



UNGEONOW 2024
首届联合国地信周



3D Real Scene Construction in China and Its Technical Framework

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1. ReS3D in China

2. Technical Framework

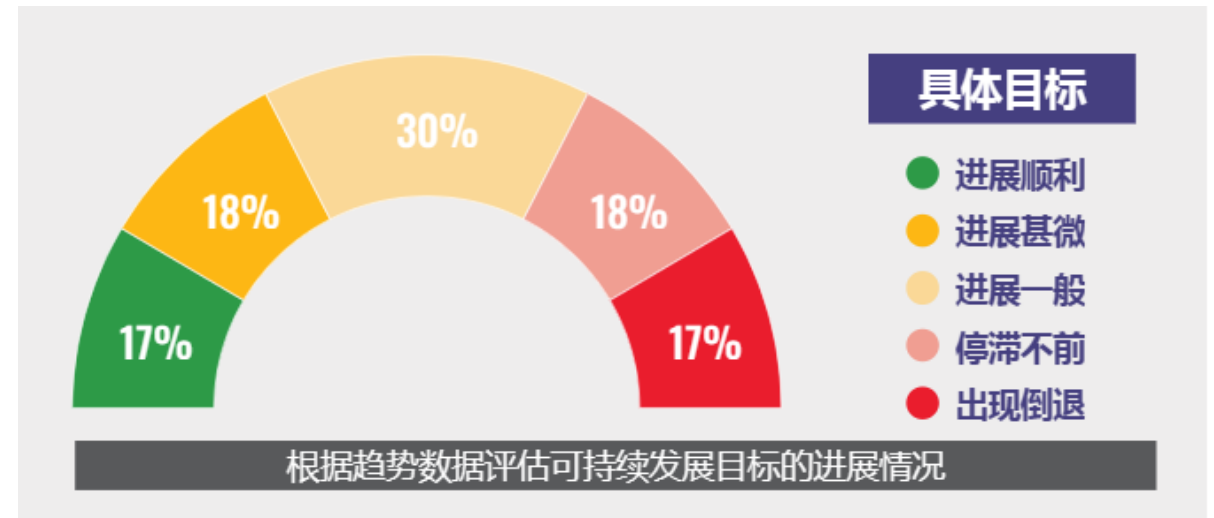
3. Application Cases

4. Summary

1.1 SDG2030 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 2024, 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 SDG2030 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 .”

《 Big Earth Data in Support of the Sustainable Development Goals(2023) 》

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.

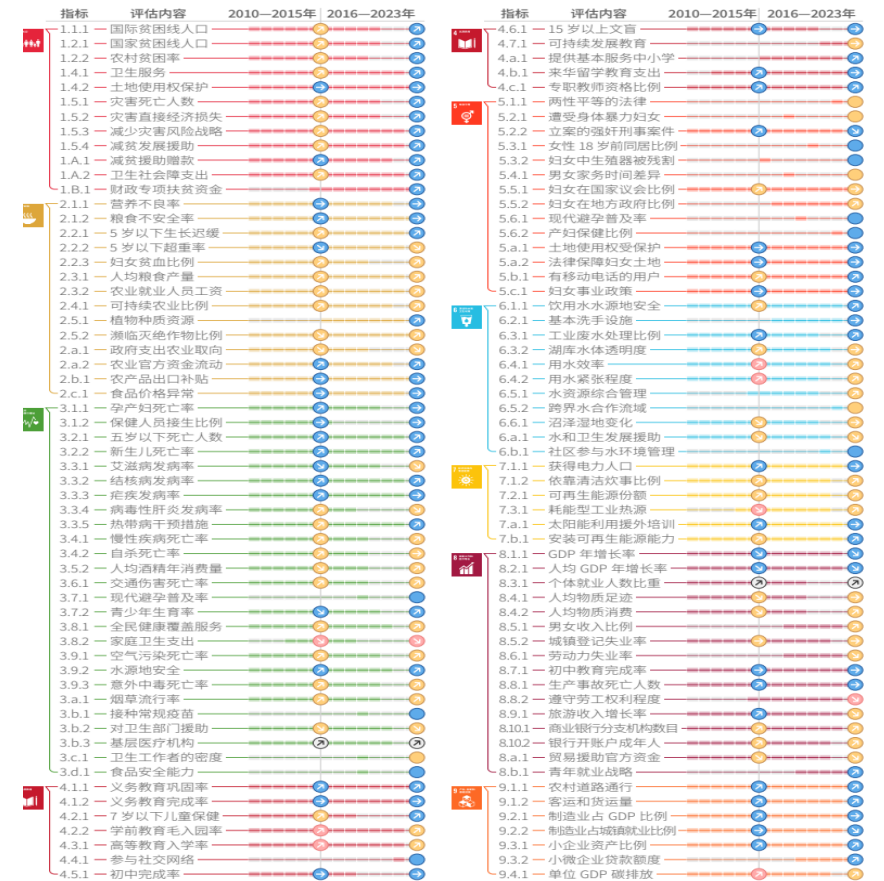
Most SDGs indicators were significantly improved:

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.

--From Prof Guo Huadong



1.2 New Requirements to Geospatial Information



The strategies of ‘Beautiful China’ and ‘Low Carbon Development’ requires **more high-quality and high-level geographic information data**, so as to enhance the synergistic management of nature resources, and to promote harmony between human and nature.

1.3 ReS3D Construction in China

in February 2022, the Ministry of Natural Resources, PRC issued the document *on the Construction of 3D Real Scene in China*.

