



Development and Integration of Geospatial Information in China

中国地理信息的开发与集成

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Geo-Information

国家测绘地理信息局

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Integration and
Applications

2014/6/19

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经验和建议
Experiences and
Suggestions



1

中国测绘地理信息概况 Surveying, Mapping and Geo-information in China

更名强职责 New Name: NASG

国家

测绘

局

State, Surveying and Mapping, Bureau (SBSM)

1956年成立; Founded in 1956

Surveying
and Mapping
Management



Geo-
Information
Supervision

NEW
NMA

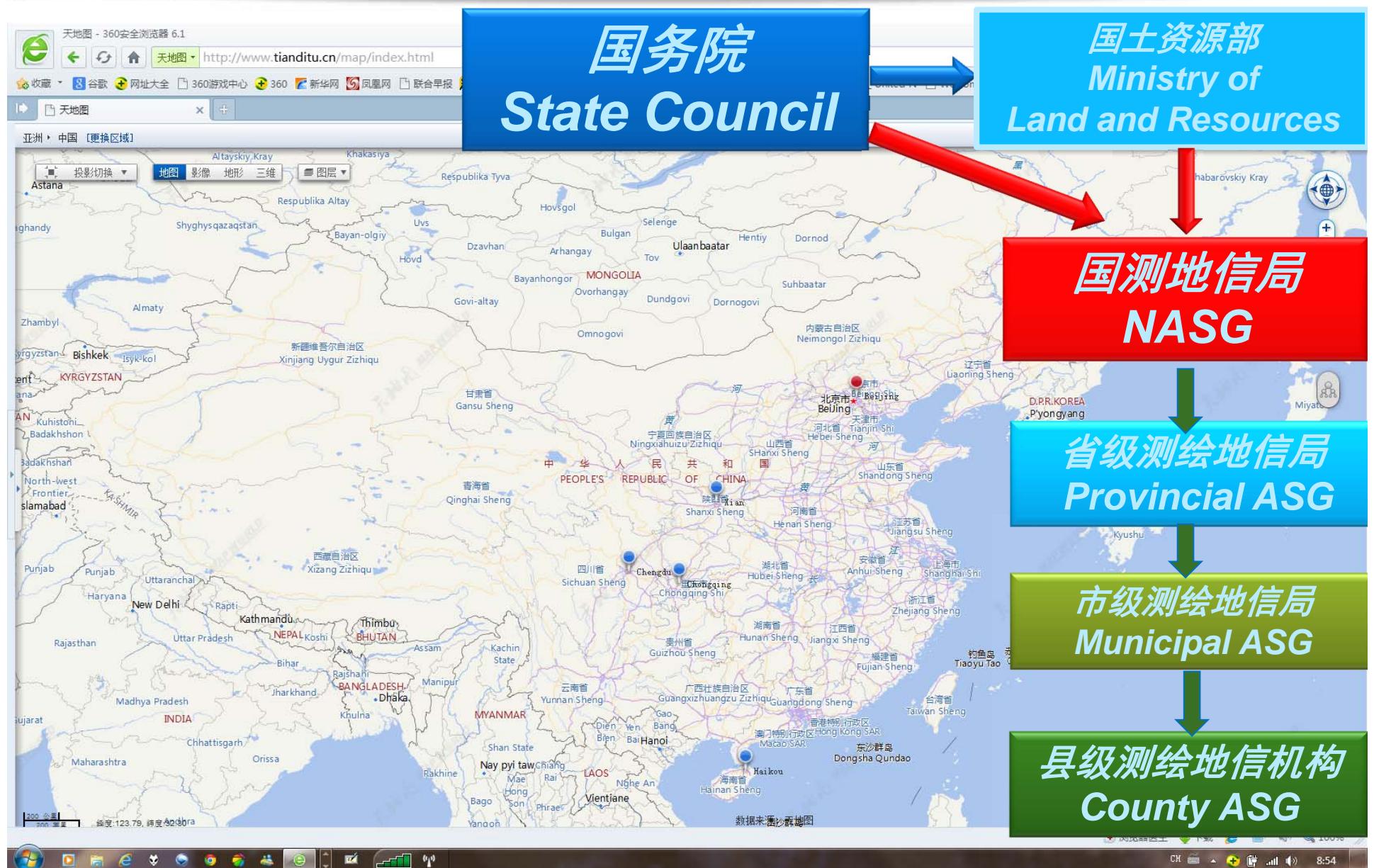
国家

测绘

地理信息 局

*National, Surveying and Mapping, Geoinformation , Administration
(NASG) May 23,2011*

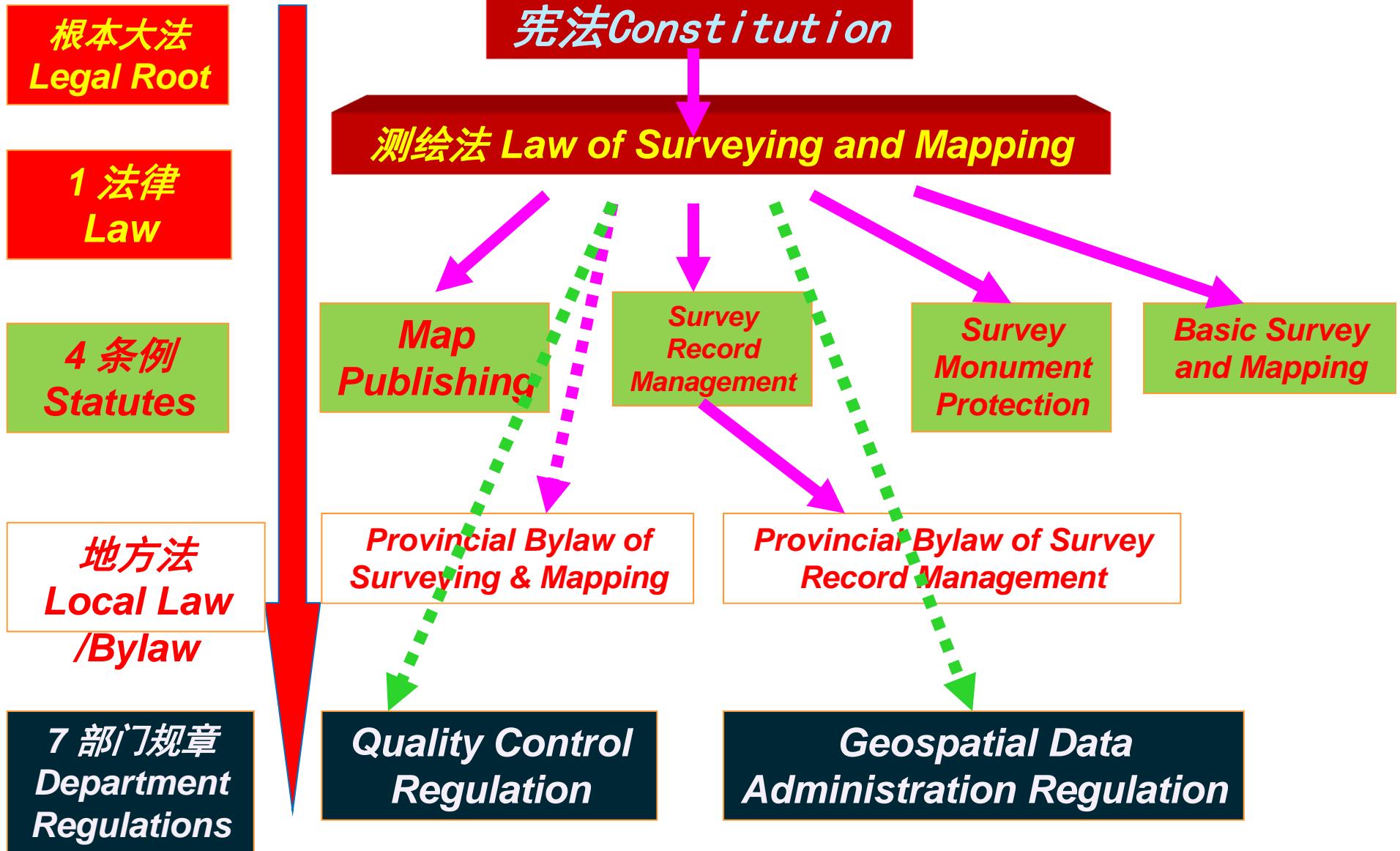
机构设置 Organizations



国家测绘地理信息战略 National strategy of geospatial information



法规体系 Legal System



监督体系 Supervising System

- Registered Surveyor
- Qualified Workers
- Quality Inspector
- Metric Inspector

- Super Class A
- Class A
- Class B
- Class C
- Class D

从业人员
Personnel

从业资质
licenses

仪器检定
Instrument

质量监督
Quality
Supervision

- Hardware Testing
- Software Assessment
- Instrument Calibration
- Annual Inspection

