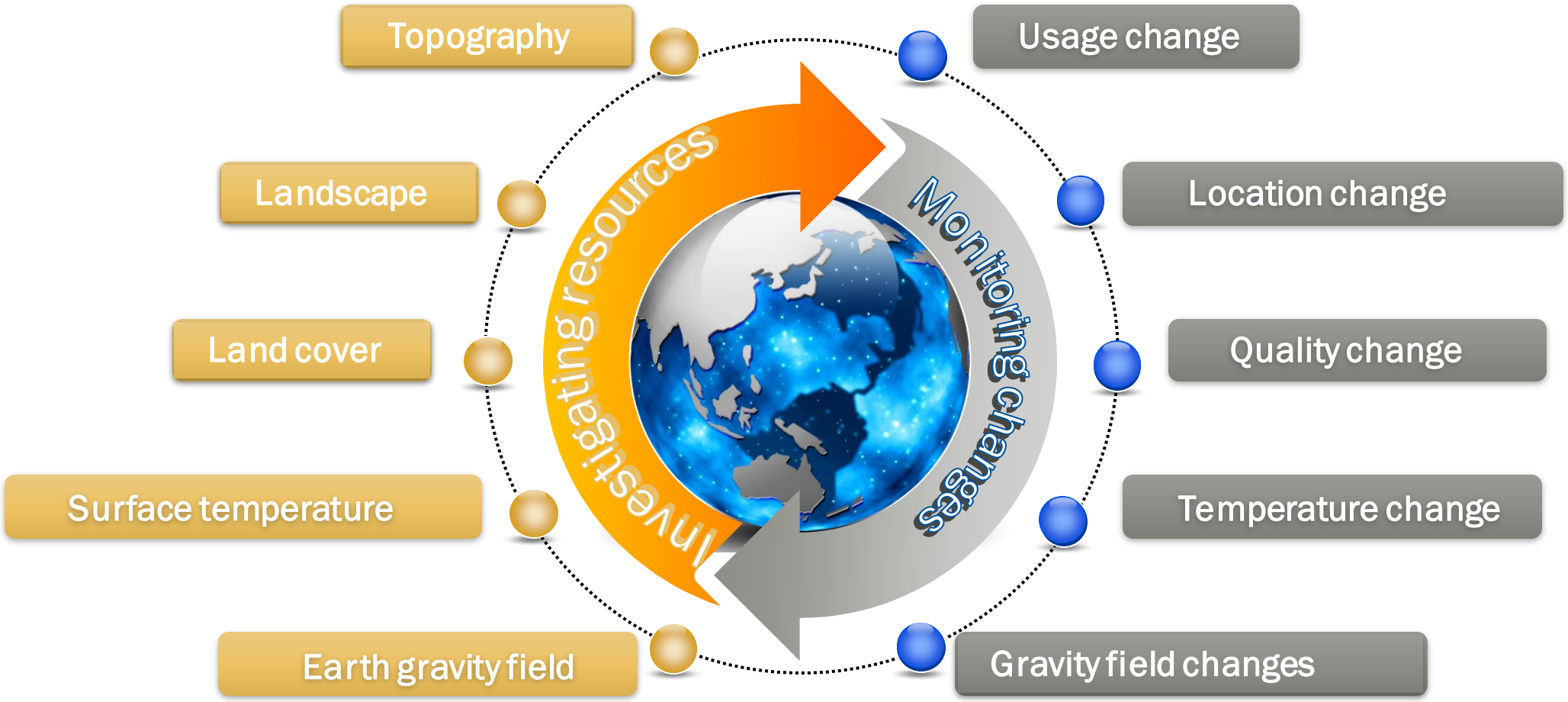


Ocean Satellites

10 satellites in three series of ocean color satellites, ocean dynamic satellites, and ocean surveillance and monitoring satellites, are in orbit for network operation, forming a multi-element and multi-scale continuous observation and coverage capability for the oceans around the world.



