

Geospatial Leadership in China and Our Future Efforts

Prof. Qin YAN

President of Chinese Academy of Surveying and Mapping(CASM)

Vice President of FIG

October 20th, 2025

地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training



Geospatial leadership training program

2024.04 Qingdao

“实景三维与智慧城市建设”
国际科技合作与发展研讨会



Workshops

2024.09 Xi'an

“地理空间人工智能促进可持续发展：治理，创新
和应用”地理空间知识交流研讨会



地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training

2024.10 Deqing



1st GEONOW

“地理空间智慧造福世界”
首届联合国地理空间知识与创新周



2025.04 Melbourne



Geospatial leadership
training and global forum

“下一代可持续发展：以地理空间智能引领未来”



What is Leadership?

- Leadership expert Stogdill emphasized its goal-oriented nature, defining it as “the influence process of achieving organizational goals”;
- Kouzes and Posner, on the other hand, highlighted its value in building consensus, proposing that leadership is “the art of motivating others to strive for a shared vision”.

Leadership

A comprehensive capability

- guides the direction of technological innovation in development processes,
- controls key links in the industrial chain,
- dominates market competition patterns,
- establishes international standards and specifications,
- and achieves sustainable development through systematic collaboration.

Geospatial Leadership

战略规划能力 技术创新能力 产业协同能力 国际治理能力

核心能力



实现

引领领域发展方向、掌控核心资源、参与全球治理

核心目标



最终体现

支撑国家战略落地

驱动产业高质量发展

赋能全球可持续发展

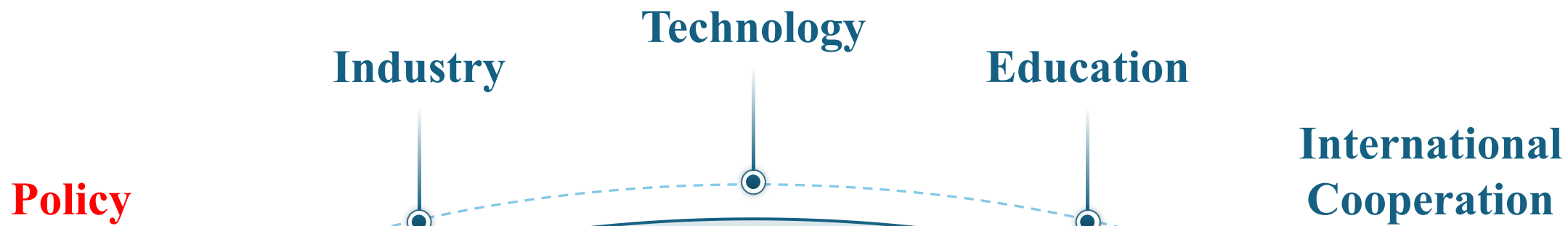
核心价值

Geospatial Leadership in China

地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training





地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training



Policy Support System



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 ...

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

地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training



Policy Support System

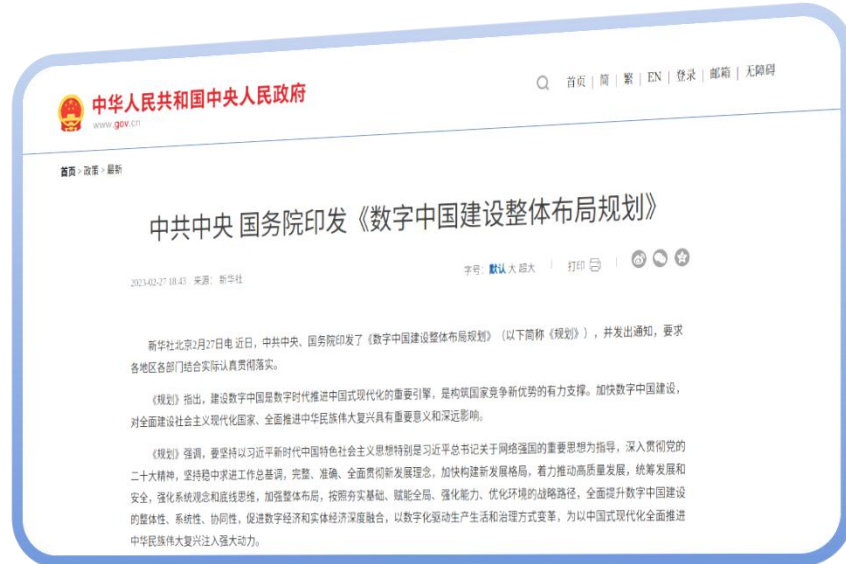


Ministry of Natural Resources of the
People's Republic of China

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

Policy Support System



Overall Layout Plan for the Construction of Digital China



地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training

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 the **Digital China initiative** and **smart city construction**, highlighting its role as a foundational platform.



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)



地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training



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

地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training



Policy

Industry

Technology

Education

International
Cooperation



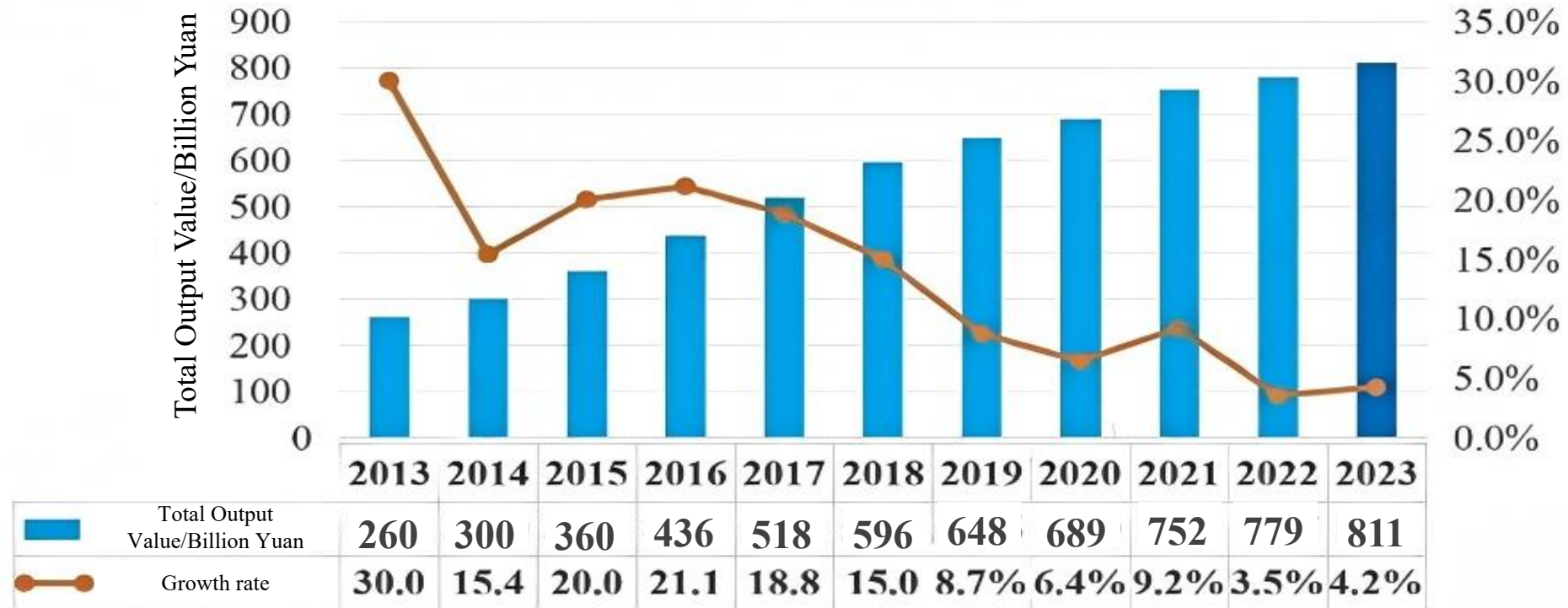
地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training



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%**.