- National
- Provincial
- Municipal

标准化管理 Standardization Administration



人力资源 Human Resources and Education

S & M Geoinformation

National

Provincial

Municipal

County

23,000

Professional Survey

Urban Rural Construction

Transportation

Water Resources

Land Resources

Agriculture Forest

Civil Affairs

400,000

Geospatial Industry

Instrument Manufacture

Remote Sensing

Geoinfo Service

Engineering Survey

Specific Survey

Academy and Education

Chinese Academy of Science

Academy of S & M

Key Labs

Engineering Research Centers

高等教育 Higher Education



More than 334 Universities

地理信息产业 Geospatial industry



National G-Park

23,000 licensed enterprises

400,000 employees

Total output in 2013: RMB 250 billion Yuan

Annual growth rate: 25%

13 enterprises in the stock market

Geospatial Industrial Parks under construction

主要建设任务 Main Tasks

- 大地基准 Dynamic geospatial referencing

一张网
One Network

- 地形图 Topographic maps
- 专题图 Thematic maps

两张图
Two Maps

四大支撑
Four Pillars

三大平台
Three Platforms

- 监管 Administration
- 产业 GI Industry
- 人才 HR
- 研发 R&D

- 慧城市 Smart City
- 地情监测 Geospatial Monitoring
- 天地图 Map World

智慧中国建设Smart China Construction

数字城市建设分布图
Digital City Construction Distribution Map

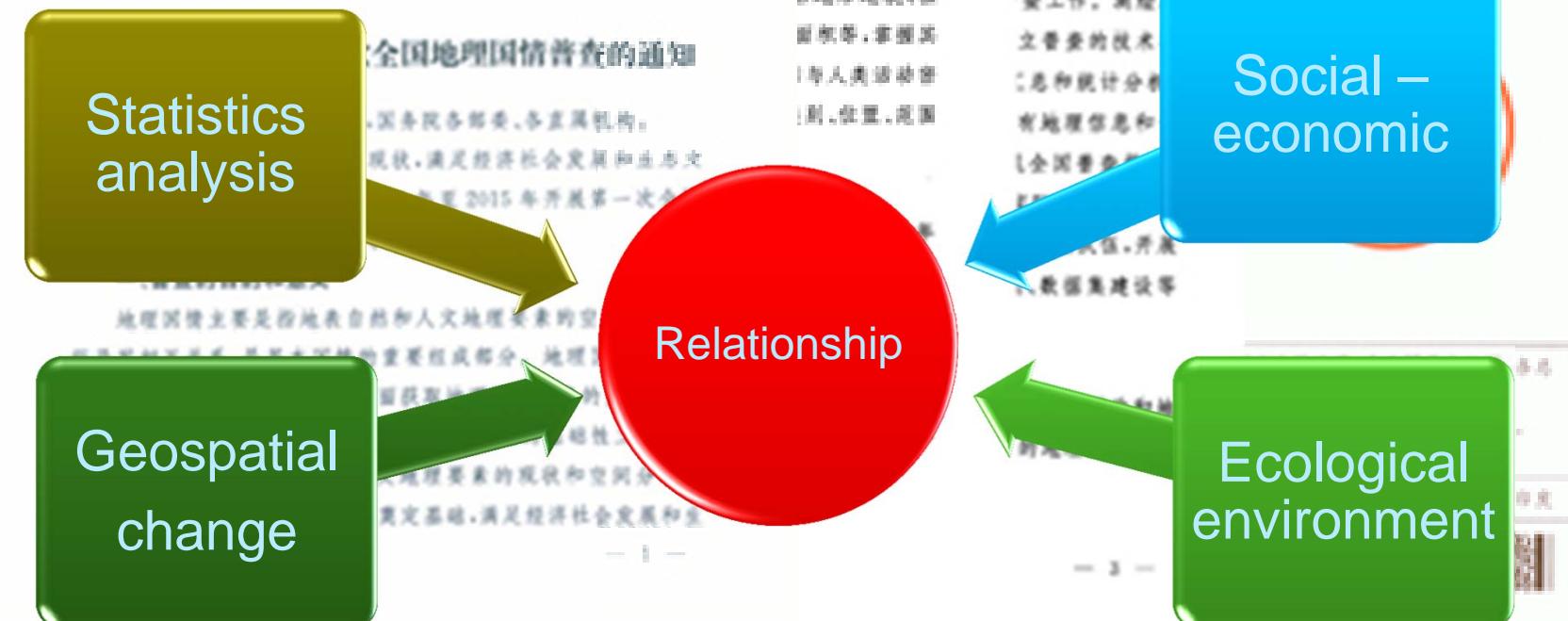
City SD

The collage illustrates the integration of 3D city models with real-world data and monitoring capabilities. It includes:

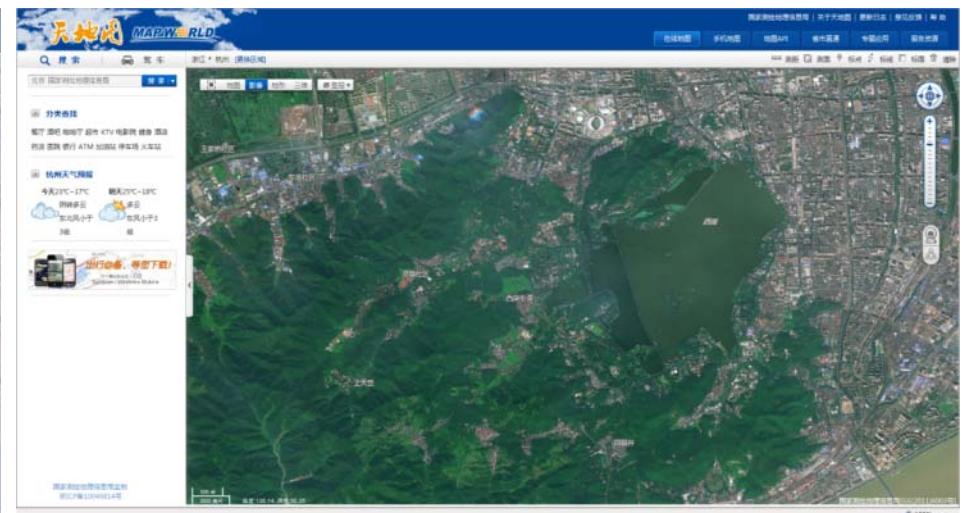
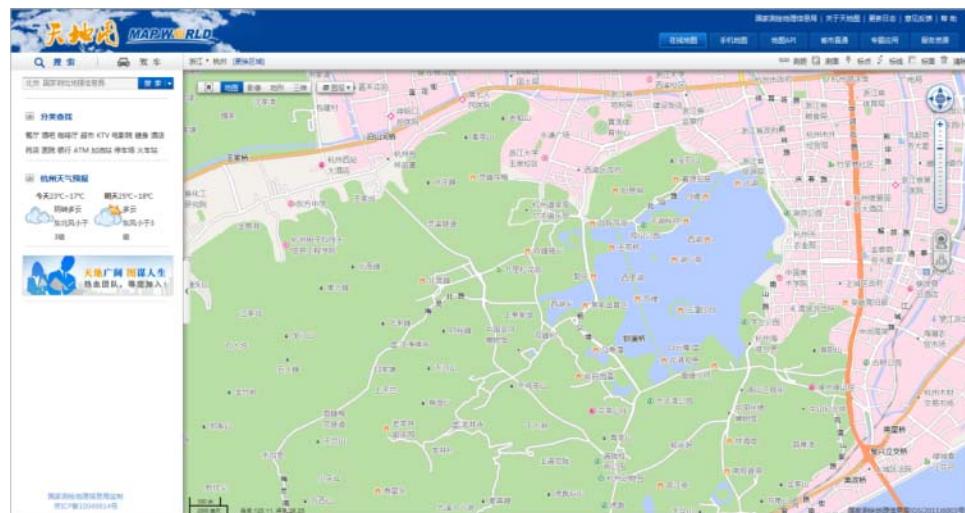
- A 3D city model of Xining City (西宁市) showing detailed buildings and infrastructure.
- A 3D city model of Xining City with a specific area highlighted in pink, labeled '甘肃省' (Gansu Province).
- A screenshot of a map showing industrial facility locations across Gansu Province, with numerous blue icons representing different types of industries.
- A screenshot of the Xinjiang Uygur Autonomous Region Emergency Platform, displaying a map of the region with various monitoring points and a live video feed of a street scene.

