

ICC2017

DISASTER MANAGEMENT,BIG DATA,SERVICES AND CARTOGRAPHIC REPRESENTATION

**Exploring Smart City Innovation:
The Rise of Geospatial Information platform for Early Warning**



空间平台在城市治理中的应用——深圳实践

**The Application of Geospatial
Platform in Urban
Governance —— Shenzhen**

Wei Sun

Urban Planning, Land&Resources Commission of
Shenzhen Municipality

Topics

- 1 历程**
Development Process
- 2 应用**
Application Status
- 3 展望**
Future Prospect

1. Development Process

深圳 The City of Shenzhen



Shenzhen, China

Founded in 1979,
China's first and one of the most successful Special Economic Zone.
covers an area of 1,997 km² with a total population of over 18 million in 2015.

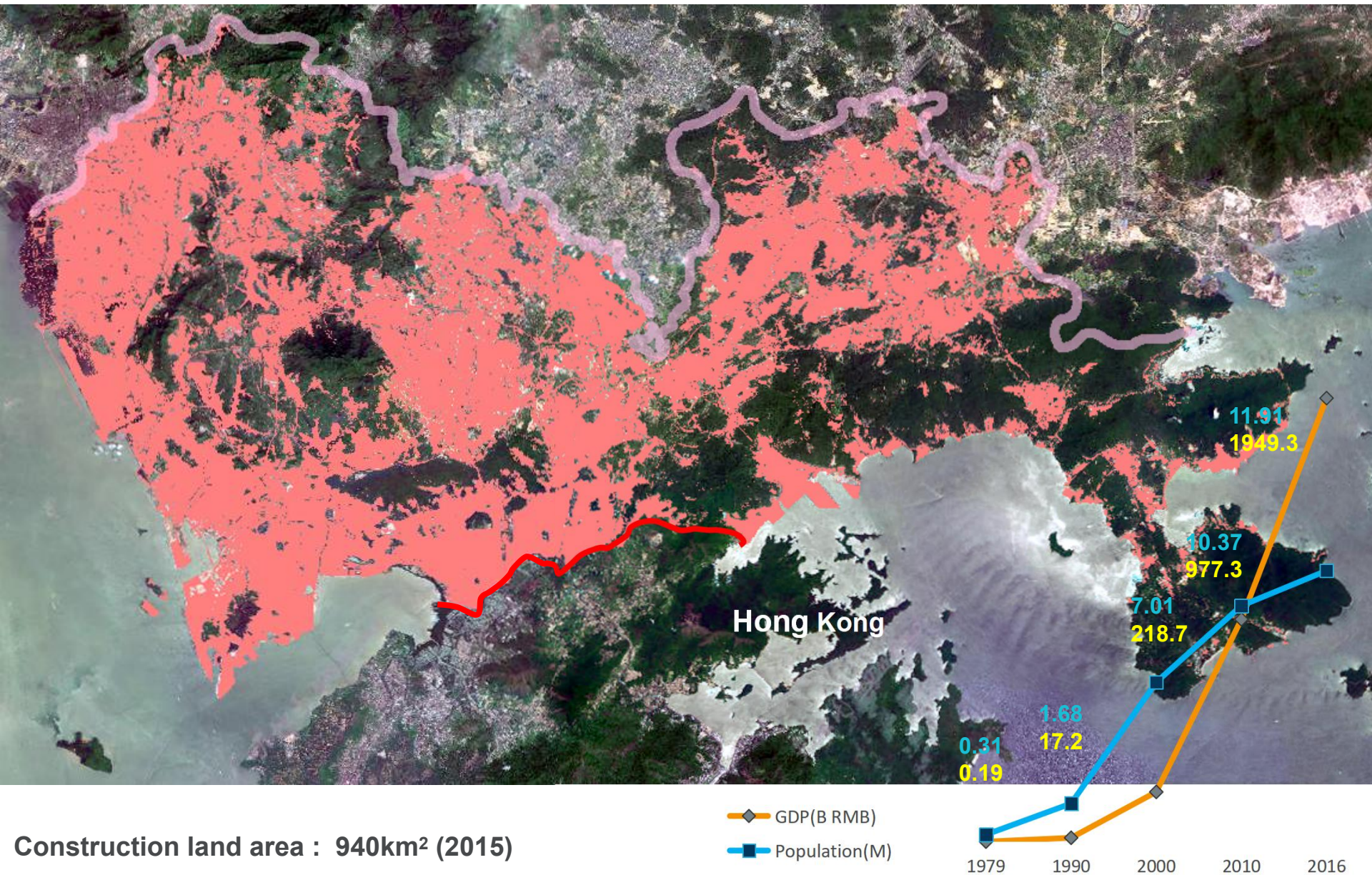
What happened in Shenzhen in 30 years?



1979 city (Bao'an County) area 1954km²

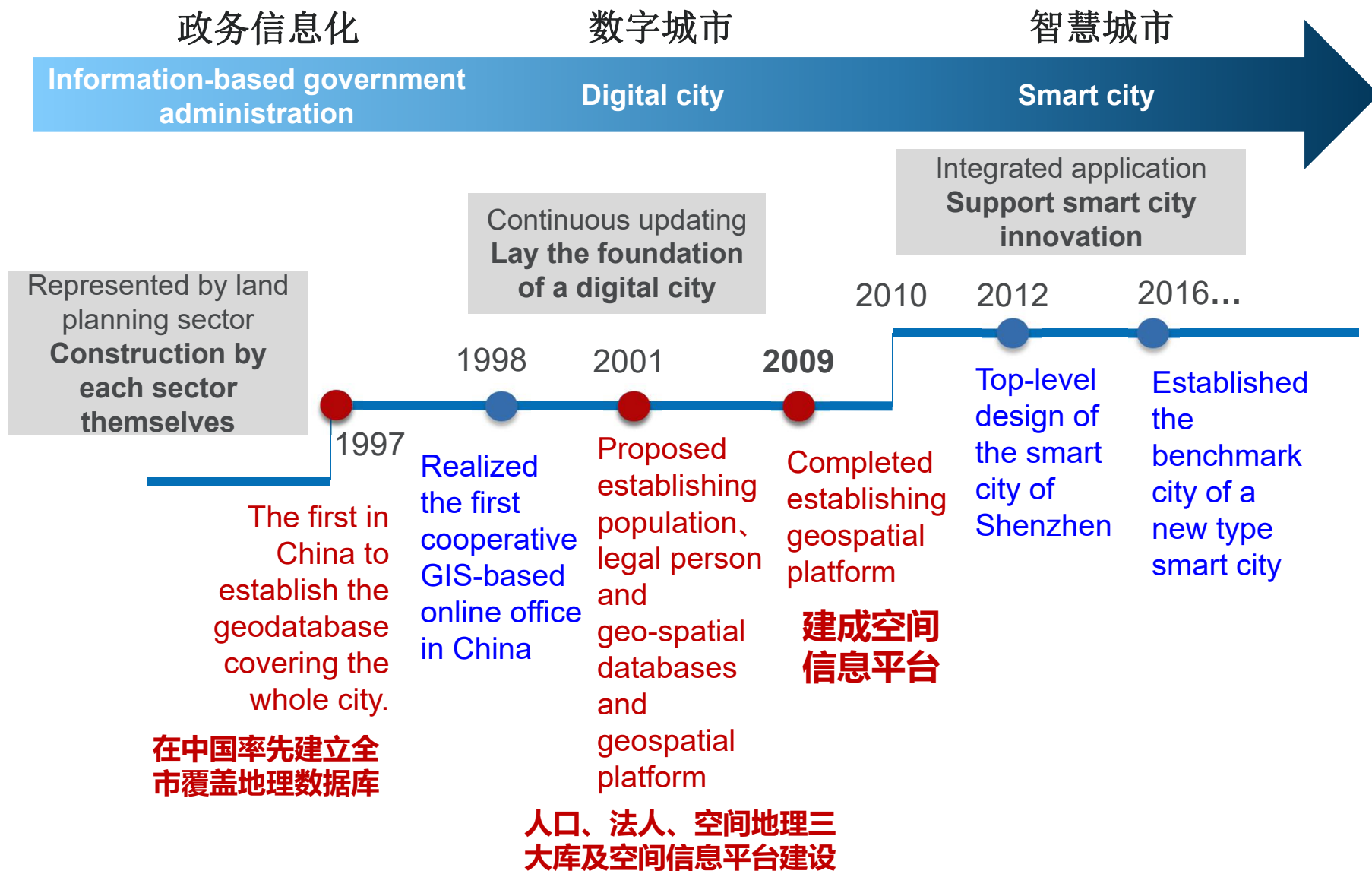
Special Economic Zone 327.5km²

What happened in Shenzhen in 30 years?



