FIG WORKING WEEK 2025
AND Locate25 THE NATIONAL GEOSPATIAL CONFERENCE
Collaboration, Innovation and Resilience: Championing a Digital Generation
FIG Geospatial Council of Australia
Brisbane, Australia 6–10 April

3D Real Scene Technology Solution:

Bridging the Digital Divide and Shaping a Beautiful Earth

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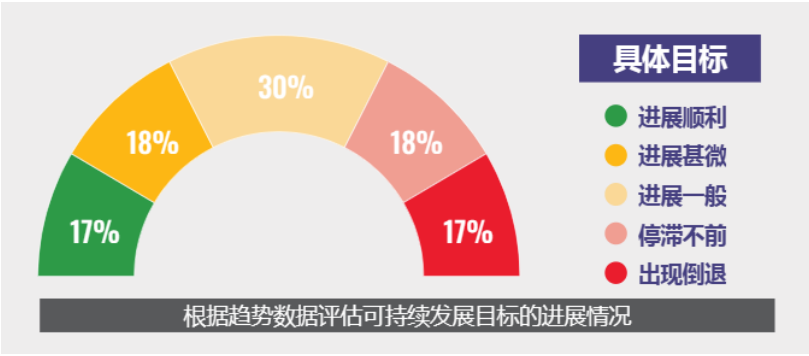
1 1.1 SDG2030 Vision & Goals and Progress in China

In September 2015, the 193 member states of the United Nations adopted *Transforming our World: The 2030 Agenda for Sustainable Development*, with 17 Sustainable Development Goals (SDGs). In 2025, the 2030 Agenda enters the second half.



"Only 9 goals of the 17 SDGs and about half of the countries have access to timely data with international comparability."

—— Deputy Secretary-General, UN

1 1.1 SDG2030 Vision & Goals and Progress in China

On 19 September 2023, during the 78th General Assembly of the United Nations, Vice President Han Zheng delivered a speech and released a 'report':

"Data and knowledge are valuable resources for development. China has released the *Big Earth Data in Support of the Sustainable Development Goals(2023)*, ... to provide scientific support and useful reference for countries ."

1 1.1 SDG2030 Vision & Goals and Progress in China

Earth Big Data support for China's SDGs indicator assessment

- **More than half of China's SDGs indicators have been achieved in advance:**

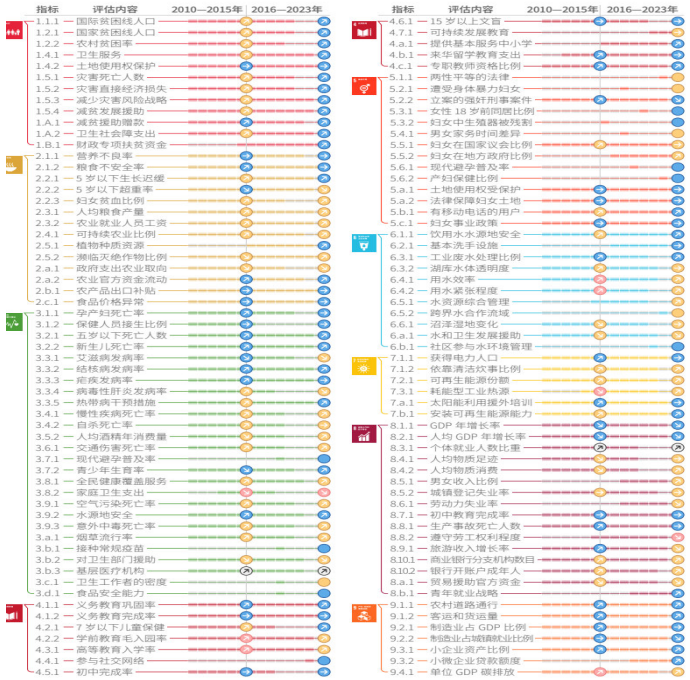
  Of the 227 indicators evaluated, **55.5 % (126)** of indicators have achieved the 2030 Agenda goals in advance.

- **Most SDGs indicators were significantly improved:**

  Since 2015, **52.4 % (119) indicators have improved significantly**, and 36.6 % (83) indicators have not changed significantly.

- **Environmental indicators have improved significantly, but lag behind social and economic indicators:**

  Among the 92 environmental indicators, **52.2 % (48)** achieved the target in advance, which was 32.2 % higher than that in 2015, and the progress was obvious.



1 1.1 SDG2030 Vision & Goals and Progress in China

From September 22 to 23, 2024, the UN Summit of the Future was held in New York. The conference passed the " *Pact for the Future* " that describes the future development blueprint of the world, and proposed to strive to build a safe, peaceful, just, equal, inclusive, sustainable and prosperous world.

On September 23, Minister Wang Yi delivered a speech entitled " *Bearing in Mind Our Common Future and Jointly Building a Better Tomorrow* " indicating that Humanity has only one planet Earth to call home, it is important that we take good care of our common home.

1 1.2 China 's New Requirements and New Initiatives in Geospatial Infrastructure

Surveying, mapping & geographic information are important strategic data resources and new production factors. The Chinese government has accelerated the layout of digital China construction and digital economy development, and put forward new and higher requirements for surveying, mapping and geographic information work.

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字号：默认 大 超大 | 打印

自然资源部关于加快测绘地理信息事业转型升级更好支撑高质量发展的意见

自然资发〔2023〕158号

各省、自治区、直辖市及计划单列市自然资源主管部门，新疆生产建设兵团自然资源局，部有关直属单位，各派出机构，部机关各司局：

测绘地理信息是重要的战略性数据资源和新型生产要素。党中央、国务院加快布局数字中国建设和数字经济发展，对测绘地理信息工作提出新的更高要求。为加快推进测绘地理信息事业转型升级和产业发展，激活测绘地理信息数据要素潜能，更好支撑高质量发展，现提出以下意见。

一、总体要求

（一）指导思想

1 1.2 China 's New Requirements and New Initiatives in Geospatial Infrastructure

At present, the digital wave sweeping the world, has become the forefront of international competition. As an infrastructure, spatio-temporal information, positioning & navigation services have become the basic platform for digital economy developmenty, and are an important part of the priority construction of digital transformation.