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

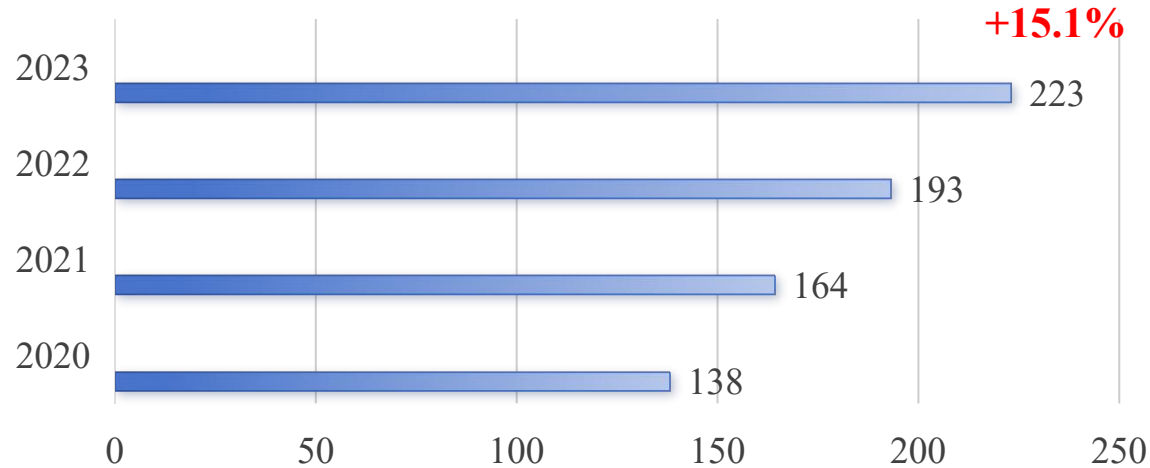
地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training



Geospatial industry

Industry Participants/thousand

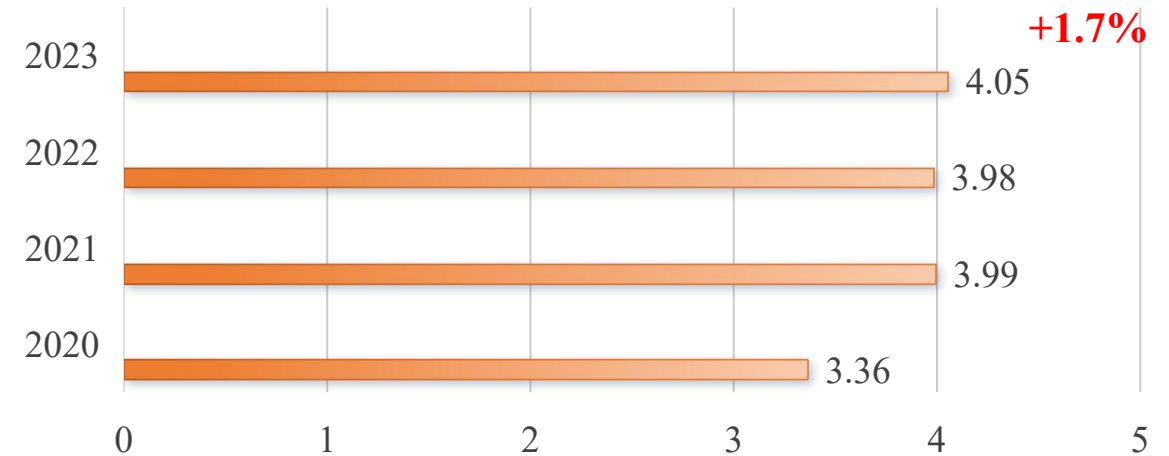


By the end of 2023, the number of industry units reached approximately **223 thousand** representing a year-on-year increase of **15.1%**.

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



Industry Practitioners/million



Geospatial industry

Listed companies:77



- ☐ Main Board : **30**
- ☐ Growth Enterprise Market (GEM): **25**
- ☐ Science and Technology Innovation :
14 Board (STAR Market)
- ☐ 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