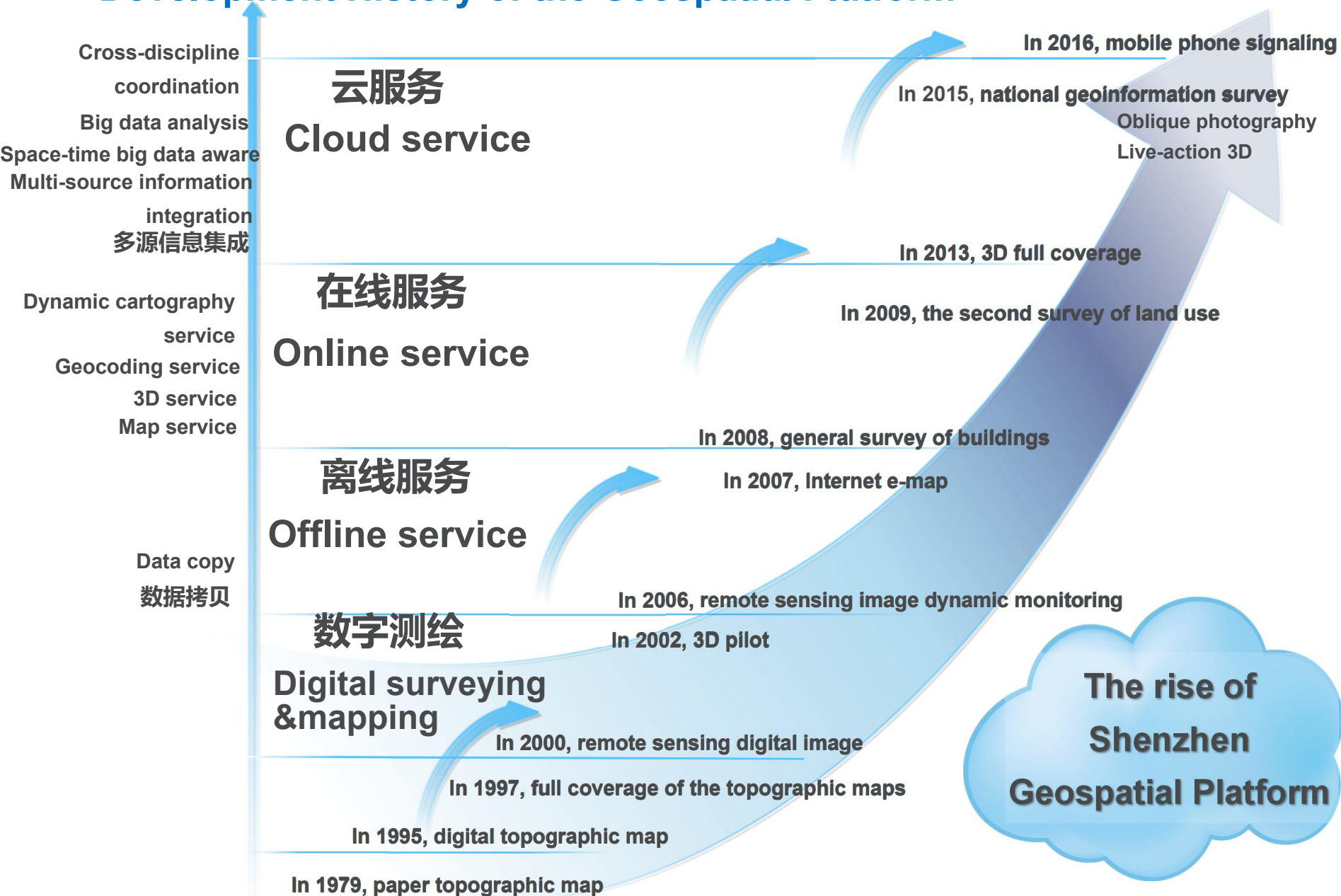
深圳信息化发展历程

Information-based Development History of Shenzhen



空间信息平台发展历程

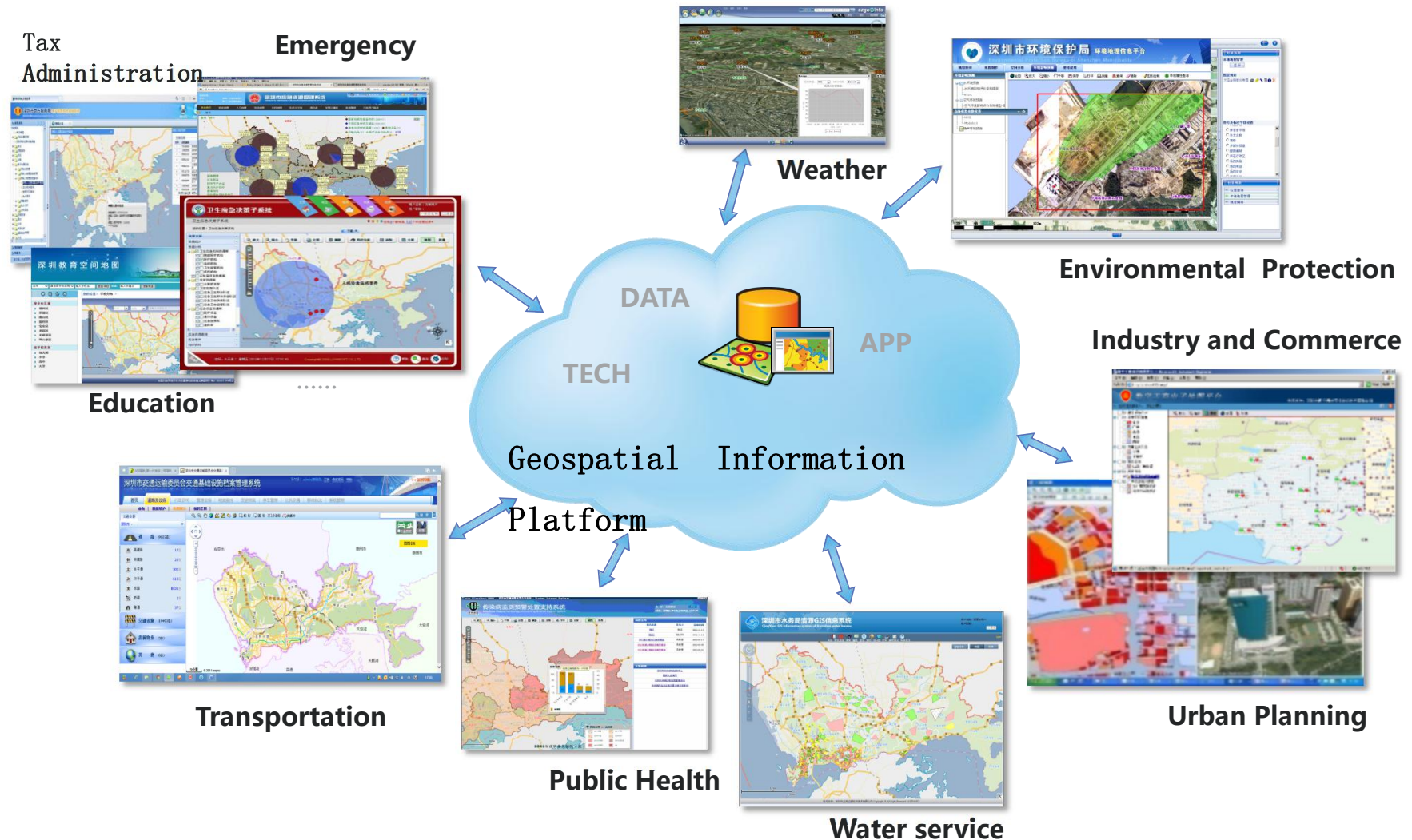
Development History of the Geospatial Platform



空间信息平台发展历程

Development History of the Geospatial Information Platform

the platform has successfully served nearly 90 departments



2. Application Status

城市发展阶段主要问题需求

Key Issues for Different Levels of Urban Development



1986

Exploit

To serve the rapid construction of the special zone
服务特区快速建设



1996

Pioneer

Integration of the special zone,
from extensive development
to intensive development
特区一体化，由粗放
到集约发展



2006

Livable

Four unsustainables :
Land & Space resources
Energy & Water resources
Labor resources
Environmental Bear capacity
四个难以为继



2016

?

Increasingly complex
urban problems
Urban Planning & Urban
Governance
城市问题日趋复杂
城市规划 & 城市治理

Innovation

开拓 Exploit

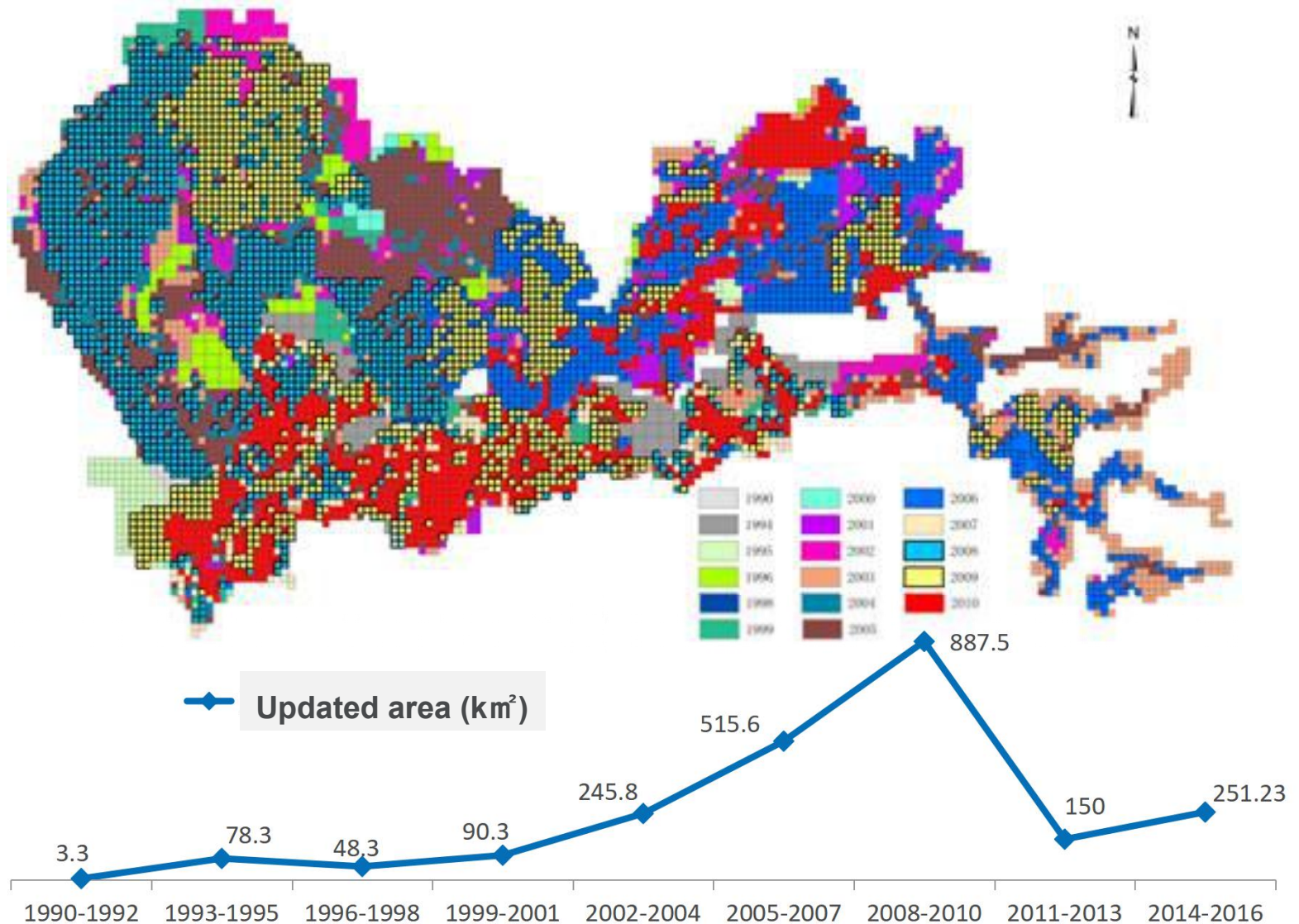
‘Exploit’ is a key word in ‘Shenzhen spirit’ in 1990.



开拓 Exploit

Surveying and mapping data service in the exploration age

The dynamic surveying of the topographic map and remote sensing image covering the whole city strongly support the rapid development of Shenzhen.



城市发展阶段主要问题需求

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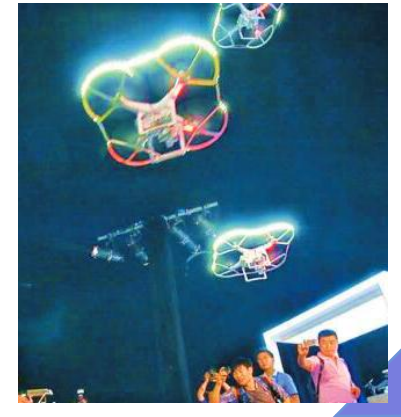
Integration of the special zone, from extensive development to intensive development
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Innovation

先锋城市理念下的城市设计

Urban design in the pioneer city idea

Master planning + Urban design ——urban morphology strengthened urban design, and improved urban quality.



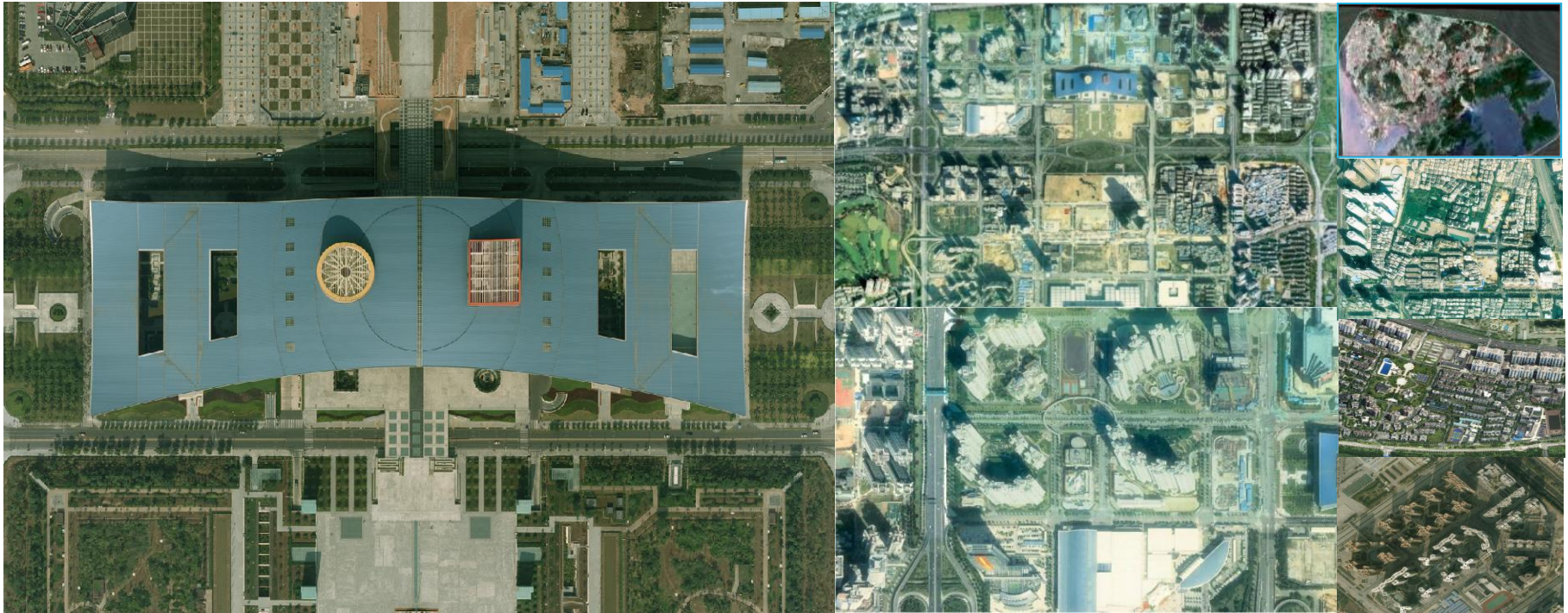
Figure: Shenzhen Bay Coastal Leisure Strip Landscape Design International Consultation