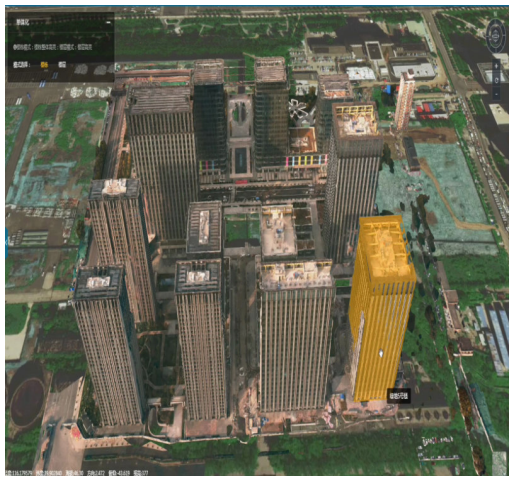
1 1.2 China 's New Requirements and New Initiatives in Geospatial Infrastructure

The proposal of ‘Beautiful China’ and ‘Low Carbon Development’ also requires more high-quality and high-level geographic information data support and guarantee, so as to enhance the synergistic management of Mountains, rivers, forests as well as farmlands, lakes, grasslands and deserts, and to promote harmony between human and nature

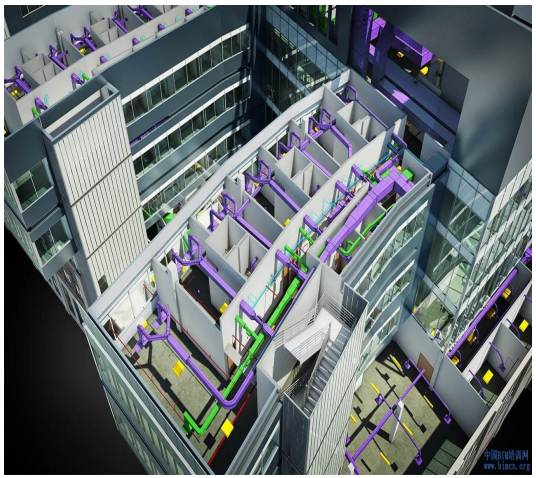
1 1.3 ReS3D Startup

ReS3D as a realistic, stereo, time-series geo-spatial information reflecting production-living-ecological spaces, is an important new type of national infrastructure, through'man-machine compatibility, IOT perception, ubiquitous services' to support the real-time correlation and interoperability between vitural space and true-life space.

Terrain-level



City-level



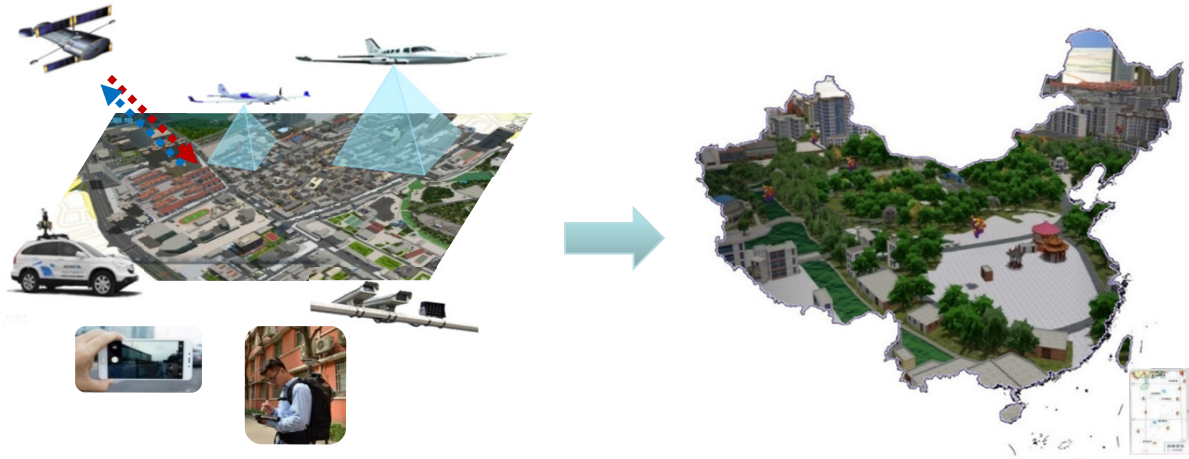
Component-level

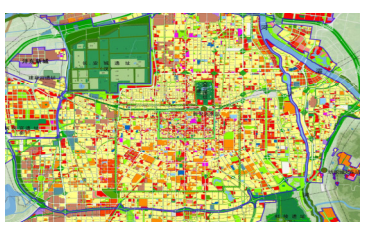
1 1.3 ReS3D Startup

The aim of ReS3D is to provide a spatial and temporal information foundation for Digital China.

By 2025, more than 50% of government decision-making, production scheduling and living planning can be completed through online real-world three-dimensional space.

By 2035, more than 80% of government decision-making, production scheduling and living planning can be completed through online real-world three-dimensional space.

