

"and Related"

Technical Trends in the Use of GIS in Planning and Transportation

URISA BC
December 13, 2004

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Agenda

1. Context:
 - Who are the users?
 - What do they need?
 - How can GIS help?
2. Observations / Trends - What's Happening in GIS?
 - A. Software / Applications
 - B. Data
 - C. Information Technology
 - D. People / Organizations
 - E. Sources of Best Practices & Ideas




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1. Context: Who are the users? What do they need?

- Organization Types being discussed today:
 1. Federal, Provincial, Municipal, Regional Governments & Agencies
 2. Transportation Agencies & Companies (transit, bus, rail, shipping, courier)
 3. Utilities
 4. "Others"


Applications Discussed in Today's Seminar	
Planning: <ul style="list-style-type: none"> ▪ Land use development ▪ Population projection ▪ Land use scenarios ▪ Urban growth modelling ▪ Development review (planning visualization) ▪ Real Estate administration 	Transportation: <ul style="list-style-type: none"> ▪ Travel survey ▪ Transportation operations ▪ Demand modelling ▪ Transportation plans

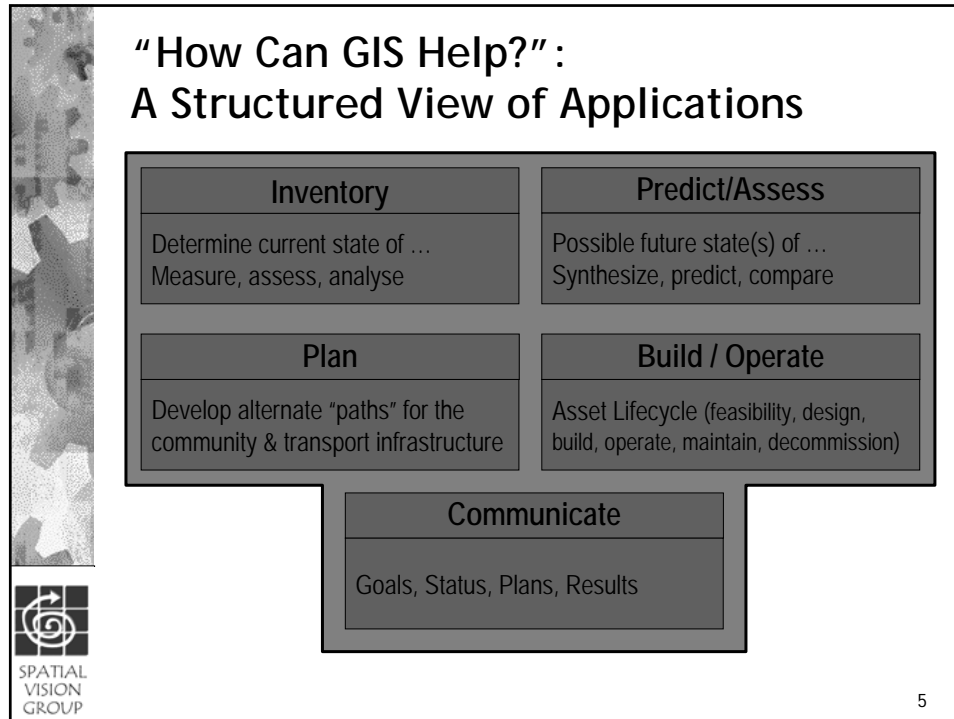

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"How Can GIS Help?" : Data Needs

<ul style="list-style-type: none"> ▪ Jurisdictions ▪ Land Fabric: <ul style="list-style-type: none"> • Cadastre • Assessment • Land title • Zoning ▪ City Infrastructure: <ul style="list-style-type: none"> • Road • Lighting • Street furniture ▪ Utility Infrastructure: <ul style="list-style-type: none"> • Water & sewer • Gas & electric • Communications 	<ul style="list-style-type: none"> ▪ Population Sizes/Trends ▪ Asset Management: <ul style="list-style-type: none"> • Maintenance plans, Backlogs • Work management • Duty cycle / Level of use • Operating costs • Repair history ▪ Other Transport Infrastructure: <ul style="list-style-type: none"> • Port facilities • Rail • Airport ▪ Other Key Assets: <ul style="list-style-type: none"> • Community buildings • Hospitals • Police
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- ## 2. Observations / Trends: What's Happening in GIS?
- Five Discussion Themes:
- A. **Software / Applications**
 - Core Software Vendors
 - Solution Vendors
 - Enterprise GIS Integration
 - B. **Data**
 - C. **Information Technology**
 - D. **People / Organizations**
 - E. **Sources of Best Practices & Ideas**
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2A. Software / Applications: Core Software Vendors

