Presented at the FIG Working Week 2025,
6-10 April 2025 in Brisbane, Australia

中国测绘科学研究院
Chinese Academy of Surveying & Mapping

Geospatial Leadership in China and Our Future Efforts

Prof. Qin YAN

President of Chinese Academy of Surveying and Mapping(CASM)

Vice President of FIG

April 2th, 2025

Geospatial Leadership in China

Policy

Industry

Technology

Education

International Cooperation

Next-Generation Sustainability

Advancing the Future with Geospatial Intelligence

United Nations

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1-3 April 2025 | Melbourne, Australia

Policy Support System

Surveying and Mapping Law of the People's Republic of China

Laws and Regulations: Surveying and Mapping Law of the People's Republic of China, Regulations on Basic Surveying and Mapping, Regulations on the Management of Maps ...

Policy Support System

Laws and Regulations: The Surveying and Mapping Law of the People's Republic of China, Regulations on Basic Surveying and Mapping, Regulations on the Management of Maps ...

Administrative Authority: Ministry of Natural Resources of the People's Republic of China. At the **provincial**, **municipal**, and **county** levels, there are corresponding administrative management departments

Policy Support System

Overall Layout Plan for the Construction of Digital China

Laws and Regulations: The Surveying and Mapping Law of the People's Republic of China, Regulations on Basic Surveying and Mapping, Regulations on the Management of Maps ...

Administrative Authority: Ministry of Natural Resources of the People's Republic of China. At the **provincial**, **municipal**, and **county** levels, there are corresponding administrative management departments

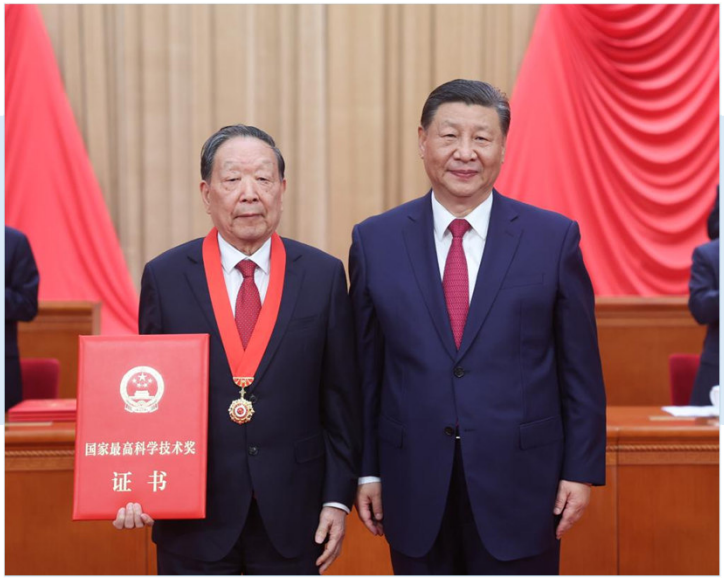
Planning Management: A basic surveying and mapping plan is formulated **every five years** to comprehensively update; Geospatial is integrated into national specialized plans such as t**he Digital China initiative** and **smart city construction**, highlighting its role as a foundational platform.

Establish United Nations Agencies

United Nations Global Geographic Information Knowledge and Innovation Center （UN-GGKIC）

International Research Center of Big Data for Sustainable Development Goals (CBAS)

China's Top Sci-tech Award



China's top sci-tech award for the year 2023 was bestowed upon Prof. Li Deren, a renowned photogrammetry and remote sensing scientist.

Li Deren, a professor from Wuhan University . He has been committed to the construction of China's high-precision and high-resolution earth observation system and has made outstanding contributions.

Li Deren and Prof. Fritz Ackerman

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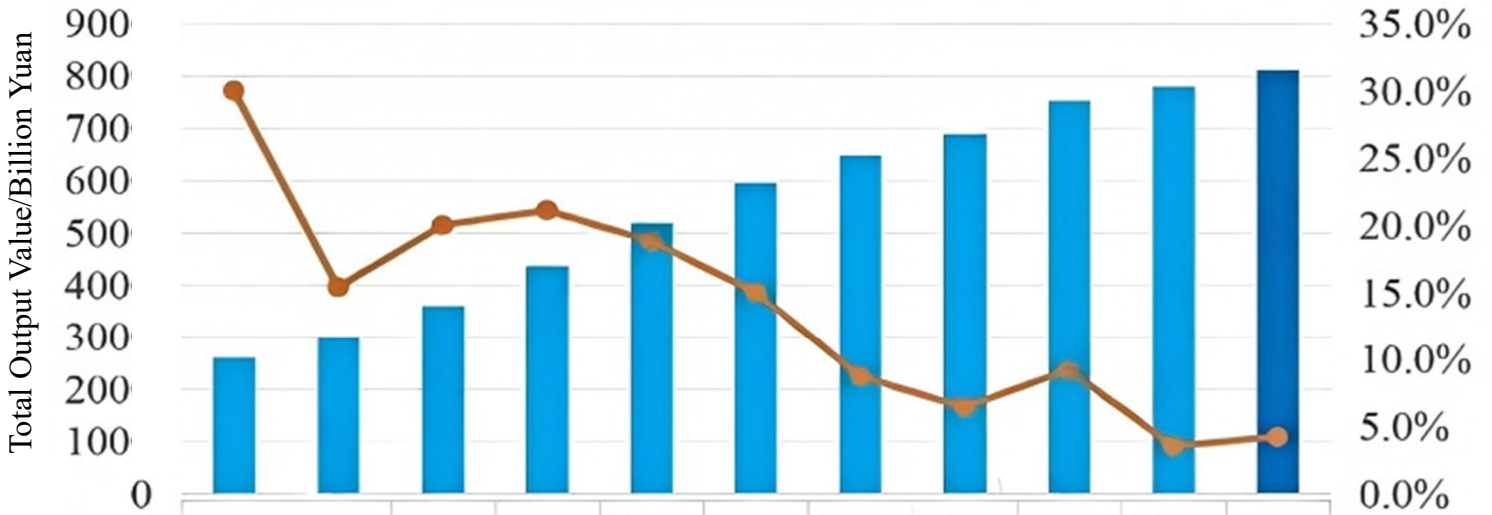
Geospatial industry

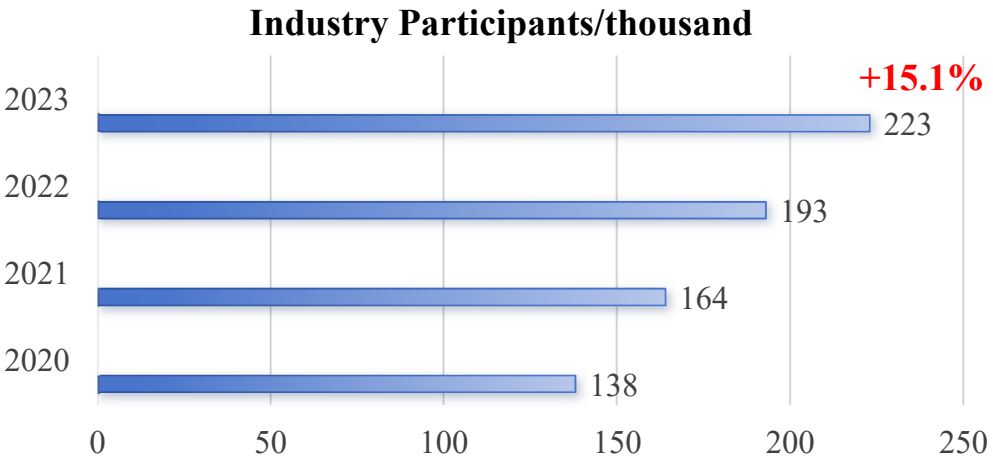
In 2023, the growth rate of Geospatial industry reached **4.2%**, with a total output value of **811.1 billion yuan**. The growth rate increased by **0.7** percentage points compared to the previous year. The compound annual growth rate over the past five years was **6.4%**, and over the past ten years, it was **12.1%**.