The screenshot shows the official website of the Ministry of Natural Resources of the People's Republic of China. The header includes the ministry's name in Chinese and English, and the text 'Government Information Disclosure'. A navigation bar contains links for Home, Organization, Dynamic, Open, Service, Interaction, Data, and Special Topics. A search bar is present with a search button and a 'Advanced Search' button. Below the search bar is a table with the following information:

名称	自然资源部办公厅关于全面推进实景三维中国建设的通知		
索引号	000019174/2022-00016	主题	国土测绘
发文字号	自然资办发〔2022〕7号	发布机构	自然资源部办公厅
生成日期	2022年02月24日	体裁	通知
实施日期		废止日期	

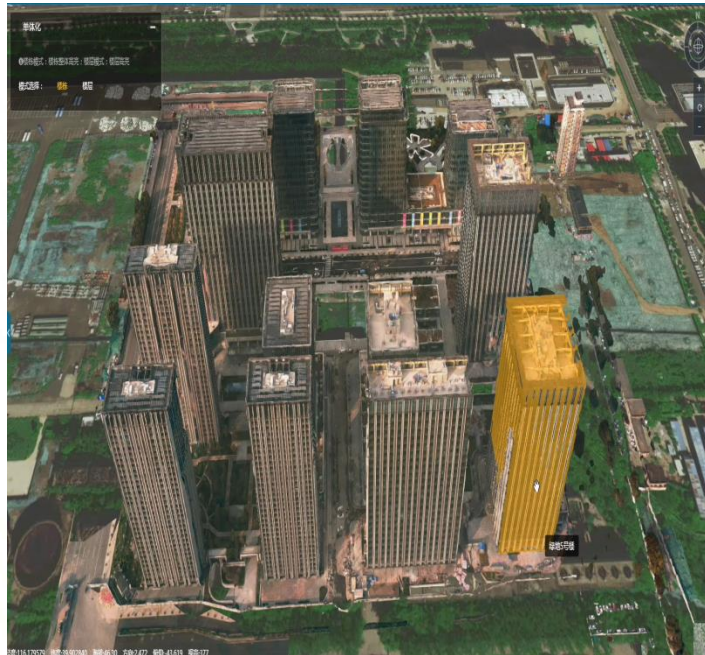
Below the table is the title of the document: **自然资源部办公厅关于全面推进实景三维中国建设的通知**. The main text of the document is partially visible, starting with: '各省、自治区、直辖市及计划单列市自然资源主管部门，新疆生产建设兵团自然资源局，国家林业和草原局，中国地质调查局及部其他直属单位，各派出机构，部机关各司局：' followed by a paragraph explaining the importance of 3D real scene construction for digital China and the need for a transition in traditional mapping services.

1.3 ReS3D Construction in China

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



Terrain-level



City-level



Component-level

1.3 ReS3D Construction in China

The aim of ReS3D is to provide a foundation for Digital China.

By 2025, more than 50% activities of government decision-making, production scheduling and living planning can be completed online supported by it.

By 2035, more than 80% activities of government decision-making, production scheduling and living planning can be completed online supported by it.



1.3 ReS3D Construction in China

ReS3D China has already started a construction boom in the country.

October 2023,

- **264 cities** were carrying out city-level 3D model construction.
- more than **60 cities** had initially completed their local ReS3D construction work.
- about **7 million square kilometres** of ReS3D with different levels have finished.



1.3 ReS3D Construction in China

a terrain-level ReS3D China database at the national level has been built.