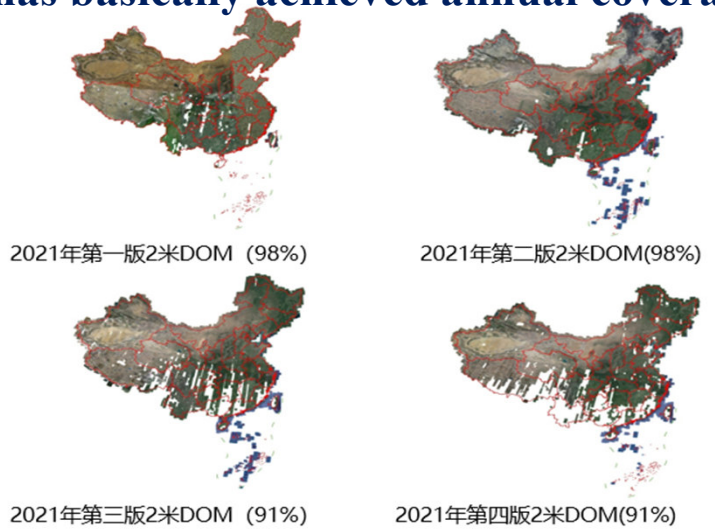




1 1.4 ReS3D construction effect

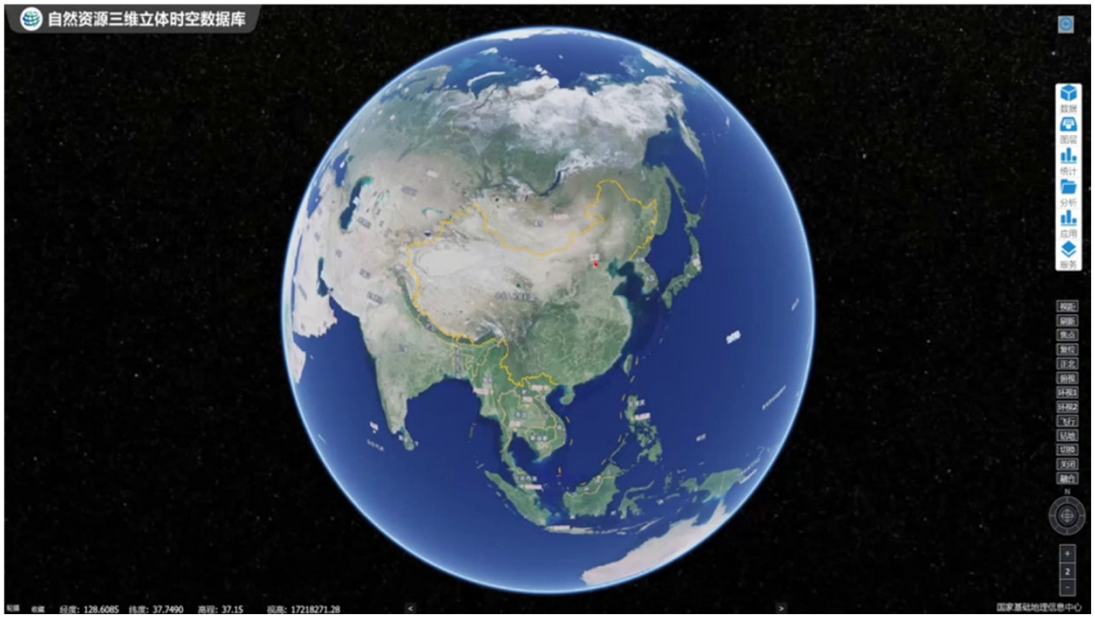
The ZY-3 01, 02, 03 satellites and GF-7 satellite have formed China 's first stereo mapping satellite constellation, which can support and guarantee the data resources for the construction of real scene China faster and better. The 2-meter resolution remote sensing image has achieved quarterly coverage of all land territory, and the 1-meter resolution remote sensing image has basically achieved annual coverage.

Satellite Networking



2-m resolution remote sensing image quarterly coverage

1 1.4 ReS3D construction effect



Source: NGCC, MNR

At the national level, a terrain-level ReS3D China database has been built, which has initially realized the transformation and upgrading of the traditional national fundamental geographic information system.

- **From 2D to 3D**
- **From static to chronological**
- **From scale expression to integrated expression**

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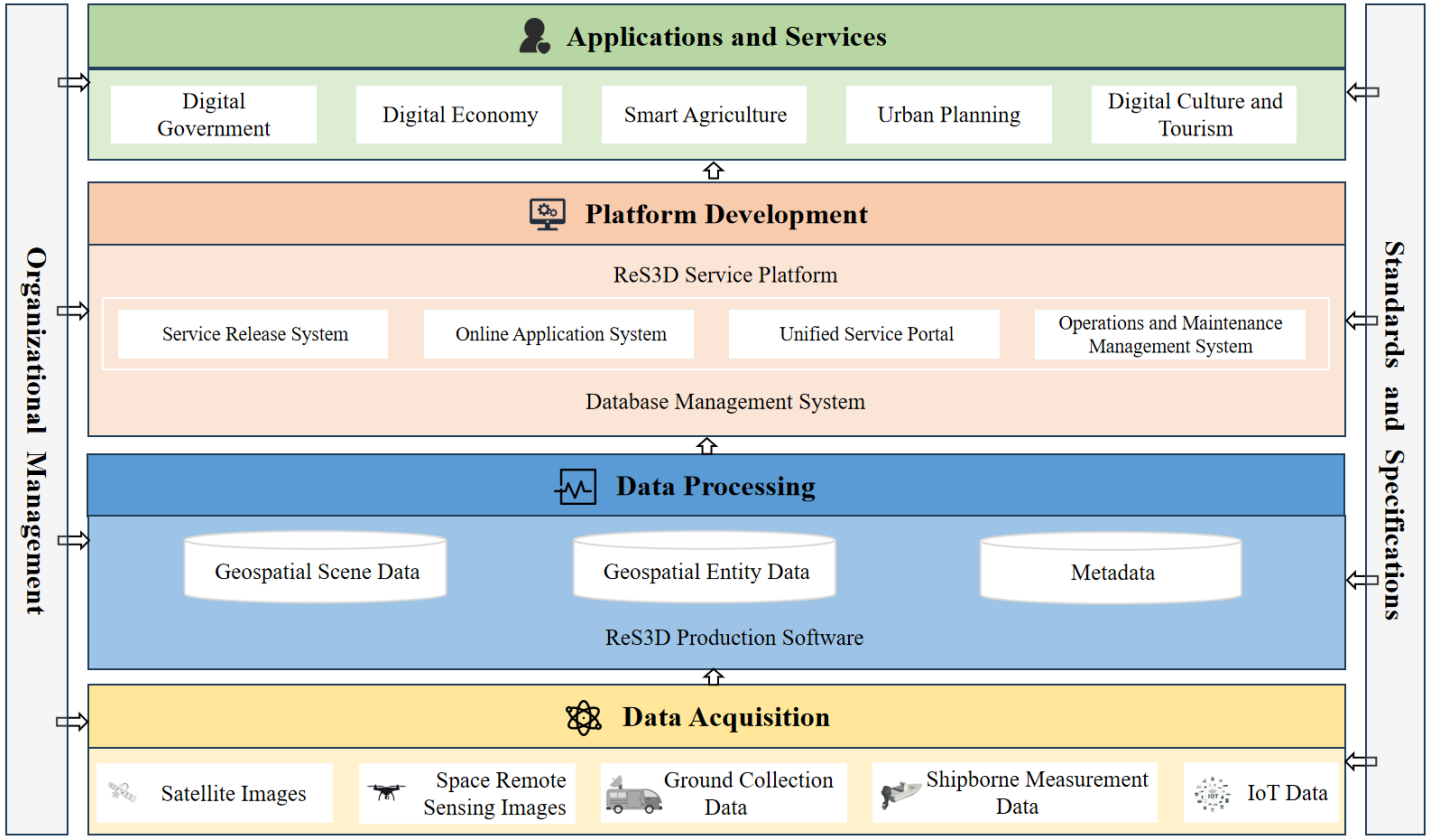
2.1 Technical Process Overview



2 2.2 High Precision Data Acquisition

According to different regional conditions, flight conditions, and application requirements. The main data acquisition techniques used include satellite imagery, aerial oblique photography, and airborne laser scanning. These methods are often combined to form a comprehensive approach for data acquisition.