Data and Application



CASAC & CACSA

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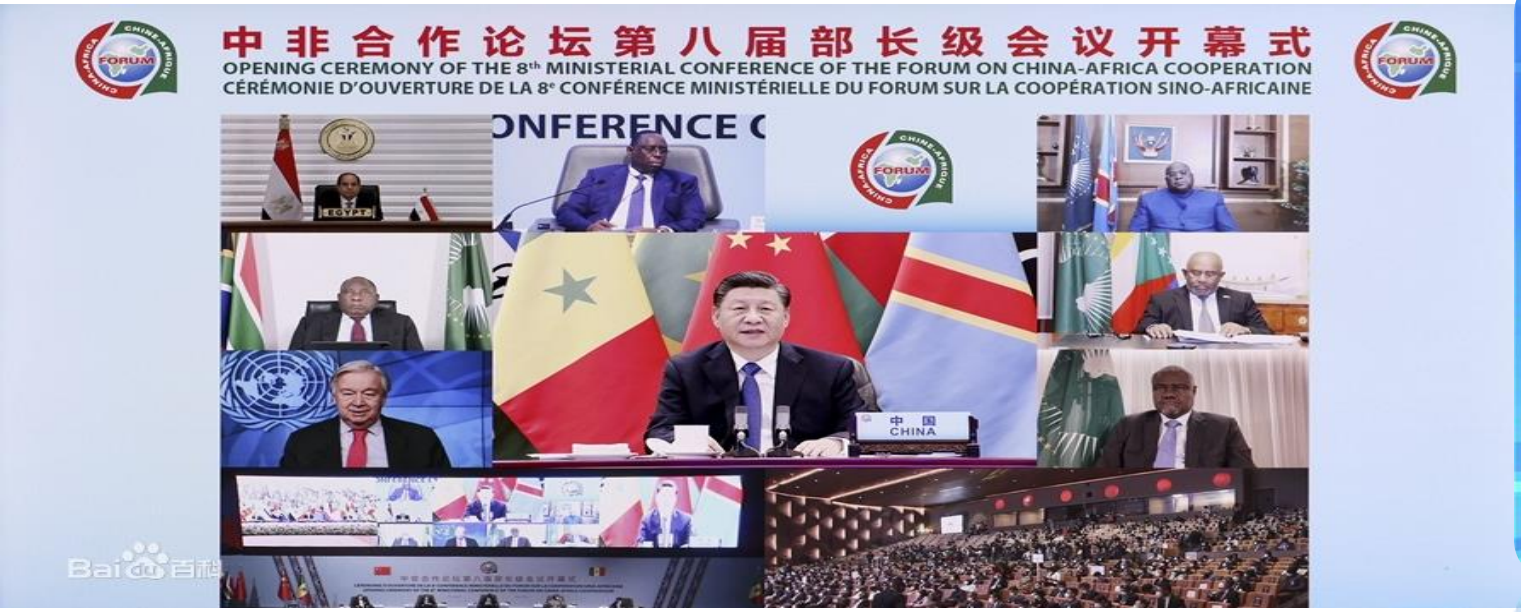
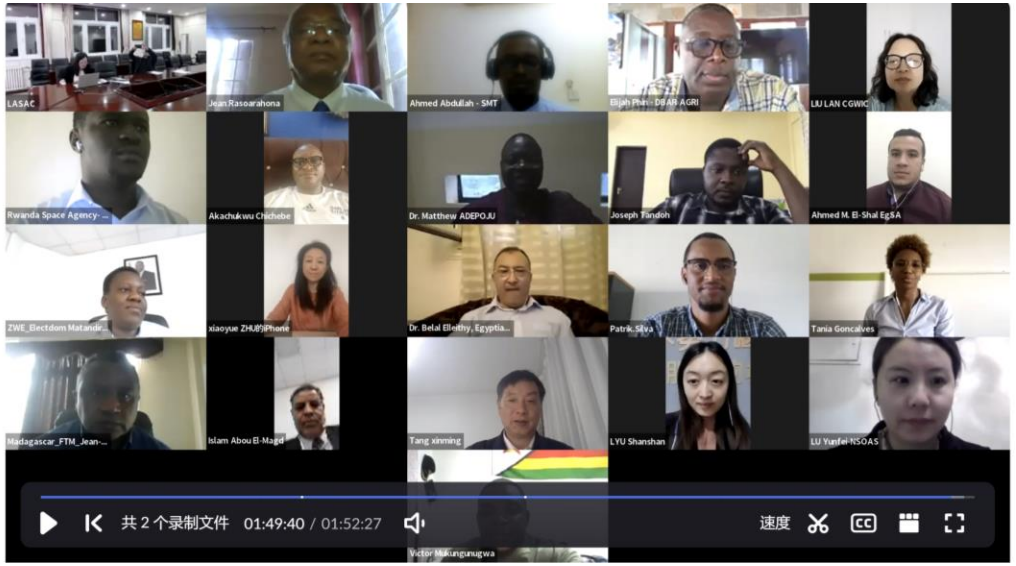
On November 29th, 2021, at the Eighth Ministerial Conference of the Forum on China-Africa Cooperation (FOCAC), President Xi Jinping proposed "Nine Programs" to bolster China-Africa practical cooperation, including setting up centers for China-Africa cooperation on satellite remote-sensing application.