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



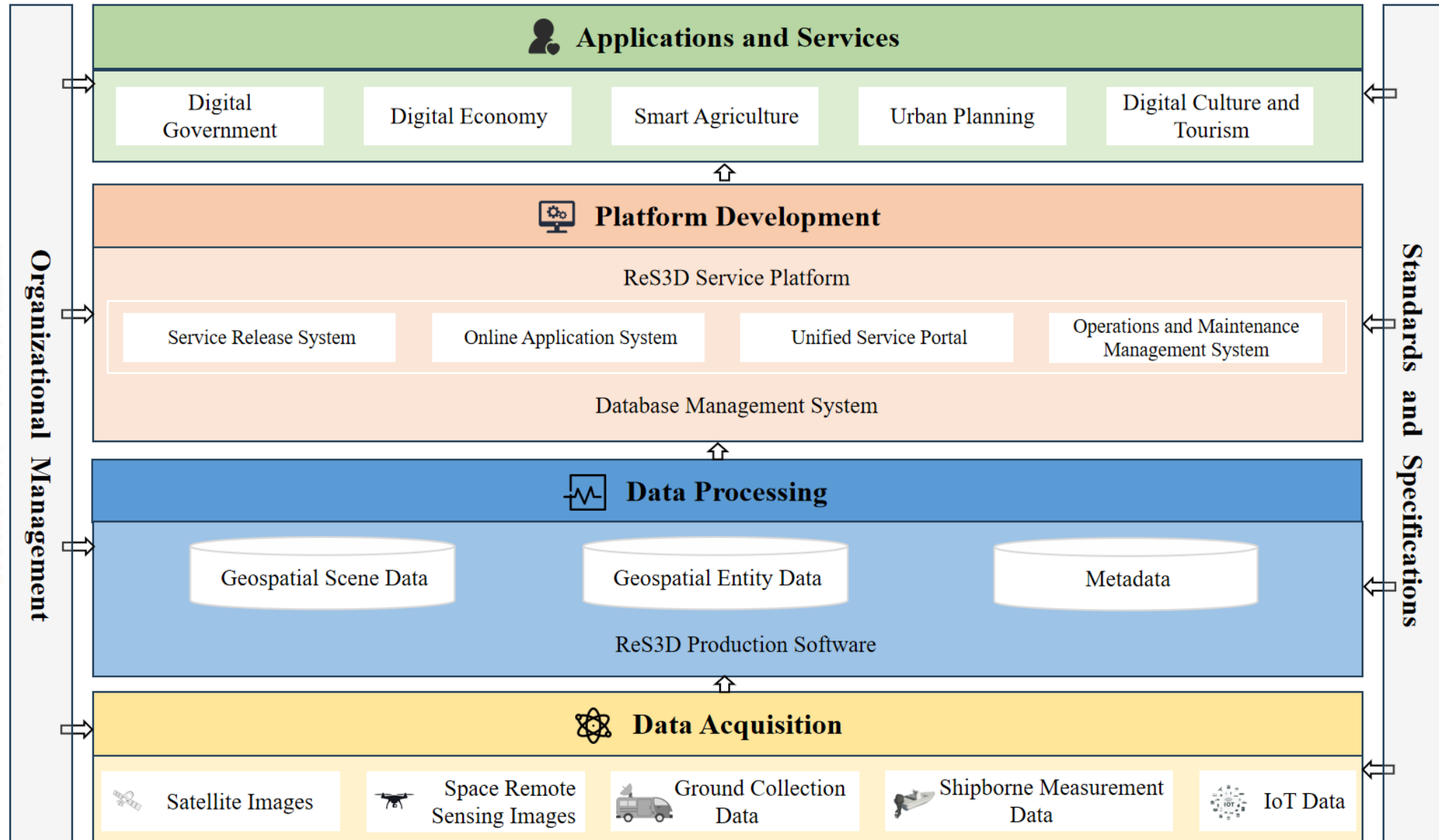
1. ReS3D in China

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2.1 Technical Framework

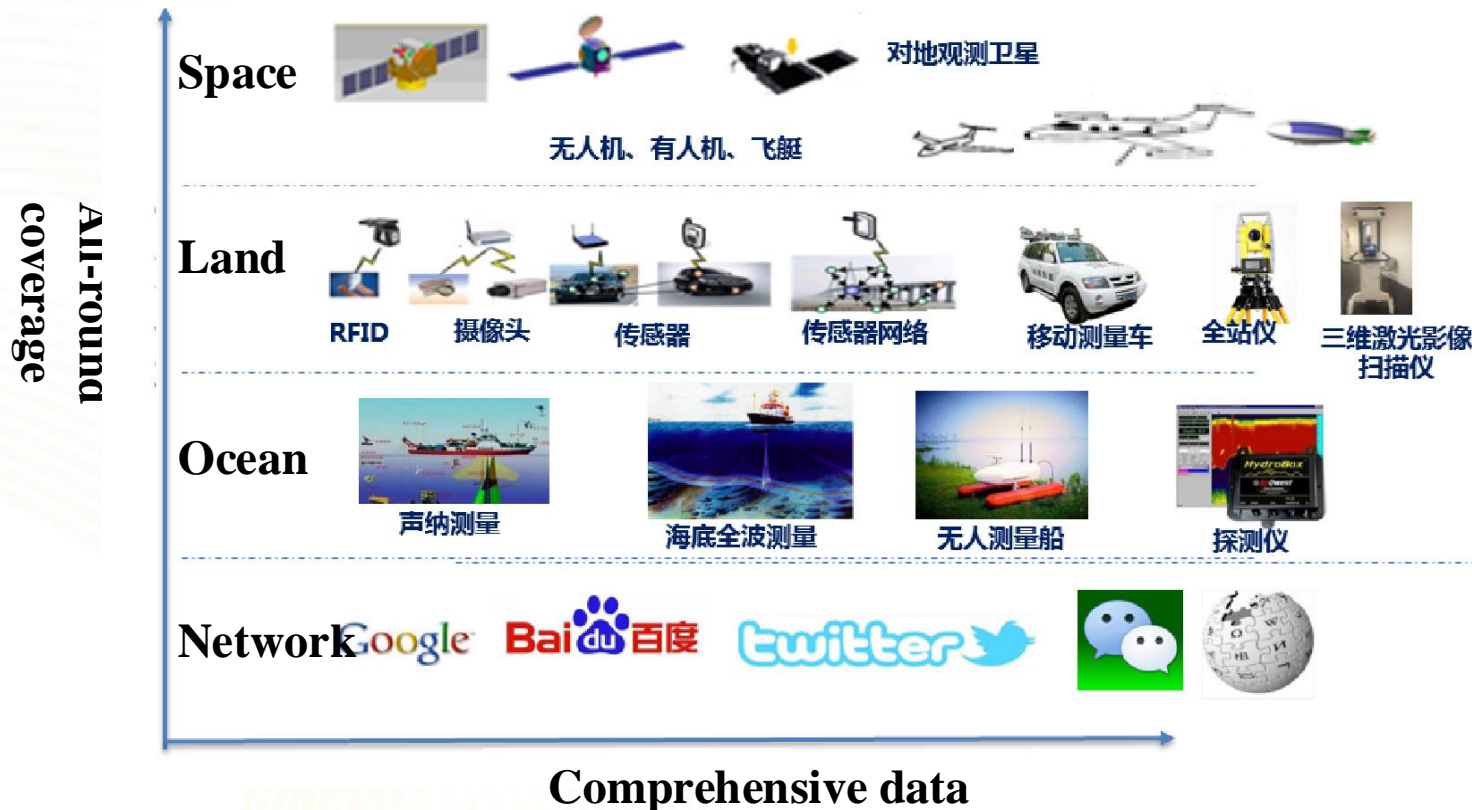


2.2 High Precision Data Acquisition

According to different regional conditions, flight conditions and application requirements.

The main geo-data: satellite imagery, aerial oblique imagery, airborne laser scanning data.

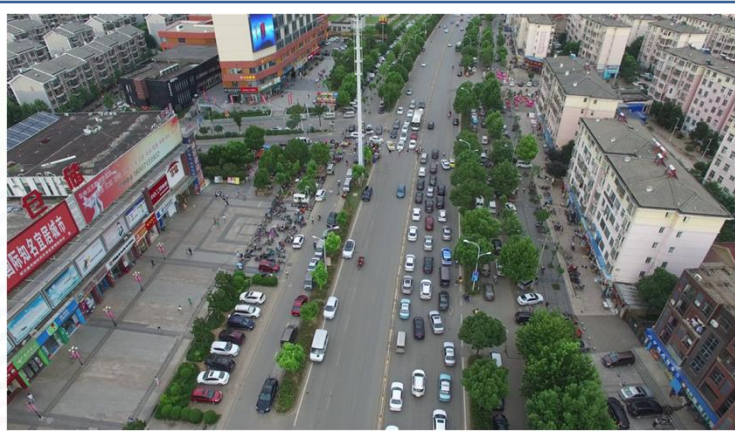
These methods are often combined to form a comprehensive approach for data acquisition.