先锋城市理念下的城市设计

Urban design in the pioneer city idea

遥感影像 Remote sensing images

- Capture 0.2m resolution aerial images every year



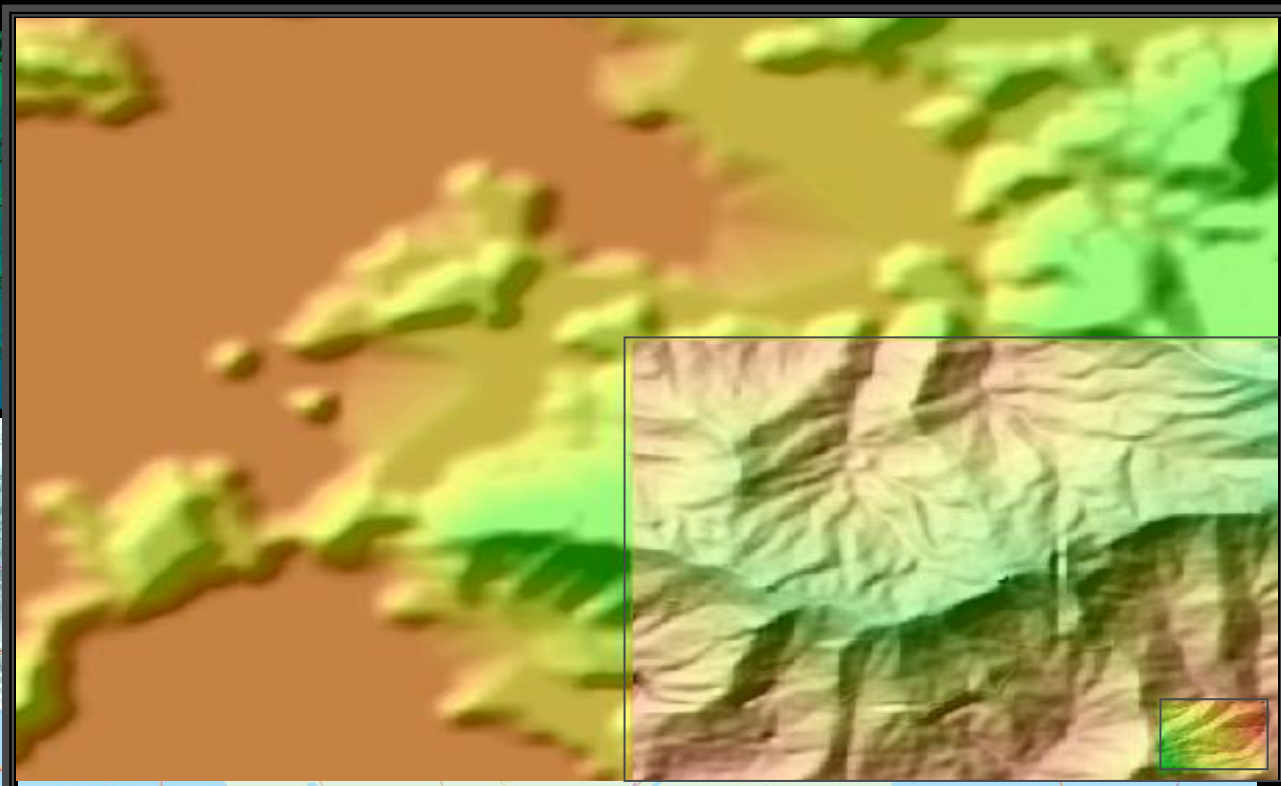
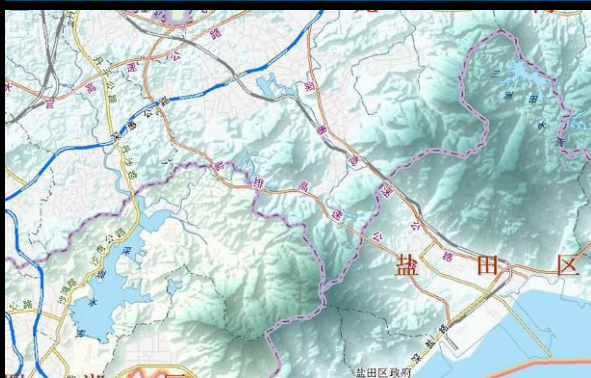
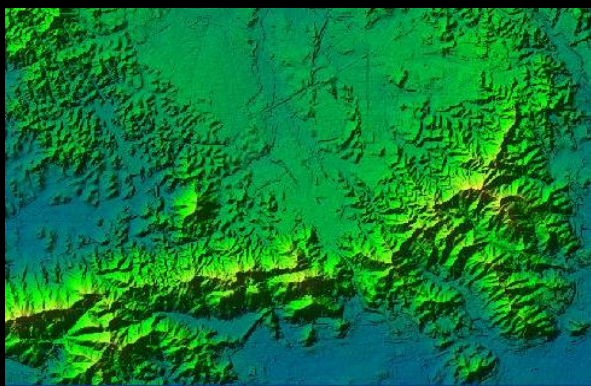
- Capture 0.6m resolution satellite images every year
- Capture 2.5m resolution satellite images every half a year

先锋城市理念下的城市设计

Urban design in the pioneer city idea

数字高程 Digital elevation model

2m resolution , update with aerial images

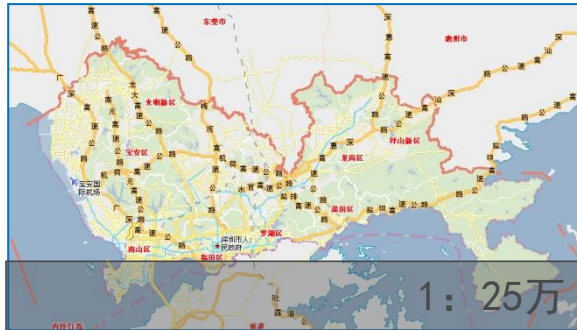


先锋城市理念下的城市设计

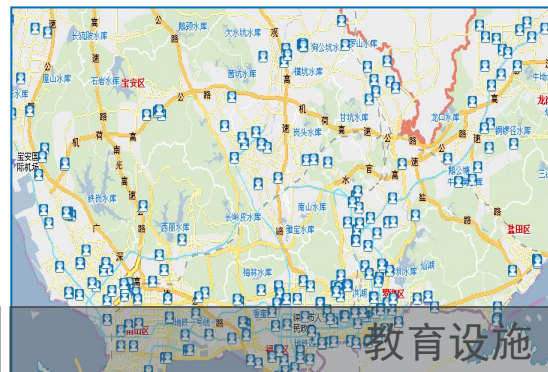
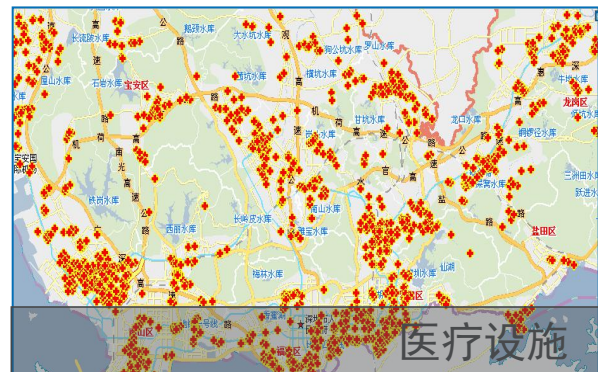
Urban design in the pioneer city idea

电子地图及公共设施

Electronic map and the distribution of communal facilities



- The maps were reviewed and processed by security technologies, providing 2 versions of map: municipal version and public version.
- All elements and varying scales (1:1000 , 1:10000 , 1:50000 , 1:250000).
- Public facilities information: 17 categories, 125 classes and 0.22million rows.
- Update the maps twice a year.



先锋城市理念下的城市设计

Urban design in the pioneer city idea

三维仿真 3D virtual city



- 3D models of the whole city , more than 600,000 buildings and main structures
- Integrated with surveying data and geocoding data
- LOD technology , supporting distribution of massive 3D models
- Underground 3D models

先锋城市理念下的城市设计

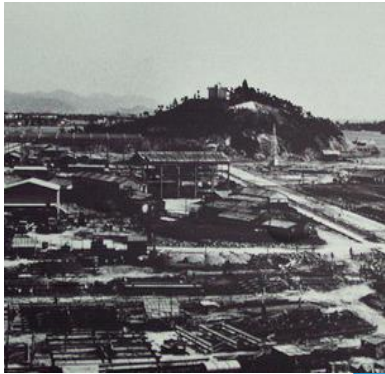
Urban design in the pioneer city idea

三维仿真 3D virtual city



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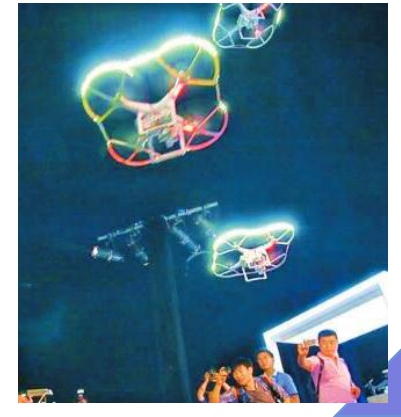
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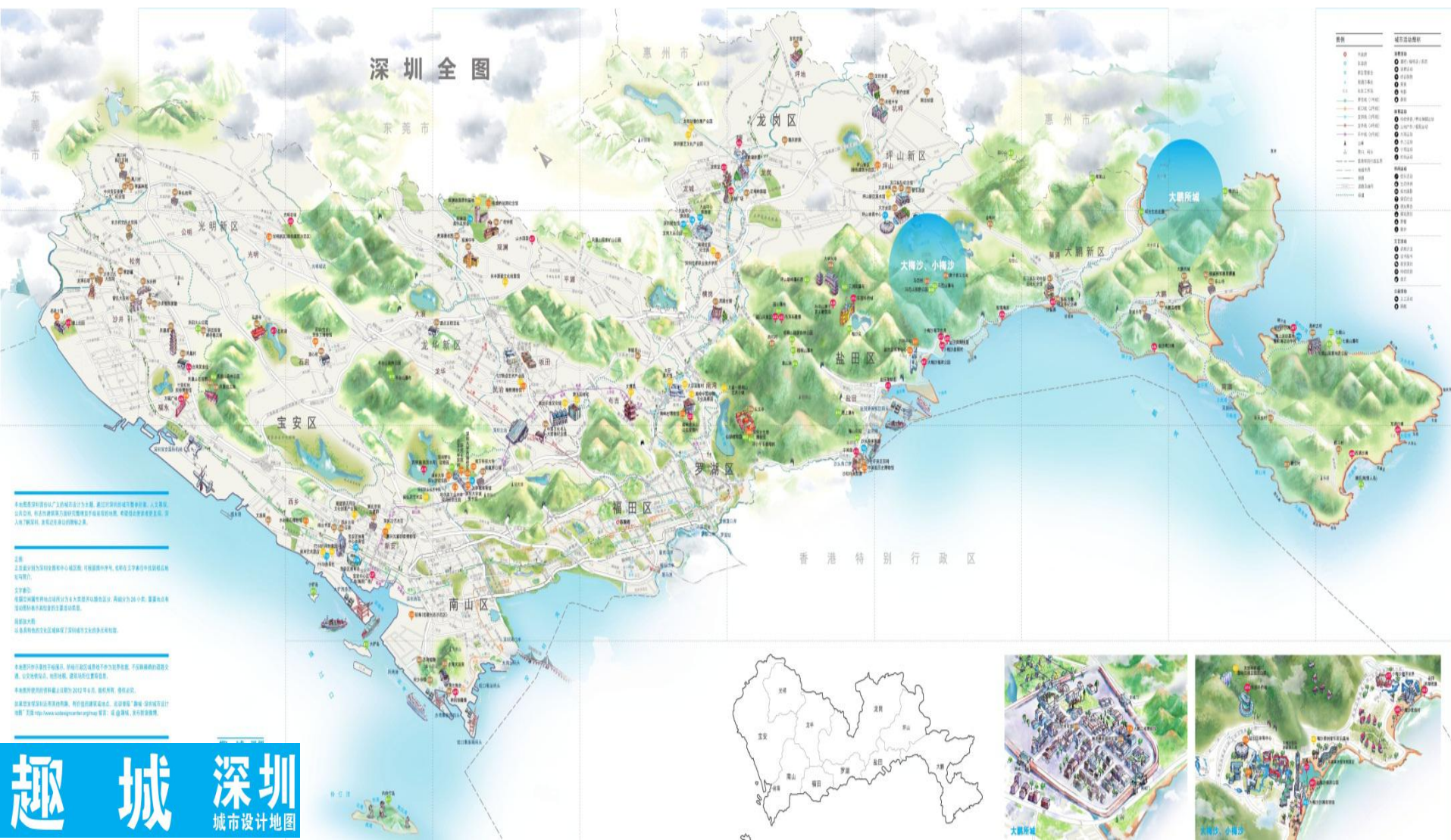
2016

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Increasingly complex urban problems
Urban Planning & Urban Governance
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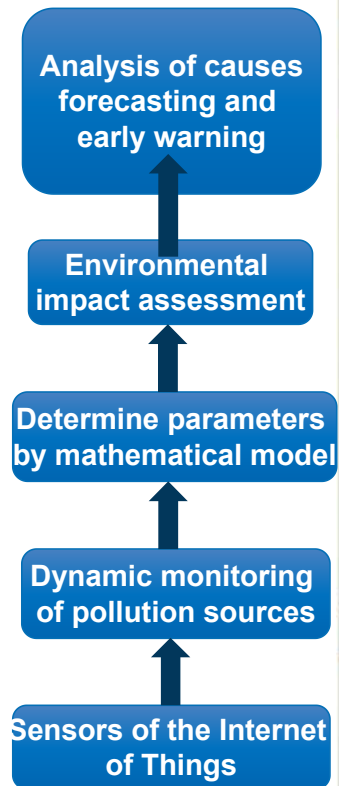
Innovation