地理国情监测 National Geographical Situation Monitoring

- Monitoring physical geographic elements
- Monitoring cultural geographic elements
- Geospatial analysis
- Geospatial monitoring service platform



国家天地图建设 National Geo-Portal: Map World





2

中国地理信息开发 Geospatial Information Development in China

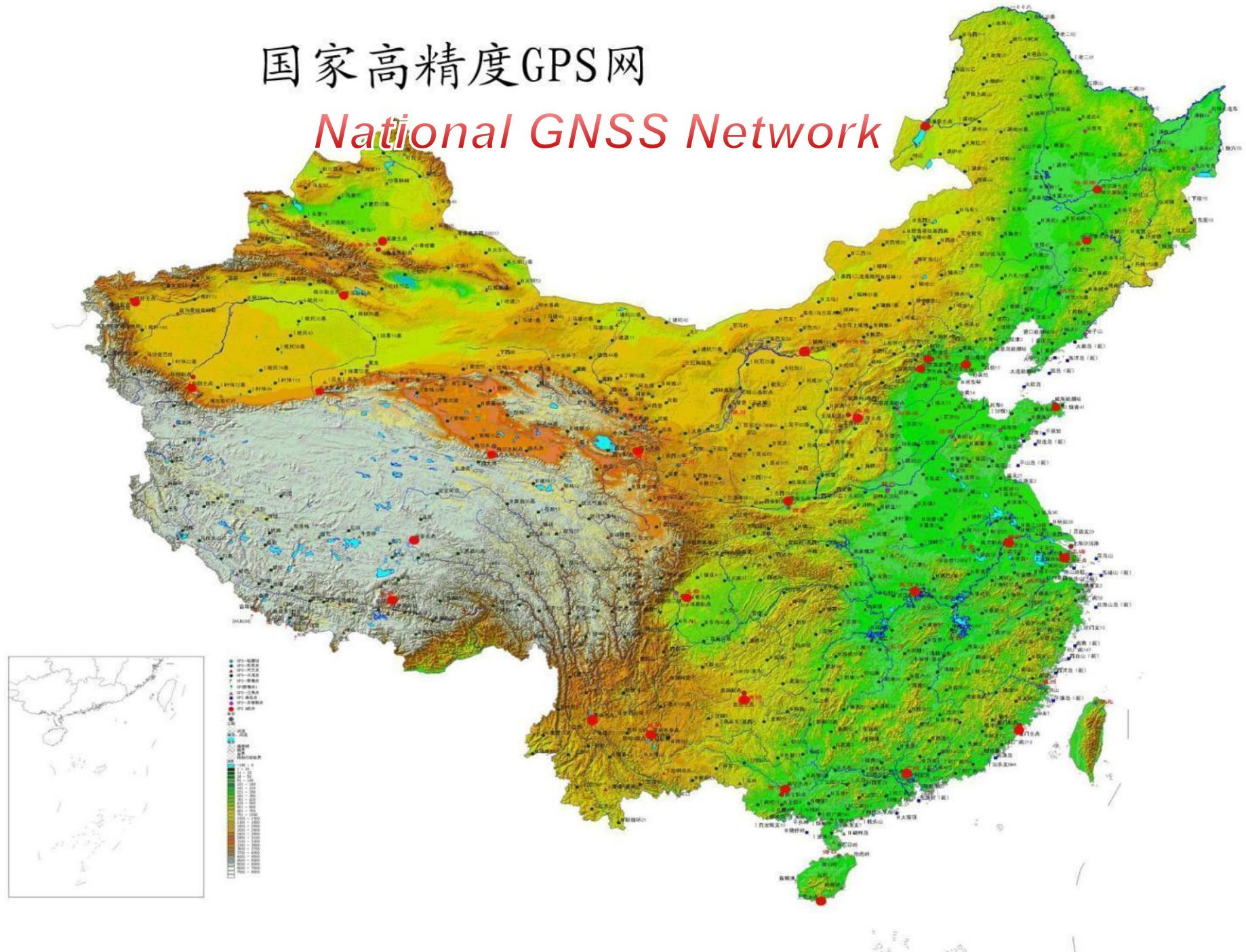
测绘技术体系演化 Mapping Technology Evolution



R&D Program for Surveying, Mapping and Geo-Information

国家高精度GPS网

National GNSS Network

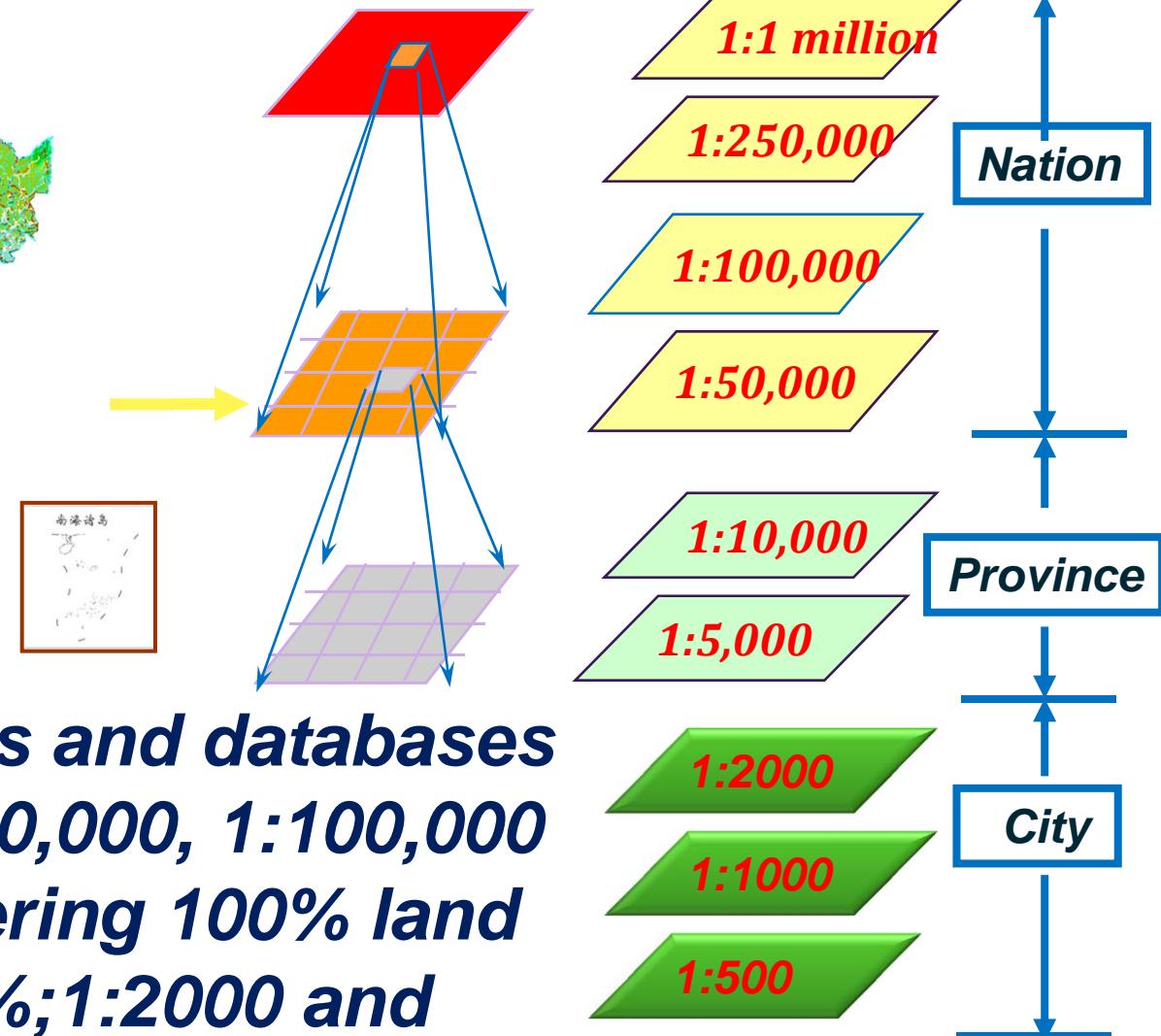
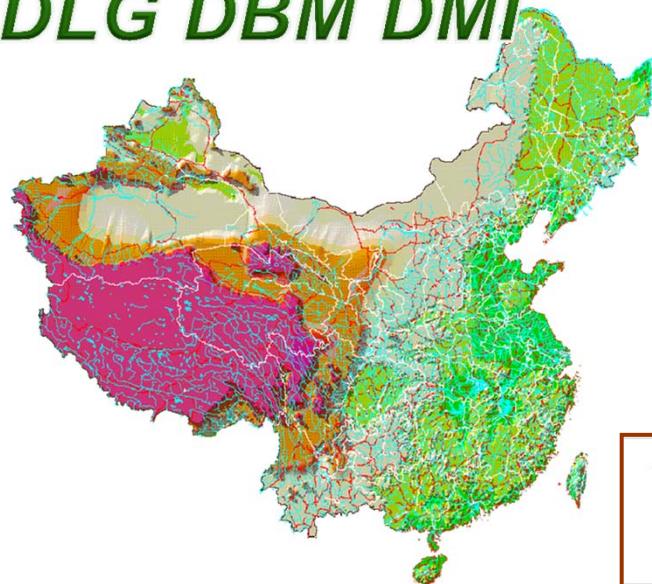