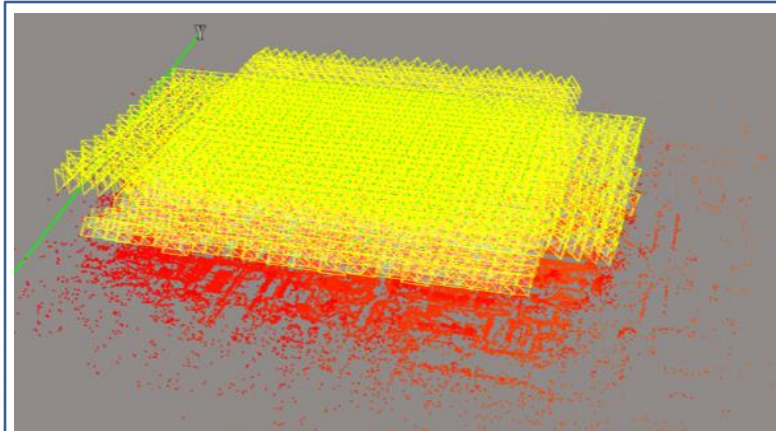
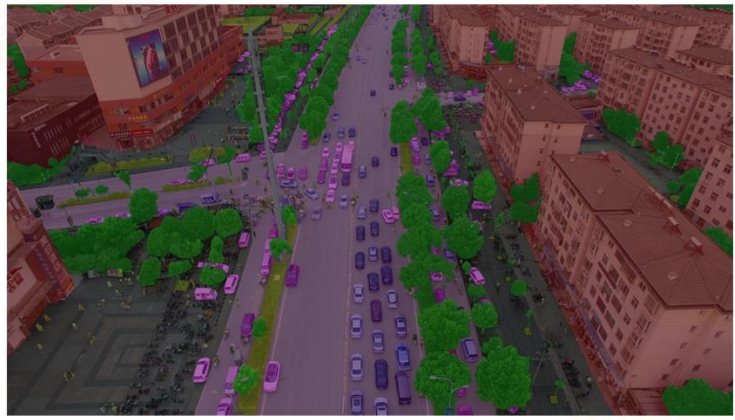
2.3 Efficient and Convenient Data Processing:

3D Modeling

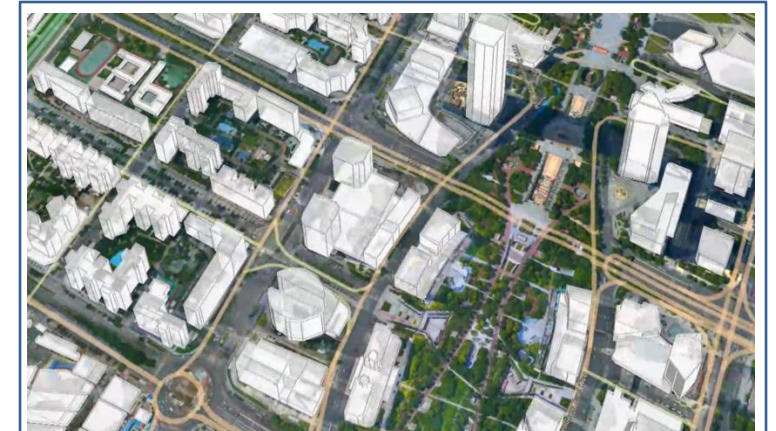
The ReS3D technical solution offers a comprehensive set of professional, multi-function software tools for 3D modeling.