— An interesting , livable , eco-civilized , in harmony with nature city



宜居城市的愿景 Vision of a Livable City

数字环保 Digital environmental protection



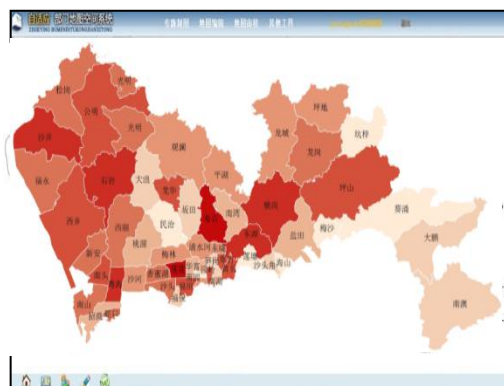
Environmental Geographic Information Platform of Shenzhen

宜居城市的愿景 Vision of a Livable City

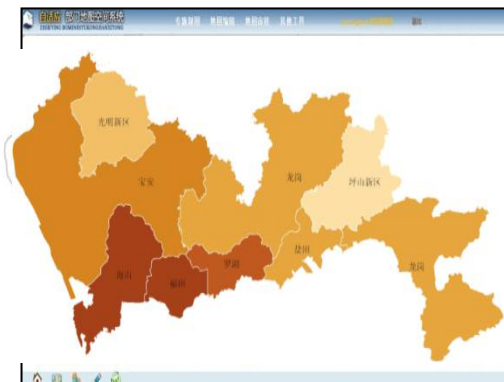
公共卫生领域 Public Sanitation

1	性别	年龄	入院日期	籍贯	职业	家庭住址	治疗
2	男	Y30	2011-04-0	湖北省鹤峰	其他专业	沙河西路425号爱绿园林	其他
3	男	Y39	2011-06-1	安徽省太湖	其他专业	深圳市南山区西丽镇珠光路	其他
4	女	Y65	2011-07-2	四川省	其他农、	深圳市西丽茶光35栋508房	好转
5	男	Y53	2011-08-2	马来西亚	其他专业	西丽留仙苑6栋502	其他
6	女	Y64	2011-10-0	广西省	无业	桃园村86栋18D	其他
7	男	Y79	2011-10-1	四川	无业	沙河荔园新村8-2单元404	好转
8	女	Y52	2011-11-2	陆丰	无业	南山区西丽镇富盛大梯C-402	其他
9	男	Y52	2011-01-2	黑龙江省	工程技术	广东省深圳市南山区工业七路39	好转
10	女	Y53	2011-03-2	内蒙古自治区	工程式技	广东省深圳市南山区向南路49号	好转
11	女	Y69	2011-10-1	广东	无业	深圳市南山区南山大道北颐景花	好转
12	男	Y69	2011-10-2	广东	无业	南山区前海路阳光棕榈园29-2-4D	好转
13	男	Y45	2010-12-2	湖北荆州	个体	福田区益田花园9栋705房	治愈
14	男	Y66	2011-01-1	广东深圳	无	宝安区公明镇楼村南片1巷19号	好转
15	女	Y68	2011-02-2	广东潮阳	退休	福田区彩田路茂恒园1-306	其他
16	男	Y70	2011-04-0	广东英德	退休	罗湖区梅园路笋岗村20号705	好转
17	男	Y57	2011-04-1	黑龙江齐齐哈尔	干部	福田区梅岗南街8号404	好转
18	女	Y53	2011-05-0	湖南衡阳	退休	南山区前海路港湾丽都6-13A	其他
19	男	Y71	2011-05-0	广东惠来	退休	龙岗区布吉莲花路莲花山庄4村12	治愈
20	女	Y74	2011-05-1	北京	退休	福田区福荣路蓝湾半岛A栋503房	治愈
21	女	Y79	2011-09-1	广东深圳	无	福田区梅林合正逸园D栋1103房	好转
22	女	Y64	2011-11-1	山东高密	退休	福田竹子林金海花园4-7B	治愈
23	女	Y60	2011-11-1	山东昌邑县	退休	福田区竹子林金海花园3栋801	好转
24	女	Y97	2011-12-1	广东省深圳	不便分类	广东省深圳市宝安区沙井街道黄	好转
25	女	Y72	2011-01-2	深圳市惠东	无业	罗湖区凤凰路3号海龙苑海阁阁24	其他
26	男	Y51	2011-02-1	广东省深圳	无业	深圳市南山区明珠花园1-503	其他
27	男	Y53	2011-03-1	广东省东源	不便分类	深圳市南山区白石洲西二坊	治愈
28	女	Y39	2011-10-1	湖南省南县	无业	龙岗区南湾丹竹头新洲西三巷三	好转
29	女	Y72	2011-03-1	河北省南皮	退休	深圳市华泰公司	好转
30	男	Y79	2011-02-1	广东省清远	不便分类	深圳福田区高尔夫花园丽景阁176	好转
31	女	Y70	2011-10-2	广东省汕头	无业	广东省汕头市潮南区	好转
32	女	Y82	2011-11-2	广东省郁南	不便分类	深圳罗湖区长岭村35-201	好转
33	女	Y56	2011-01-1	广东汕头	工程技术	福田区沙嘴路好景豪园海景阁B	未愈
34	女	Y30	2011-09-2	广东鹤山	其他专业	农林路龙溪花园7-3-404	好转
35	女	Y68	2011-01-1	广东深圳市	不便分类	罗湖区宝安南路2103号骏庭名园	其他

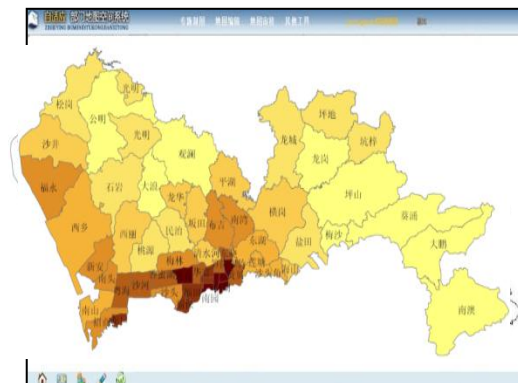
Data from Shenzhen
Medical Information
Center
深圳市医学信息中心
病例数据



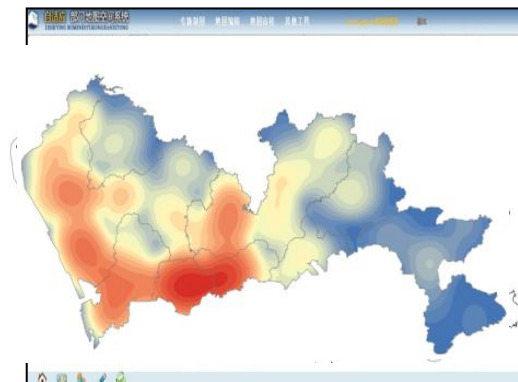
2011 Statistical map of liver cancer by sub-district



2011 Statistical map of hepatitis B by district



2011 Density map of hypertension by sub-district



2011 Contour map of heart disease

城市发展阶段主要问题需求

Key Issues for Different Levels of Urban Development



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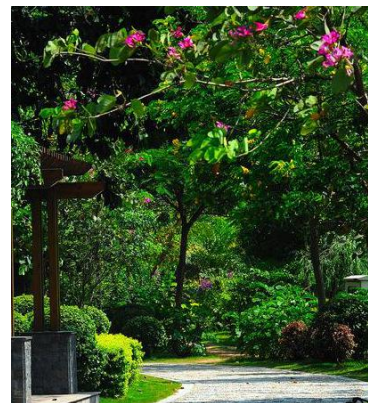
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城市问题日趋复杂 Complex Urban Issues



**Shortage of
resources and
environment**



Traffic jams



**Insufficient public
service capacity**



**Hidden danger from
illegal construction**



City safe-guarding

创新城市下的智慧应用探索

Exploration of Smart Applications in the Innovative City

Upgrade of geospatial Platform , and technical support

Urban Security Application

Fire Topic

Explosion
Topic

Pollution Topic

Land
Subsidence
Topic

Landslide
Topic

...