中国卫星导航定位协会
GNSS & LBS Association of China



中国测绘学会
Chinese Society for Geodesy | Photogrammetry and Cartography

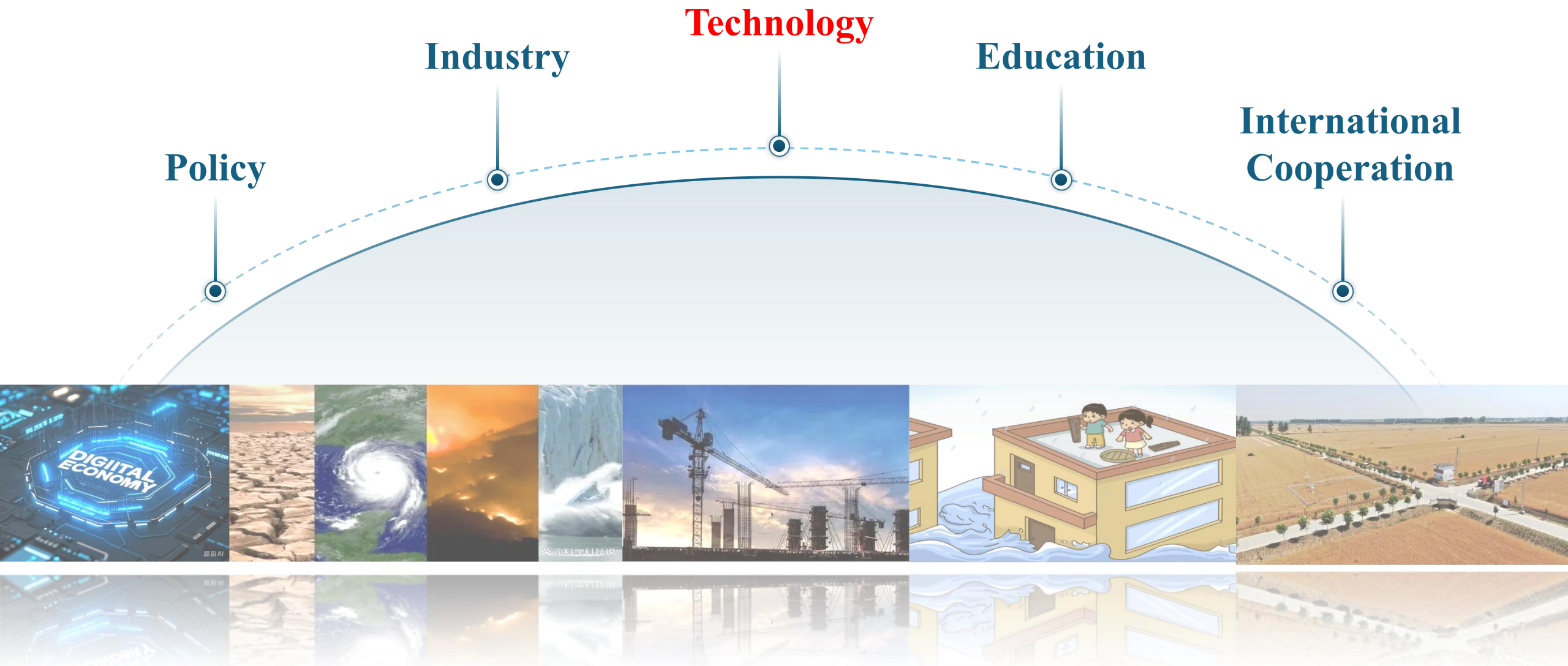


中国地理信息产业协会
China Association for Geospatial Industry and Sciences

地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training



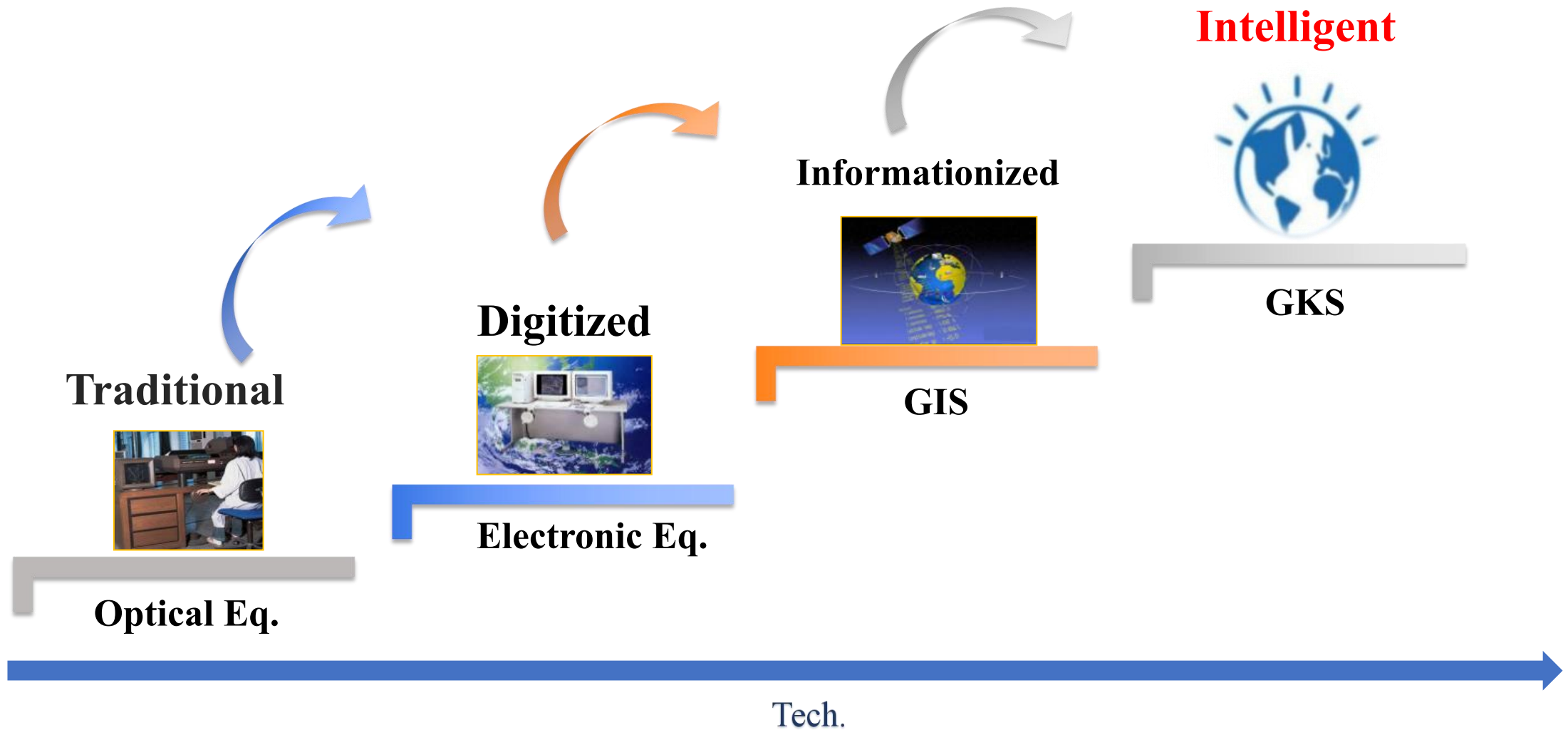


地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training



Upgrade of Tech. System



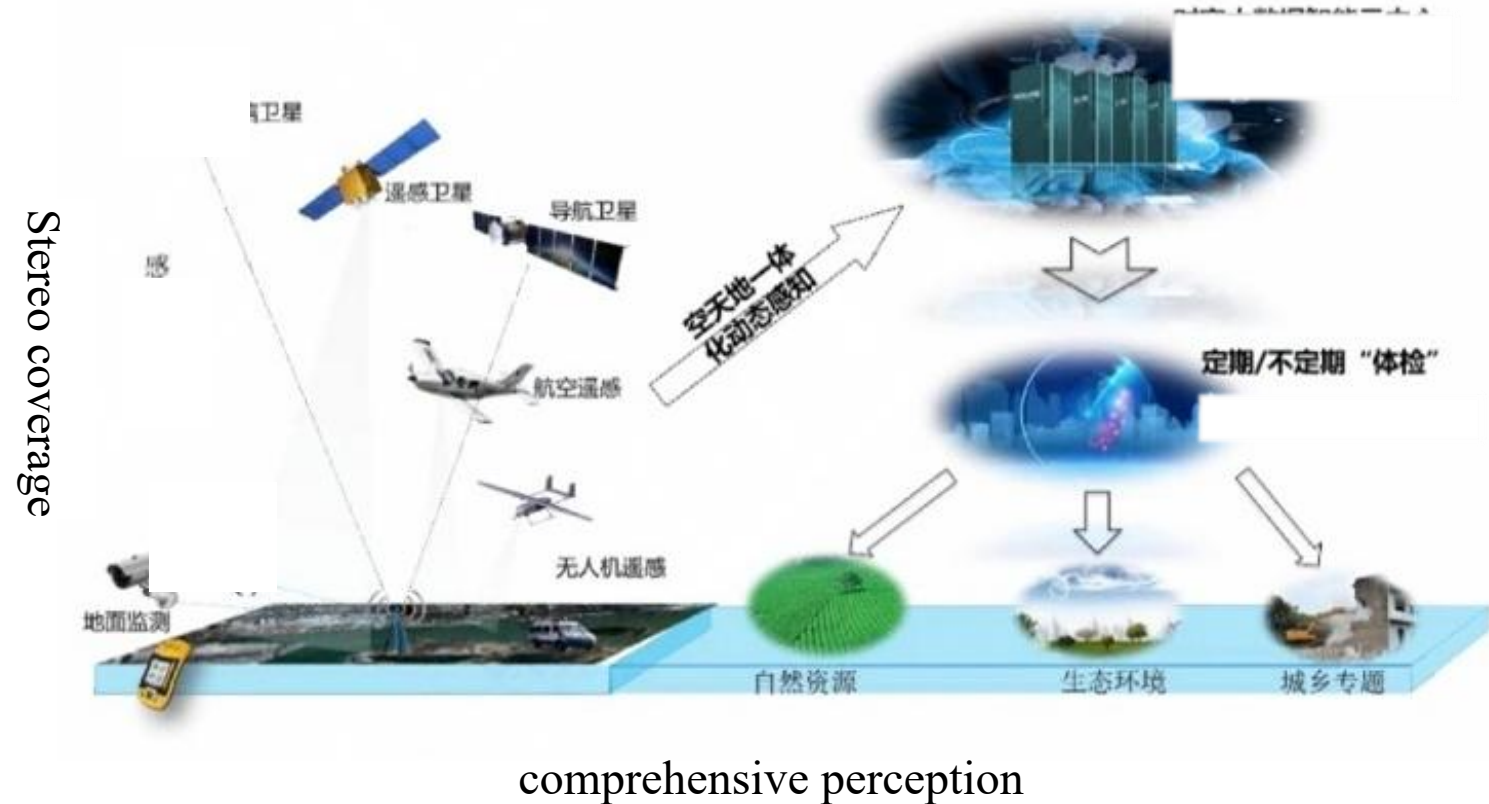
地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training



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.