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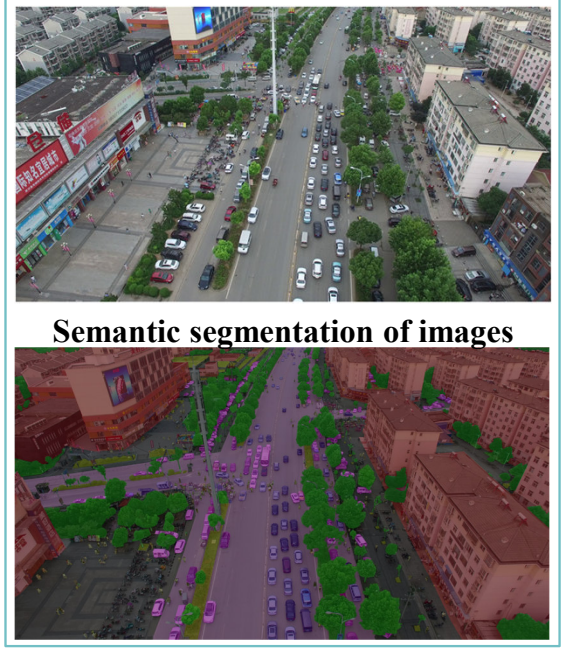
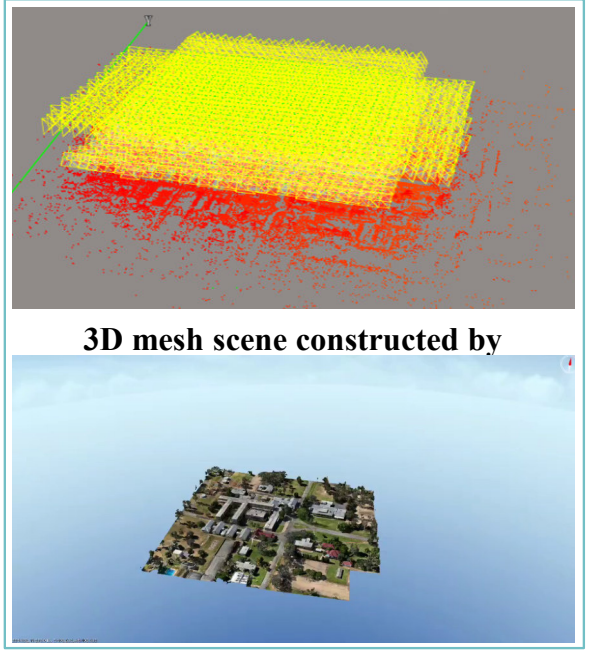
2.3 Efficient and Convenient Data Processing:
3D Real Scene Reconstruction

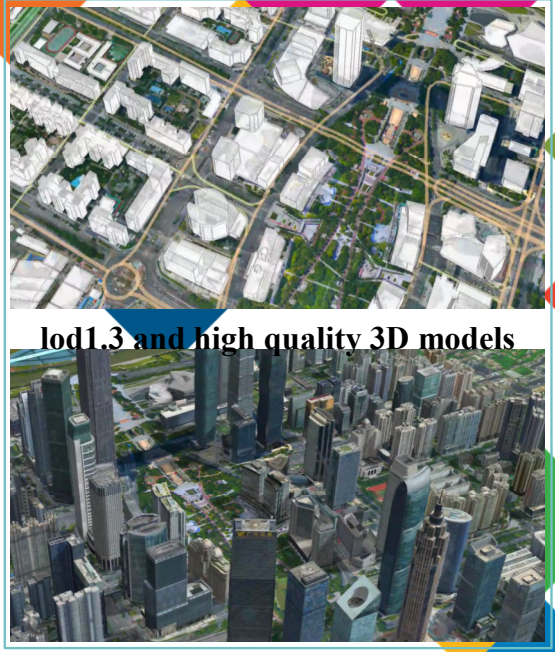
The ReS3D solution offers a comprehensive set of professional, fully self-developed software tools for multi-source remote sensing imagery.



Semantic segmentation of images



3D mesh scene constructed by



lod1,3 and high quality 3D models

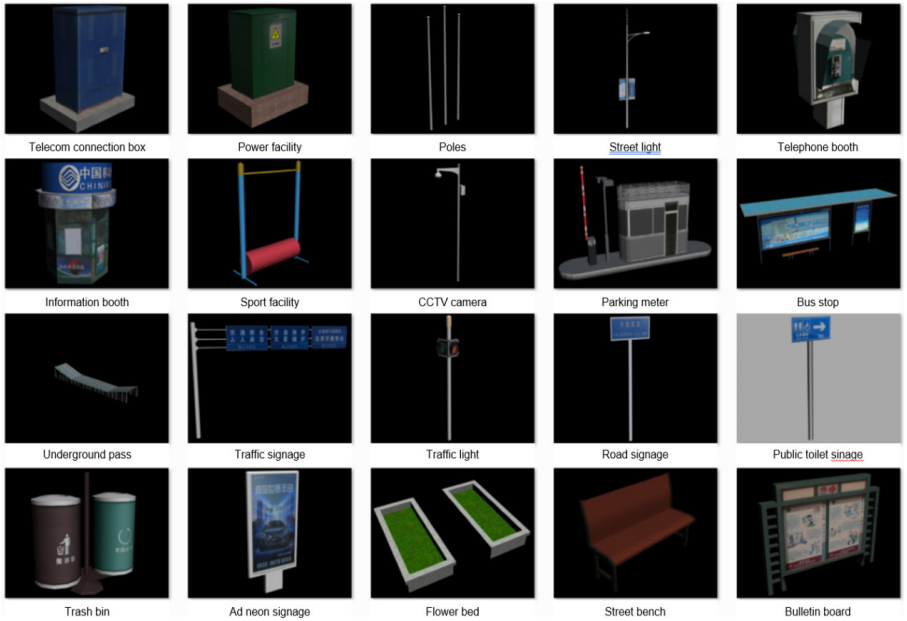
2

2.3 Efficient and Convenient Data Processing:

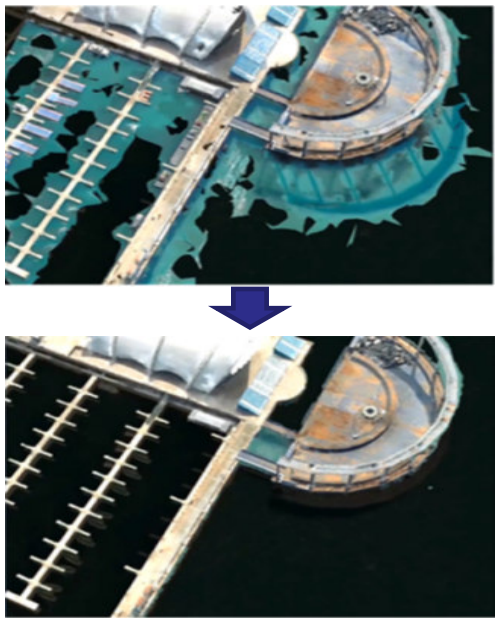
Model Entity Realization

For specific urban refined management demands, it is necessary to realize the entity of 3D Real Scene in key areas and refine the scene.

