SuperMap Land Industries
Solutions

SuperMap Software Co., Ltd.
China Land and Resources Business

Land and Resources Business

Land and resources Management
- Land use planning, land use management, approval of construction land, basic farmland management, land acquisition reserves and supply, land development, land transactions, cadastral management, land price evaluation, ...

Mining Management
- Mineral resources planning and management, mineral reserves management, mining rights management, mining environmental management and protection, mining supervision and management, ...

Geological Environment
Start: data vectorization, single application system, office system, single website

Information resource integration: development of integrated e-government system

Information regulatory analysis: development of consolidated supervision application platform

Further information use: information sharing service, decision support, warning and forecast
Contents

1. China Land and Resources Business
2. SuperMap Land and Resources Informatization Solutions
3. Success Stories and Awards
SuperMap Land and Resources Informatization Solution

- Overall framework of information system development
- Database construction
- Basic platform and application services development
- Application system development
- Information service development
Overall Framework of Land and Resources Informatization

Data collection

Information management

One map management

Data collection

Information management

Information applications

land, mineral, geological environment, comprehensive supervision, ...
Overall framework of information system development
Database construction
Basic platform and application services development
Application system development
Information service development
Database Construction

- Data center framework design and construction
- Data collection and database construction process
- Data update mechanism construction
Data Center Positioning

- It is the integration center of various types of land data, application services center, data storage and management center.
- Data center is not only simple overlay of various types of spatial information, but also provides a uniform data management, business regulation and information mining platform for land and resource management.
Data Center Contents

Application service
- data directory
- data query and browsing
- picture browsing
  - data distribution and product customization
  - data call and interface
  - others

Database management system
- data import and export
- data update
- data query and browsing
- data editing
- data conversion
- system maintenance
- others

Database
- basic data
- land
- mineral
- geological environment
- others

Infrastructure
- hardware and software operating environment
Database Construction Ideas — “One Map”

• Build business database according to “One Map” standards
  – Unified coordinate system, unified data format, uniform classification and coding, unified naming rules.
Data Center Construction — Business Data Classification

Management database
- Approval of construction land
- Land development
- Land supply
- Land registration
- ...

Business database
- Land use
- Land use planning
- Basic farmland
- Mineral resources
- ...

Basic database
- Basic geographic (DLG)
- Remote sensing images
- Names and address
- DEM
- ...

Unified spatial positioning reference, unified classification and coding, unified naming rules, unified data format, unified statistical
Data Center Construction — Data Types

- Spatial data (2D, 3D)
- Attribute data
- File data
Data Center — System Deployment

- Ministry of Land and Resources
- Provincial Department
- Subordinate counties
- Special network of Land and Resources
- Subordinate branch, towns and other departments
- City GIS common platform
- Government Other Applications
- Internet Browser
- Government Intranet
- Public service
- Data update server
- Data query and management
  (SuperMap Object\IClient)
- Application service
- SuperMap Deskpro
- SuperMap Object development & runtime
- Windows 2000/XP/2003 Pro
- Special network of Land and Resources
- Data center room
- Server clusters
- LINUX, UNIX, AIX
- SuperMap IServer
- ORACLE
- City GIS common platform
- Government Intranet
- Special network of Land and Resources
- Data query and management
  (SuperMap Object\IClient)
Data Collection and Database Construction Solution

- Establishment of relevant technical standards and specifications
- Data collection
- Data integration
- Develop database management system
- Form data management and updating mechanism
- Establish data running environment
Flow Chart of Land and Resources Business Data Collection

1. Land Business file → Data management
   - Data scanning → Data input → Data upload
   - Data checking → no
   - yes → File Associations

2. Existing business system data → Data processing
   - Data conversion → Data checking
   - no → no
   - yes → yes

3. yes → coordinates input → Generate features → Coordinate System Transformation → Graphic And attributes association → Data checking

4. no → no
Data Collection — Establishment of Standards

- Land survey technical regulations
- Quality check rules for land survey results data
- ...
Data collection — collection platform

- Vehicle-carried or handheld terminal
- Data warehousing
- HDD / SD Card / Bluetooth / Wi-Fi
- Spatial database
- Office management
- Field collection, mobile applications (SuperMap iMobile)
- Server
- Client
- Ipad
Data Collection — Collection Platform

- Supports mine inspections, specifically including cross-border exploitation, warrantless mining and geological disasters.
- Collect coordinate ranges, business attributes, photos, audios, videos, etc.
- Some areas can transmit inspection information through 3G network.