- **Types of Vendors:**
 - GIS/CAD: e.g. ESRI, MapInfo, AutoDesk, Bentley
 - Database: e.g. Oracle, Microsoft
 - Other: Macromedia-based companies, Microsoft
- **Observations:**
 - We don't buy solutions from single suppliers anymore
 - Web-enabled products much more mature



Software

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Solution Vendors

- **Vendors of Solutions That Meet Specific Business Needs:**
 - Engineering: Hansen, Miner & Miner, Haestad
 - Planning/Permitting: CityView, Amanda, Tempest
- **Observations:**
 - Many achieving significant market share
 - Some started in non-spatial and have added GIS
 - None of them meet all needs of government
- **Trends:**
 - Becoming more important as an "out-of-the-box", lower-cost, faster-to-implement solution
 - Municipalities cannot afford to keep on building & maintaining custom solutions.
 - Some of the Core Software Vendors attempting to offer solutions as well



Software

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Data Providers

- Vendors are selling GIS services, GIS-ready datasets or both:
 - Compusearch, Statistics Canada, GIS Innovations
 - McElhanney, Triathlon, Radarsat
- Examples of Datasets Available:
 - Street Centreline
 - Demographic Data
 - Remotely-sensed data (airborne & satellite)
- Provincial Initiatives
 - DRA (Digital Road Atlas)
 - ICIS (cadastre)

Example: Index of MapInfo Data Catalogue 2004 (page 100 of 102)

S

Sales Data See Demographics, Financial Data

Satellite Imagery See Raster Maps

Scandinavia 55-57

Sementation See PSYTE

Singapore 23

South America

 Brazil 65

 Spain 57-58

 State Boundaries for Mexico 63

 Statistics See Demographics

Street Maps

 Brazil Streets 65

 CDATA 2001 - Detailed Base Map 12

 Drivetime® European Edition 43

 Drivetime™ for Australia 9

 MapInfo® StreetPro Basic™ Australia 8

 MapMarker® Plus U.S. 70

 MapMarker® U.S. 71

 MapMarker® World 92

 Mexico Street and Demographics Bundle 64

 Mexico Streets 63

 New York City Block Level Map 67

 Routing J Server Austria 46

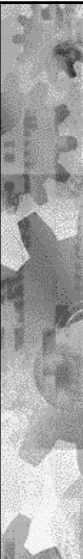

 Routing J Server Canada 26

 Routing J Server Deutschland 52

 Routing J Server Finland 47

... add turn-by-turn driving directions, drivetime polygons (isochrones) and multi-point routing (traveling salesman) to any application. Calculating either the shortest distance or quickest timed route between any two points, Routing J Server Canada returns text-based driving directions and spatial points to your users.

Data

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Data Needs: Not just data, but a need for "structure"