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total Output Value/Billion Yuan	260	300	360	436	518	596	648	689	752	779	811
Growth rate	30.0	15.4	20.0	21.1	18.8	15.0	8.7%	6.4%	9.2%	3.5%	4.2%

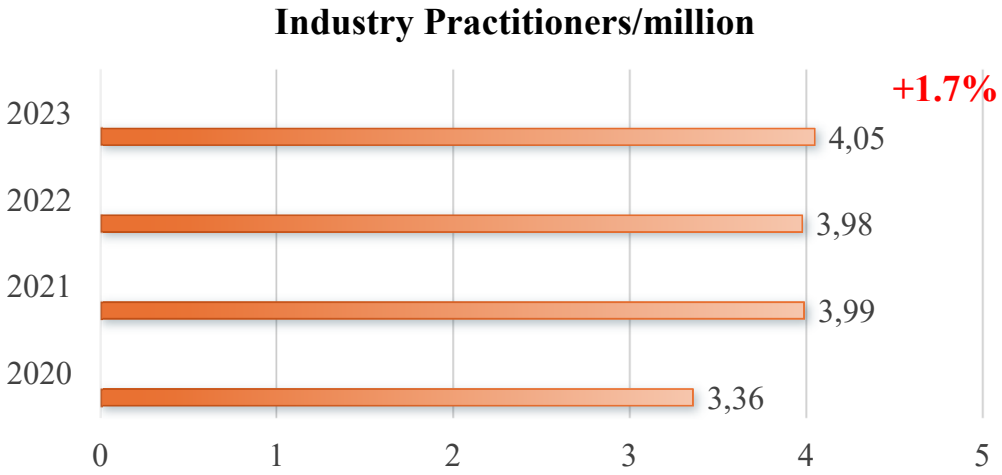
Source: Report on the Development of the Geospatial Information Industry(2024), China Association for Geospatial Industry and Sciences

Geospatial industry



By the end of 2023, the number of industry units reached approximately **223 thousand** representing a year-on-year increase of **15.1%**.

The number of industry employees exceeded **4.05 million**, representing a year-on-year increase of **1.7%**.



Geospatial industry

Listed companies:77

- Main Board : **30**
- Growth Enterprise Market (GEM): **25**
- Science and Technology Innovation Board (STAR Market) : **14**
- Beijing Stock Exchange (BSE) : **5**
- Hong Kong Stock Exchange (HKEX) : **2**
- Nasdaq : **1**

- By the end of 2023, there were **77** listed companies related to the geospatial information industry.
- The total market value of these companies reached **713.91** billion yuan by the end of 2023, with an average market value increasing by **19.6%** compared to the end of 2022.