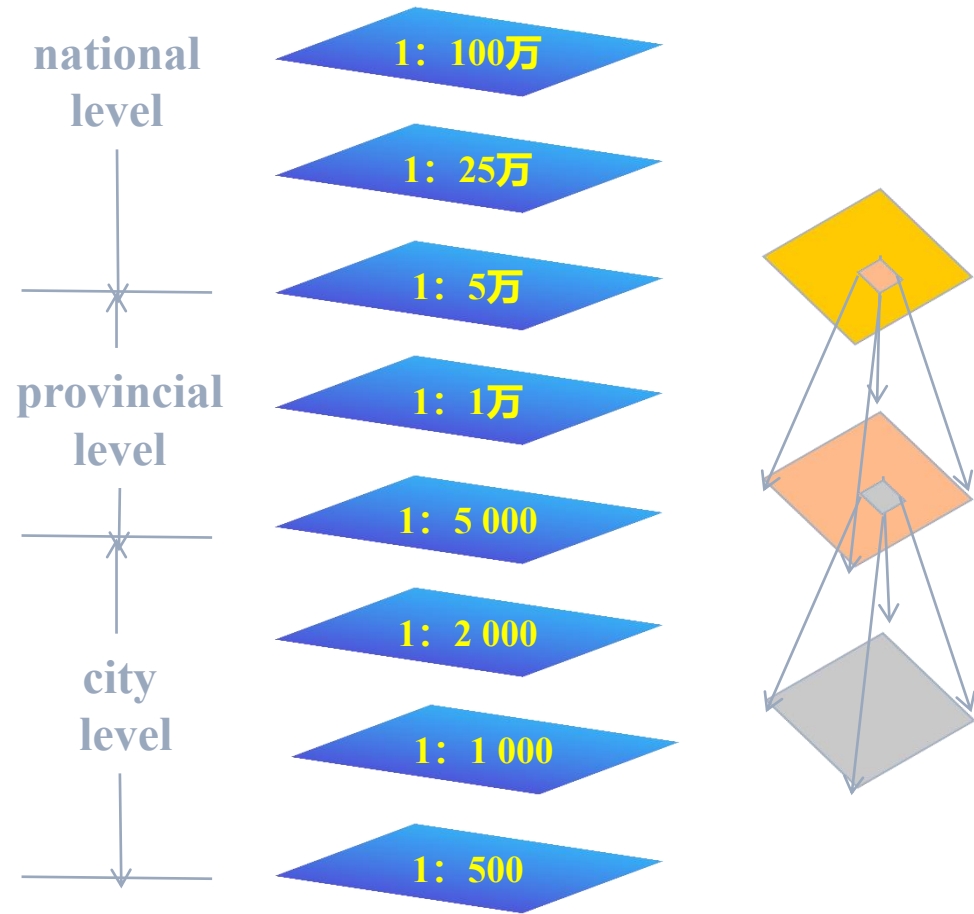


地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training



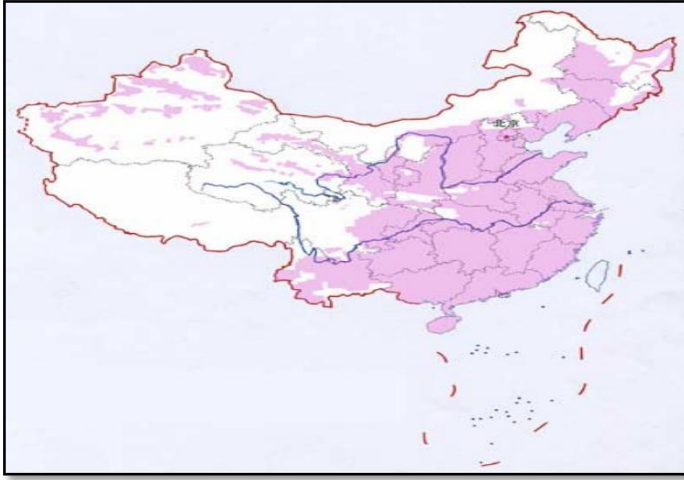
National Fundamental Geographic Information Data



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**

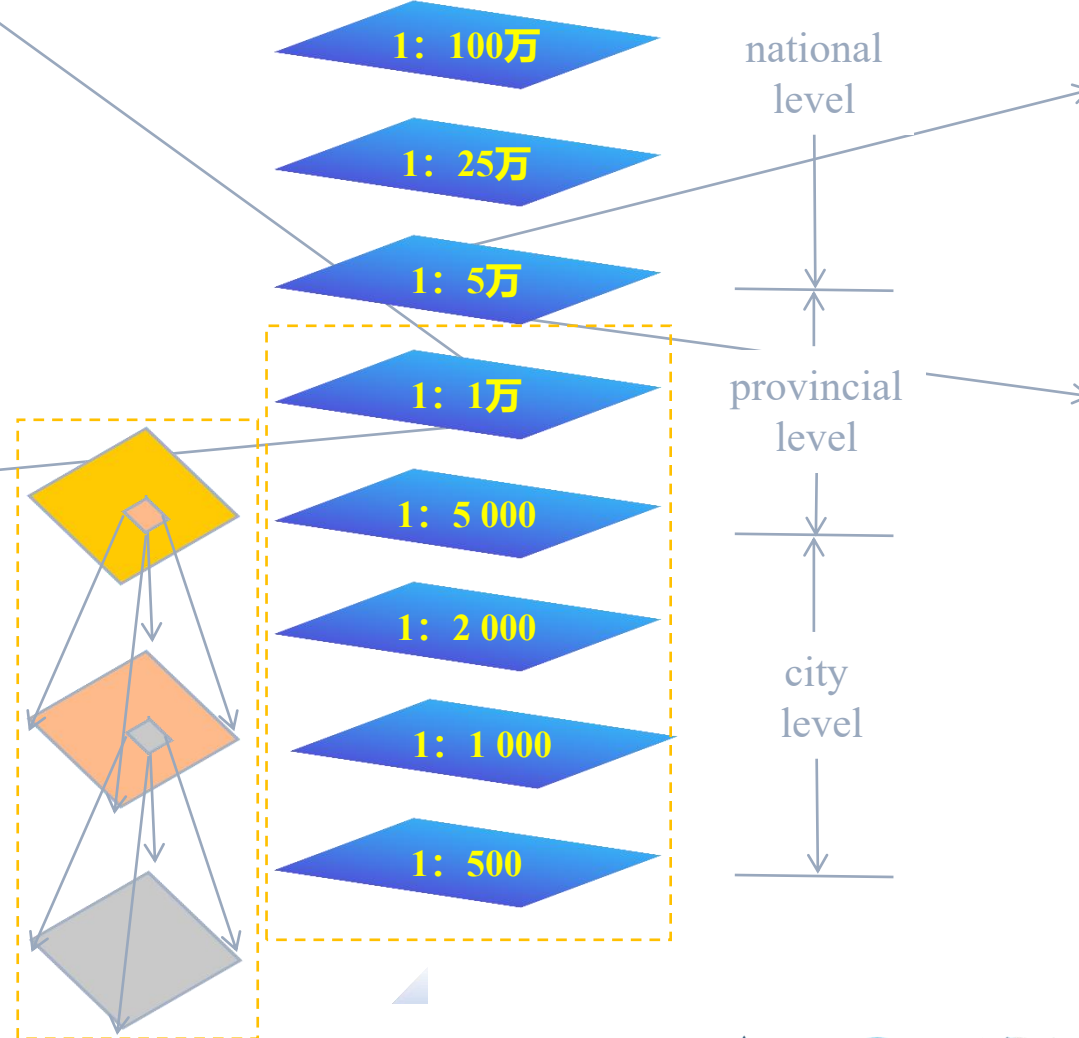
National Fundamental Geographic Information Data

Coverage area of 1 : 10 000 data



Coverage area of 1 : 50 000 data

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



1:50 000
fundamental
geographic
information data is
published annually

地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training



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.