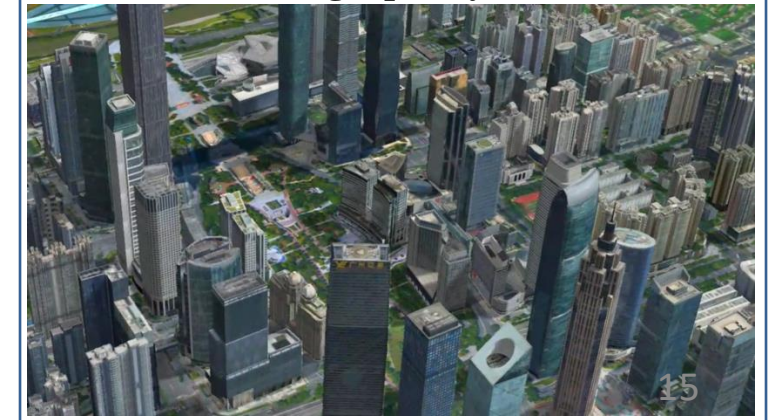
Semantic segmentation of images



3D mesh scene constructed by oblique photos



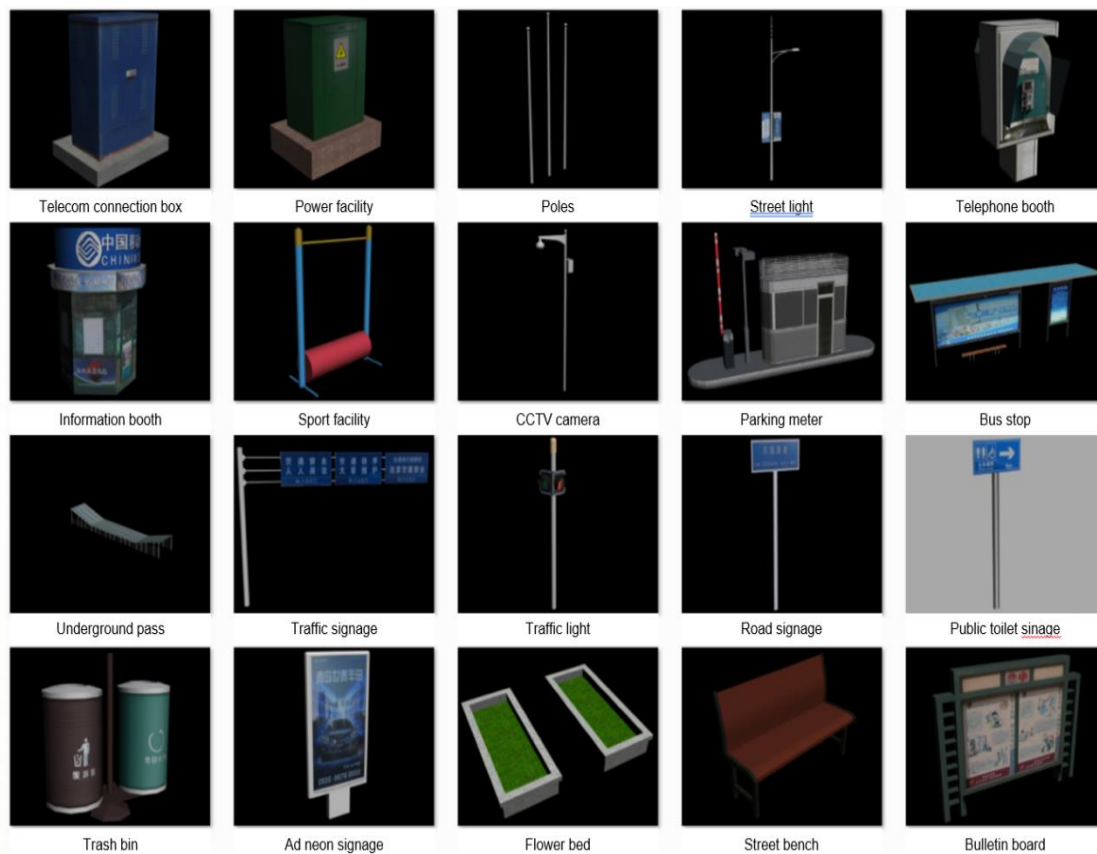
lod1.3 and high quality 3D models



2.3 Efficient and Convenient Data Processing: Geo-Entity Modeling



Building Entity Model



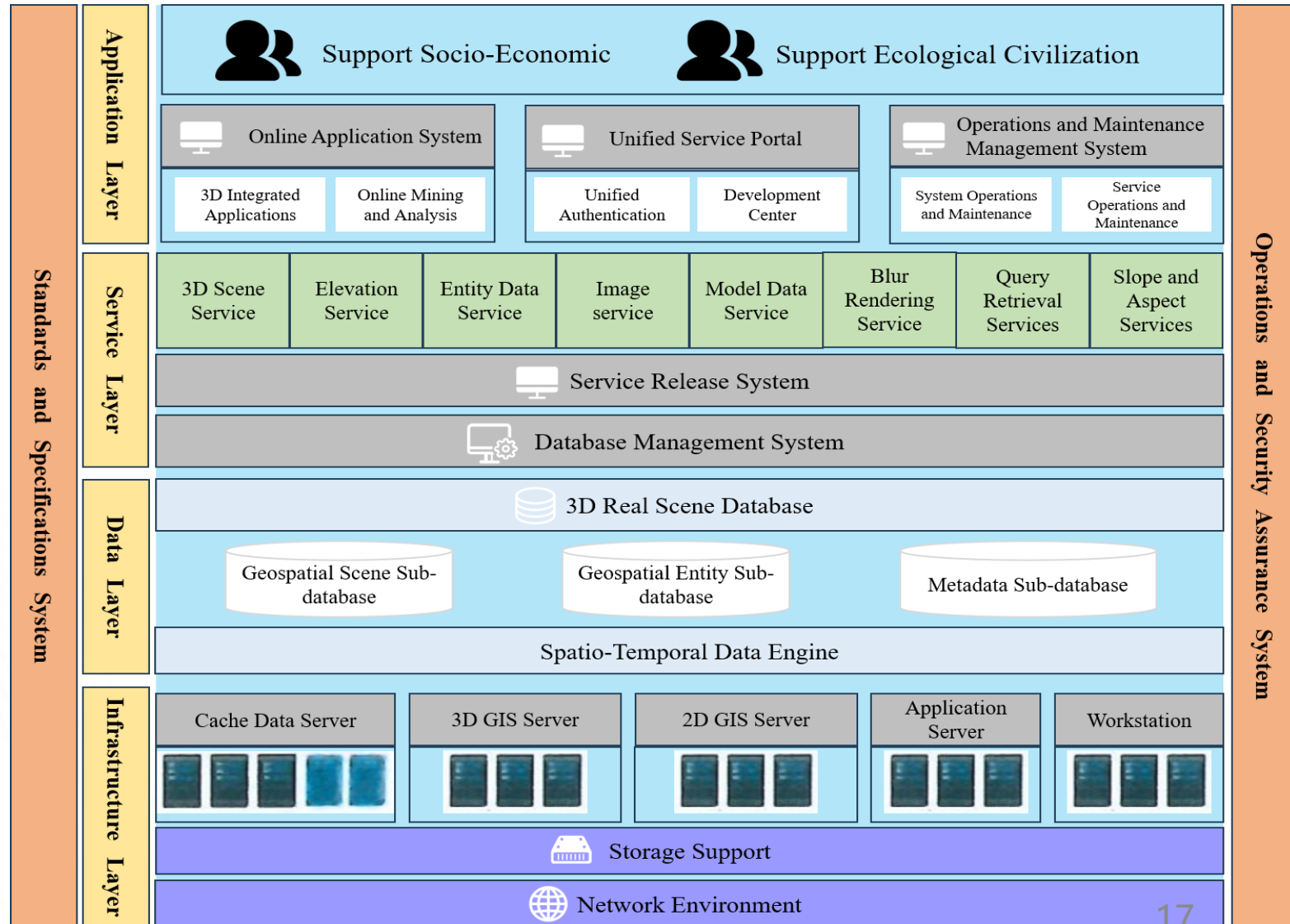
Component Entity Model



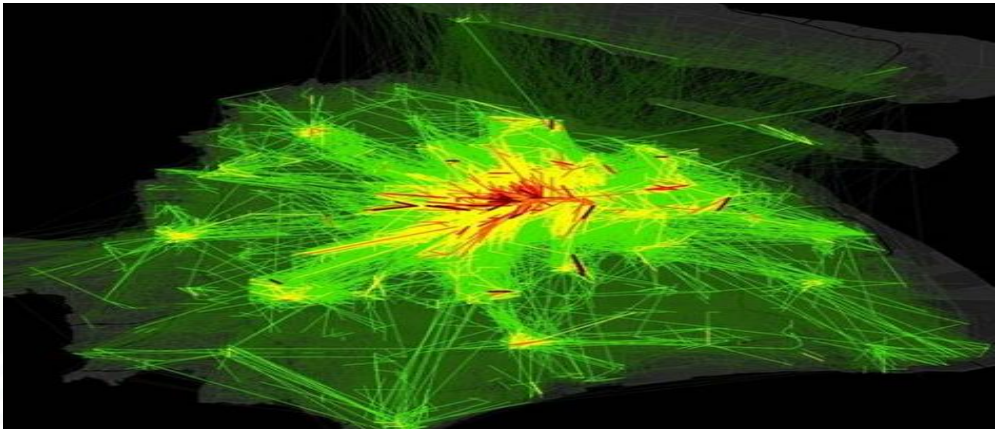
Scene Refinement

2.4 Platform Development

- ❑ Data fusion and integration
- ❑ Data visualization
- ❑ Data analysis
- ❑ Online service release
- ❑ Database management