Building Entity Realization



Component Entity Realization

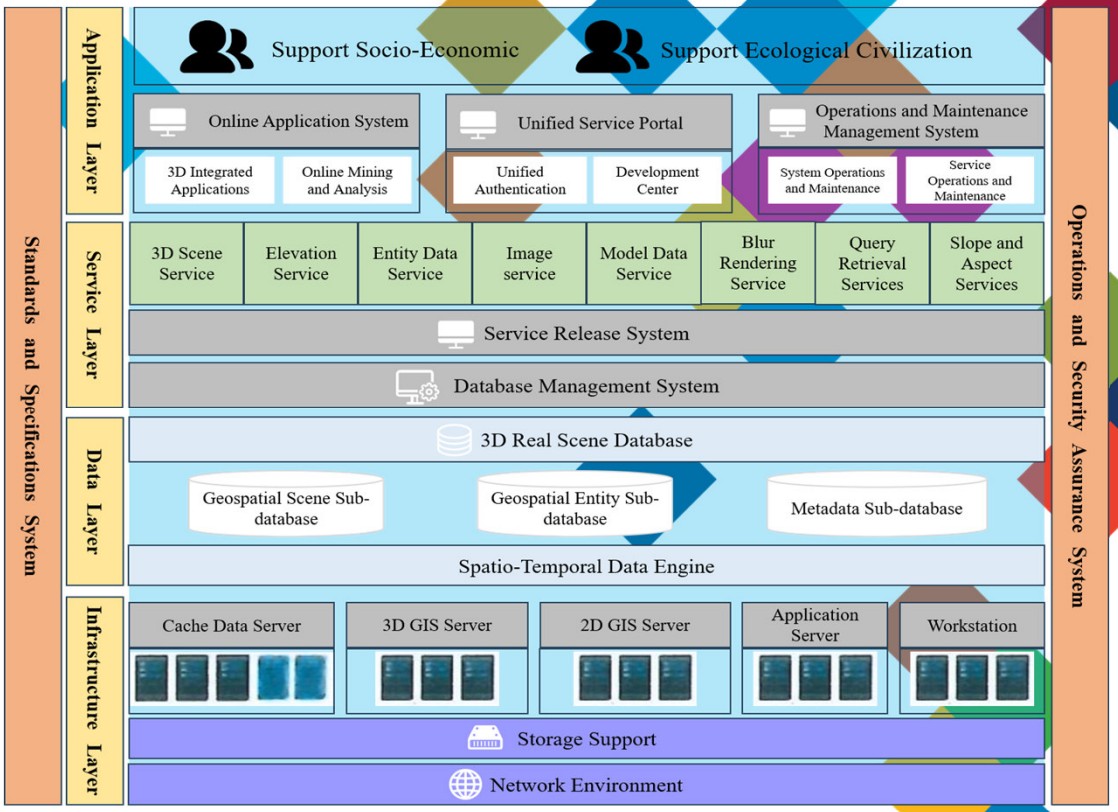


Scene Refinement

2 2.4 Platform Development and Shared Services

The platform provides visualization, analysis, sharing, and distribution services across different platforms and terminals.

It forms a unified platform that integrates 2D and 3D data, combines surface and underground environments, and unifies indoor and outdoor spaces, creating a comprehensive digital twin platform.

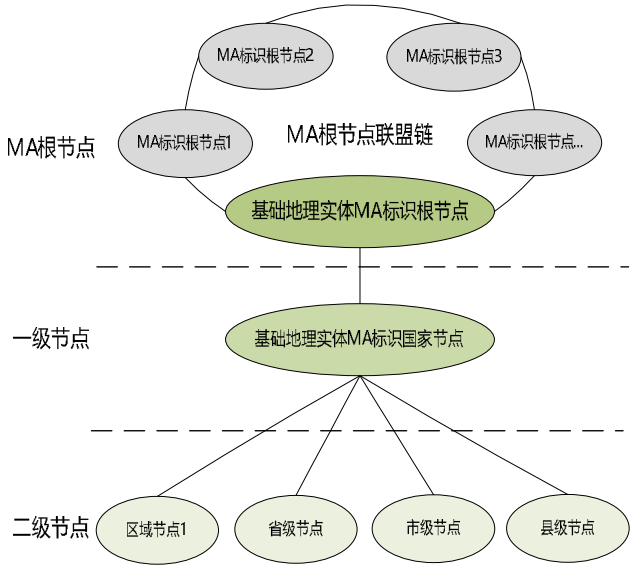


2

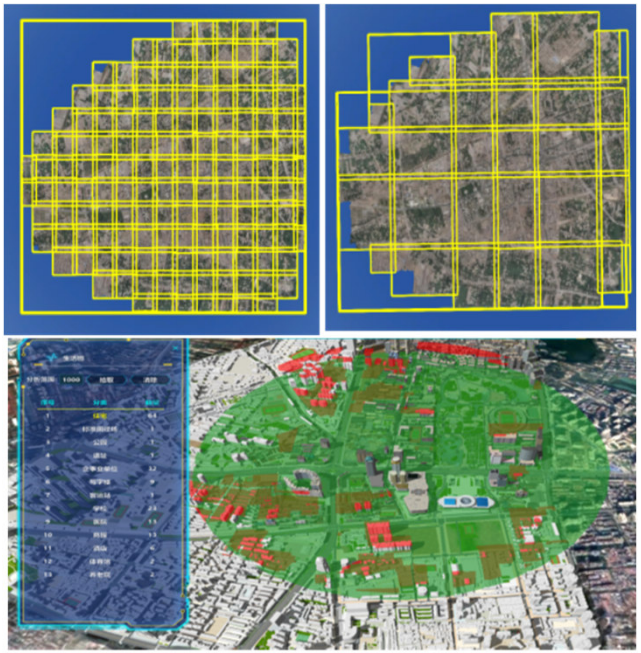
2.4 Platform Development and Shared Services:

Database Management System and ReS3D Service Platform

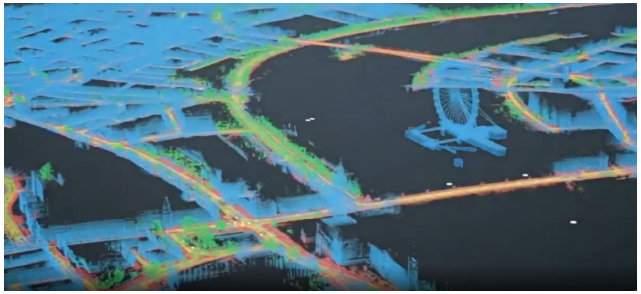
Aggregates DEM, DOM and Mesh models, etc., to form a geographical scene sub-database. It will provide users with basic services such as 3D scene services and entity data services, as well as customized services to meet diverse business requirements.