Geospatial industry

Policy

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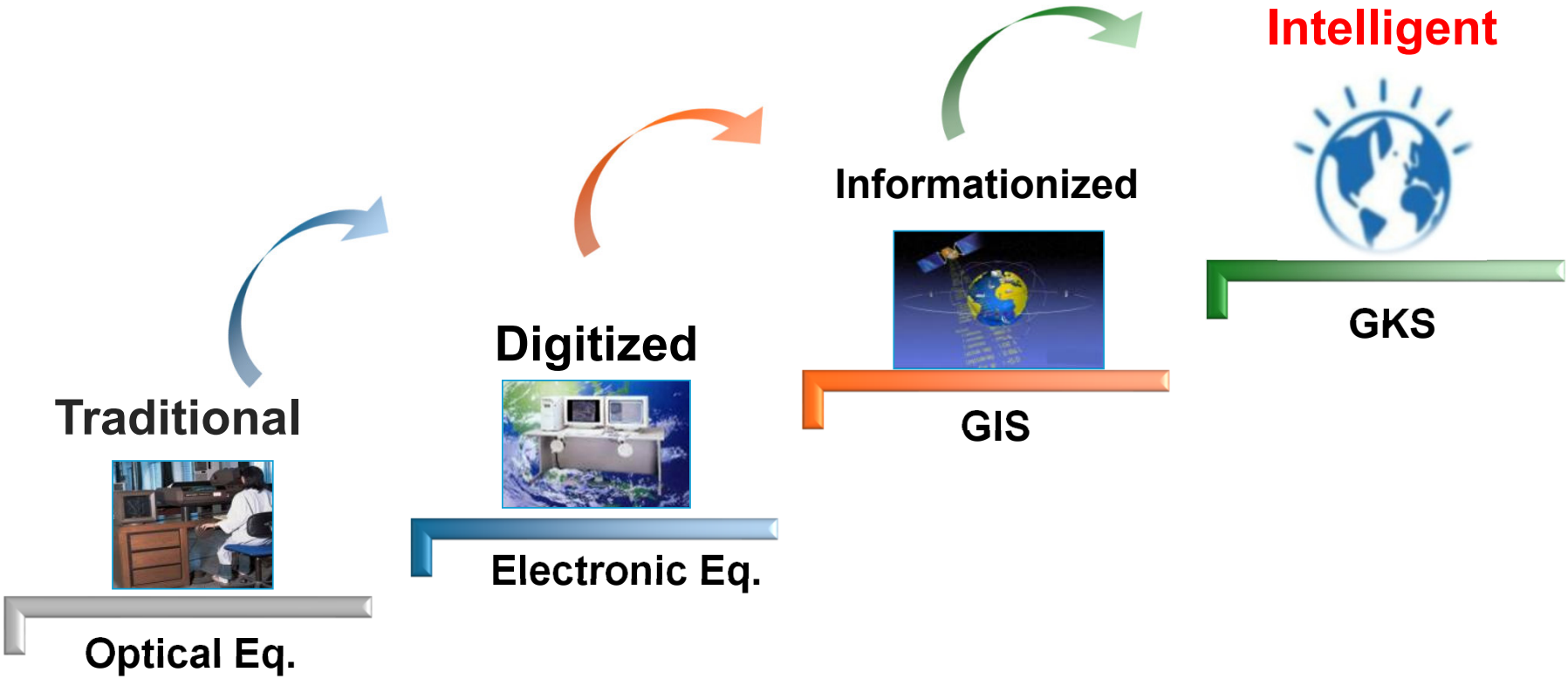
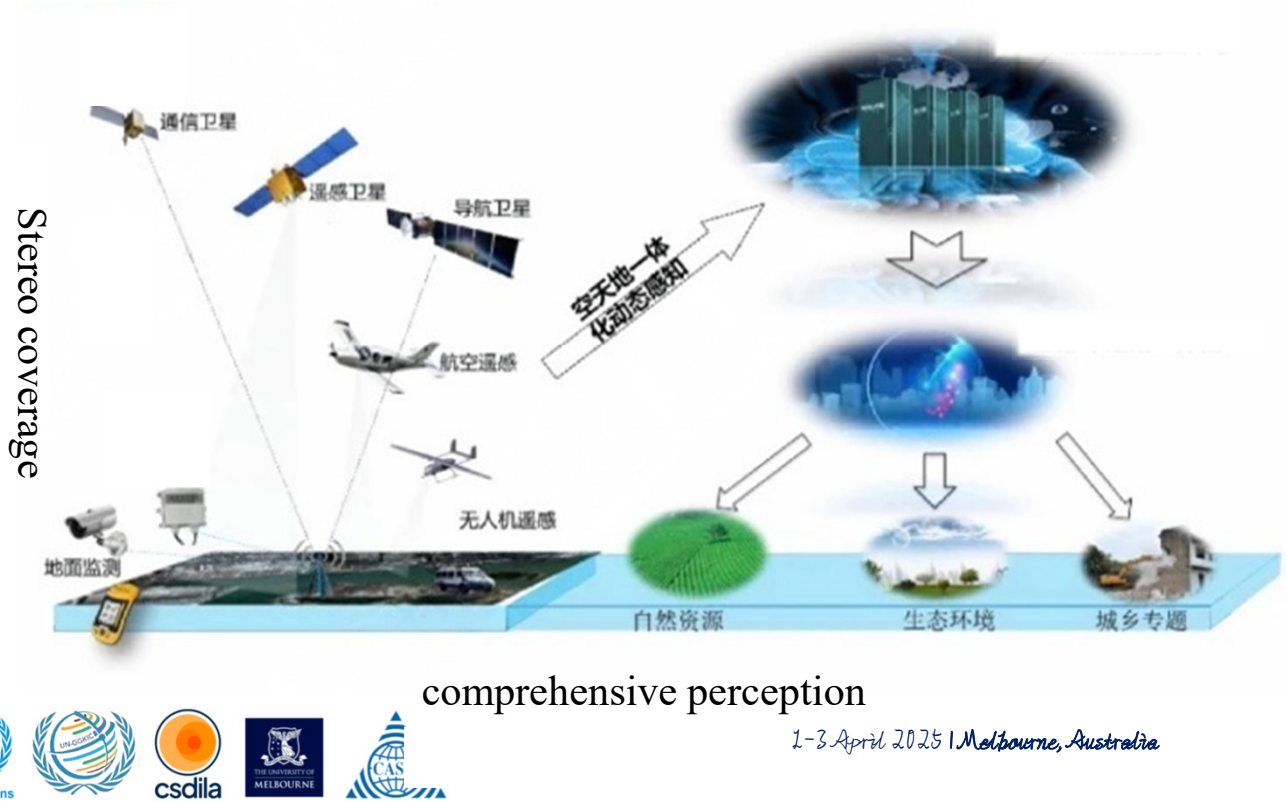
Upgrade of Tech. System



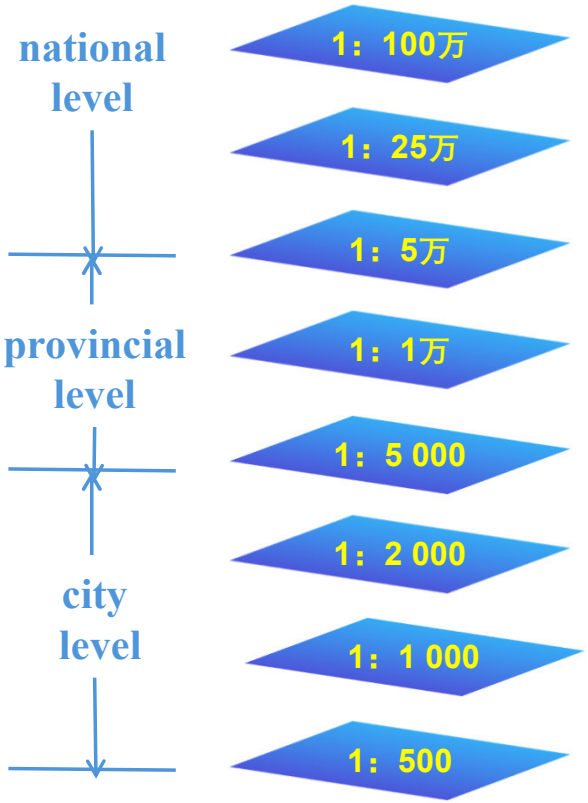
Tereoscopic Monitoring System

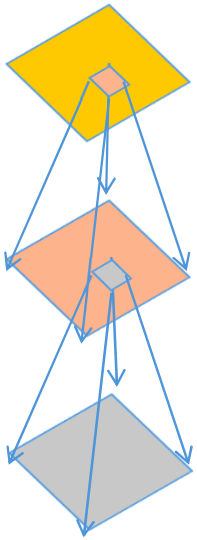
with the development of multiple platforms and sensors in aerospace, aviation, low altitude, ground, underwater etc, the real-time/quasi real-time acquisition of surveying geospatial information is realizing.