地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training



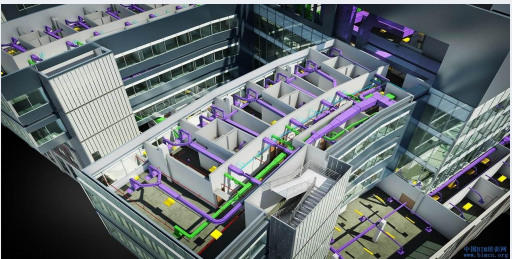
3D Real Scene China Program



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

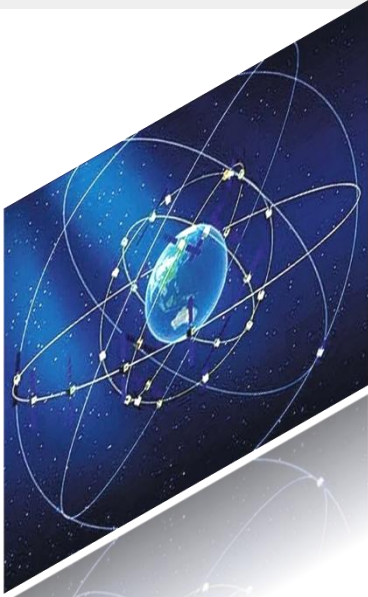


地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training



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



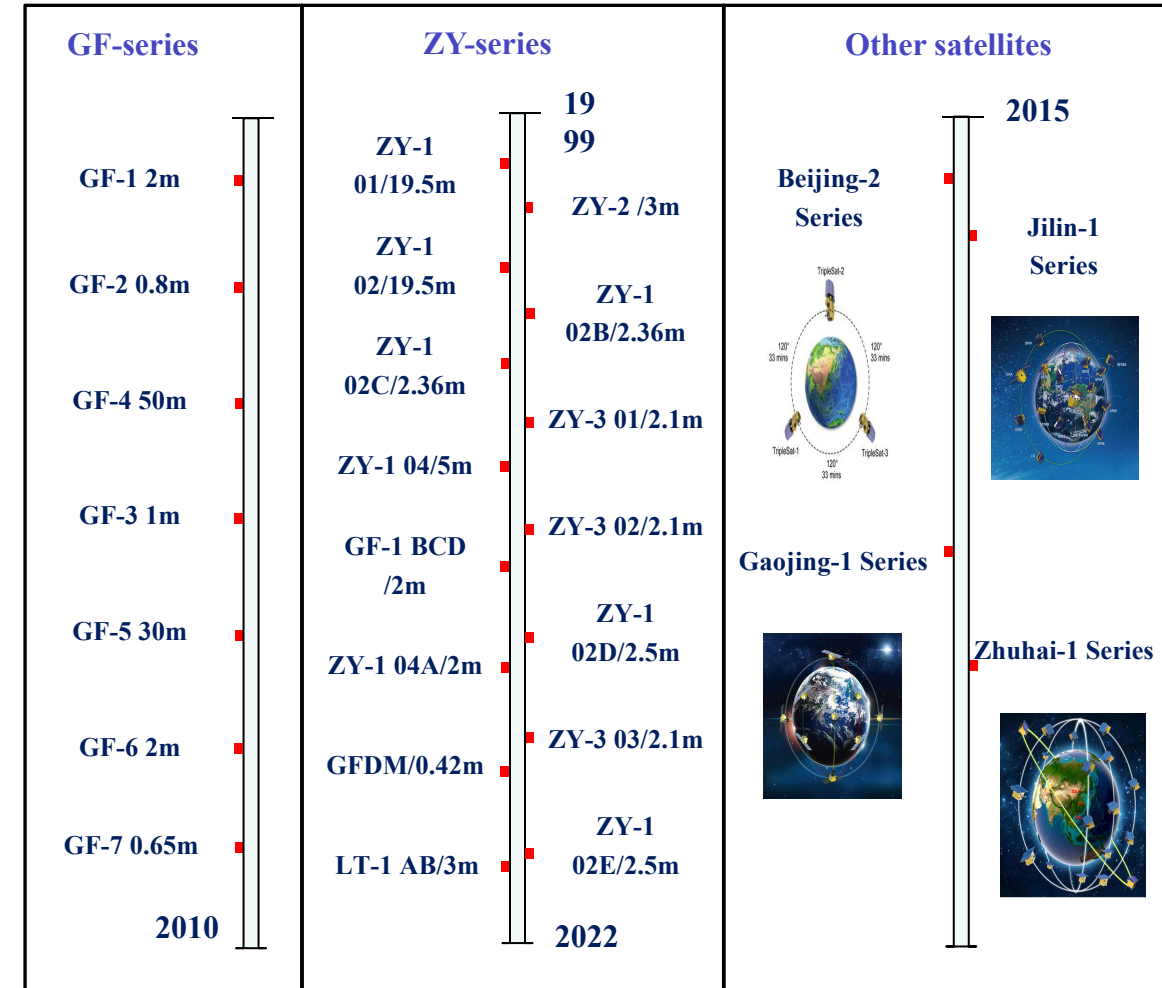
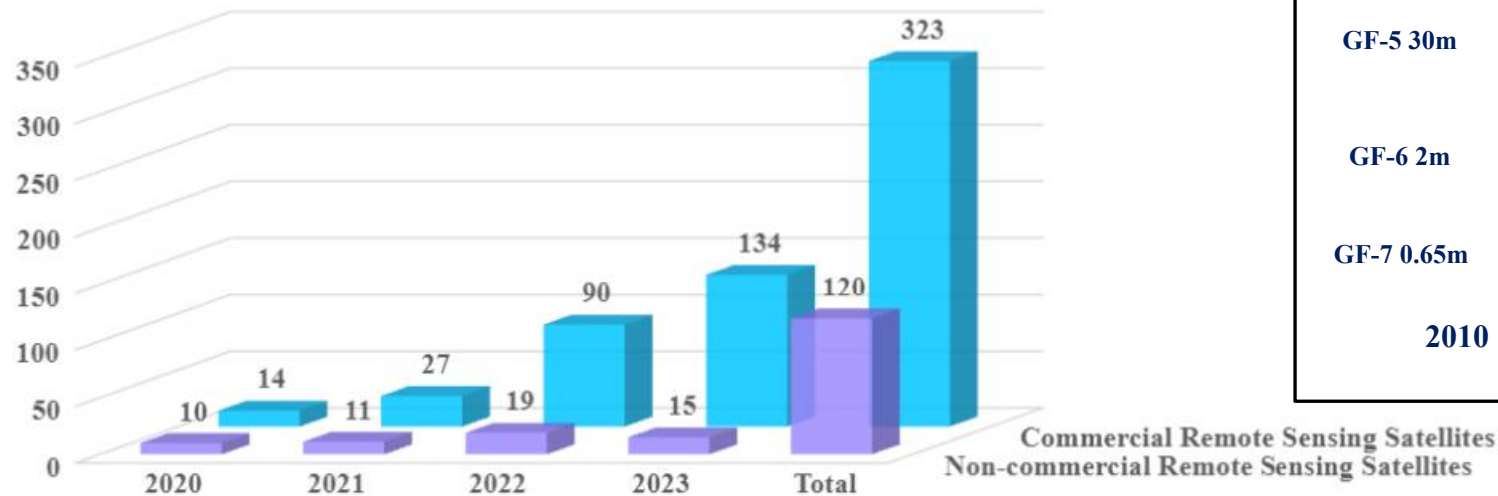
地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training



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.