2.4 IoT Sensing Data Integration



正常: 916 故障: 28

显示模式
热力图

序号	名称	状态
1	52-53X轮开包-10.77.11.139+	在线
2	53-54值机后台-10.77.6.122+	在线
3	53-54值机前置-10.77.6.12+	在线
4	54-55X轮开包-10.77.11.140+	在线
5	55-56值机后台-10.77.10.12+	在线
6	57-58安检开包-216/-10.77.7.159+	在线
7	58-59安检开包-10.77.7.162+	在线
8	6-7X机开包-10.77.11.96+	在线
9	60-61安检开包-10.77.7.163+	在线
10	61-62安检开包-10.77.7.157+	在线
11	62-63安检开包-10.77.7.165+	在线
12	64-65安检开包-10.77.7.174+	在线
13	66-67值机开包-10.77.7.173+	在线
14	67-68安检开包-10.77.7.166+	在线
15	69-70安检开包-10.77.7.170+	在线

德本宾馆

朝阳公园古碑村村委会路口南

新村路口 (东)



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3.1 China's Initiatives to Promote the ReS3D Applications

“ Typical Cases of Innovative Applications of ReS3D Data Enabling High-quality Development in 2024” jointly issued by MNR and NDA, August 23, 2024

中华人民共和国自然资源部
Ministry of Natural Resources of the People's Republic of China

政府信息公开

首页 机构 动态 公开 服务 互动 数据 专题

标题

名称	自然资源部办公厅 国家数据局综合司关于2024年实景三维数据赋能高质量发展创新应用典型案例的通报		
索引号	000019174/2024-00053	主题	国土测绘
发文字号	自然资办函〔2024〕1746号	发布机构	自然资源部办公厅
生成日期	2024年08月23日	体裁	通报
实施日期		废止日期	

自然资源部办公厅 国家数据局综合司关于2024年实景三维数据赋能高质量发展创新应用典型案例的通报

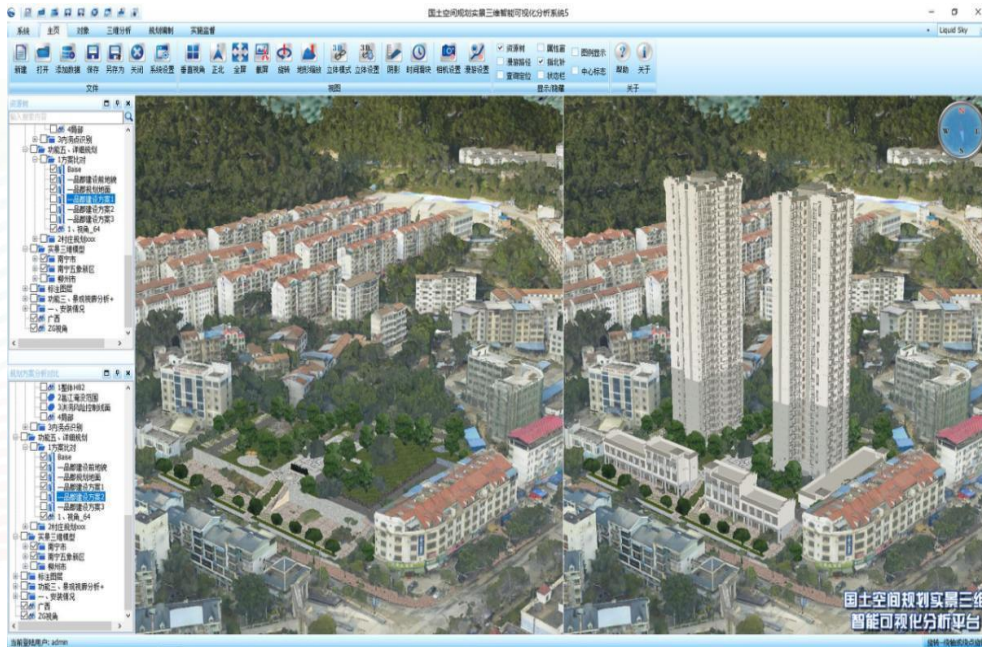
各省、自治区、直辖市自然资源主管部门、数据主管部门，新疆生产建设兵团自然资源局、数据局，中国地质调查局及自然资源部有关直属单位、有关派出机构：