comprehensive perception

National Fundamental Geographic Information Data

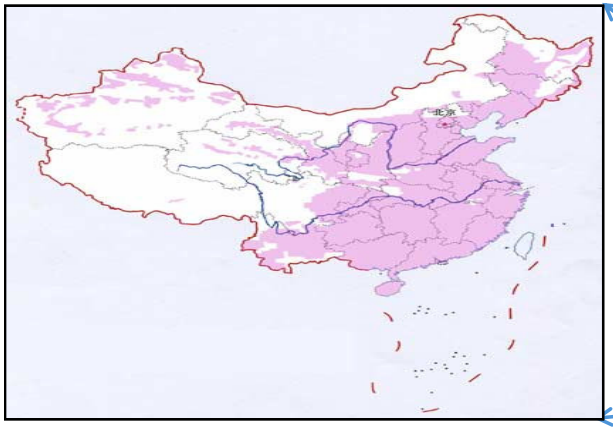




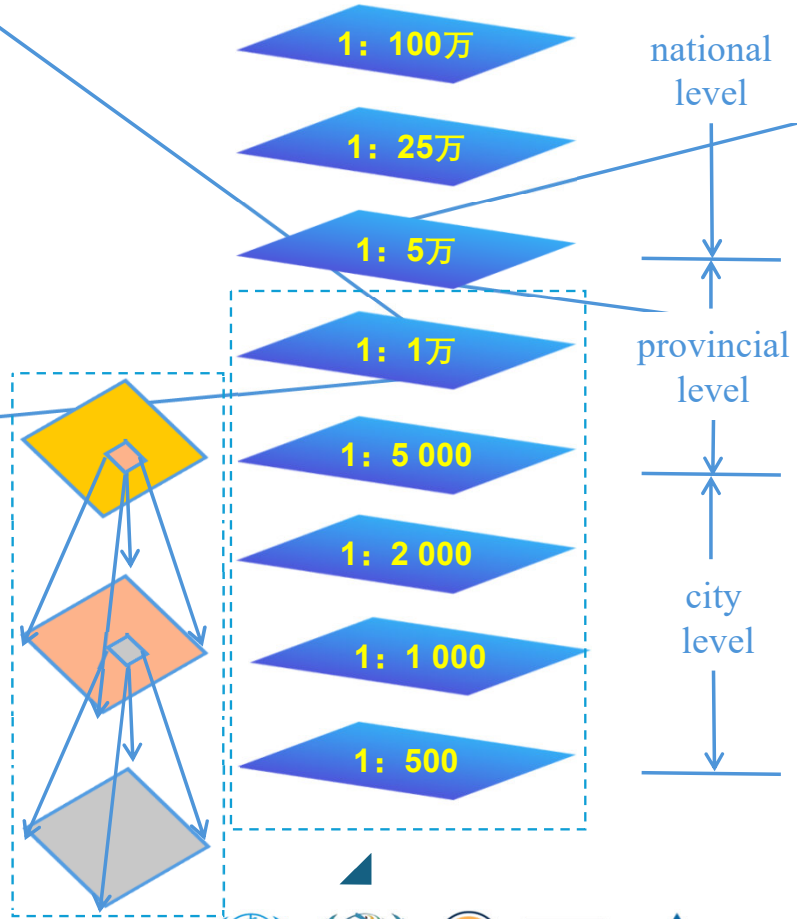
The fundamental geographic information data of 1∶1 000 000, 1∶ 250 000 and 1∶ 50 000 realized the full coverage of the territory and the annual dynamic update

National Fundamental Geographic Information Data

Coverage area of 1 : 10 000 data



Coverage area of 1 : 50 000 data



1:50 000 fundamental geographic information data is published annually

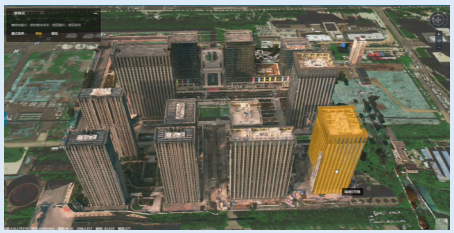
1: 10 000 ~ 1:500 fundamental geographic information data achieves coverage as per demand

From 2D Geographic Information to 3D Real Scene

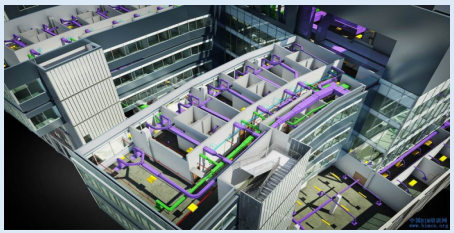
At the 46th session of the World Heritage Committee, Beijing's Central Axis was inscribed on the UNESCO World Heritage List.

3D Real Scene China Program

Terrain level 3D real scene



Urban level 3D real scene



Component level 3D real scene

From abstraction to reality

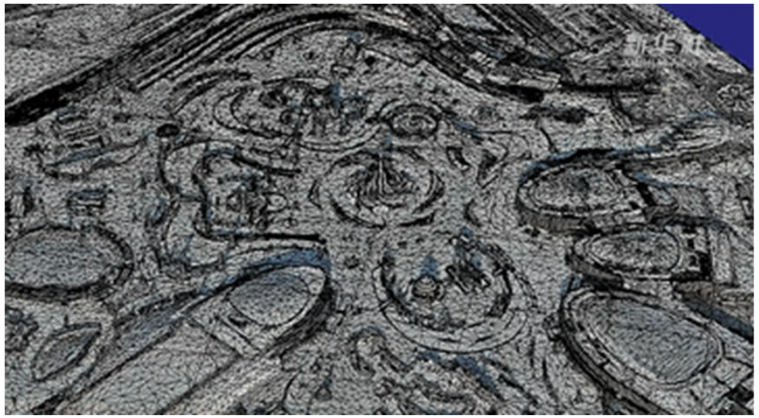
From elements to entities

From static to temporal

From human understanding to human-machine understanding

From 2D to 3D

From surface to space



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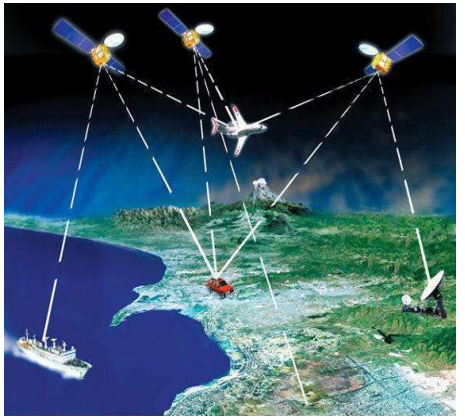
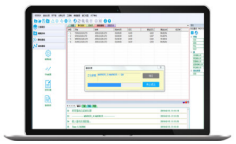
Beidou Navigation System

- By the end of 2023, the number of in-orbit BeiDou satellites had increased to **48**, including 15 BeiDou-2 satellites and 33 BeiDou-3 satellites.
- The BeiDou system was officially incorporated into the standards of the **International Civil Aviation Organization (ICAO)**, becoming a globally recognized satellite navigation system for civil aviation.
- There were approximately **32,000** satellite navigation and positioning reference stations.



Beidou Navigation and Positioning Equipments

	Beidou RTK i93 Pro-BD		Beidou handheld terminal LT60G-BD		Beidou Ground - based Augmentation System P5-BD
Beidou monitoring station H7		Beidou navigation application CGI-610		Shared bicycles	
	Beidou monitoring terminal MS401/451		Beidou vehicle - mounted terminal Qmini A30		Beidou wearable terminal Qbox S30
Beidou Cloud Platform		Beidou reference station receiver NET S11(c)		Beidou Mobile tablet terminal X10S	
	Beidou data transmission terminal QX-RDSS-301		Beidou satellite communication terminal Beidouxinshi		Software Platform