GNSS continuously operating reference stations



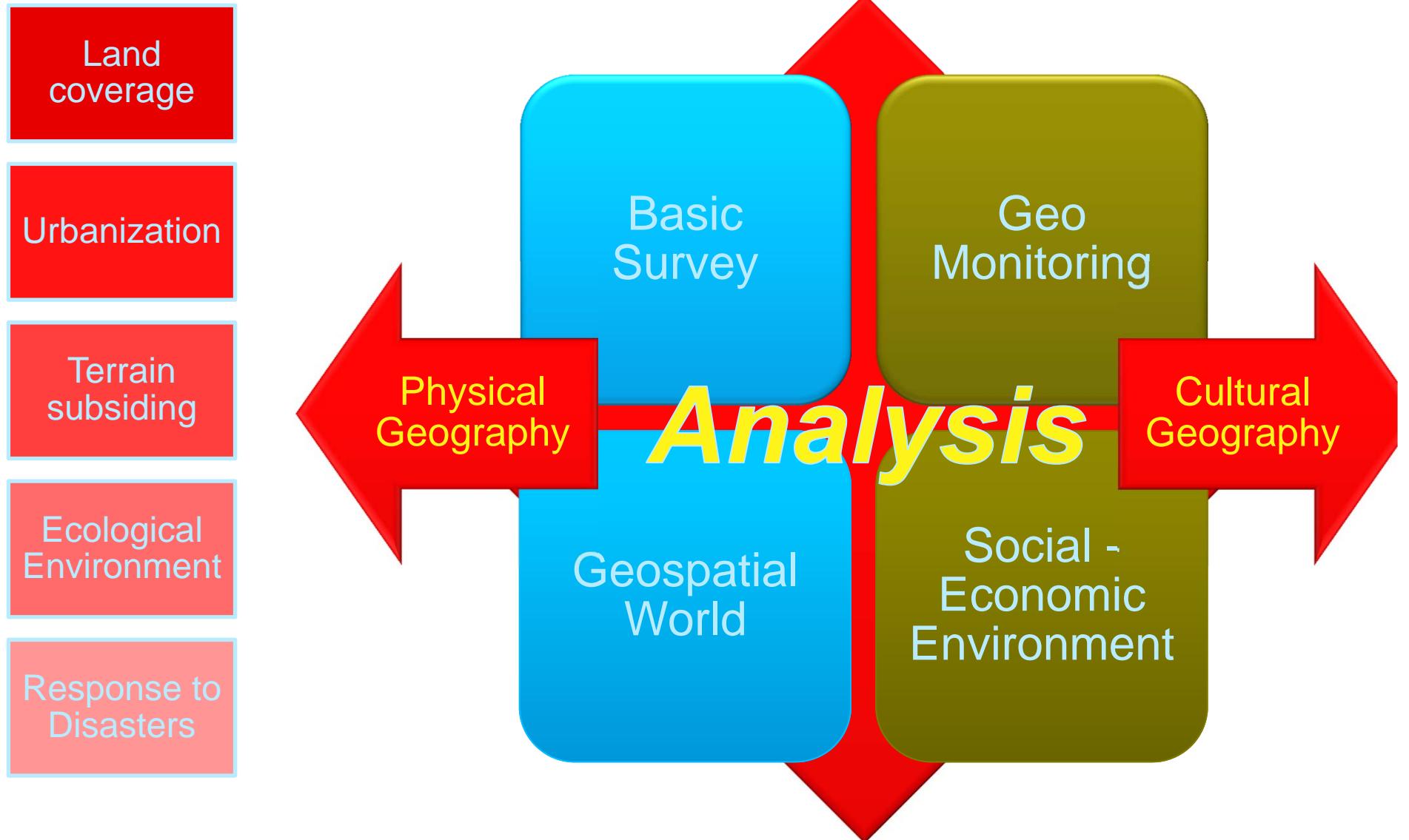
国家地理信息资源 Geospatial Data

**DEM DOM DRG
DLG DBM DMI**



**Topographic maps and databases
at 1:1million, 1:250,000, 1:100,000
and 1:50,000 covering 100% land
area; 1:10,000 52%; 1:2000 and
1:500 most cities**

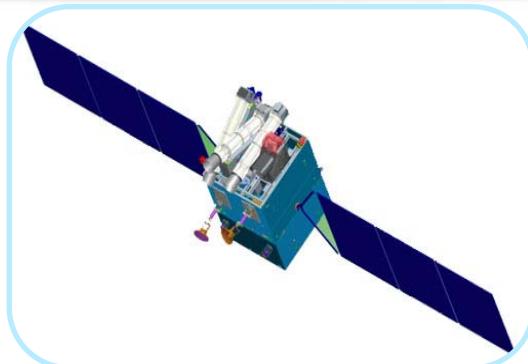
地理国情普查 China Geographical Situation Census