MA identification of basic geographic entity



Lightweight technology



Cloud rendering technology

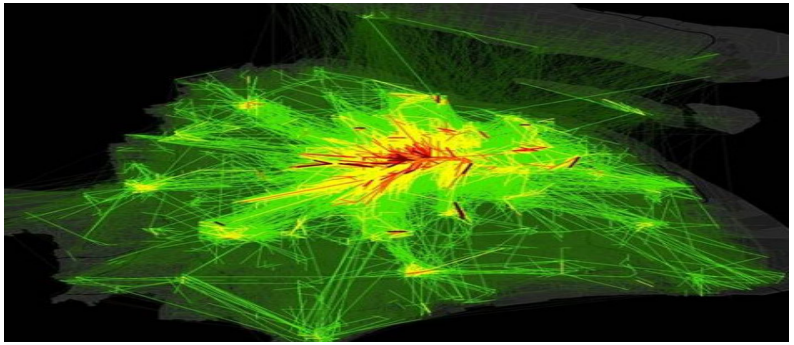
(Google Map (2022): Neural Rendering + Google Cloud Immersive Stream)

2

2.4 Platform Development and Shared Services:

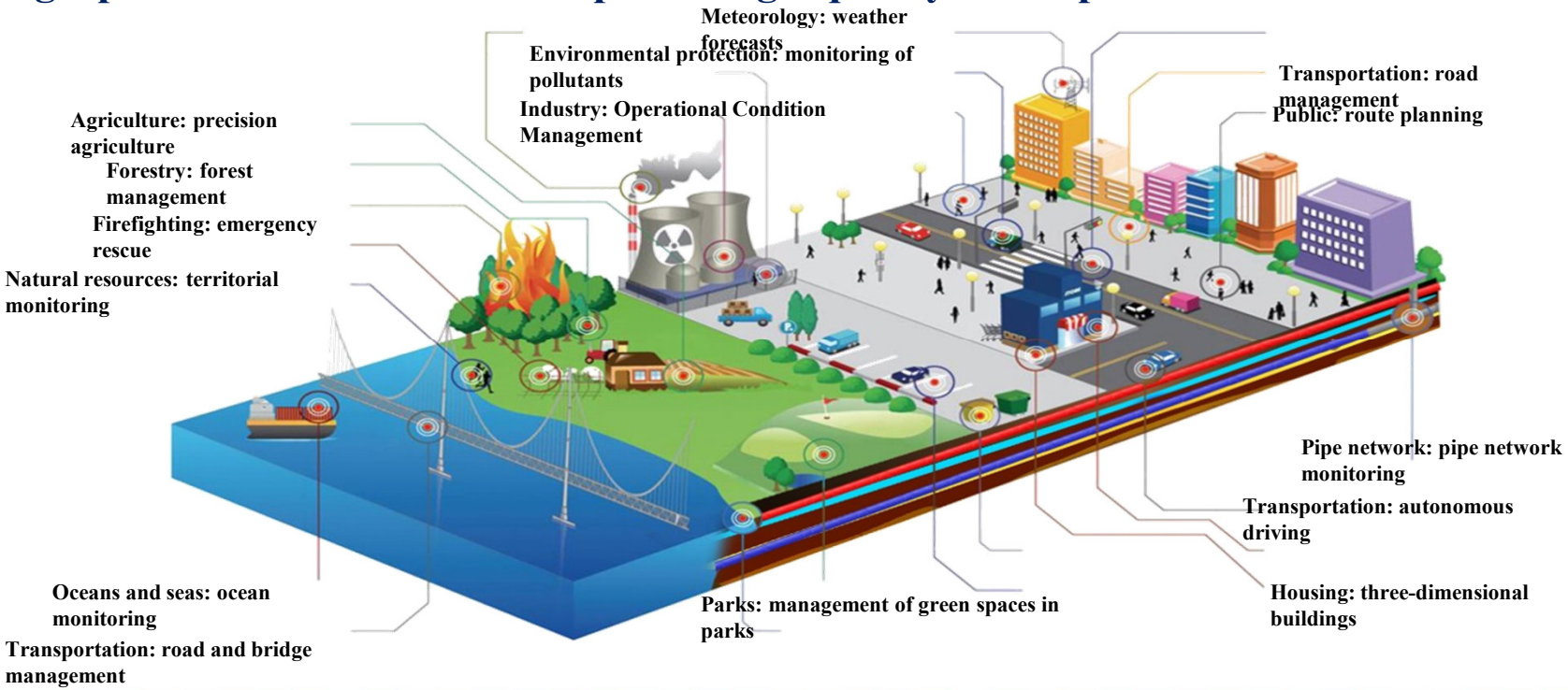
IoT Sensing Data Access and Integration

The platform integrates real-time sensing data of natural resources, urban Internet of Things sensing data, Internet online capture data, etc. with real-life three-dimensional scenes to enrich real-time information.



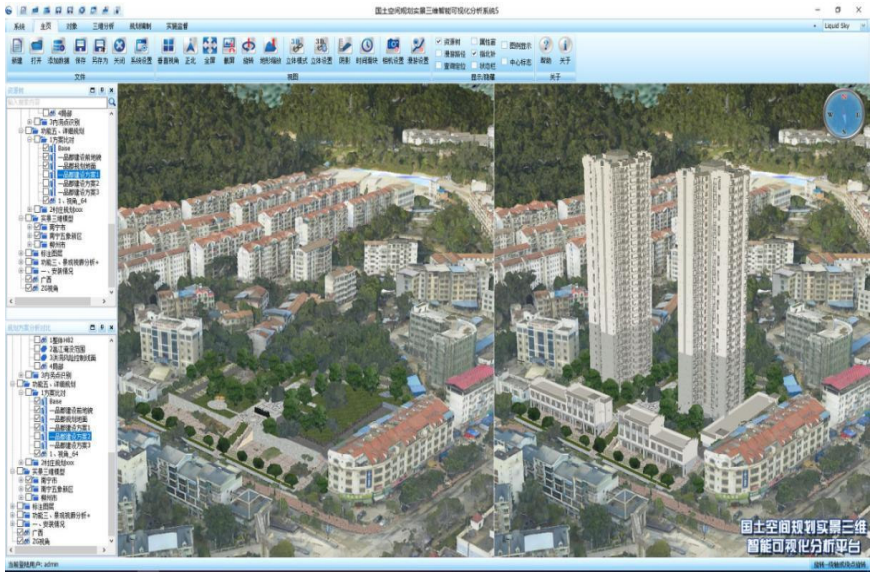
2 2.5 ReS3D Applications Cases

More than 100 kinds of application scenarios in 22 categories are formed to highlight the value of spatial geographic data elements and empower high-quality development.