SOUTH 南方测绘
成 就 时 空 信 息 价 值

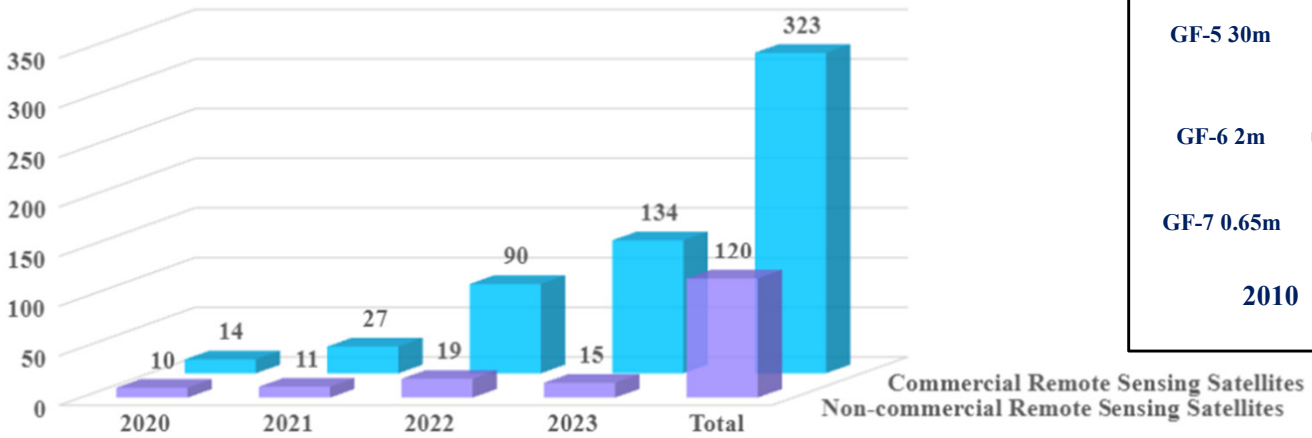
CHCNAV

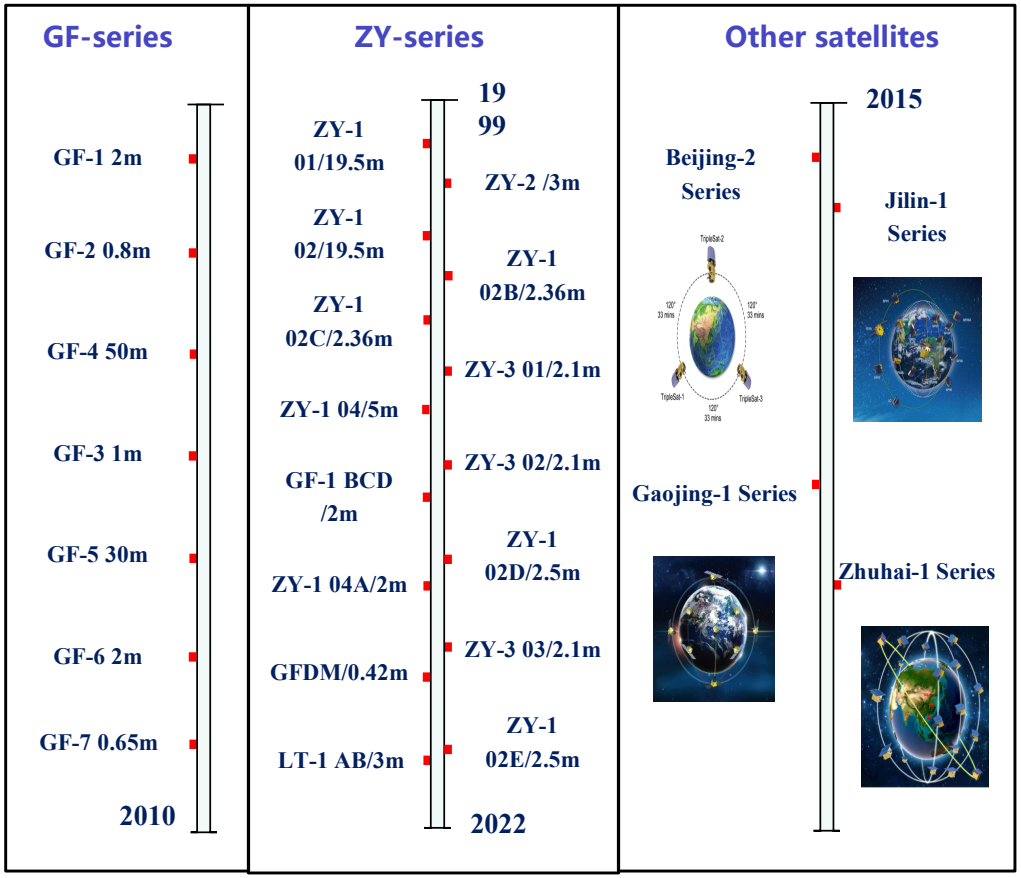
中海达

司南导航

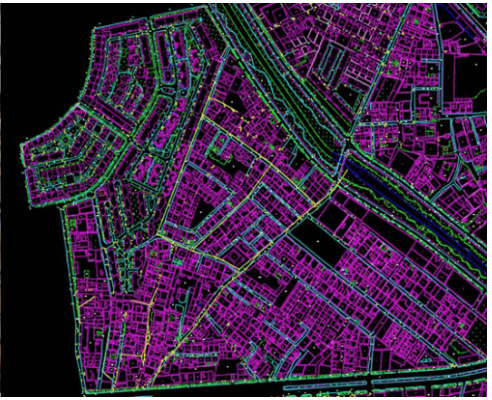
Remote Sensing Satellite

- By the end of 2023, China had **443** operational civil remote sensing satellites in orbit, of which **323** were commercial remote sensing satellites, accounting for **73%** of the civil remote sensing satellites.
- ZY satellites and GF satellites have formed the country's **first stereoscopic mapping satellite constellation.**





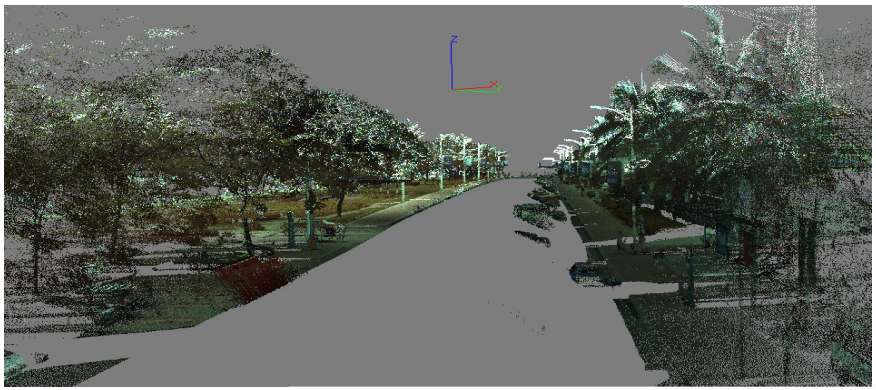
UAV Remote Sensing System



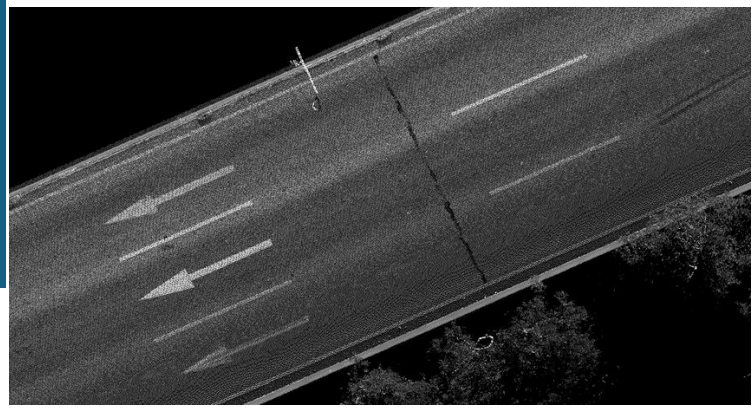
Rapid data acquisition, significantly reduced fieldwork costs, and flexible generation of various surveying and mapping results.