空间基础设施 Spatial Info Infrastructure



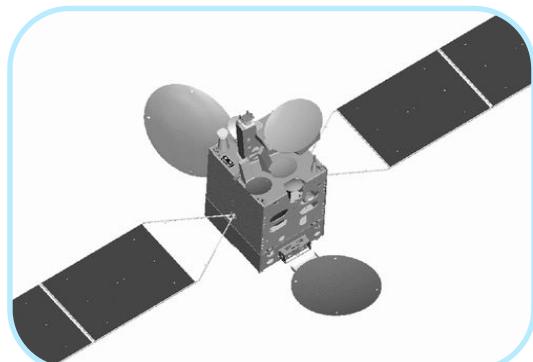
资源1号 ZY1



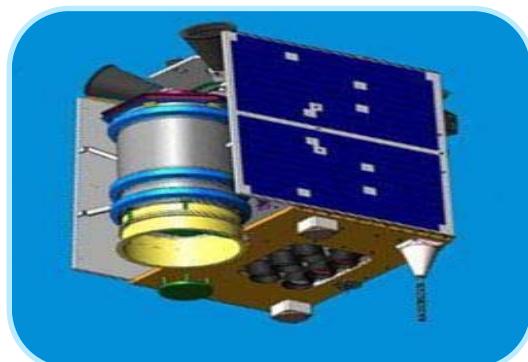
资源3号 ZY3



天绘 1号
Tianhui 1



高分1号
Gaofen -1

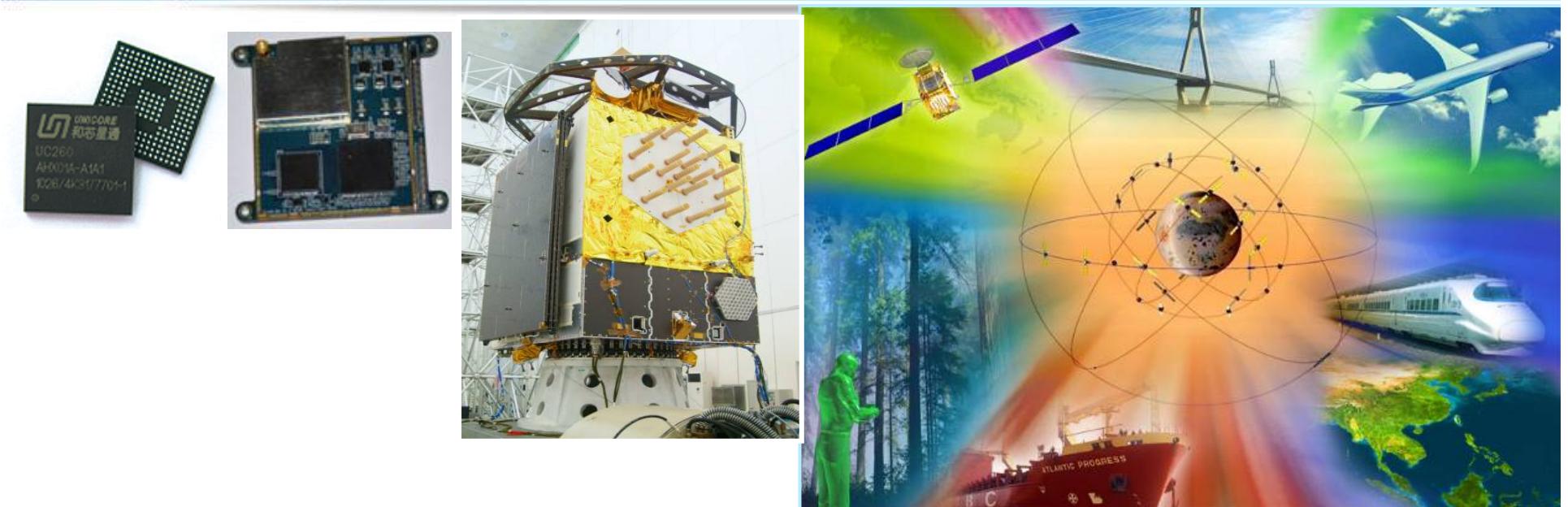


北京1号
Beijing 1



北斗2代
Beidou 2

北斗卫星导航系统 Beidou Nav. Satellites



2012 亚太地区 *Asia Pacific*

2020 全球覆盖 *Worldwide*

地球静止轨道 *Geostationary Orbit (GEO)* 5

地球中轨轨道 *Middle Earth Orbit (MEO)* 27

地球倾斜静止轨道 *Inclined Geostationary Orbit (IGSO)* 3

资源3号立体测绘卫星 ZY3 Mapping Satellites

Tri-linear Pan cameras
Forward Backward 3. 5M
Nadir 2. 1M
Strip width 50KM

Multi-spectrum
4 bands 5. 8M
Strip width 50KM

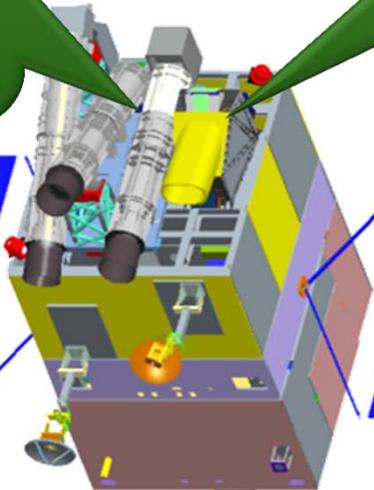
B/H
0. 85-0. 95

Cycle time 59 D
Revisit 5D

Sun-sync
500 KM

Global
coverage Latitude 84

3. 92M X 14. 22M



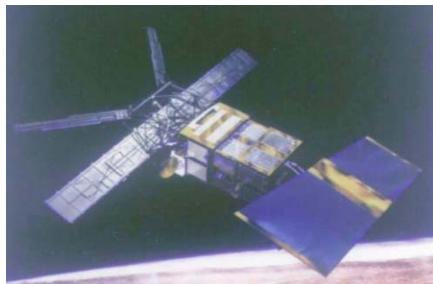
测绘卫星规划 Mapping Satellites Planned



2-5m Pan、6-10m multi-spectrum

1-2m Pan、3-6m multi-spectrum

0.5-1m Pan、1-3m multi-spectrum

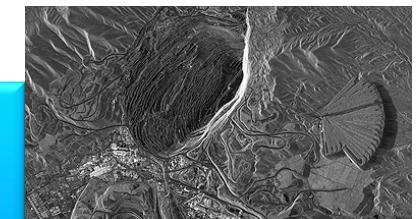


3-5m , C band/S band SAR

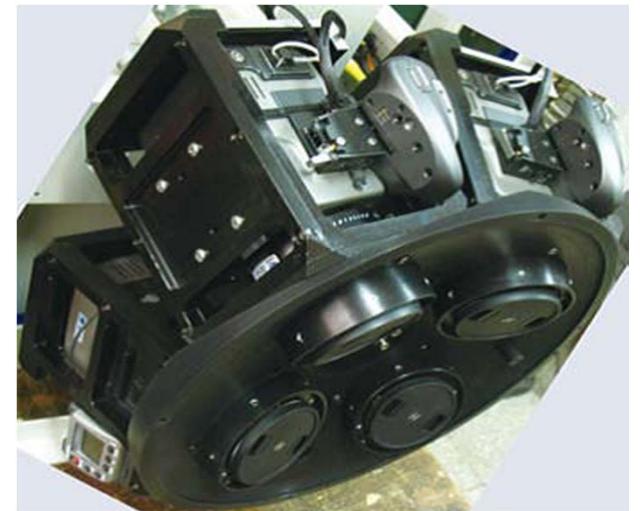
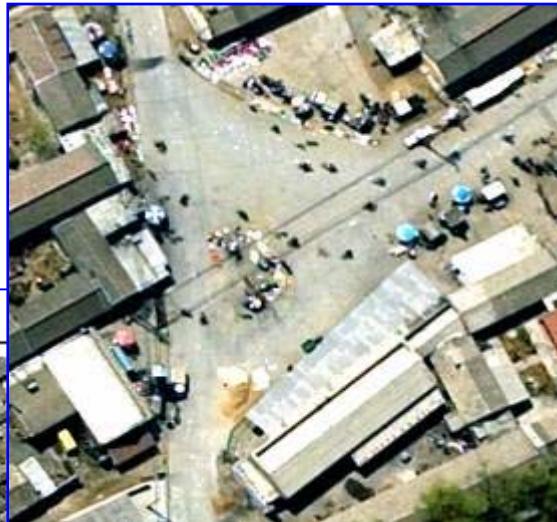
0.5-1m, multi-band SAR