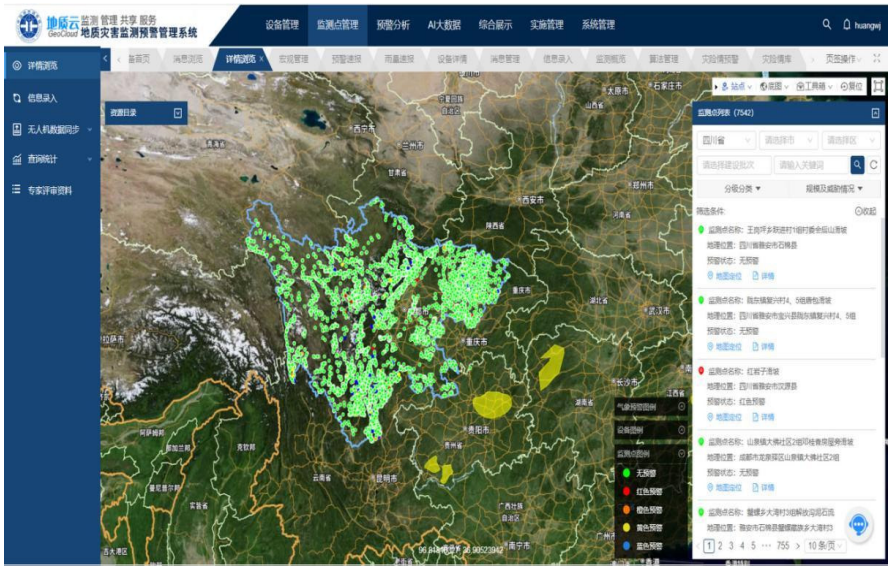


2 2.5 ReS3D Applications Cases

Supporting natural resource management: Promoting the optimal allocation of natural resources in time and space, and comprehensively supporting the implementation of the "two unities" of natural resources.



Guangxi: R&D and Application of Three-dimensional Intelligent Visualization and Analysis Platform for Territorial Spatial Planning

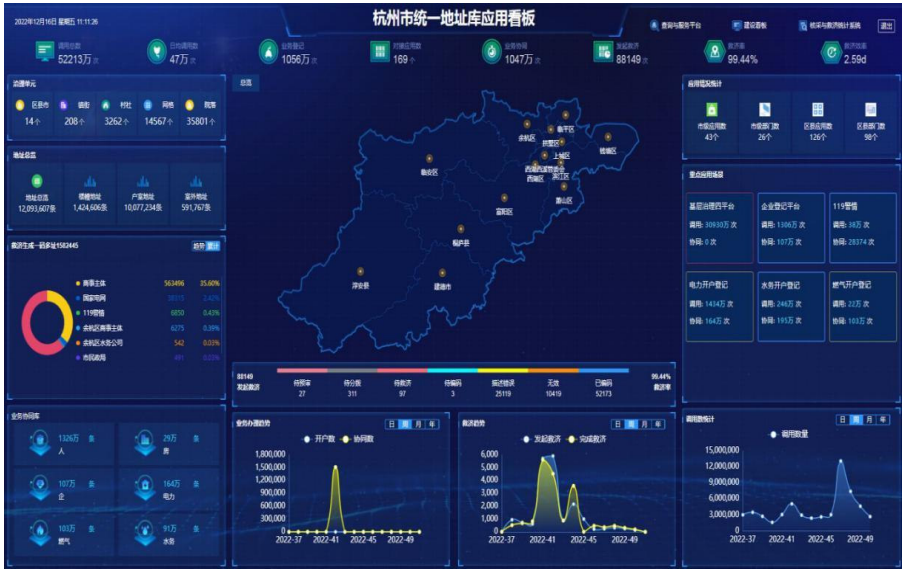


Geological and Environmental Monitoring Institute: National Geological Hazard Realistic 3D Key Technology and Application

2 2.5 ReS3D Applications Cases

Enabling government management decision-making: Promoting more accurate and effective matching of various types of resources in time and space, and supporting the informatization construction of government departments and the innovation of governance mode.

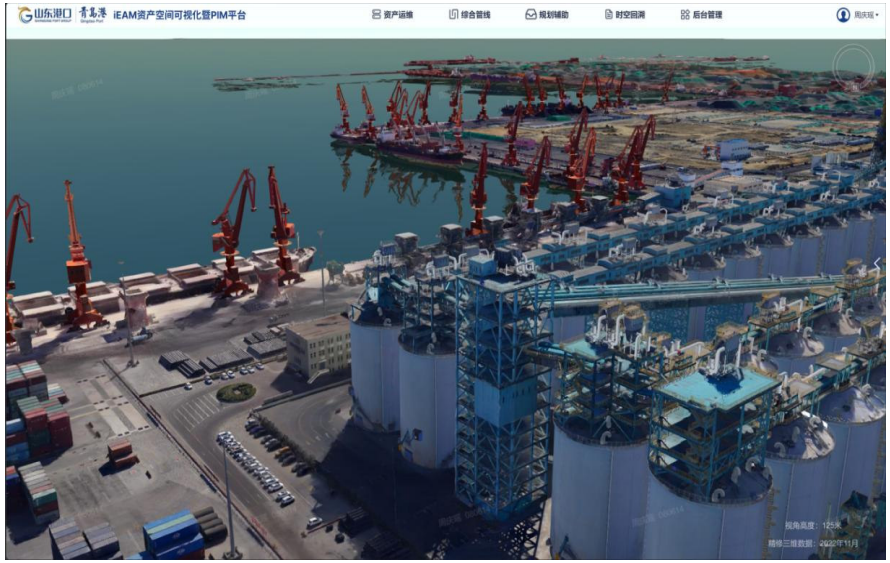
Chongqing: Realistic 3D empowers megacities to modernize governance



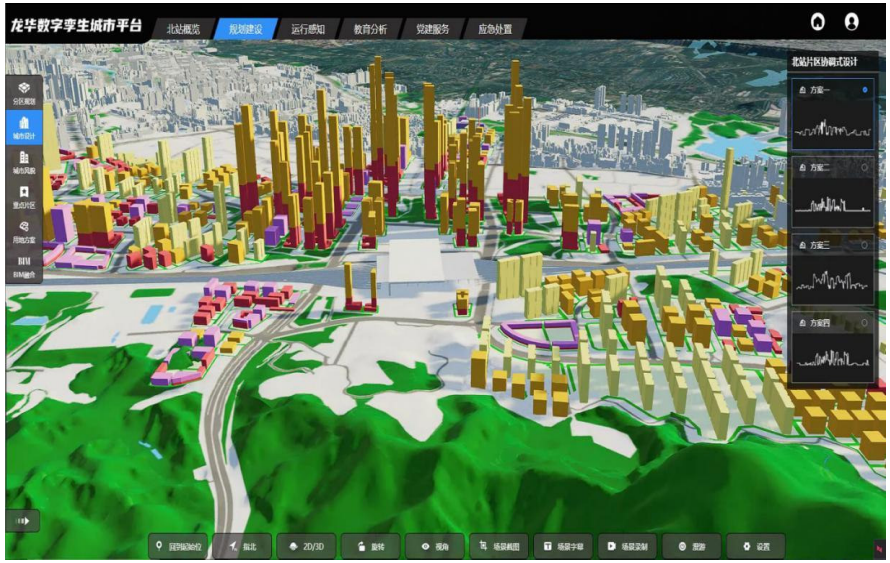
Hangzhou: Full-cycle management of urban landscape based on “spatial wise governance” of real-life three-dimensional base

2 2.5 ReS3D Applications Cases

Boosting the development of digital economy: realizing the coupling and synergy between the ReS3D data and other production elements, supporting business process reengineering and comprehensive integration of the scene.