Mine inspection example based on SuperMap iMobile platform
Data Collection — Collection Platform

• Mobile development platform — SuperMap iMobile for Android/iOS
  – Support online service access, offline caching
  – Support data collection, online and offline editing
  – Support spatial query and positioning
  – …
Database Construction Process

Survey data
- VCT data
- CAD data
- Map GIS data
- Image data
- Doc data

SuperMap database building tool
- Data import
- Projection transformation
- Data checking
- Data format checking
- Data editing
- Mapping and output

Land and resource database
Database Management System
Development

System Functions

- Database construction
- Data editing
- Data quality check
- Query and statistics
- Mapping management
- Report management
- Image management
- Rights management
- Metadata management
- ...
Convert survey data (*.DWG, DXF, MIF, etc.) to SuperMap data format.

Mapping a user-defined configuration field with commonly used GIS formats (*.SHP, E00, MIF, etc.) to the database.
Data Quality Check

- Topology check
  - Support custom topology rules
- Support graphical and attributes consistency check
Data Editing

- Spatial data editing
- Attribute editing
  - Input attribute value, generate attribute data, maintain attribute fields
  - Input archive data
Metadata Management

• Through data directory, it describes, organizes and manages land information in a unified way, so as to facilitate data retrieval and application system access.
Results Output — Maps and Reports

- Provide statistical charts output function
- Output maps by administrative district, map sheet, any range at any scale
Data Submission and Updates

Basic data
- ETL
- Integration, transformation
- Batch update

Business data
- ETL
- Web Service
- Data extraction, integration, transformation
- Batch and incremental updates

Management data
- API
- Real-time, synchronous Updates

“One Map” core database
## Data Update Frequency

<table>
<thead>
<tr>
<th>Database</th>
<th>Data source</th>
<th>data Update</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land registration database</td>
<td>City and county land registration business</td>
<td>Real-time</td>
</tr>
<tr>
<td>Construction land database</td>
<td>Provincial, city and county land approval business</td>
<td>Real-time</td>
</tr>
<tr>
<td>Exploration and exploitation of mineral resources database</td>
<td>Provincial, city and county approval of mining operations, the provincial reserve assessment, mining supervision business</td>
<td>Real-time/Regular</td>
</tr>
<tr>
<td>Geological environment database</td>
<td>Provincial geological environment approval business</td>
<td>Real-time</td>
</tr>
<tr>
<td>Geological disaster database</td>
<td>Geological disaster monitoring activities at all levels</td>
<td>Real-time/Regular</td>
</tr>
</tbody>
</table>
SuperMap Land and Resources Informatization Solutions

- Overall framework of information system development
- Database construction
- Basic platform and application services development
- Application system development
- Information service development
Basic Platform and Application Services Development

Development of the basic platform and application services

- Land E-government platform
- Land application services
Land E-government Platform

• The configurable E-government platform is composed of business modeling, organizational modeling, form definition and unified security authentication, and single log-in.
• Includes business building platform and business running platform.
• Builds various types of application systems based on e-government platform, realizing government information management.
Module Structure and Functions

Expand business applications based on land resource e-government basic platform

Land resource business application system
- Land management information system
- Mineral management system
- Administrative Office Automation System
- Information service system

E-government running platform
- GIS business components

E-government building platform

definition
Maintainence
Features of E-government Platform

• All systems are developed based on a unified e-government basic platform
• GIS system uses component-based encapsulation in accordance with different business demands
• All systems use a unified certification authority
• All systems share data based on “One Map”.
• Business processes can be flexibly customized
• Institutions, personnel, authority can be flexibly adjusted
• Business forms can be easily modified
The purpose of sharing services

- Provide a wide range of Web services or OGC standard services based on “one Map” core database in data center, so that various business departments, other business units and subordinate business units can use the sharing services.
Land Application Service — Contents of Sharing Services