2 Bands Laser Ranging, 1 m Pan



数字航空相机 Digital Aerial Camera



机载合成孔径雷达测图系统

Airborne InSAR Mapping System



SAR



POS



Integrated System

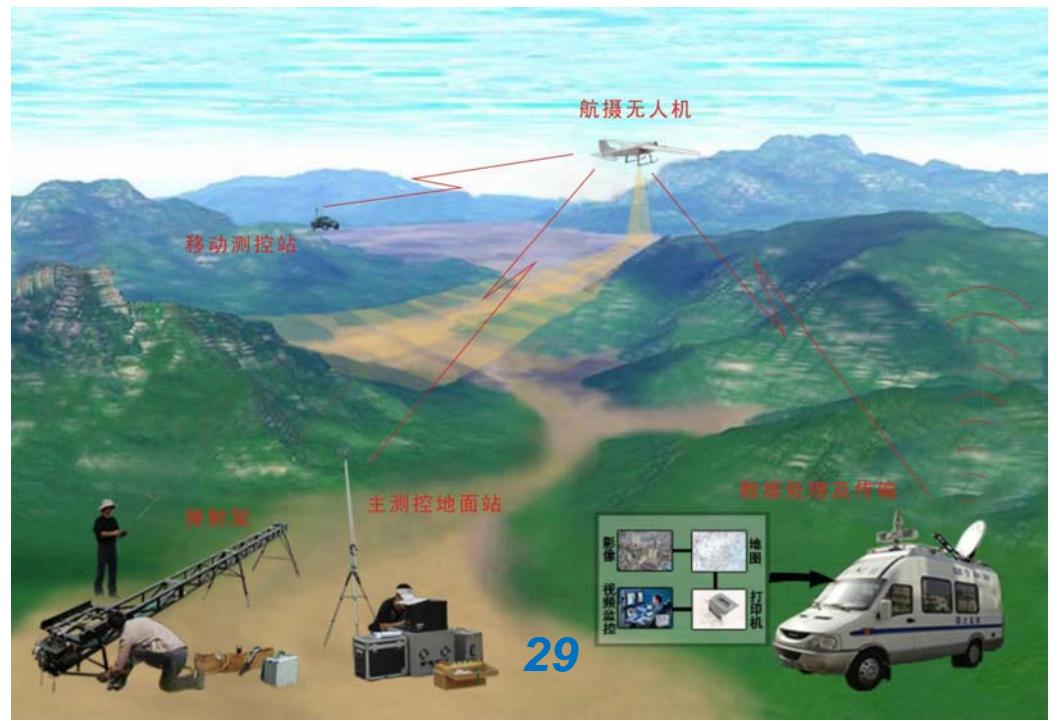


X band antenna



P band antenna

无人机航空遥感系统 UAV Photography System



车载移动测图系统

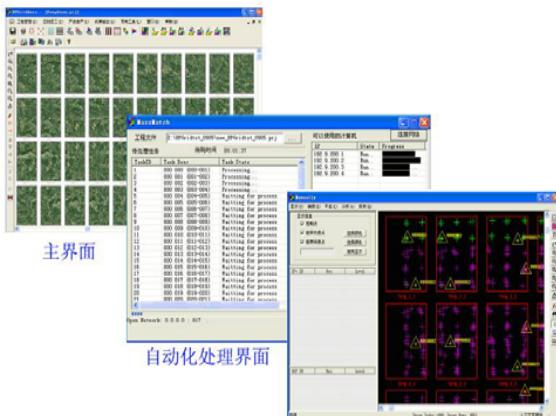
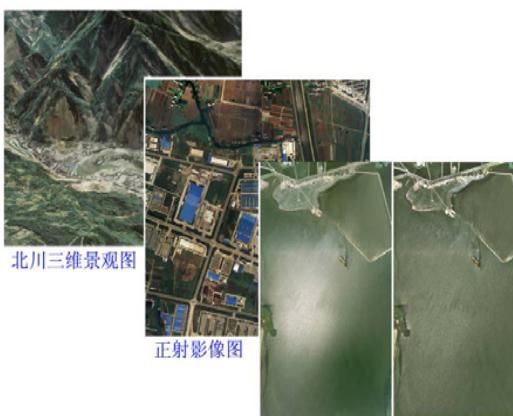
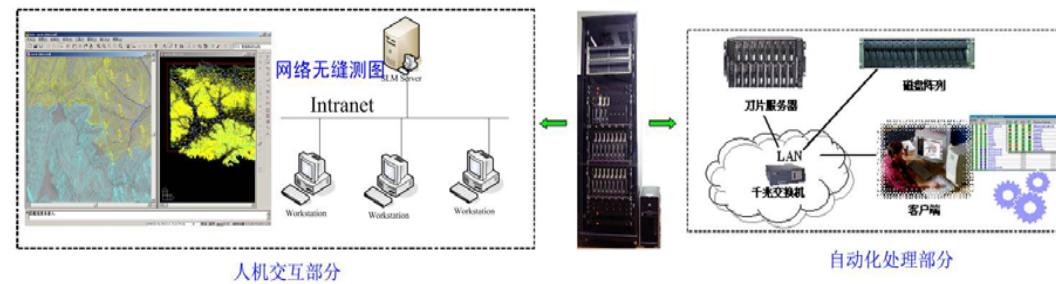
Mobile Mapping Systems