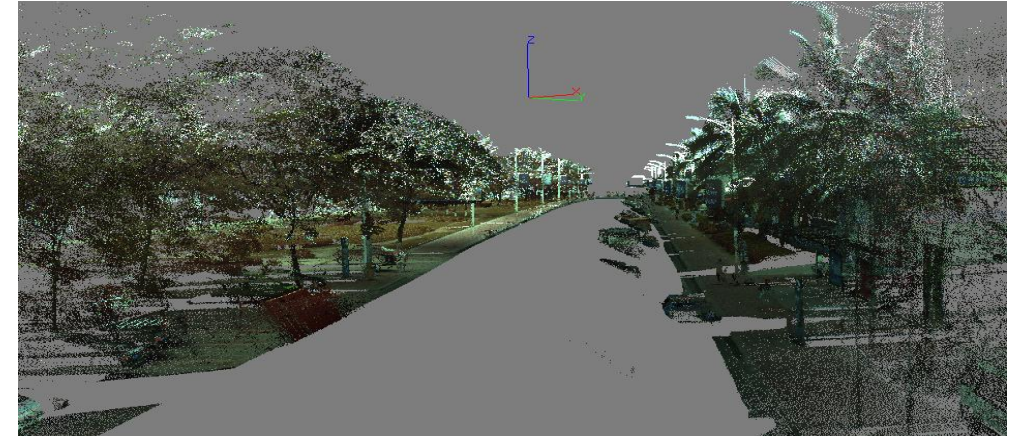
地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training

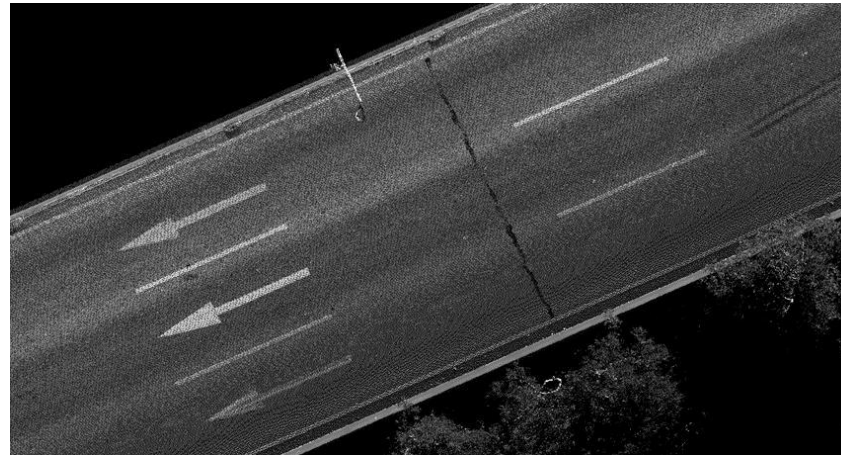


Mobile Mapping System

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

地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training

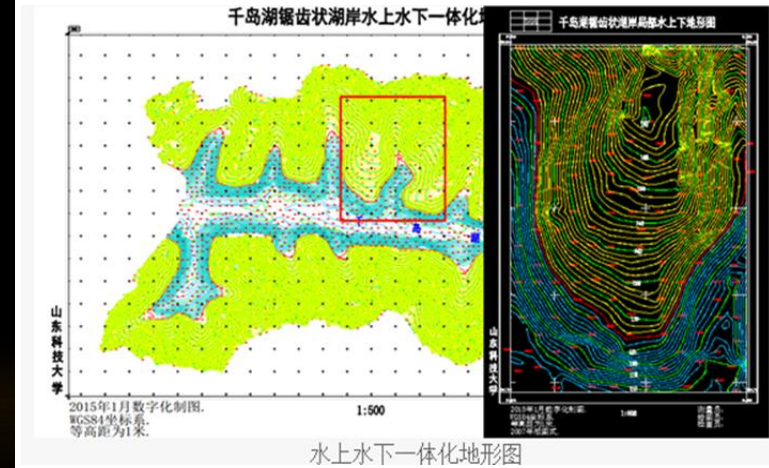


Underwater Surveying Equipment

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



Mengxiang (Dream)