Multi-dimension multi-
target data cleansing
model

Multisource and
polymorphism data
association model

Mass heterogeneous data
integration model

Urban big data fusion environment

Multi-source integration

Dynamic acquisition

Real-time monitoring

Remote
sensing

Topograp
hy

Land
form

Facilities

Compon
ent

Stream
of people

Logistics

Energy
stream

Video

Temperature

Displacement

Deformation

Pressure

Urban basic data

Urban operation data

Dangerous source monitoring data

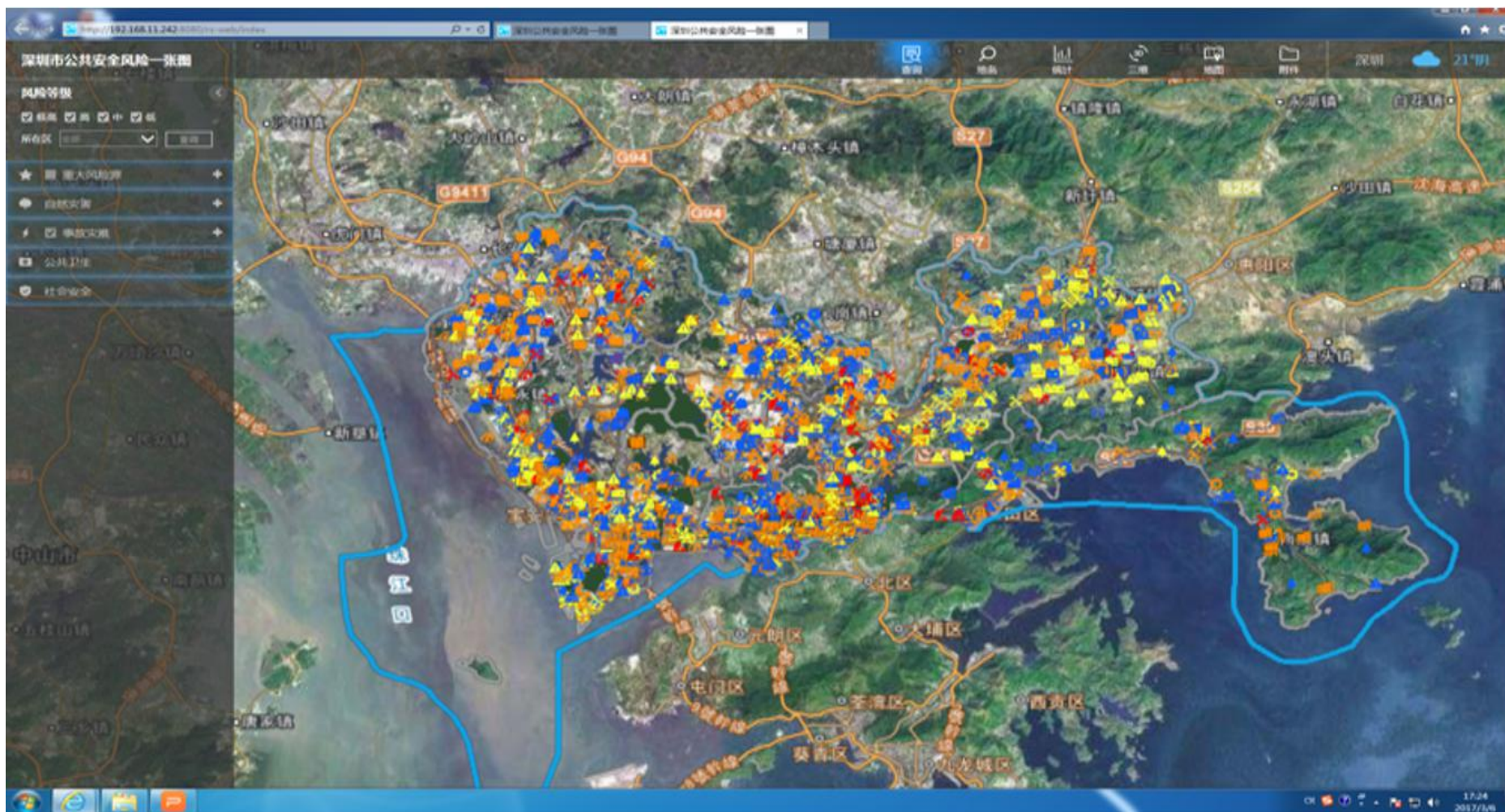
Urban big data environment

创新城市下的智慧应用探索

Exploration of Smart Applications in the Innovative City

深圳市公共安全一张图——事故灾害类风险点分布

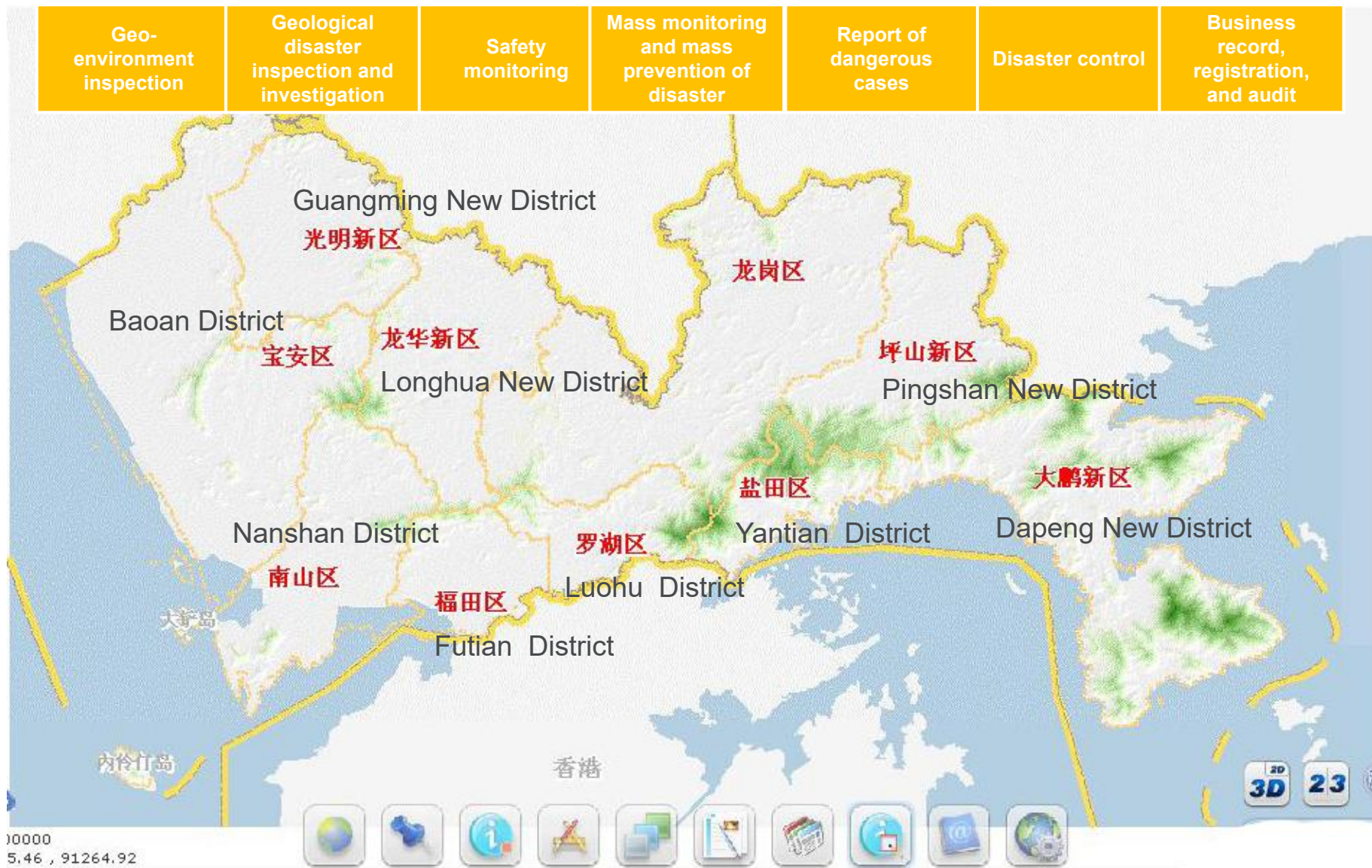
A picture of Shenzhen public security –Distribution of risk points of accident and disaster



创新城市下的智慧应用探索

Exploration of Smart Applications in the Innovative City

Geological disaster prevention and management information system construction



创新城市下的智慧应用探索

Exploration of Smart Applications in the Innovative City

自然地形地质持续监控

Continuous monitoring of natural landform and geology



创新城市下的智慧应用探索

Exploration of Smart Applications in the Innovative City

3D application platform of the new smart city --Analysis and decision-making on emergency response treatment

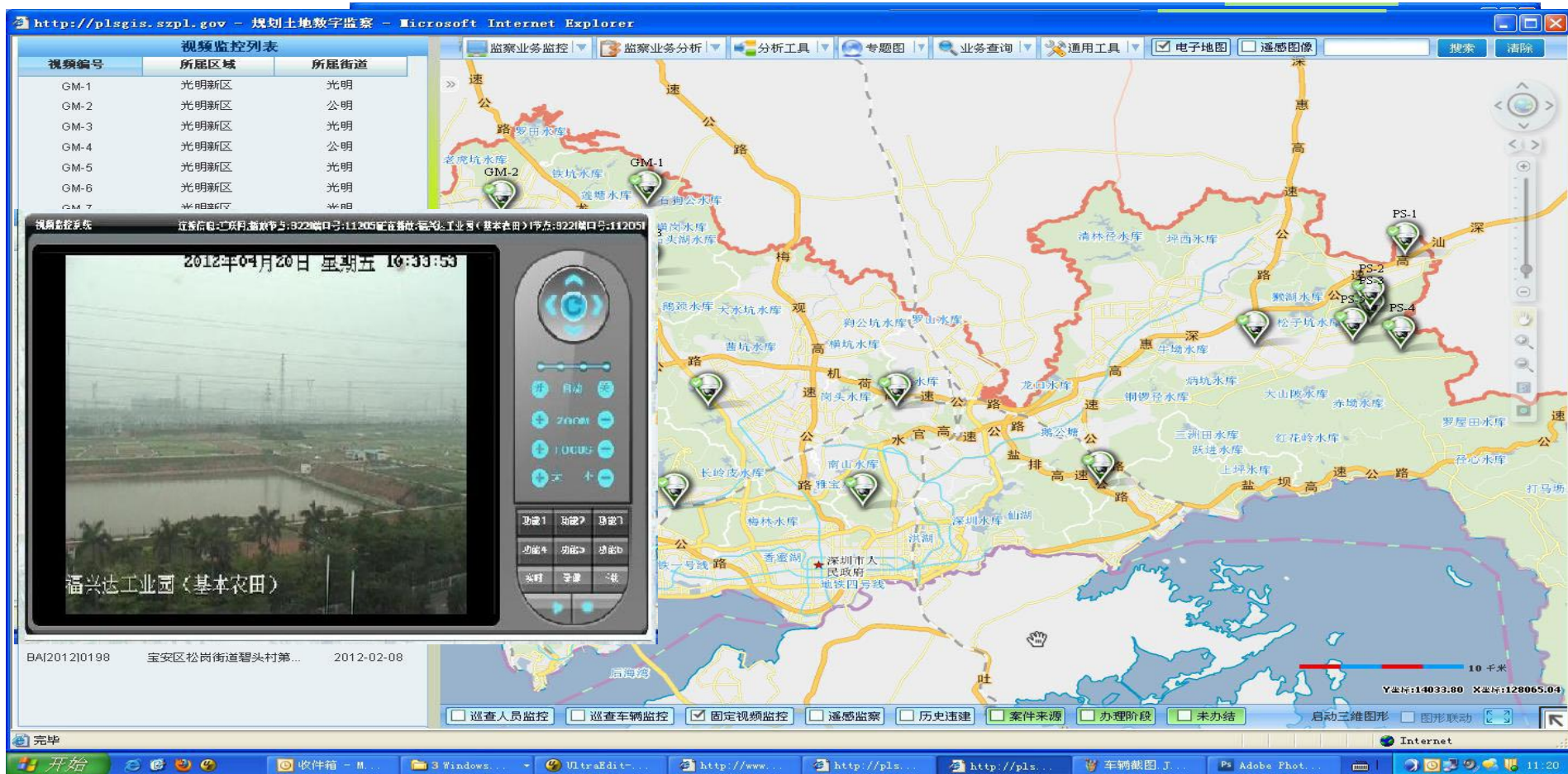


创新城市下的智慧应用探索

Exploration of Smart Applications in the Innovative City

违法建筑土地监察平台 Illegal Construction Land Supervision Platform

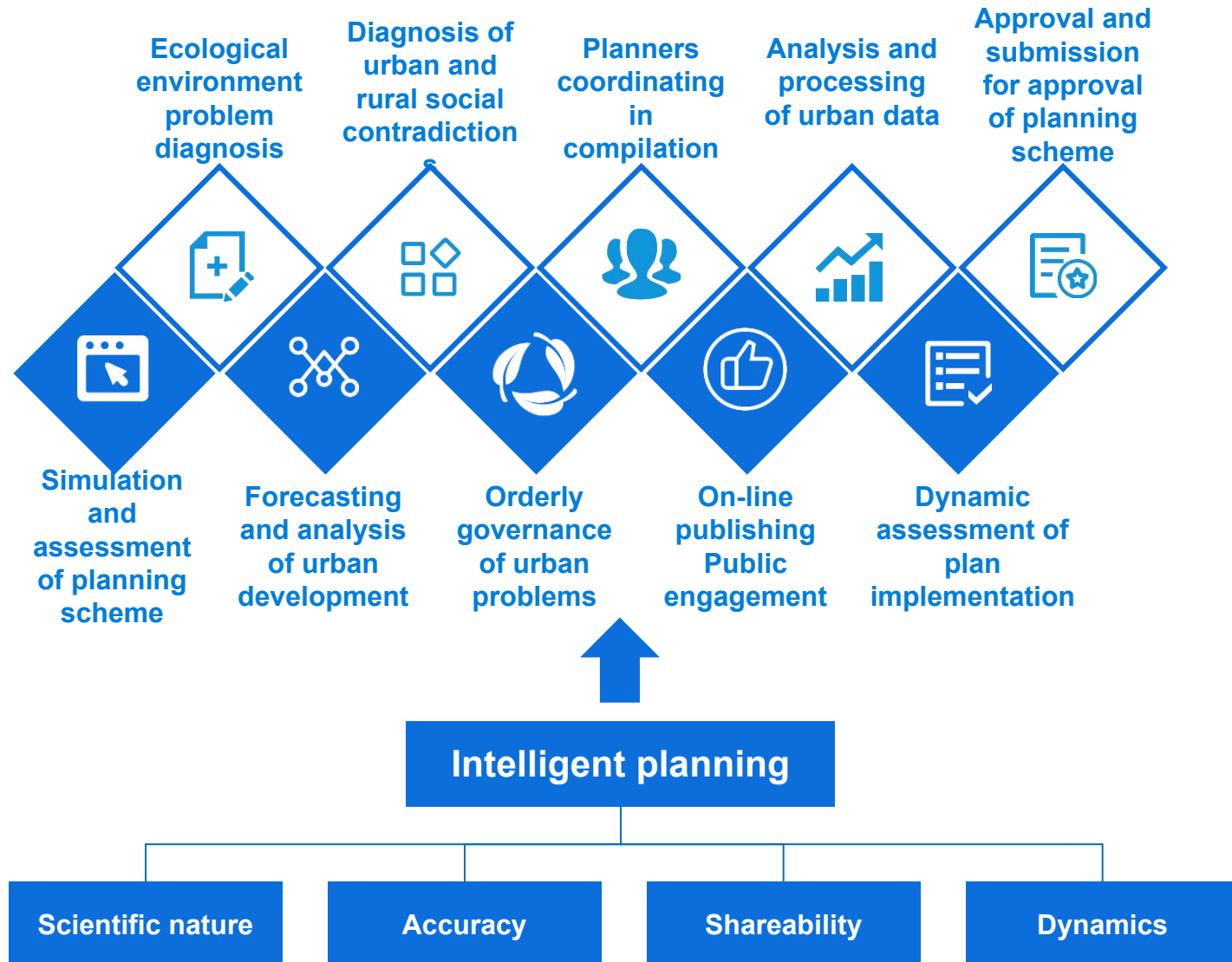
Viewing from the sky, Probing by videos, Reporting by people, Managing on line