自主研发的重要软件系统 Developed Software Systems

DPS :
GeoWay Solution
PixelGrid
FeatureStation
DPGrid

DPGrid体系架构



GIS :
SuperGIS
NewMap
GeoStar
MapStar



3

地理信息集成与应用 Geospatial Information Integration and Application

地理信息的数据集成 Data Integration

基础数据-专题数据
Fundamental - Thematic

小尺度数据-大尺度数据
Small - Large scale

档案数据-成果数据
Historic-Current

矢量数据-栅格数据
Vector-Raster

地面数据-街景数据
Ground-Street

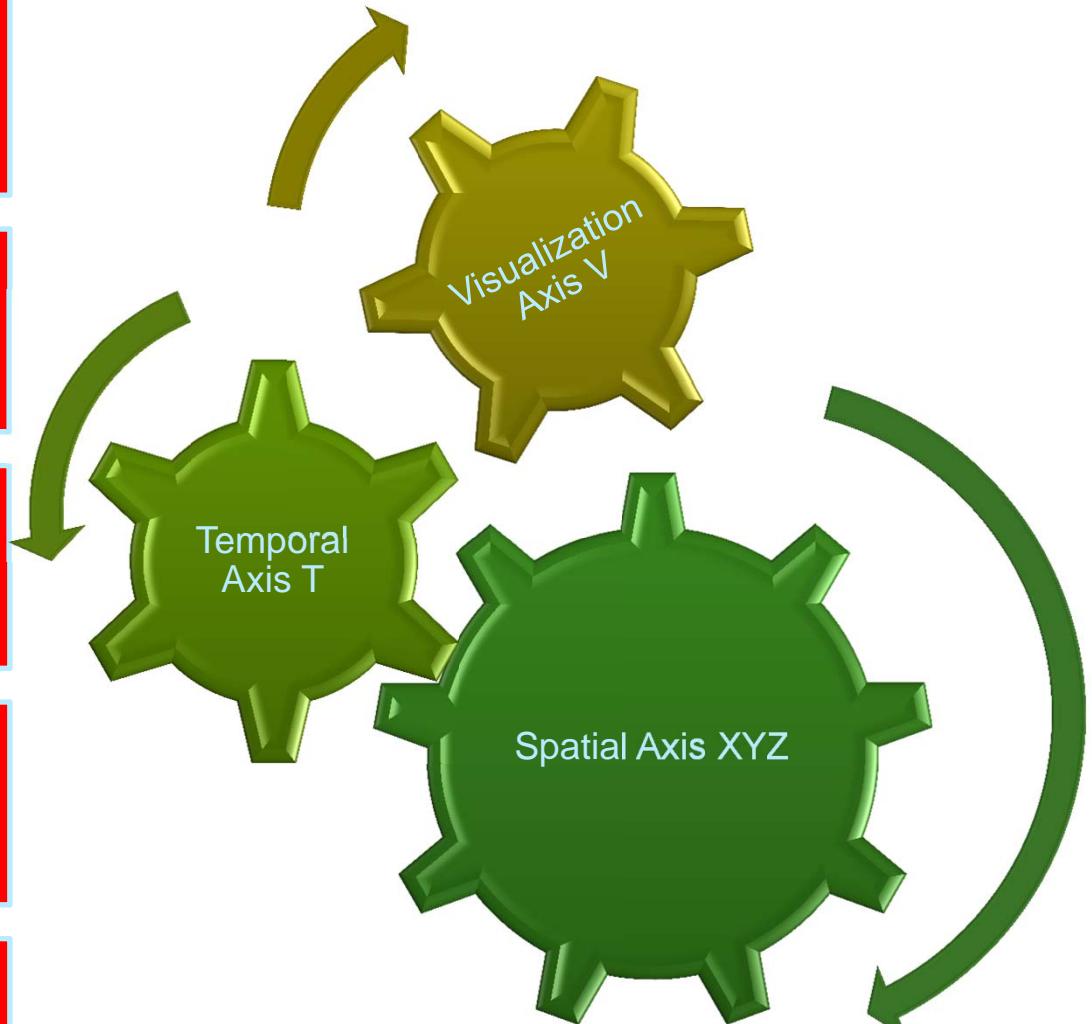
地上数据-地下数据
Surface-underground

离散数据-连续数据
Discrete-Continuous

稳定数据-易变数据
Steady-Volatile

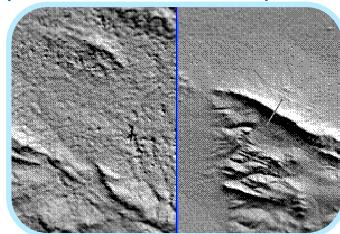
自然数据-人文数据
Natural-Artificial

2D数据-nD数据 2D - nD



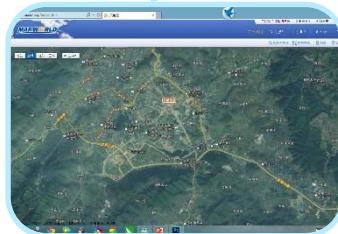
地理信息的数据综合 Data Generalization

1: 500



DEM

1: 2000



DOM

1: 5000



DLG

1: 10000



DMI

1: 50000



BIM

1: 250000

1: 1000000

地理信息的技术集成 Technology Integration



地理信息的系统与平台集成 System & Platform Integration

Fundamental
GDB 基础地
理信息数据
库

GeoCensu
s GDB 地理
国情数据库

Classified
MapWorld
天地图涉
密版

Framework
GDB 框架数
据库

G-Name &
Image
地名地址和
影像数据
库
国情数据库

E-Gov
MapWorld
天地图政
务版

Application
GDB 应用数
据库

POI &
Navigation
GDB 兴趣
点和导航数
据库

Public
MapWorld
公众版天
地图

地理信息重要应用 Major Applications

- Macro-Economy 宏观调控
- Market Supervision 市场监管
- Common Service 公共服务
- Social Management 社会管理

Govern
ance
政府监
管

Daily
Life 公
众生活

Military
军事防
务

Enterpr
ise 企
业发展

- Entertainment 娱乐休闲
- Cultural 文化体验
- Virtual Tourism 虚拟游览
- Exploration 导航探险

- Strategy 战略布局
- Info 情报搜集
- Guide 战术指导
- Status 战况概览

- Strategy 宏观布局
- Planning 规划设计
- Info Service 信息发布
- Value-added 增值拓展

地理信息普查调查应用 Applications in Census & Survey

人口普查
Census

第三产业普查
Service Industry
Census

工业普查
Industry Census

农业普查
Agricultural
Census

经济普查
Economic
Census

水利普查 Water
Census

土地普查
Landuse
Census

土壤普查 Soil
Survey

地名普查 Place
name Census

污染源普查
Pollution sites
survey

林业普查
Forestry
Census

文物普查
Historical Relics
Census

国家治理与电子政务 State Governance & e-Gov.



社会管理与智慧社区 Community Governance

- 智慧社区
• SMART COMMUNITY
- 数字村镇
• DIGITAL VILLAGE
- 人口管理
• PEOPLE ADM.
- 房产信息化
• HOUSING IS
- 社会保障
• SOCIAL SECURITY
- 综合治理
• COMPREHENSIVE GOVERNANCE
- 城市管理
• URBAN ADMINISTRATION



农业现代化与智能农业 Modern Agriculture

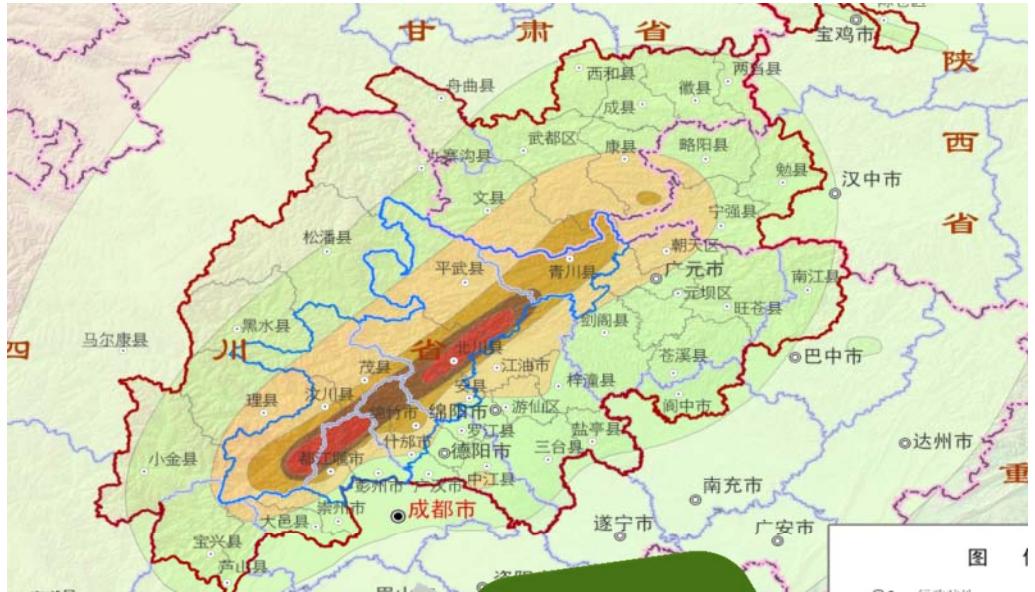
- 农业区划
- Agricultural Zoning
- 农田水利建设
- Irrigation Infrastructure
- 作物种植计划
- Crop Planning
- 农业遥感监测
- RS Monitoring
- 农业机械定位
- Machinery Positioning
- 农产品交易
- Farm Product Trading
- 精细农业
- Precise Farming



生态文明与智能环境 Ecological Civilization

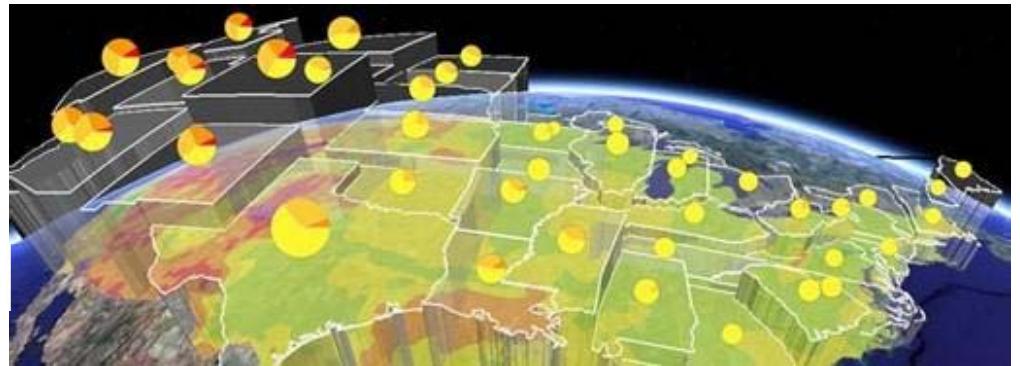


应急救灾决策 Emergency Relief & Decision Support



国土资源智能监管 Land Resources Administration

- 国土一张图
- ONE-MAP OF LAND
- 地质资源数据库
- GEOLOGICAL DATABASE
- 矿山动态监测
- MINING MONITORING
- 矿权交易
- MINE TRANSACTION
- 土地交易
- LAND TRANSACTION
- 土地督察
- LAND AUDITING
- 土地评估
- LAND ASSESSMENT



人口健康与智能医疗 People Health and Smart Medical

- 人口与健康地理分布
- DEMOGRAPHY
- 计划免疫执行情况
- IMMUNIZATION
- 计划生育分布
- FAMILY PLANNING
- 传染病分布与控制
- INFECTIOUS DISEASE CONTROL
- 卫生服务
- HEALTH SERVICE
- 远程诊断
- TELE-DIAGNOSIS



现代物流与智能交通 Logistics and Smart Transportation

- 交通规划设计
- PLANNING & DESIGN
- 交通流量监控
- TRAFFIC MONITORING
- 智能停车场
- SMART PARKING
- 智能货场与物流
- SMART STORAGE
- 智能调度
- SMART DISPATCHING
- 动态导航
- DYNAMIC NAVIGATION