On October 26, 2021, at the 24th ASEAN-China Summit, Former Chinese Premier Li Keqiang proposed to Establish a China-ASEAN Satellite Remote Sensing Application Center

CACSA

- Establish China Africa satellite remote sensing application long term cooperation mechanism
- Build China-Africa Satellite Remote Sensing Data Sharing Network System
- Establish dynamic monitoring platform and demonstration application
- Explore joint satellite calibration and other satellite ground infrastructure construction
- Organize collaborative training and capacity building
- Promote commercial cooperation in satellite remote sensing application



CASAC

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Build and maintain a long-term and sustainable cooperation mechanism for satellite remote sensing applications between China and ASEAN countries;

- **Strengthen satellite connectivity between China and ASEAN countries by co-constructing an effective and user-friendly data sharing network system with data and product accessible and results publicity;**
- **Carry out technical training and exchanges to promote regional remote sensing technology and application abilities;**
- **Conduct application cooperation in satellite remote sensing monitoring of natural resources and environment monitoring in ASEAN countries, providing support for high-quality economic and social development and sustainable goals in the ASEAN region**

Serving the sustainable development of China and ASEAN	Exchanges, Trainings and Applications	Seek progress while ensuring stability, Applying while Building

Joint Consultation

Joint Construction

Shared Benefits

Perspectives

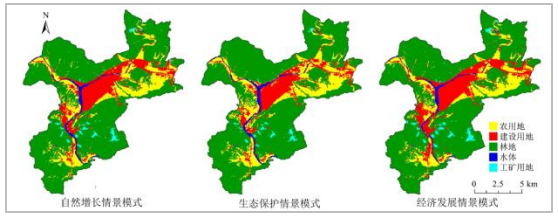
Decision making

Application Service System

V0.5

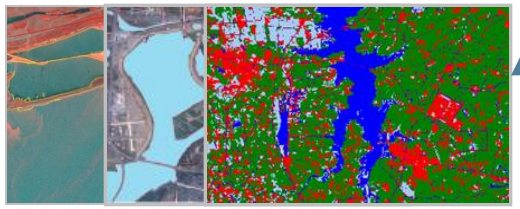
Cloud service platform

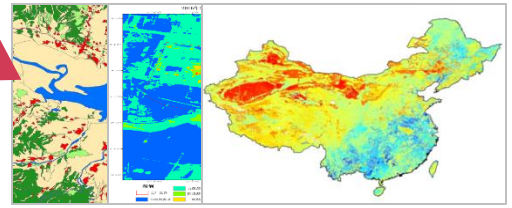
Cloud supervision platform



Knowledge

Double evaluation





Product System

DOM

DEM

DSM

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Monitoring System

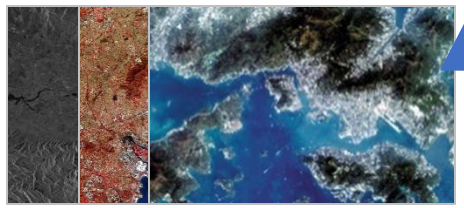
Nature Resource survey monitoring

Natural Ecological monitoring

Comprehensive Governance monitoring

Information

Quality monitoring



Observation system

Gravity satellite

Laser altimetry satellite

Optical (visible light) satellite

Hyperspectral satellite

Radar satellite

Marine satellite

Image

Quantity monitoring

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