Qingdao: The World's First Port Information Modeling (PIM) Practice Based on Realistic 3D Viewing

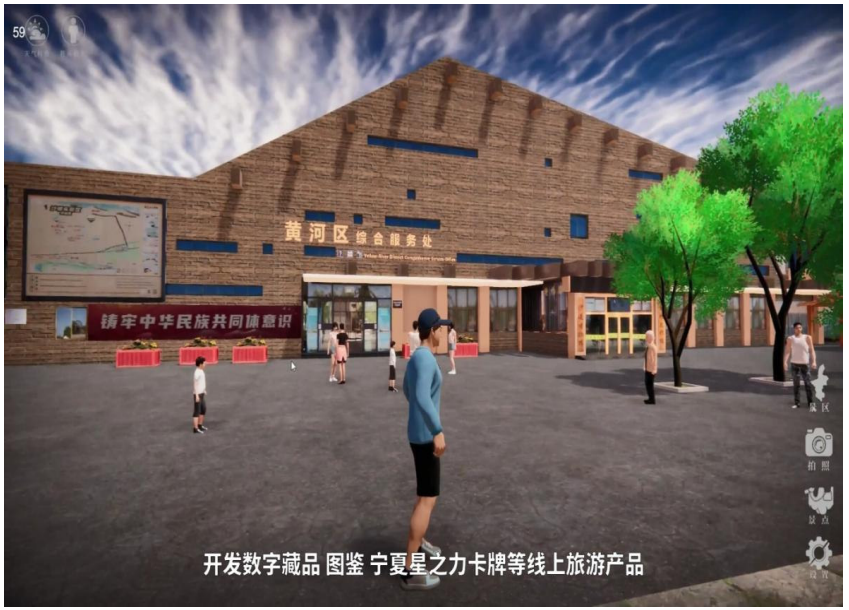


Shenzhen: real-life three-dimensional data to empower the high-quality development of digital Longhua

2 2.5 ReS3D Applications Cases

Serving for better life: developing new modes of immediate supply, active service and personalized service based on real-life three-dimensional data, so as to enhance the people's sense of acquisition, happiness and security.

Hunan: empowered by numbers, live 3D innovation “technology + culture and tourism”



Ningxia: three-dimensional “yuan tour of Ningxia” immersive culture and tourism meta-universe

2 2.5 ReS3D Applications Cases

Servicing for digital culture construction: real display, fine portrayal of the whole picture of cultural heritage, inheritance of history and culture, and promote the creative transformation and innovative development of Chinese outstanding traditional culture.

Shaoxing: live three-dimensional innovation to empower the conservation and utilization of the ancient city of Shaoxing

Beijing: Realistic three-dimensional help “Beijing Central Axis” heritage bidding

2 2.5 ReS3D Applications Cases

Supporting the construction of digital ecology: supporting resource and environmental protection, serving the digital governance of beautiful China, and providing elemental guarantee for green and low-carbon transformation.

Chongqing: Digital Ecological Base Construction and Ecological Protection and Restoration Practices in the Yangtze River Economic Belt

Shanxi: Realistic 3D opens a new chapter in the protection and development of the Qinling Mountains

Contents

3 3.1 ReS3D Supports the Achievement of SDGs Goals

In the next step, the construction of ReS3D should strengthen the deep integration with the new generation of information technology such as artificial intelligence and big data, develop more application scenarios, take scenario application as the traction, build the cornerstone of digital security, empower urban governance modernization, and contribute to the realisation of SDGs 9, 11, 13 and 15, and build a livable, resilient, and smart cities centered around people.

3 3.2 ReS3D Supports the Achievement of SDGs Goals

Using the results of ReS3D, more SDG 2030 goals can be supported in the future:

——Reduce poverty and hunger: Querying and locating poor people and areas through ReS3D to achieve precise support agriculture, invigorate agriculture and promote agriculture

3

3.2 ReS3D Supports the Achievement of SDGs Goals

——**Provide better quality education：** **Enhancing the educational experience in real 3D space through ReS3D for the globalisation and equalisation of education**

——**Protect historical culture and natural heritage：** **3D recreation of historical and cultural heritage through ReS3D**

——**Reduce regional disaster risk：** **Prediction of areas affected by natural disasters and post-disaster reconstruction with ReS3D**

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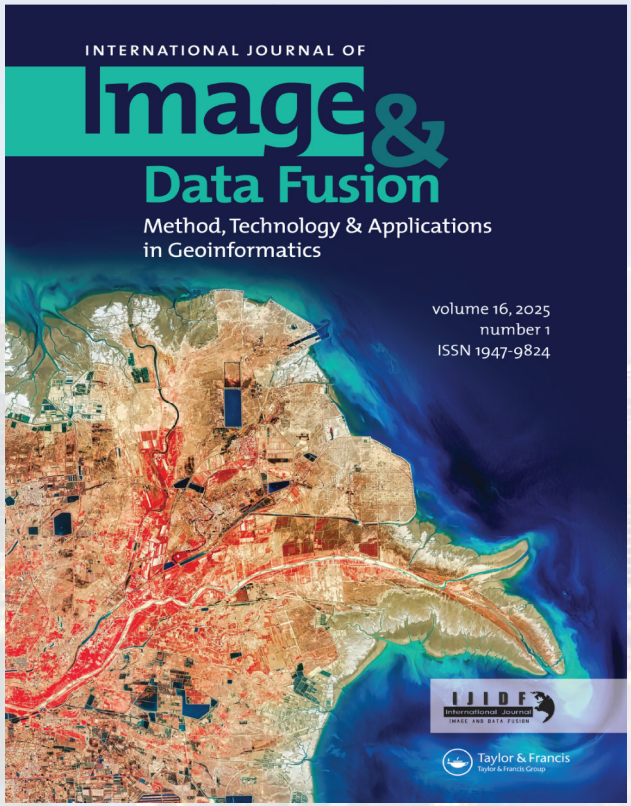
3.3 International Cooperation and Exchange

Thanks !



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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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