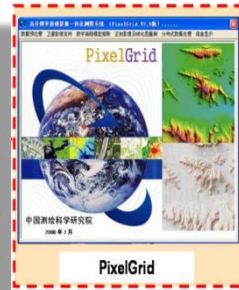


地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training



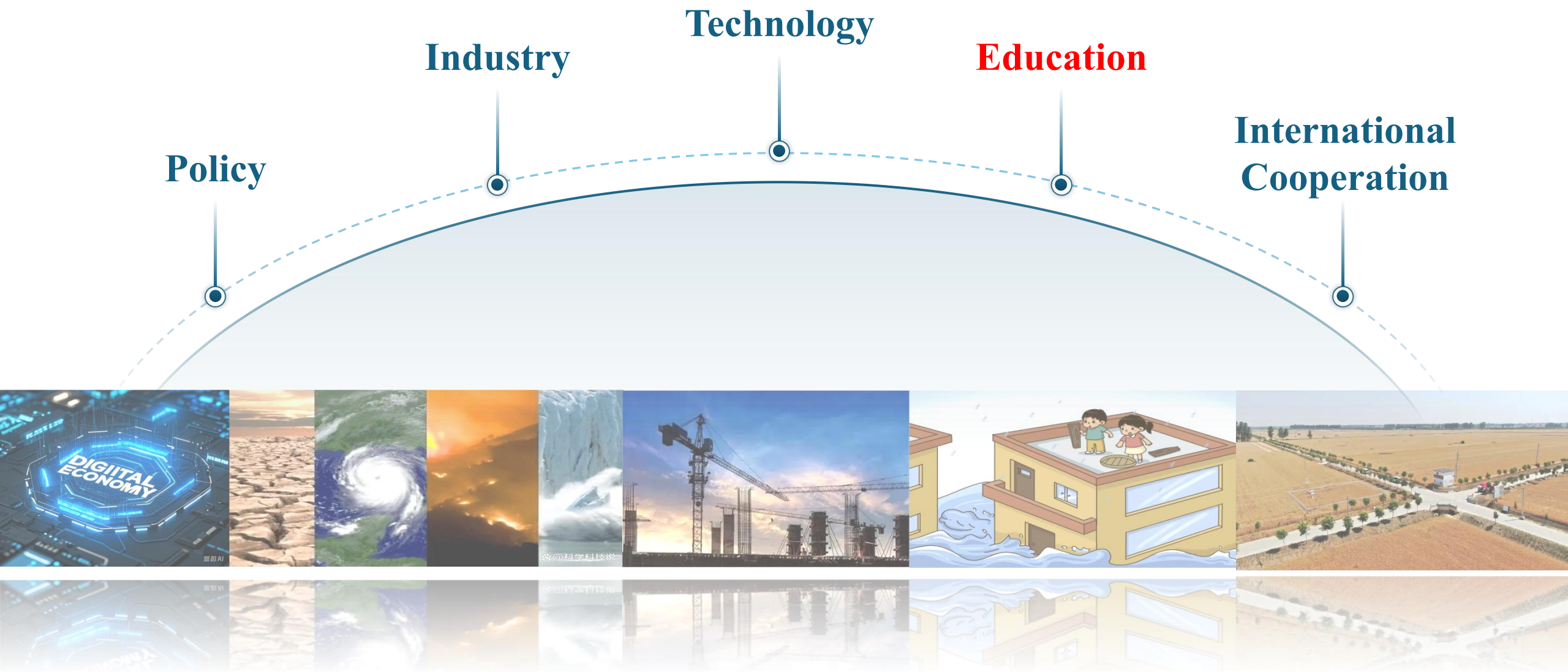
Geoinformation Softwares



地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training





地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training



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

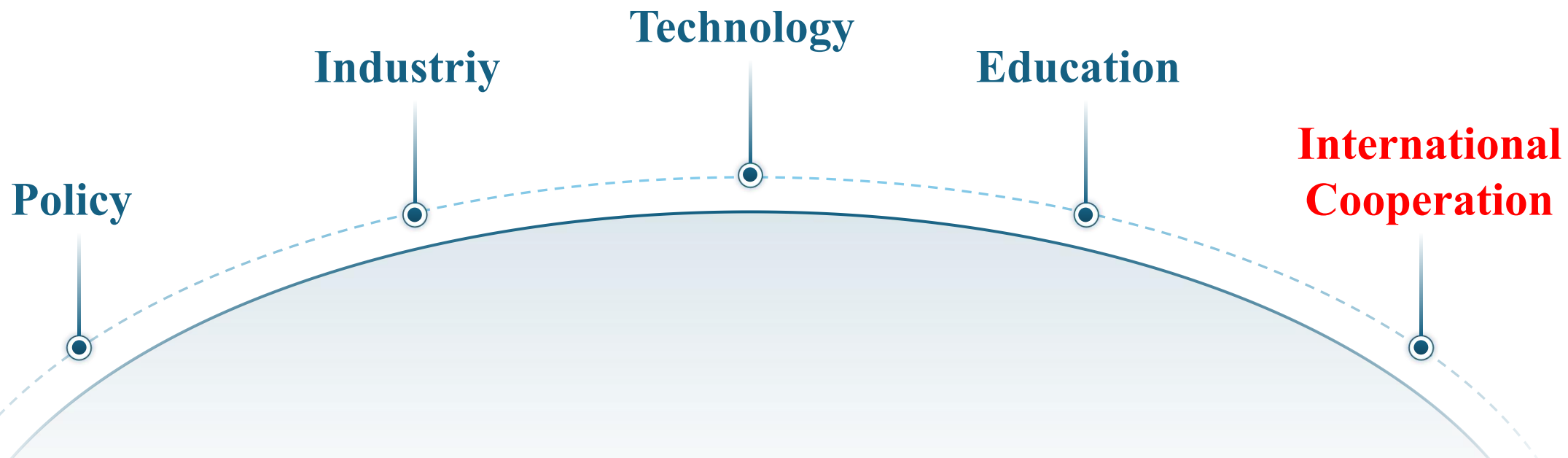


- In 2023, the total number of graduates with bachelor's, master's, and doctoral degrees was about 40,000.
- There are about 20,000 professional technicians in the surveying field.

地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training





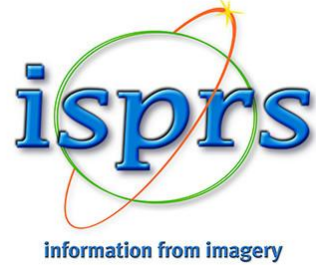
地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training



International Cooperation

International Society for Photogrammetry and
Remote Sensing



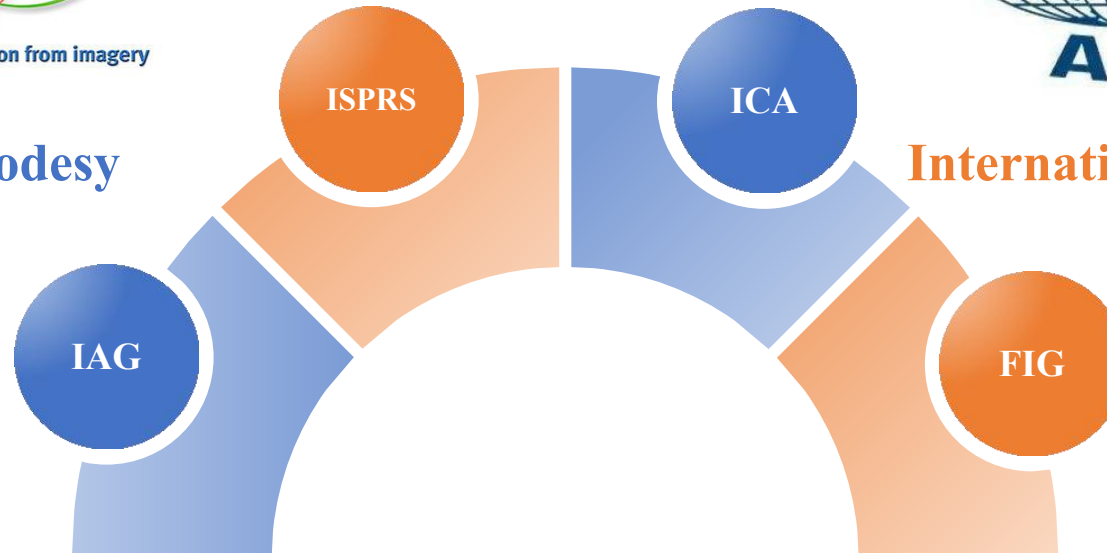
International Cartographic Association



International Association of Geodesy



International Federation of Surveyors

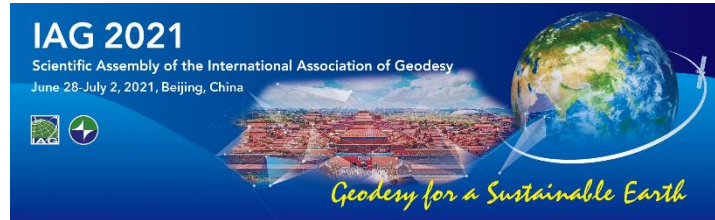


地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training



International Cooperation



Scientific Assembly IAG 2021

2021



1st UN WGIC

2018



21st ISPRS Congress

2008

23rd International Cartographic Conference

2001



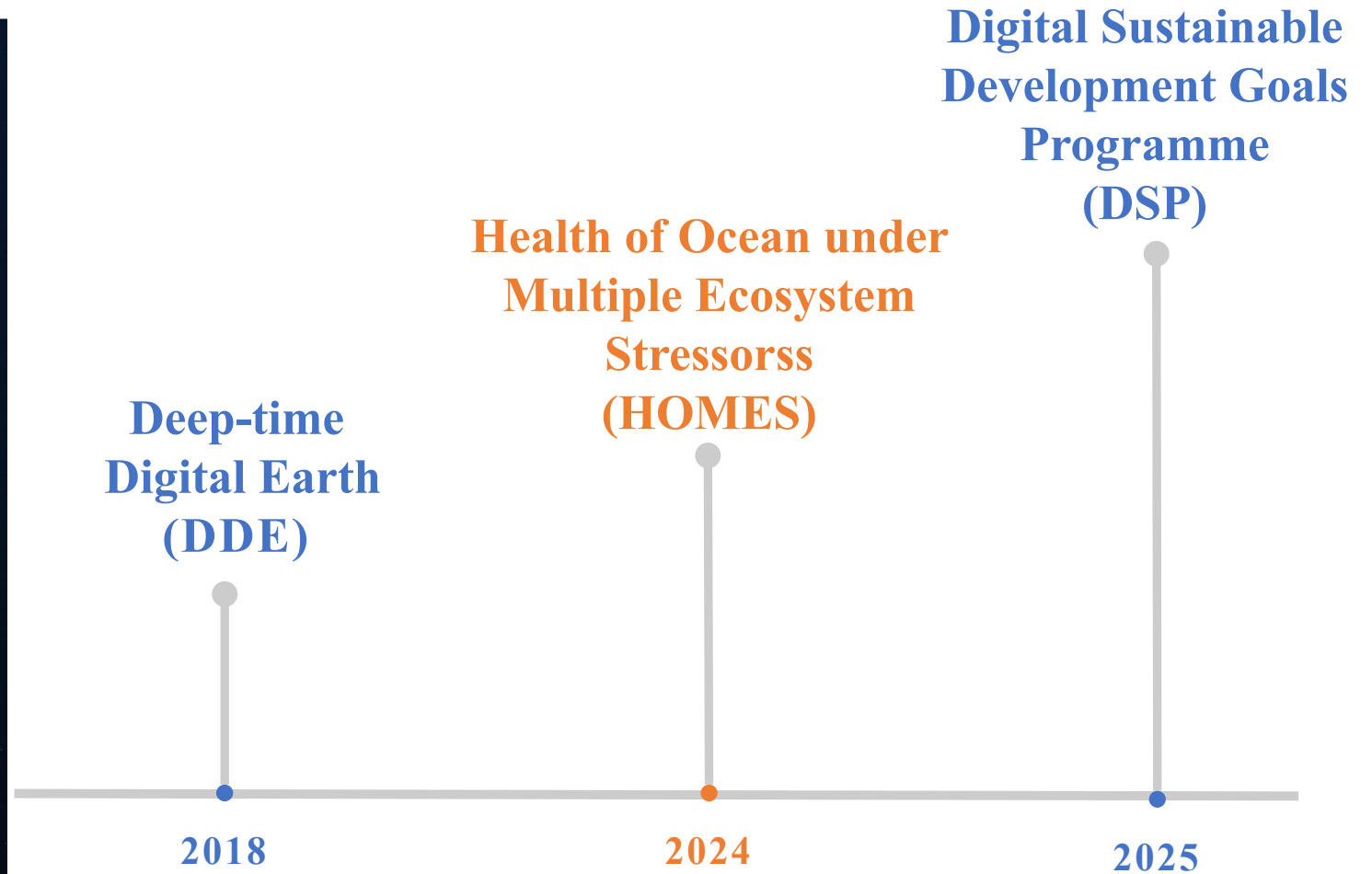
International Cartographic Association
Association Cartographique Internationale

地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training



International Cooperation



地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training



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.