3. Future Prospect

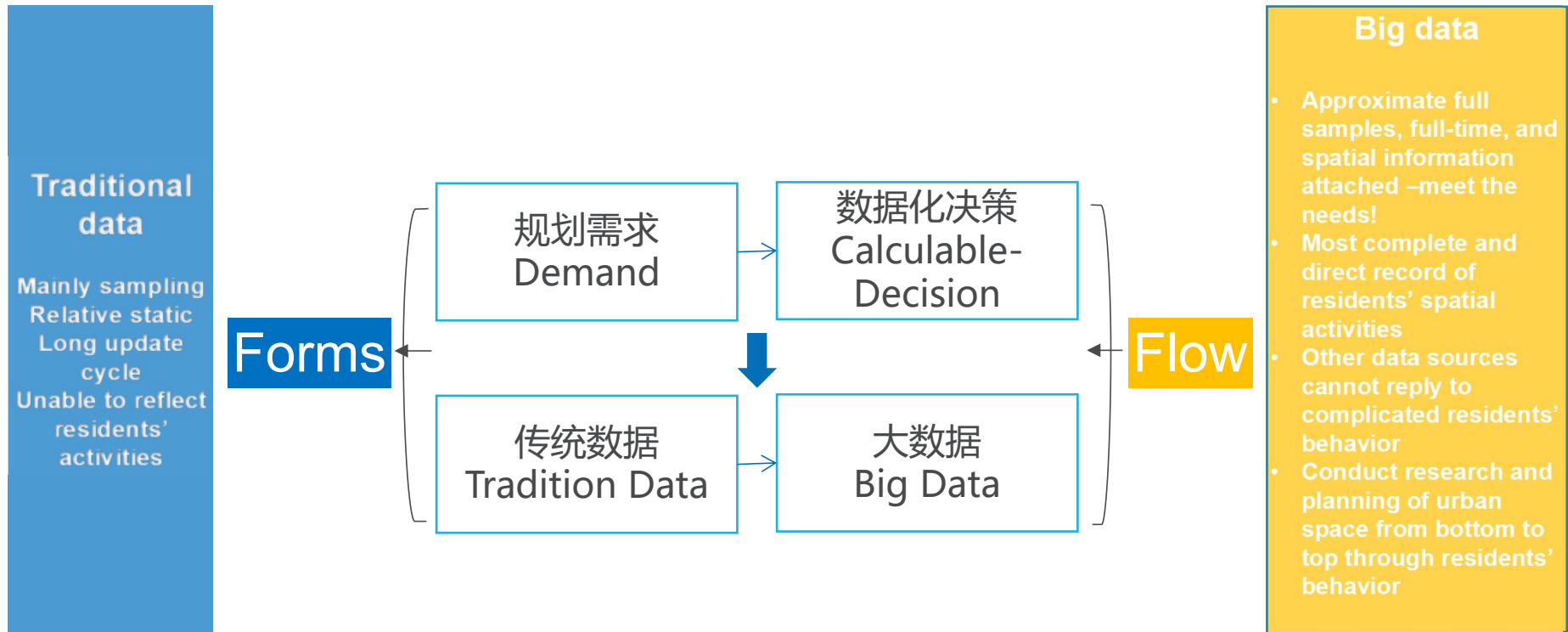
未来展望 Future Prospect

Intelligent urban planning



未来展望 Future Prospect

静态数据——动态数据
Static data —— Dynamic data



Objectivity



Full samples

Continuity



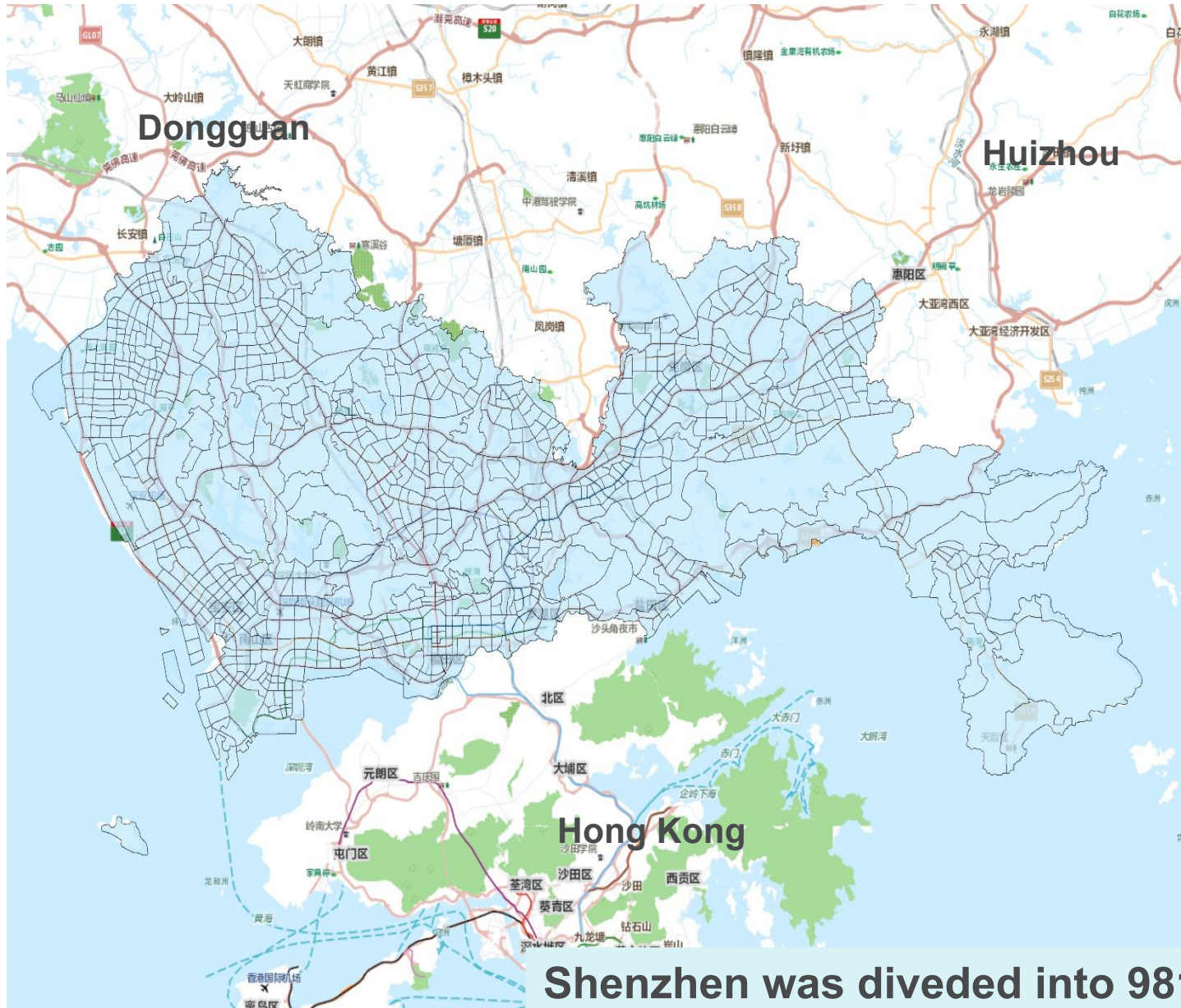
Real time and dynamic

Precision



No group differences

未来展望 Future Prospect



Traffic Zone

Daily population

Resident population

Overnight population

Permanent population

Working population

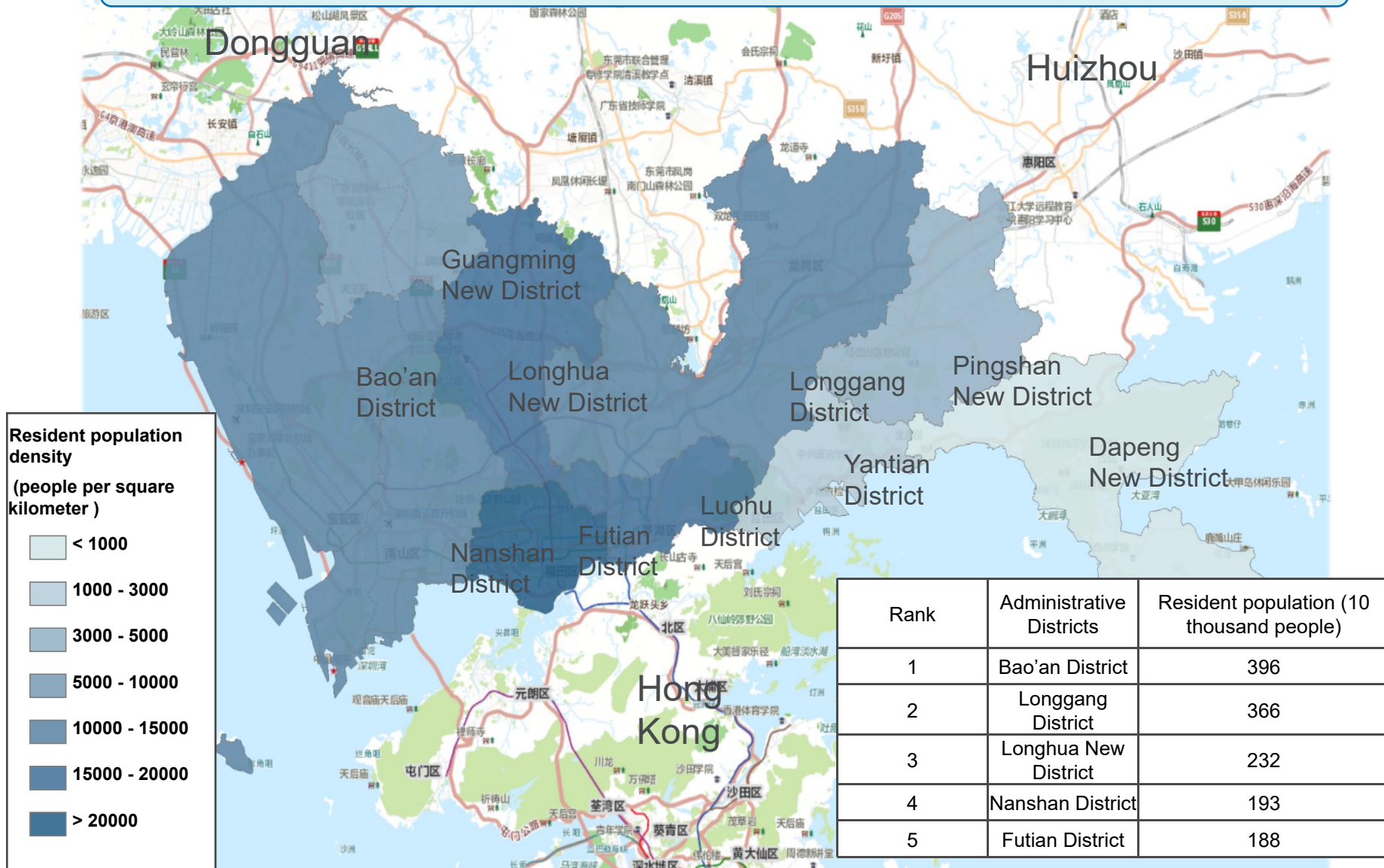
Floating population

Respiratory population

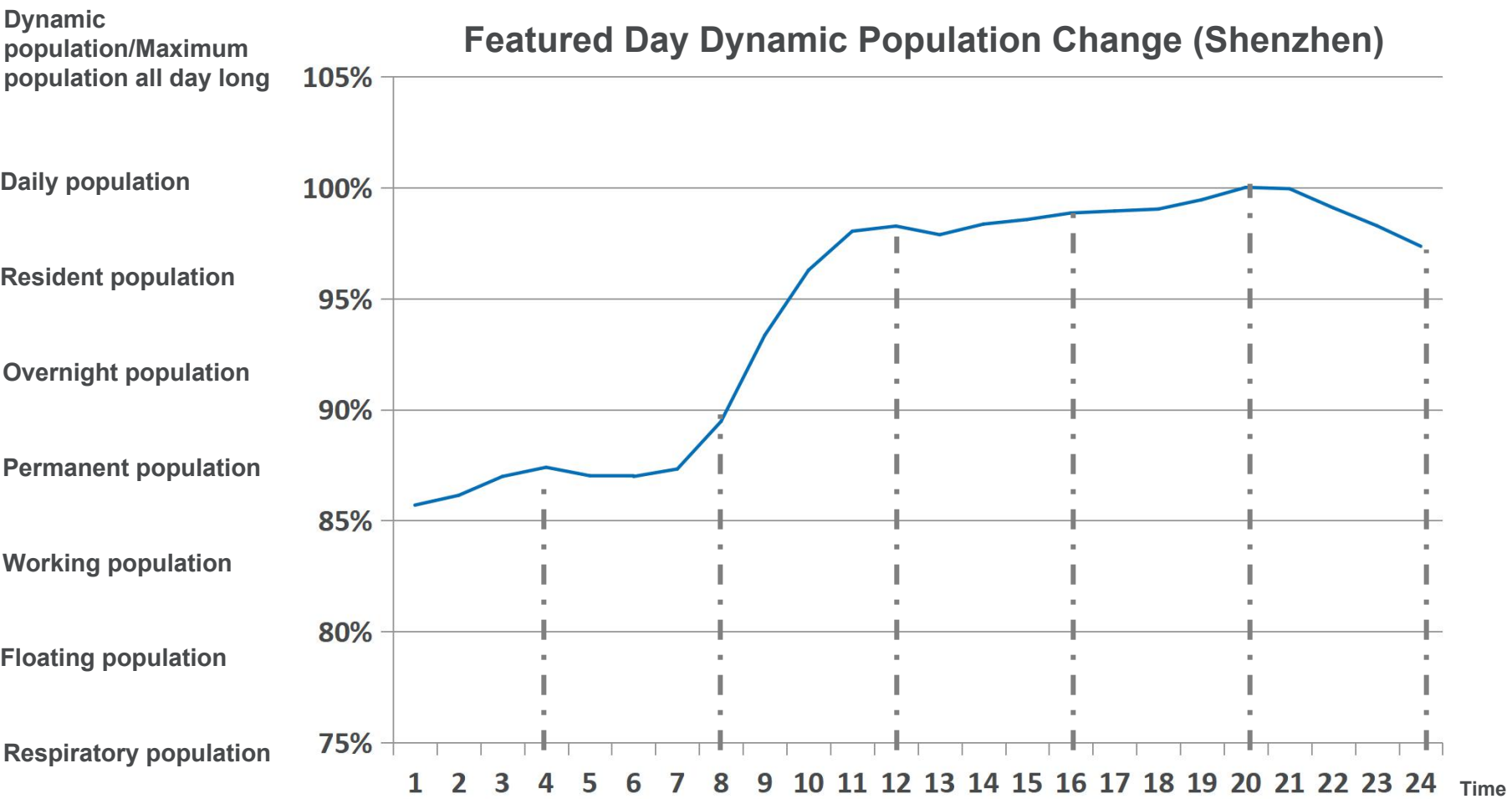
Shenzhen was divided into 981 Traffic zones.