Mobile Mapping System

Applied to the construction of smart cities, urban management, and emergency disaster relief.



SSW Mobile Mapping System

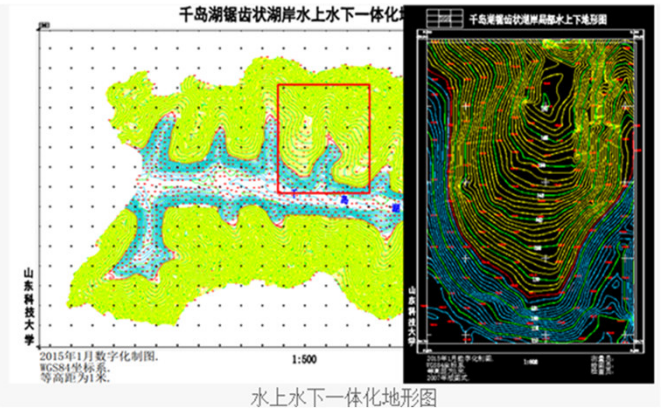


HiScan-Z High-Precision 3D Laser Mobile Mapping System

Underwater Surveying Equipment

Achieved the information collection of multi-beam sounding system and shipboard laser scanning system, completed rapid extraction of terrain and attribute information

Mengxiang（Dream）



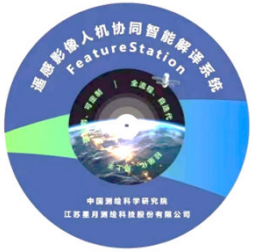
水上水下一体化地形图

Geoinformation Softwares

SuperMap GIS

GeoStar 吉奥时空

宏图卫星云 PIE-Engine

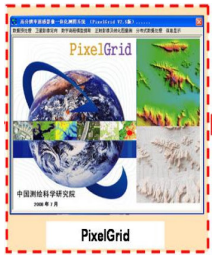


MapGIS

KQ GEO TECHNOLOGIES

GEO-VISION 四维远见 无人机AI赋能体系 UAV AI Empowerment Platform

ACID



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Policy

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Geomatics-related Universities

- Nearly 200 undergraduate institutions with majors in surveying and geographic information
- Nearly 60 institutions with master’ s programs in surveying and geographic information
- Over 50 institutions with doctoral programs in surveying and geographic information
- Nearly 300 vocational and technical colleges with majors related to surveying and geographic information

- In 2023, the total number of graduates with bachelor's, master's, and doctoral degrees was about 40,000.
- There are about 20,000 professional technicians in the surveying field.

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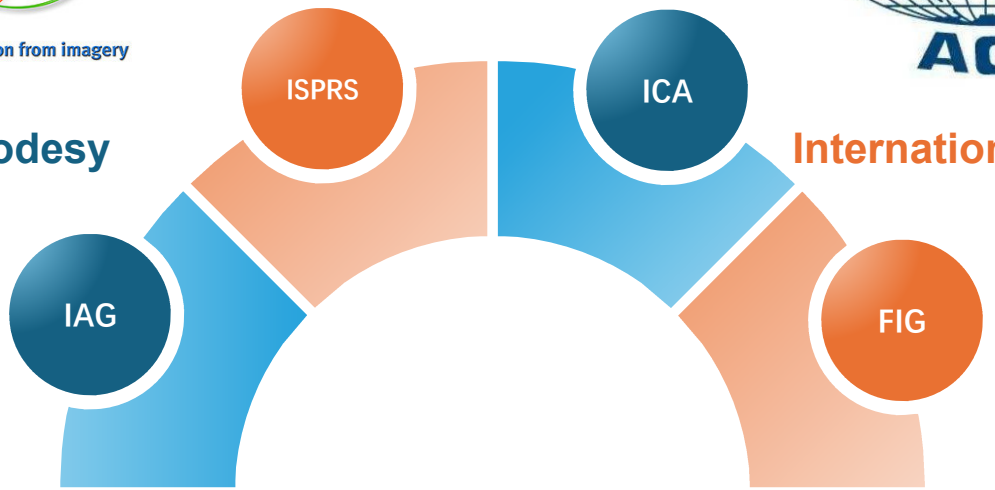
International Cooperation