- Includes map service, data service, spatial analysis service, 3D service, business application service, metadata service, ...
SuperMap Land and Resources Informatization Solution

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Application System Development

Application system development

- Land and resources management
- Mining management
- Geological environment
- Law Enforcement and Supervision
- Consolidated supervision
- Integrated affairs
Land and Resources Management Business Application System Development

Land and resources management

- Land use overall planning information system
- Land use management system
- Approval of construction land management system
- Land supply management system
- Urban and rural cadastral management information system
- Basic farmland management information system
- Mobile law enforcement surveillance system
- ...
Land Use Management System — Land Use Type Business

- Input, output, manage, update, query, analyze and make statistics on land use graphics and attribute data

Land type query and management

Statistical analysis within an area delineated
Rural Cadastral Management Information System — Land Use Type Business

- Manages state-owned land use rights, collective land ownership, collective land use rights and other ownership, and provides other business functions, such as the initial registration, change of registration, cancellation of registration, real estate registration, etc.

Provide unified management of current and historical data, comprehensive data collection and update capabilities.

Complete temporal data model, land change process monitoring, and both of cadastral graphical data and attributes historical backtracking.
Approval of Construction Land Management System — Administrative Approval

- The system uses workflow technology to achieve approval of construction land management processes information (application, joint hearing, approval, filing, fees, etc.)
- The system connects departments of planning, farming protection, use, cadastral and supervision to the land administrative departments at provincial, municipal and county levels to achieve approval management interaction.
Construction Land Approval Management System — Custom business processes, templates and comments

The workflow, forms, templates and comments can be flexibly customized and adjusted.
3D Land Supply Management System — Land Price Query

• Support the planning criteria query, land price query, and land supply analysis based on 3D scene.
• In land supply consultation meeting, the government can determine the land price and delivery time based on planning conditions and basic land price in 3D scene.
Development of Mining Management Business

Mining management

- Mining registration and approval system
- Mineral resource planning and management system
- Mineral resources and reserves management system
- Mining rights trading management information system
- Mining environmental protection systems
- Mining supervision and management information system
- ...
Mineral Resources and Reserves Management System

• Manage mineral reserves, register the changes of mineral resources, and make statistics on the changes.
Mining Registration and Approval System
Development of Consolidated Supervision Application System

- Monitor the entire process
- Comprehensive query and statistics
Comprehensive Statistical Analysis and Decision-making Analysis System

• Provide comprehensive statistical and graphical analysis functions for land business based on “One Map” core database.

Cadastral data overlay analysis with other thematic data, to achieve the best analysis mode of land use.
Development of Law Enforcement Business Application System

- Develop monitoring and warning system used in land businesses, such as land use, mineral resources and geological environment.
Vehicle-carried System for Monitoring

Quick navigation to the accident site
On-site investigation and evidence collection
Preliminary check
Real-time video recording and uploading
Receive real-time inspection tasks and upload them
Two-way consultation with the command center
Field Survey with Handheld Devices

Together with law enforcement vehicles
Receive command center assigned tasks, image navigation
Recording tracks
Site enforcement image acquisition
Overlay analysis of land use planning data
Photographing the scene and evidence, associated with the corresponding graphics
Development of Integrated Affairs Application System

Integrated affairs

• Land and resources files management system
• Office running system
• Query system of laws and regulations
• Information Service System
• ......
Land and Resources Files Management System

- Offer a variety of ways to achieve rapid retrieval and accurate positioning.
- Support convenient and flexible file input, output, and modification.
- Support file borrow and destroy in accordance with the relevant norms and standards.
SuperMap Land and Resources Informatization Solutions

- Overall framework of information system development
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Land and Resources Information Service Development

• Offer both government and the public the land information through Internet, touch screen, big screen, SMS services, etc.
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3. Application Cases and Awards
Application Cases

- In 2008, the background database construction of the MLR second land survey "One Map" is based on SuperMap GIS.
- Amount of data exceeds 45TB.
- It's China's largest spatial database system currently.
Application Cases
— Land and resources information system

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