60 Typical Cases

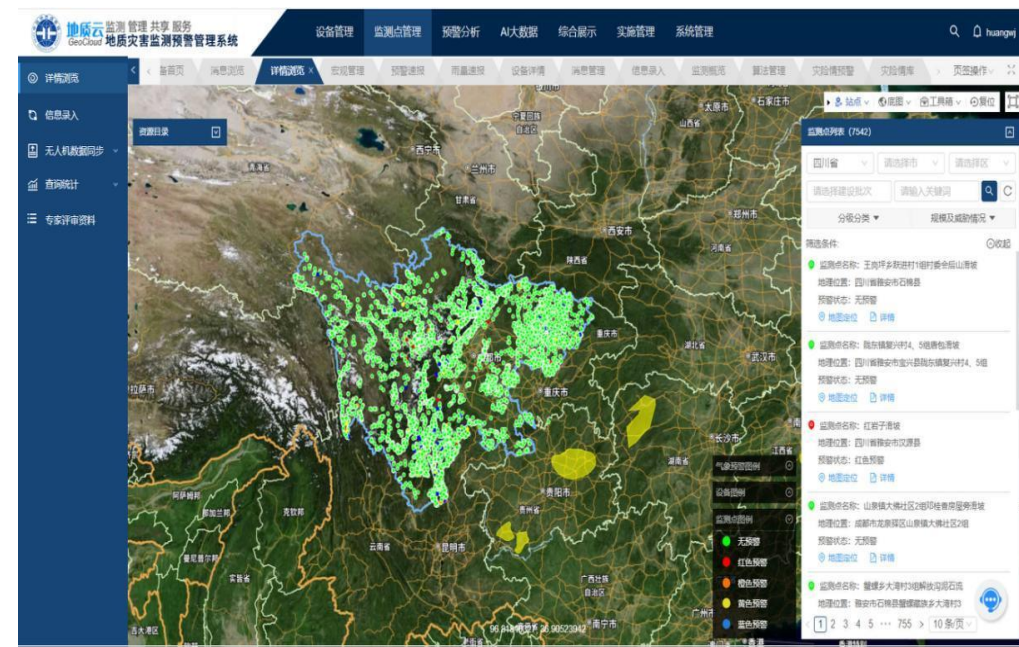
- Supporting natural resources management
- Enabling Government Decision-Making
- Contributing to the digital economy
- Serving people for a better life
- Serving Digital Culture
- Supporting digital ecological civilization

3.2 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: **Urban Planning**



Geological and Environmental Monitoring Institute:
Geological Hazard Prevention

3.3 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.



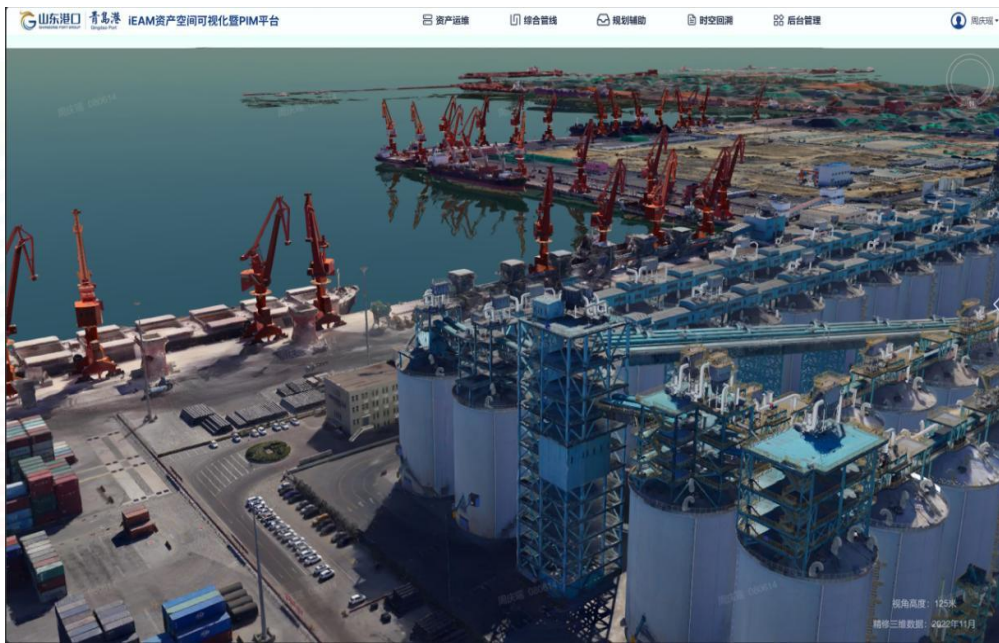
Chongqing: social governance



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

3.4 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



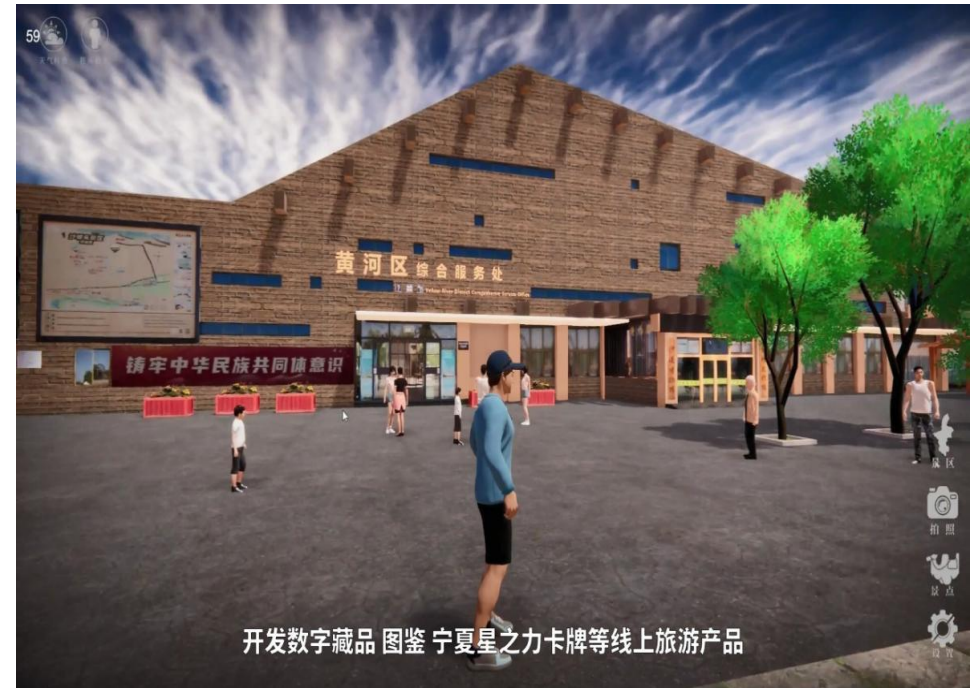
Shenzhen: digital Longhua

3.5 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: innovative “technology + culture + tourism”



Ningxia: “yuan tour of Ningxia” meta-universe

3.6 Servicing for digital culture

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: the ancient city conservation



Beijing: “Beijing Central Axis” heritage

3.7 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: Ecological Protection and Restoration in the Yangtze River Economic Belt



Shanxi: the protection of the Qinling Mountains



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4.1 Deqing Declaration

Last November in Deqing, CASM and domestic partners jointly released the Deqing Declaration on the Construction of ReS3D in China, which drew a blueprint of high-quality development for the construction of ReS3D China.