International Society for Photogrammetry and Remote Sensing

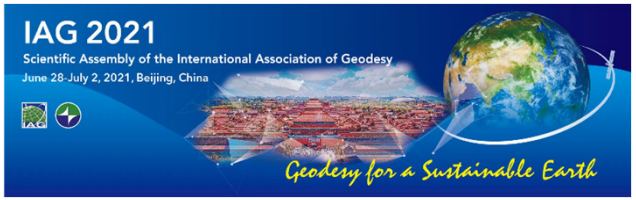
International Cartographic Association

International Association of Geodesy

International Federation of Surveyors



International Cooperation



Scientific Assembly IAG 2021 2021

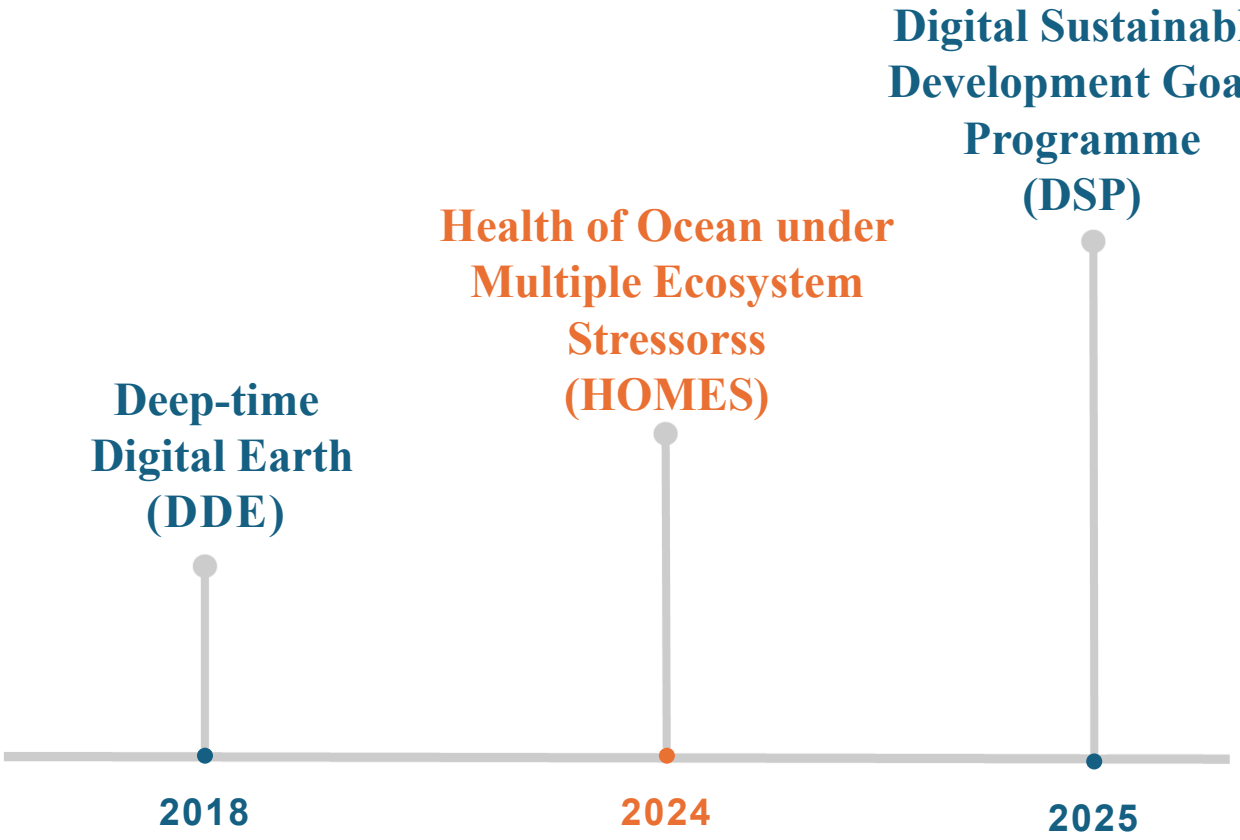
1st UN WGIC 2018

21st ISPRS Congress 2008

23rd International Cartographic Conference 2001

ICA
International Cartographic Association
Association Cartographique Internationale

International Cooperation

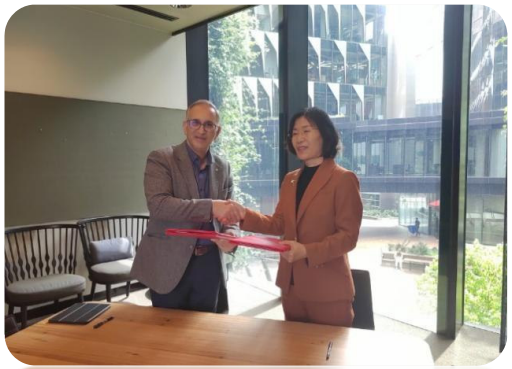


International Cooperative Partner

Collaboration Fields	**3D Real Scene/GIS**
Priority Areas	**Photorealistic 3D Modeling of Complex Urban Areas**
Collaborative Achievements	**Officially Released "3D Real Scene Technology Solution Res3D V1.0"**
Collaborative Vision:	**Extending 3D Digitalization Capabilities to Address Global Challenges Such as Climate Change and Cultural Heritage Preservation.**

中国测绘科学研究院
Chinese Academy of Surveying & Mapping

International Cooperative Partner



In 2023, CASM and the University of Melbourne entered into a Memorandum of Cooperation (MoC), initiating collaborative efforts in joint project applications, technological research and development, as well as academic exchanges for visiting scholars and graduate students.

Geospatial Knowledge Exchange Symposium

Australia-China International Collaborative Project

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Geospatial leadership for next generation sustainability

Sustainable Development Goals (SDGs)

70%

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Capacity Building

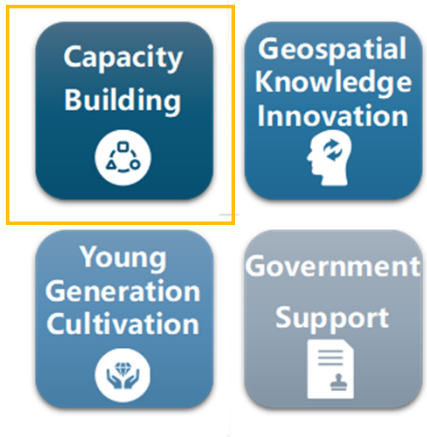
Geospatial Knowledge Innovation

Young Generation Cultivation

Government Support

Enhancing Capacity Building to Bridge the Digital Divide

1. Support international training programs.
2. Provide a broader range of data products and technical solutions.
3. Provide advanced technical equipment and software platforms.



ASEAM-China Remote Sensing Satellite ApplicationCenter

China-Africa Remote Sensing Satellite Cooperation Center

2014
GlobeLand30

2020
GlobeLand30 2020

2022
Global Sustainable Development Data Products

2024
Real Scene 3D Technology Solution ReS3D V1.0

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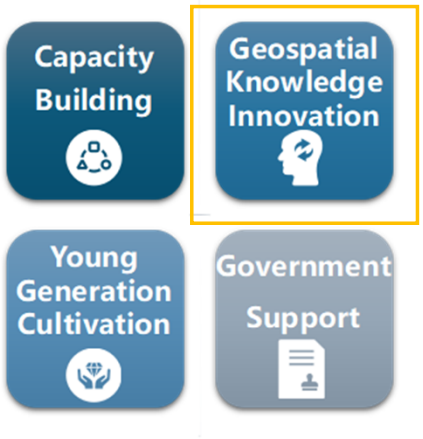
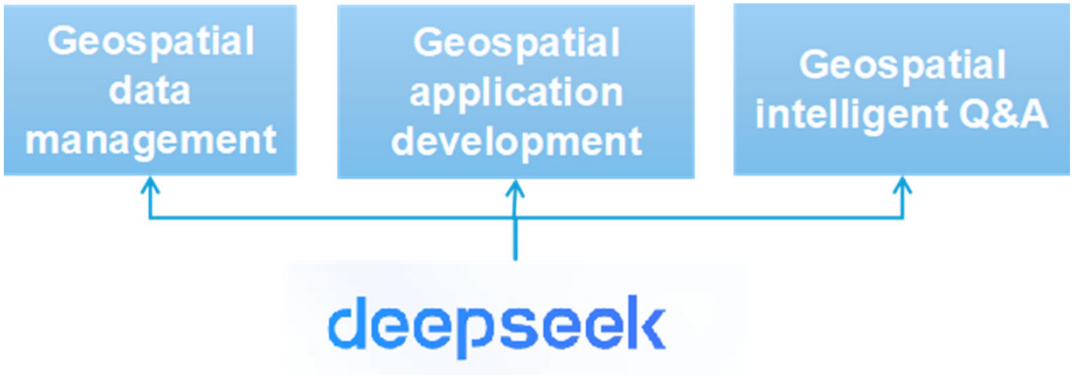
Enhancing the Innovation of Geospatial Knowledge

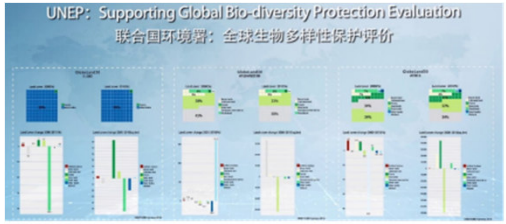
1.Promote innovation and application of AI + Geospatial Knowledge Technology in multiple fields.