文化产业与文物保护 Cultural Industry & Relics Protect

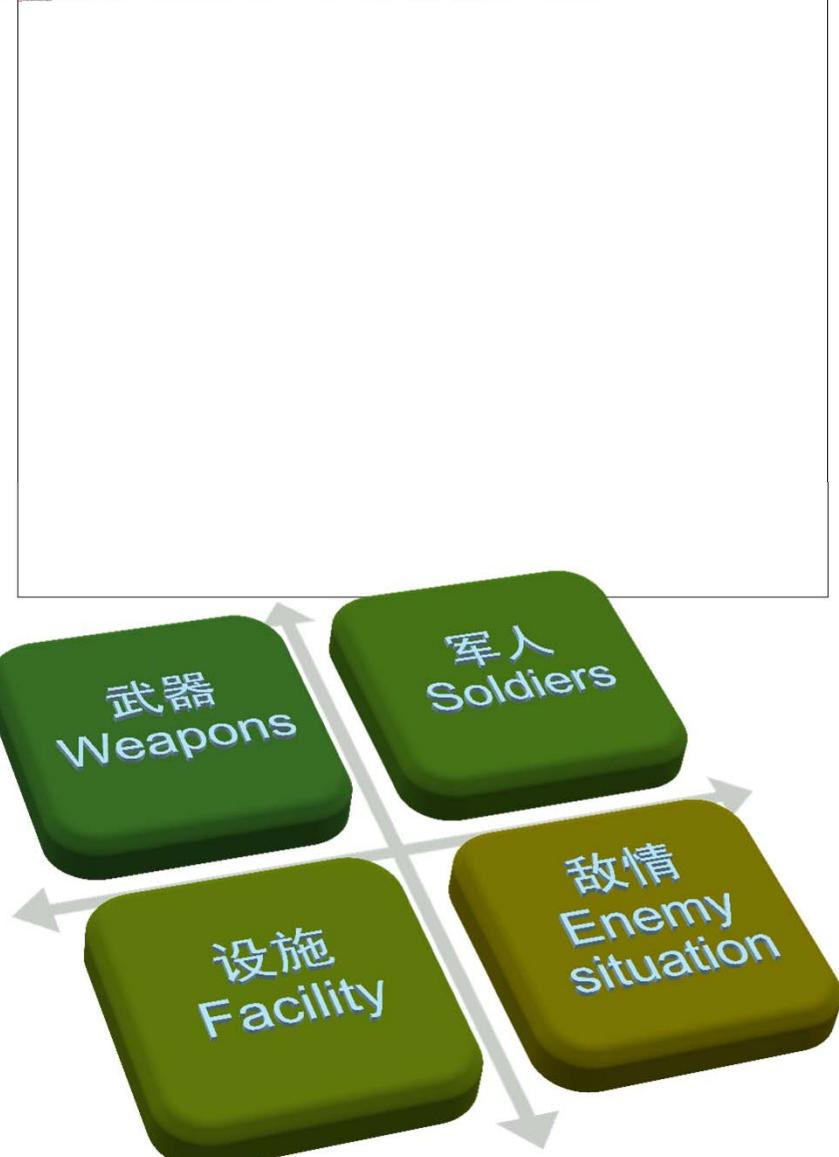
- 动漫设计地图产品
 - COMIC & ANIMATION
 - 文物普查
 - RELICS SURVEY
 - 文物监控
- 物理计算模型分析图
- 文物数字化
 - DIGITAL RELICS
 - 遗址保护
 - RELICS PROTECTION

多区域人口综合覆盖计算分析图



信息化战争与智能武器 IT Enabled Wars & Smart Weapons

- 武器装备导航定位
WEAPON GUIDANCE
- 数字战场
DIGITAL WAR FIELD
- 战略制定
STRATEGY OUTLINE
- 打击评估
HITTING ASSESSMENT
- 动态预警
DYNAMIC WARNING
- 数字化战士
DIGITAL SOLDIER



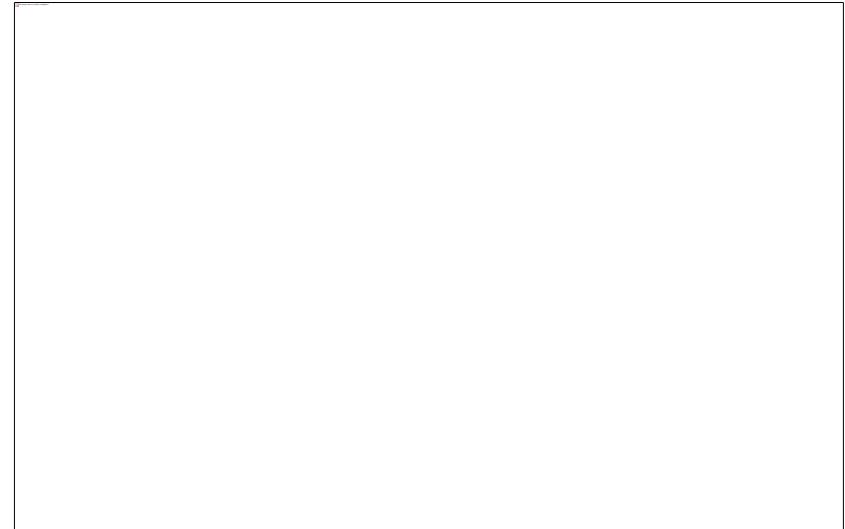
绿色能源与智能电网 Green Energy & Smart Grid

- 电源建设规划
- GENERATOR PLANNING
- 电网规划
- GRID PLANNING
- 电力设施
- ELECTRIC FACILITY
- 电网感知监控
- GRID SENSING
- 电网资产管理
- GRID PROPERTY
- 电力服务
- POWER SERVICE



绿色出行与智能铁路 Green Travelling & Smart Railway

- 铁路建设规划
• RAILWAY PLANNING
- 铁路设施建设
• RAILWAY CONSTRUCTION
- 铁路感知监控
• RAILWAY SENSING
- 火车监控
• LOCOMOTIVE MONITORING
- 铁路物流
• RAILWAY LOGISTICS
- 铁路运输业务
• TRANSPORTATION SCHEDULE
- 铁路路产管理
• RAILWAY ASSETS MANAGEMENT





4

经验和建议 Experiences and Suggestions



主要经验 Experiences

1. 监管体系 Governance mechanism
2. 按需测绘 Mapping on demand
3. 应急测绘 Emergency survey & mapping
4. 科技创新 S&T Innovation
5. 人才激励 HR and talent development
6. 标准支撑 Standardization
7. 增强的财政投入 Great Financial Support
8. 开放合作 Open and cooperation



面临的挑战 Challenges

- 1. 权威监管 Authoritative Geo-Governance**
- 2. 大地基准现代化 Modern Geo-Reference**
- 3. 地理信息共享 GI Resources & Sharing**
- 4. 互联网地图商业化 WebMap Service**
- 5. 位置服务与导航产业 LBS & Navigation**
- 6. 现代核心装备条件 Modern Equipment**
- 7. 人才知识结构 HR & Knowledge structure**
- 8. 公共财政投入不足 Low Financial Input**

联合国合作项目 UN-China Technical Cooperation Trust Fund

*Geospatial Information Management Capacity Development
in China and other Developing Countries (GIMCD)
(US\$800,000 per year for 5 years)*



UN-GGIM-Training Coordinating Board

Asia
Pacific

America

Mid-
East

Africa

Europe

联合国全球地理信息管理培训中心（中国） UN-GGIM-Training Center-China(UN-GTC)

- *Leadership enhancing at Director level*
- *Senior Engineer Training and Field works*
- *Diploma and degree courses*
- *Seminars and workshops*

测绘地理信息的新定位 New Roles of NGA

市场监管

Market
Supervision

基准现代化
Modern Geo-
Reference

地理信息资源
GI Resources

位置服务产业
LBS &
Navigation

电子政务时空云
E-Gov Temporal
and Spatial
Clouds

公共与应急测绘
Public service &
Emergency Mapping

产权登记与交易
Real Estate
Registration &
Transaction

空间规划监督
Spatial Planning
and Monitoring

地理发展指数
Geo-
Development
Index

第三次联合国地理信息管理高层论坛
3rd HLF of UN-GGIM in Beijing

Thank you!

Oct.22 to 24,2014