实景三维中国建设德清宣言

2023年11月10日，德清

第一届中国测绘地理信息大会于2023年11月8日至10日在浙江省湖州市德清县举行，大会期间举办了“实景三维中国建设”分论坛。该分论坛由中国测绘学会实景三维工作委员会、中国地理信息产业协会实景三维城市工作委员会、实景三维技术创新工作委员会和城市空间信息工作委员会联合举办。与会代表积极响应2023年10月8日至10日在重庆市召开的实景三维中国建设推进会议有关精神和要求，围绕实景三维中国建设的目标任务、关键技术和应用服务等进行了广泛而深入的交流和讨论。大会发布宣言如下：

一是坚持数据为王，聚焦数据建设。强化测绘地理信息数据是自然资源要素保障的理念，要将实景三维中国建设视为数字中国建设、数字经济发展的重点任务，有力推动地形级和城市级实景三维数据资源建设，加强国省市实景三维数据的衔接，以地理实体空间身份编码为纽带，保证省级层面能够及时调用市县级建设成果，并能够及时向国家层面汇集数据成果。

二是坚持应用为本，构建应用生态。按照“需求牵引供给、供给创造需求”原则打造多类型应用场景，纵深推进自然资源和重点行业典型应用场景落地，推动实景三维中国建设工作在应用领域做深做实，推进保密处理技术研发应用，推动国产密码技术融合应用，真正构建起更智能、更高效、更安全的实景三维应用生态，有力支撑自然资源管理，赋能政府政策，助力数字经济发展，服务百姓美好生活，服务数字文化建设，支撑数字生态文明建设。

三是坚持创新为要，强化创新驱动。要注重理念创新，充分认识到实景三维是国家重要的新型基础设施，也要强化开放共享的理念，还要增强赋能的意识和统筹融合的意识；要加快机制创新，系统性构建“需求征集-业务研究-产品定制-应用服务-跟踪维护”的全流程主动式服务机制和多部门、多层级参与的协调工作机制；要突出科技创新，加强产品创新，坚持产学研用深度融合，围绕基础研究、技术攻关、标准制定、软硬件研发等成立联合攻关技术团队，构建自主可控的实景三维中国建设技术体系、标准体系和产品体系。

“实景三维，协同建设，创新发展，共筑辉煌”。让我们携起手来，加快推进实景三维中国建设，为数字中国建设打造统一的时空基底！

长沙市 地理信息服务中心 山东省 国土测绘院 深圳大学 青岛市 勘察测绘研究院 中国测绘 科学研究院 实景三维信息技术 股份有限公司 安徽省 测绘总院 上海华东测绘技术 股份有限公司 实景三维科技(北京) 股份有限公司

喻志权 田中原 李峰 张吉峰 燕琴 刘旭 张和成 胡伟 杨明章

4.2 International Cooperation

Initiated an international pilot project on Digital Twin and ReS3D Technology

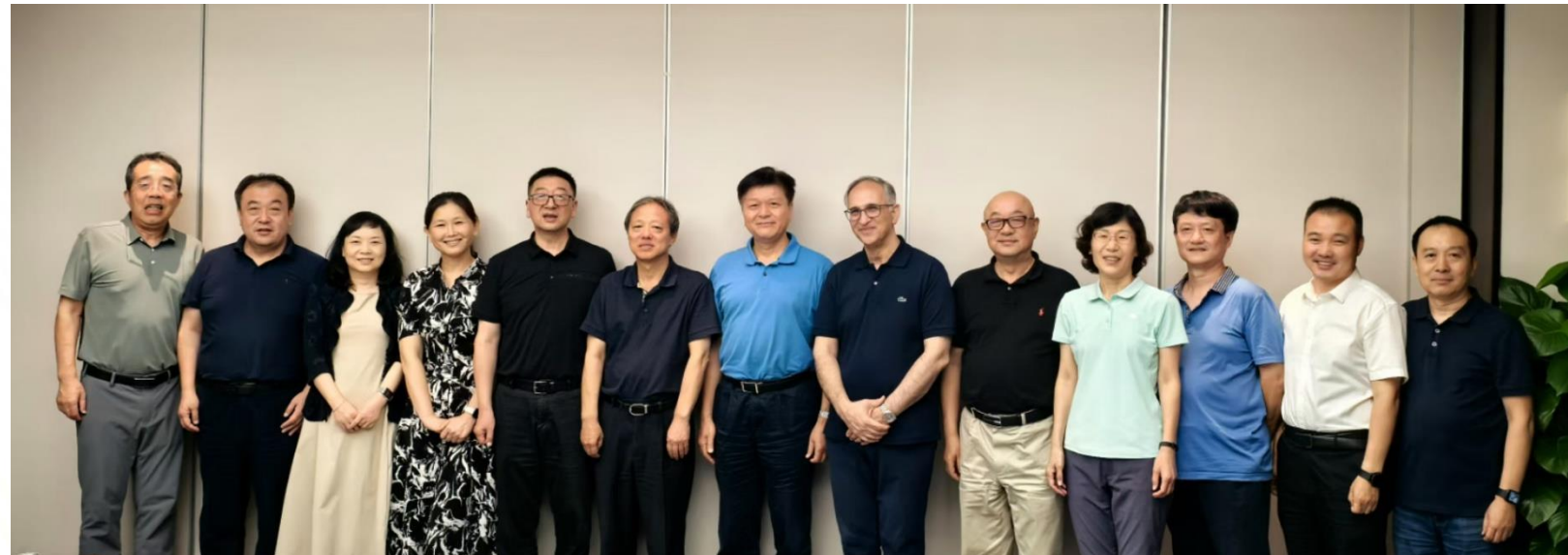
Established a team jointly with University of Melbourne and Qingdao Institute of S&M

Jointly hosted 2 international workshop in QingDao and Xi'an

Jointly host this session and in the future...



Qingdao



Xi'an

4.3 Support to the SDGs

more 2030 Agenda Goals 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

—**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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UNGEONOW 2024
首届联合国地信周



THANK YOU

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