未来展望 Future Prospect

Resident population of Shenzhen City 16.73 million



All kinds of demographic interpretation and application significance



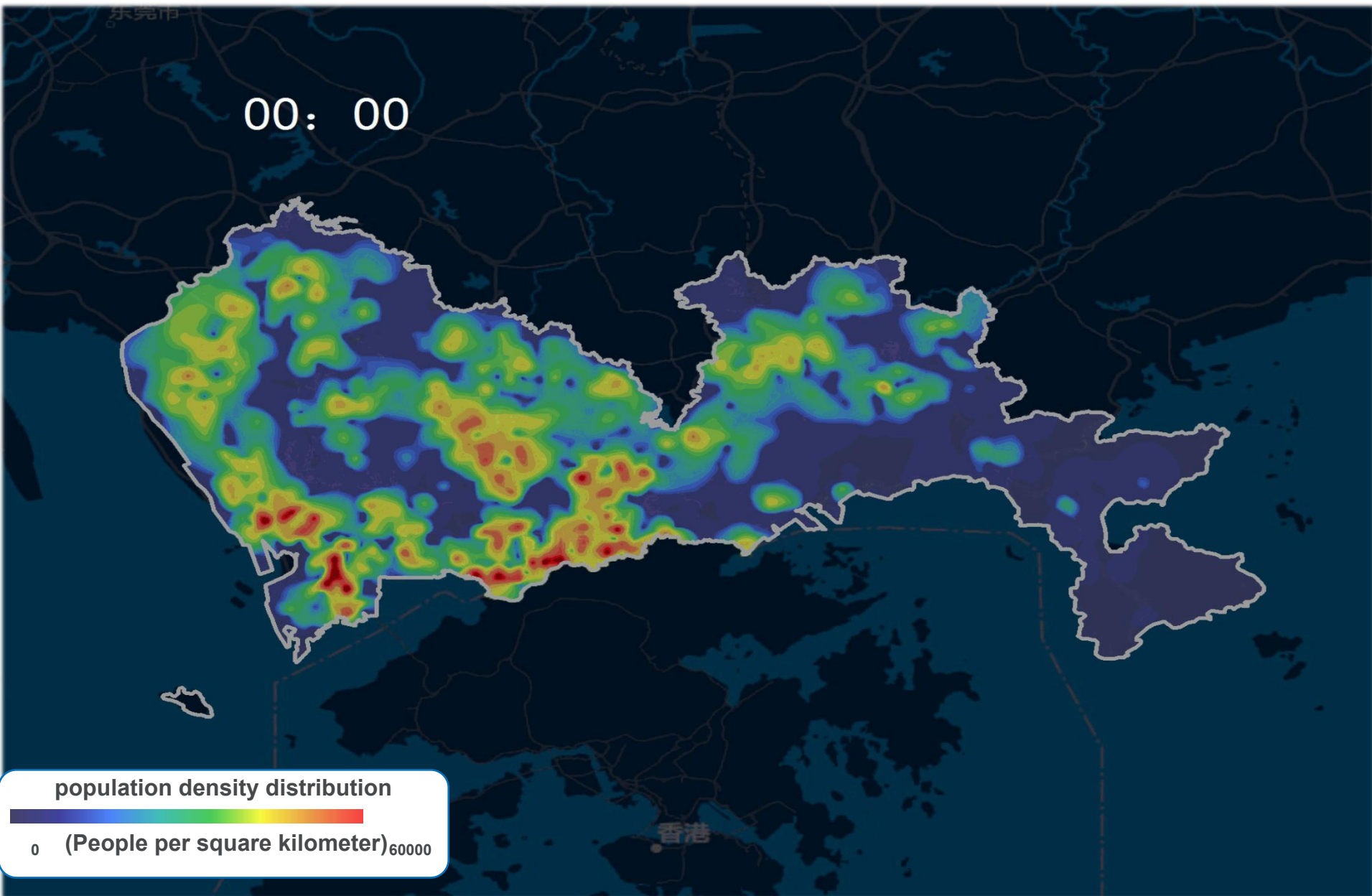
未来展望

Future Prospect

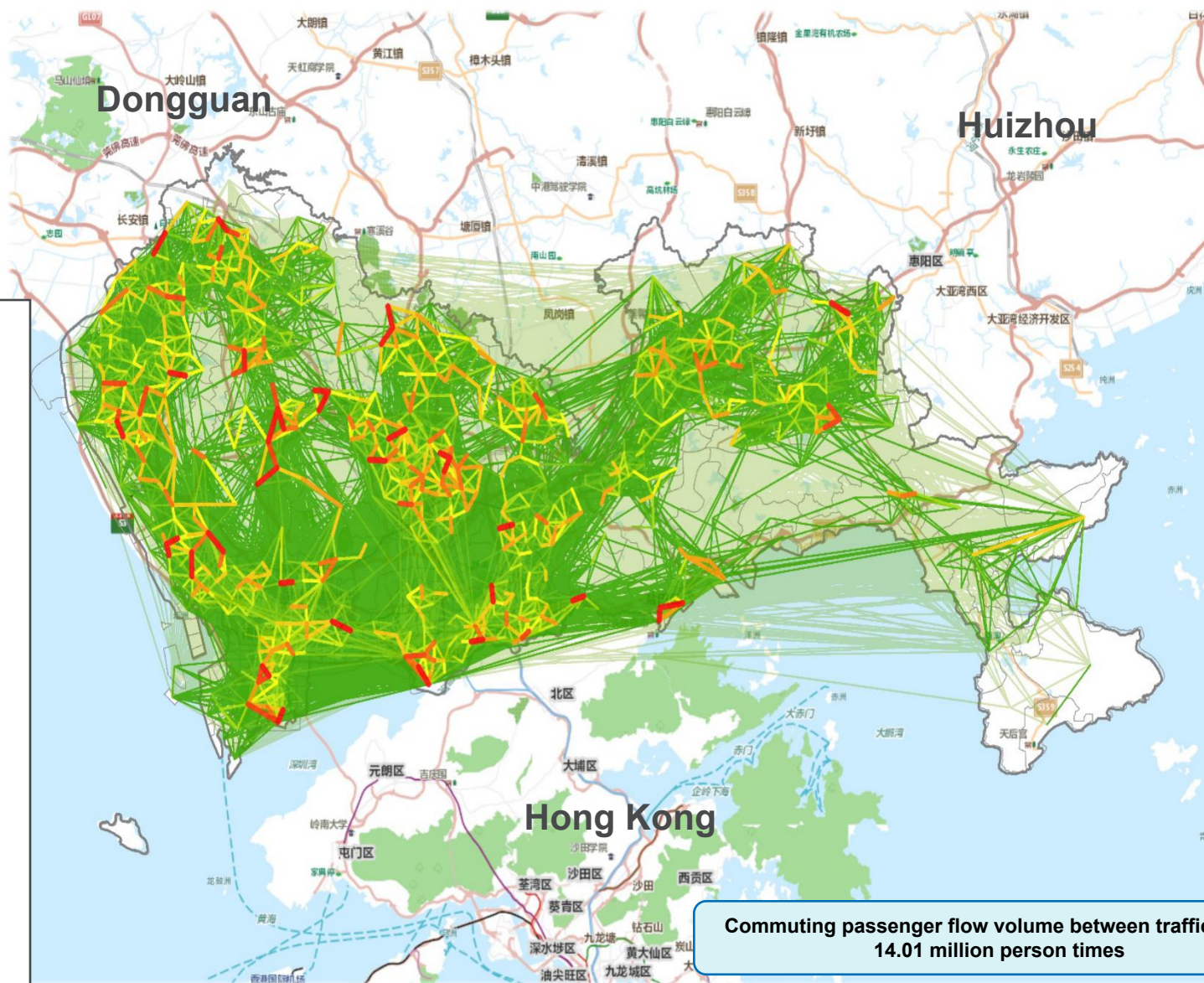
00: 00

population density distribution

0 (People per square kilometer) 60000



未来展望 Future Prospect



未来展望

Future Prospect

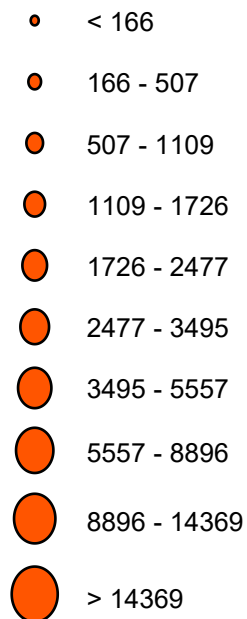
Analysis of passenger flows over road segments in the city proper



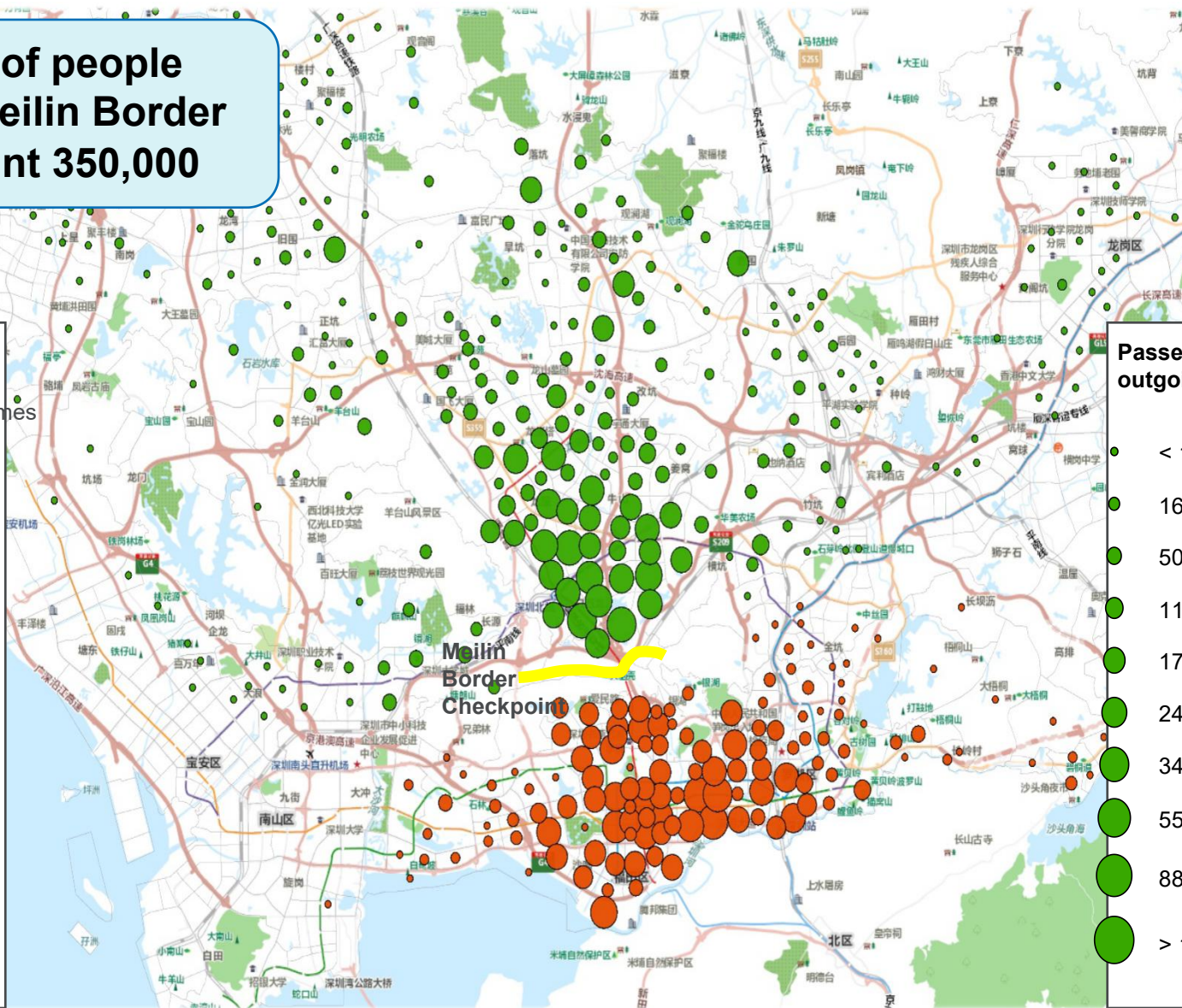
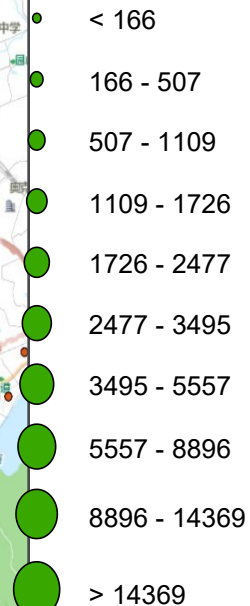
未来展望 Future Prospect