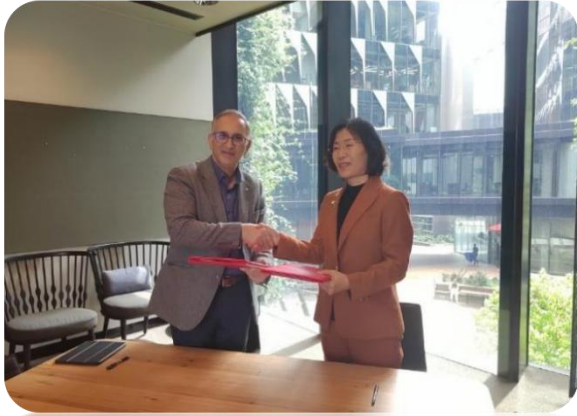


地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training



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.

Australia-China International Collaborative Project



Geospatial Knowledge Exchange Symposium



地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training



Geospatial leadership for next generation sustainability

地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training



Sustainable Development Goals (SDGs)



70% ↓



地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training



**Capacity
Building**



**Geospatial
Knowledge
Innovation**



**Young
Generation
Cultivation**



**Government
Support**



地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training



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.



Apr. 2016 Addis Ababa, Ethiopia



Aug. 2018, Tanzania



Sep. 2018, Nairobi, Kenya

- | | | | |
|---|---|--|--|
| 2015
• Workshop for countries surrounding China | 2016
• Inter. Seminar on GLC Supporting SDGs
• UNGGIM HLF Side Event | 2017
• Workshop for countries surrounding China
• Training Program of MFA | 2018
• Workshop for countries surrounding China
• ISPRS Capacity Building |
|---|---|--|--|



ASEAN-China Remote Sensing Satellite Application Center



China-Africa Remote Sensing Satellite Cooperation Center

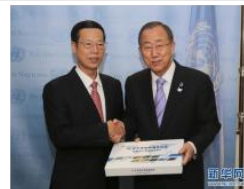
2014
GlobeLand30



2022
Global Sustainable Development Data Products



2020
GlobeLand30 2020



【中国科学报】中方向联合国赠送6套全球可持续发展数据产品

当地时间2022年4月15日，在联合国总部举行的“全球可持续发展数据产品”赠礼仪式上，中方代表向联合国秘书长古特雷斯、副秘书长坎帕多、副秘书长坎帕多、副秘书长坎帕多等赠送了6套全球可持续发展数据产品。中方代表表示，中方愿与联合国一道，为全球可持续发展事业作出更大贡献。

中方赠送的数据产品包括：全球30米分辨率遥感影像数据集、全球30米分辨率土地利用数据集、全球30米分辨率地表覆盖数据集、全球30米分辨率地表温度数据集、全球30米分辨率地表湿度数据集、全球30米分辨率地表风速数据集。中方代表表示，中方愿与联合国一道，为全球可持续发展事业作出更大贡献。

2024
Real Scene 3D Technology Solution
ReS3D V1.0

地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training



Enhancing the Innovation of Geospatial Knowledge

1. Promote innovation and application of AI + Geospatial Knowledge

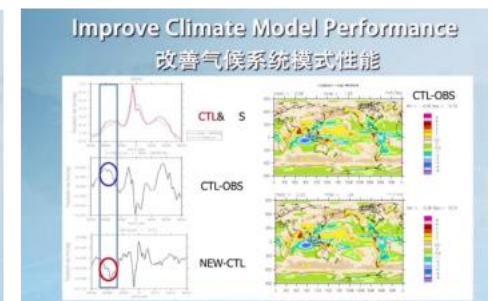
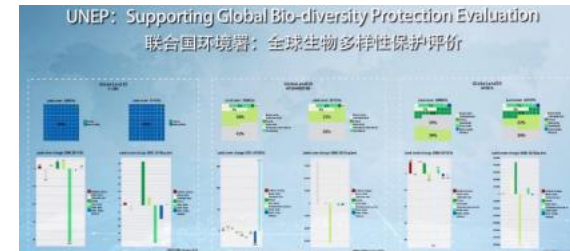
Technology in multiple fields.

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



deepseek

AI + Open-source + Free



地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training



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.



地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training



Welcome to The 2nd UN GEONOW



UN GEONOW 2024 in Deqing, China

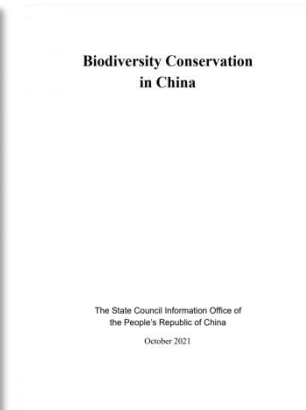
地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training



Advocate for Government Encouragement and Support of Geospatial Applications

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



地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training



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 academican 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



地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training



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
- ...

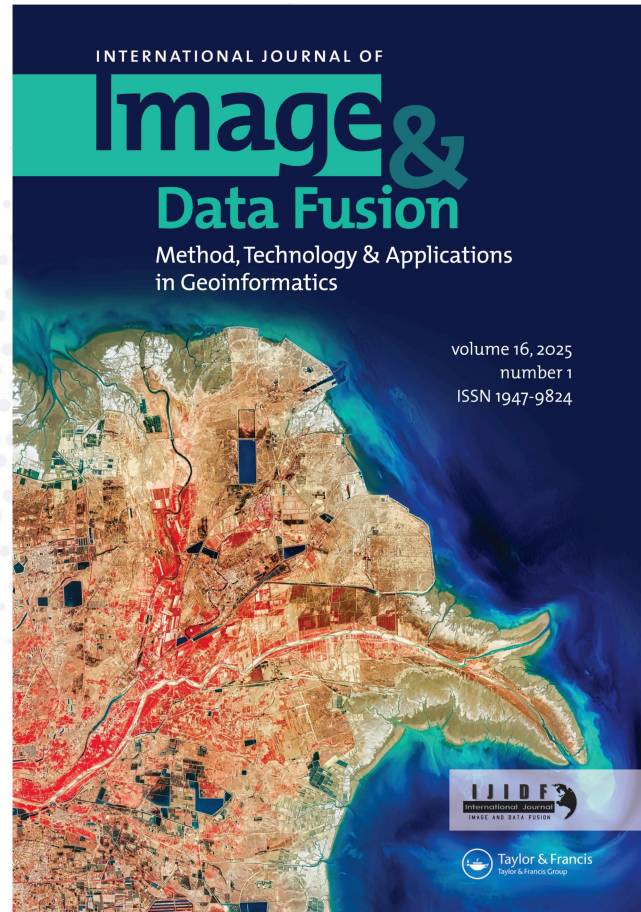
Academic Journal

- 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!

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.

Editor-in-Chief: Prof. Jixian Zhang - Moganshan
Geospatial Information Laboratory, China / National
Geomatics Center of China, Beijing, China

Executive Editor-in-Chief: Prof. Qin Yan - Chinese
Academy of Surveying and Mapping, Beijing, China

Associate Editor: Dr. Liang Zhai - Chinese Academy of
Surveying and Mapping, Beijing, China



tandfonline.com/tidf

Impact Factor 1.8 (2023)
Citescore: 5.0 (2023)



tandfonline.com/tidf

地理信息知识创新领导力培训

Geospatial Knowledge and Innovation Leadership Training