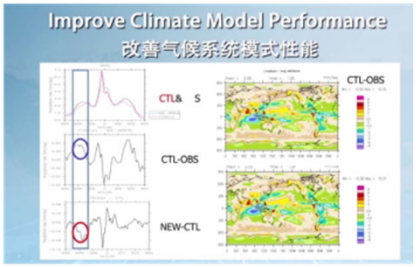
2.Strengthen the development of new types of global public goods and the formulation of standards.





AI + Open-source + Free





Promoting Leadership among The Next Generation

1.Proactively provide more opportunities and platforms for communication.

2.Such as establishing youth forums and implementing joint international cooperation programs.

Welcome to The 2nd UN GEONOW

UN GEONOW 2024 in Deqing, China

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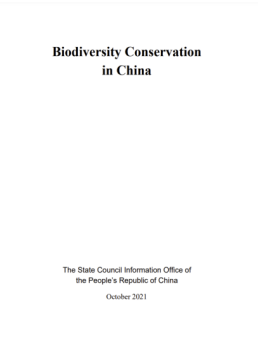
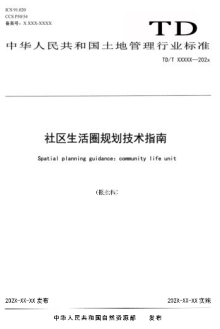
Advocate for Government Encouragement and Support of Geospatial Applications

1. Formulating national strategic action plans.
2. Encouraging new technology adoption.
3. Fostering industrial prosperity.





Chinese Academy of Surveying and Mapping

Founded in 1959 and under the leadership of the Ministry of Natural Resources of the P.R.C.

Organizational Positioning

CASM is the multi-disciplinary comprehensive research institution with the largest surveying and mapping geographic information in China. It is the only central-level non-profit scientific research institute, with a Class A surveying & mapping qualification and the ISO quality assurance system certification.

Organizational Goals

CASM will lead and promote the progress of surveying and mapping geographic information technology while shouldering the core responsibility of "two unifications" for natural resources management. It will also serve the economic & social development of China and major state strategies.

Organizational Personnel

CASM boasts one academician of the CAE Member, nine National Talents such as those under the national "Ten Thousand Talents Program" and the "National Hundred, Thousand and Ten Thousand Talents Program", and 22 researchers have been selected to join the team for the Ministry of Natural Resources high-level talent program.

Research Fields

Research fields covering geodesy and navigation, photogrammetric and remote sensing, geographic information system and cartography, geospatial big data, natural resources survey and monitoring, etc.

中国测绘科学研究院
Chinese Academy of Surveying & Mapping

Next-Generation Sustainability
Advancing the Future with Geospatial Intelligence

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Chinese Academy of Surveying and Mapping

Founded in 1959 and under the leadership of the Ministry of Natural Resources of the P.R.C.

Research Institution

- The Institute of Geodesy and Geodynamics
- The Institute of Photogrammetry and Remote Sensing
- The Institute of Cartography and Geographic Information System
- The Research Center for Geospatial Big Data Application and the Research Center for Natural Resources Survey
- Monitoring and other research institutions

Scientific and technological innovation platforms

- State Key Laboratory of Spatial Datum
- The National Research Center for Surveying and Mapping Engineering Technology
- The National Field Science Observation and Research Station
- The International Joint Research Center for Surveying and Mapping Geographic Information
- The National Surveying and Mapping Geographic Information Metrology Station
- ...

Academic Journal

- International Journal of Image and Data Fusion
- 《测绘科学》(Science of Surveying and Mapping)
- 《遥感信息》(Remote Sensing Information)
- 《导航定位学报》(Journal of Navigation and Positioning)

Professional Education

- Master's Degree Conferring Institution
- Postdoctoral Research Workstation
- Established a joint graduate training program with leading universities including Wuhan University, Tongji University, China University of Geosciences, China University of Mining and Technology, and Shandong University of Science and Technology...

Vision: CASM will become an industry leading surveying and mapping geographic information research institute within China as well as internationally renowned.

Thanks!

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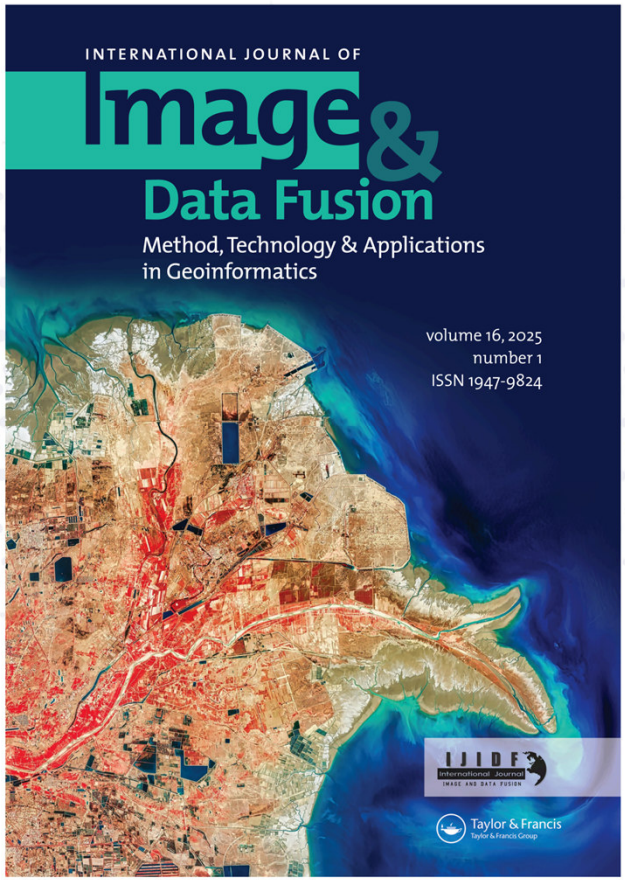

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Advancing the Future with Geospatial Intelligence

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Find out about this journal

IJIDF provides a single source of information for a wide range of remote sensing image and data fusion methodologies, developments, techniques and applications. Image and data fusion techniques are important for combining the many sources of satellite, airborne and ground based imaging systems, and integrating these with other related data sets for enhanced information extraction and decision making.

Aims & Scope

Image and data fusion aims at the integration of multi-sensor, multi-temporal, multi-resolution and multi-platform image data, together with geospatial data, GIS, in-situ, and other statistical data sets for improved information extraction, as well as to increase the reliability of the information. This leads to more accurate information that provides for robust operational performance, i.e. increased confidence, reduced ambiguity and improved classification enabling evidence based management.

This journal focuses on the theories, methodologies and applications of image and data fusion from SAR (Synthetic Aperture Radar) data, LiDAR data and all types of optical images. It also encourages submission on a broad range of topics such as concept studies, new fusion techniques at different processing level, image and data fusion architectures, algorithms, and novel applications. Papers addressing fusion needs for data from new or planned platforms and sensors are specifically invited.

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