Number of people
entering Meilin Border
Checkpoint 350,000

Source of passenger
flow volume (person-times)

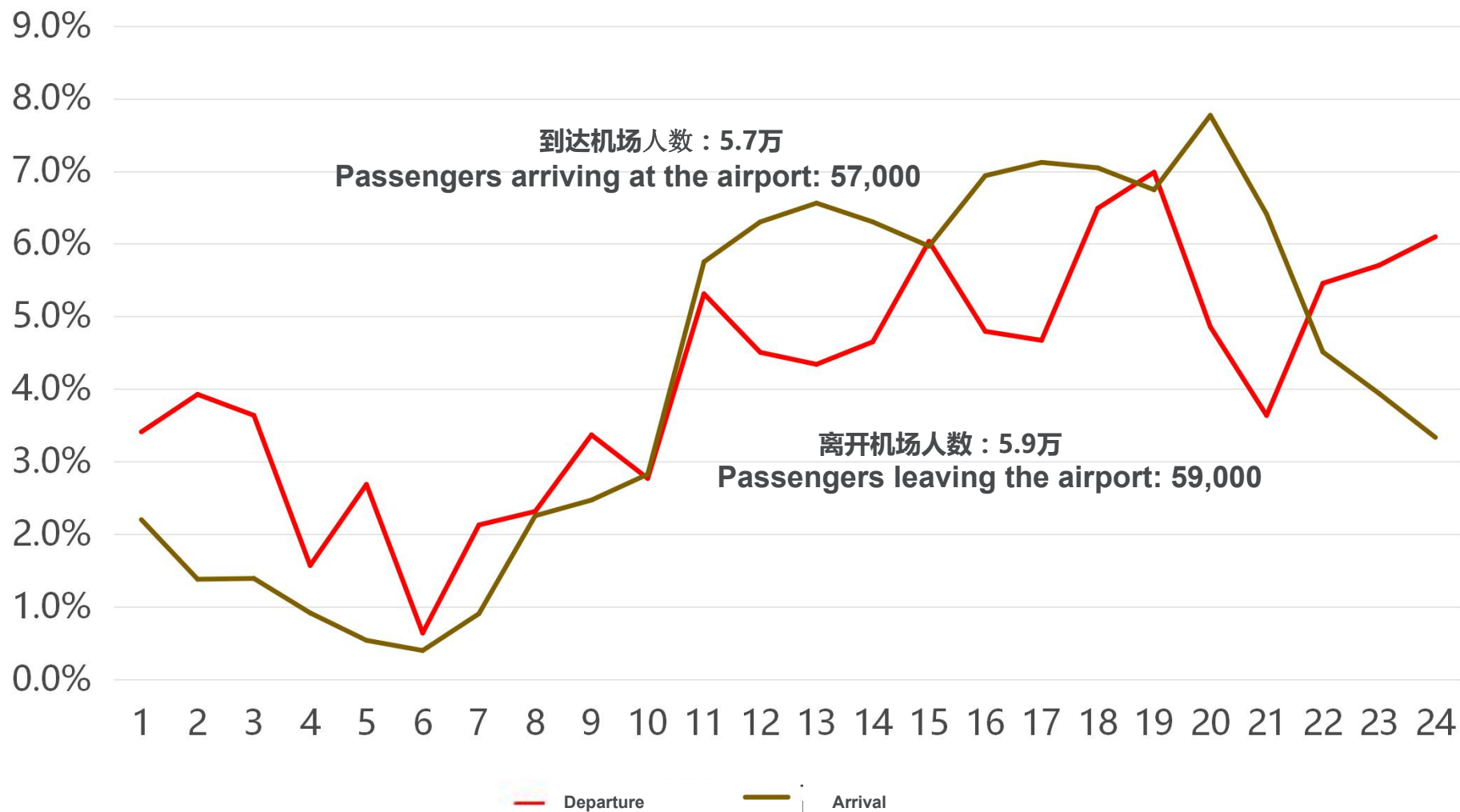


Passenger flow
outgoing (person-times)

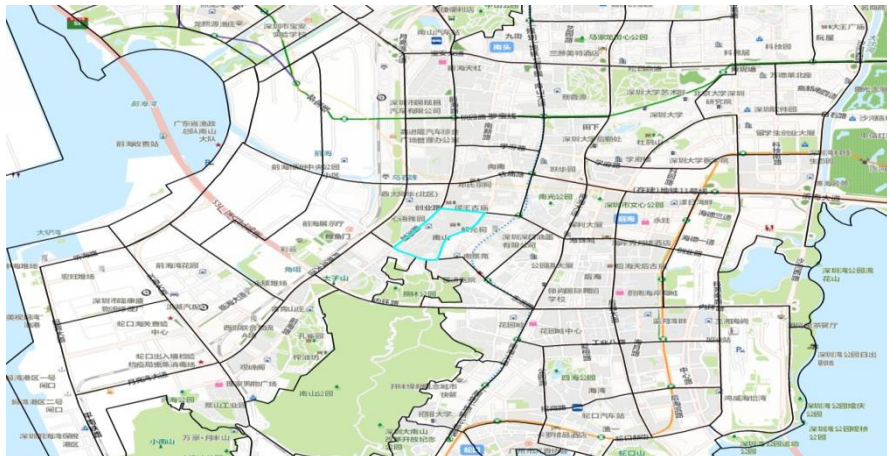


宝安机场客流时变

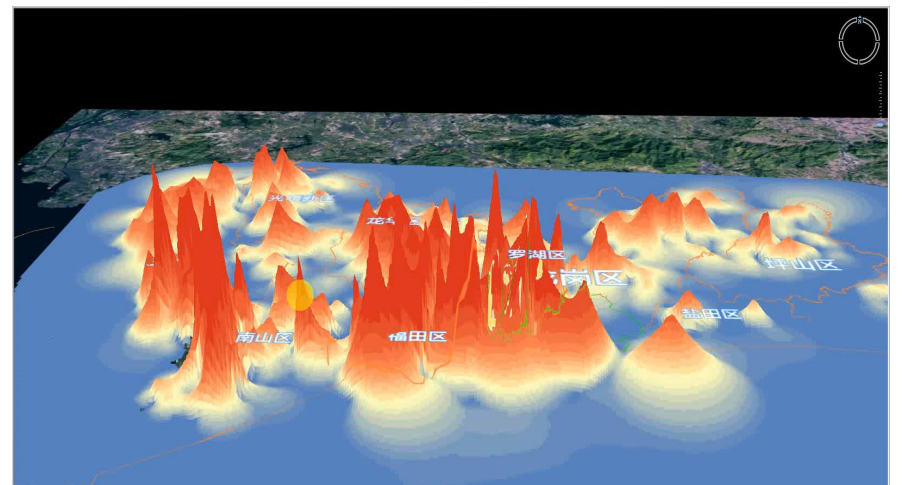
Time varying of passenger flow at Bao'an Airport



未来展望 Future Prospect



Nanyuan (traffic zone) Resident population 52,600 , population density 131,200 people per square kilometer



Huaqiang North (traffic zone) Working population 56,300 , population density 135,6 131,200 people per square kilometer

虚拟城市 Virtual City

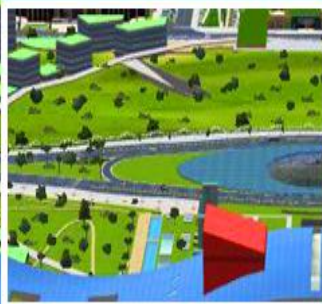
Dynamic



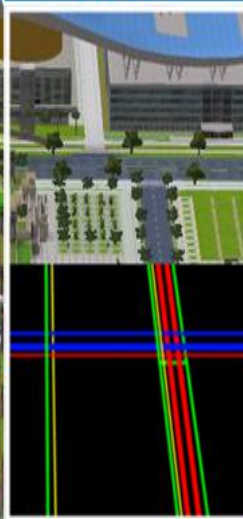
Indoor



Overground



Underground



Outdoor

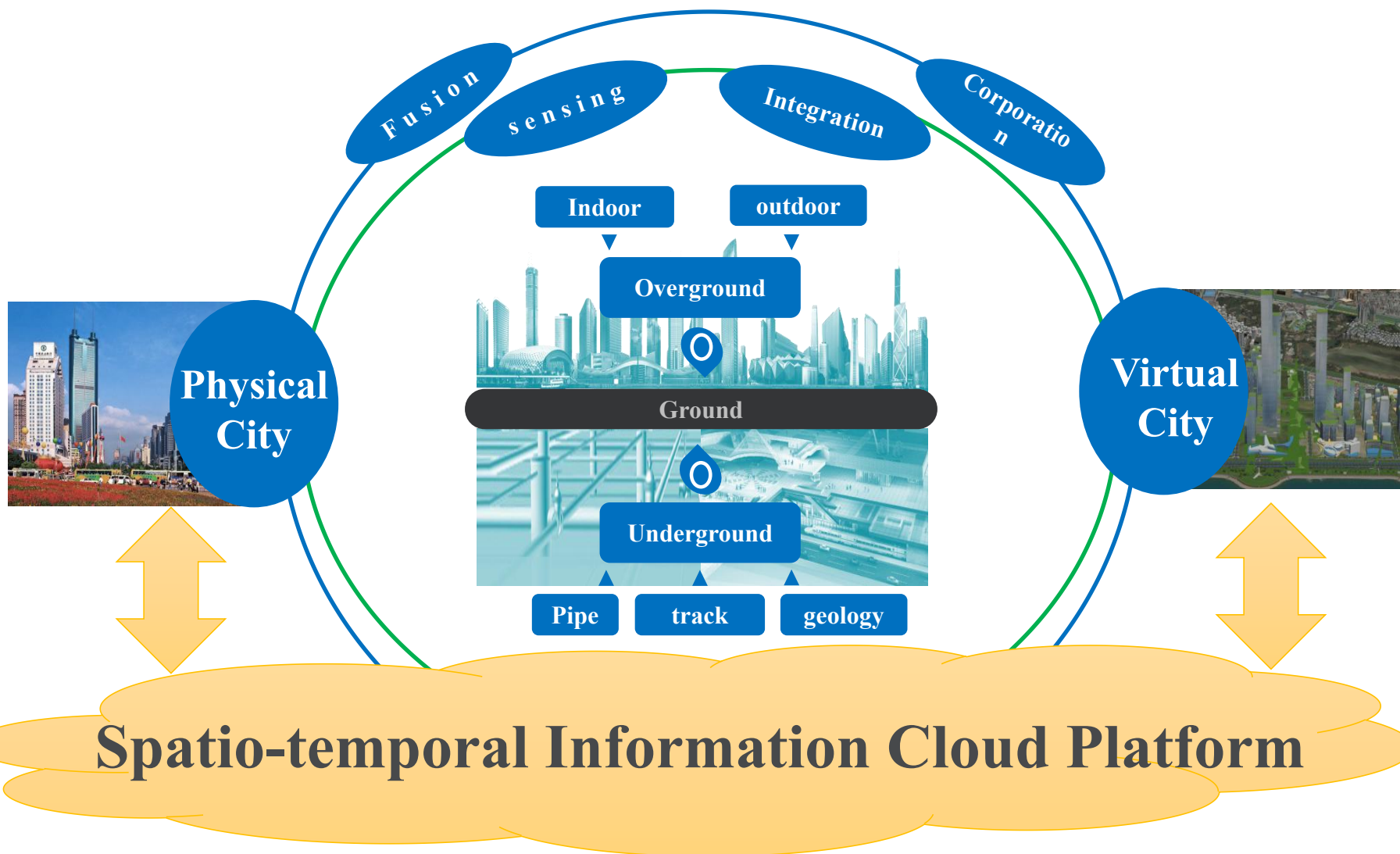


室内 室外 地上 动态

地下

时空信息云平台

Spatio-temporal Information Cloud Platform





THANK YOU