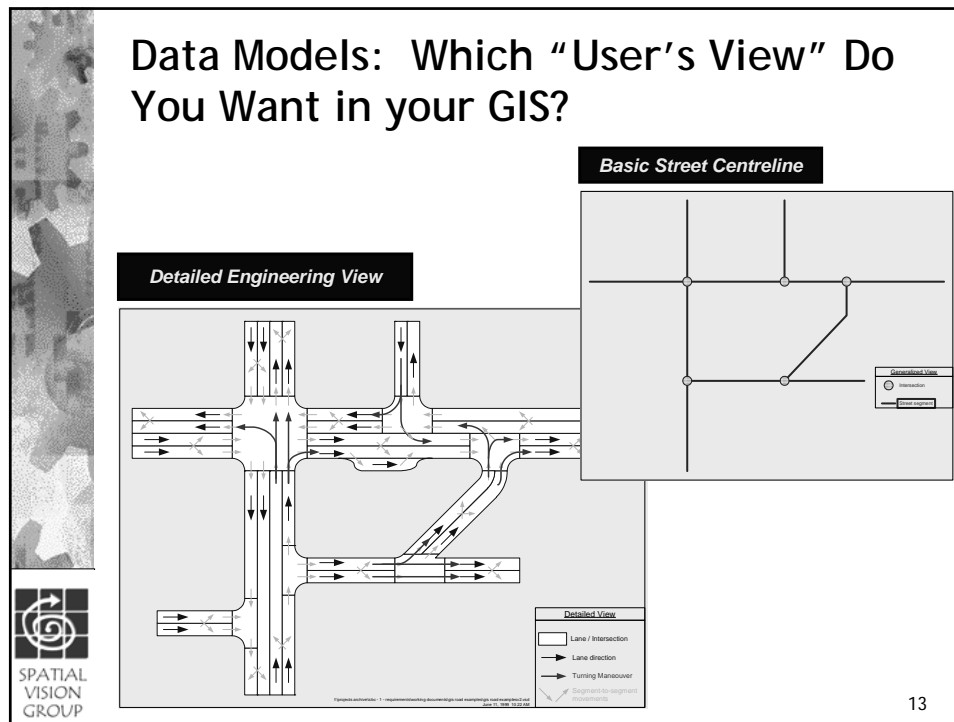
Example: Parcel-centric GIS data model.

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graph TD
    Cadastral((Cadastral)) --- Assessment[Assessment]
    Cadastral --- LandTitles[Land Titles, Agreements]
    Cadastral --- Permits[Permits]
    Cadastral --- Bylaws[Bylaws]
    Cadastral --- Inspections[Inspections]
    Cadastral --- Zoning[Zoning / OCP / Floodplain / ALR]
    Cadastral --- Services[Services]
    Cadastral --- Infrastructure[Infrastructure]
    Cadastral --- Planimetry[Planimetry / Environment]
    Cadastral --- ForeignUtilities[Foreign Utilities]
    Cadastral --- Imagery[Imagery]
    Cadastral --- Geodetic[Geodetic Survey Base]
            
```

Data

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"Reusable" Data Models

- Vendors are starting to offer re-usable data models
 - E.g. UML Data Models from ESRI:
 - ✍ Basemap, Land Parcels, Administrative Boundaries
 - ✍ Transportation, Telecommunications
 - ✍ Utilities (energy & water), Petroleum
- Key Points:
 - These models can be used to create a GIS data structure (a big time saver)
 - Moving towards common semantic content (more agreement on meaning)

Data

The Spatial Vision Group logo is in the bottom left corner, and the number 14 is in the bottom right corner.

2C. Information Technology

Consideration	Near-Term Trends
IT Infrastructure	<ul style="list-style-type: none"> Now very low-risk element of any "spatial" initiative Issue not technical feasibility, but cost
Web GIS	<ul style="list-style-type: none"> A major implementation area for municipal government.
Data Sharing / Integration with CAD	<ul style="list-style-type: none"> Moving data more and more easily between organizations Now "referencing in" CAD drawings directly into their GIS view (access to "as-built" plans)
Digital Imaging	<ul style="list-style-type: none"> Major increase in the use of digital imagery (orthophoto underlay)
Field Data Gathering / Mobile Data	<ul style="list-style-type: none"> <u>Gather</u>: Increased use of GPS <u>Use</u>: Mobile field data via wireless network
Integration with Models	<ul style="list-style-type: none"> Transportation: Road network models Planning: Population growth models adding the time, physics, socio-economic elements



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2D. People / Organizations

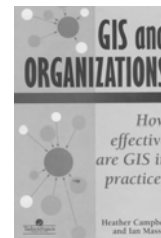
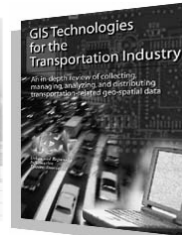
- Employees or Consultants?:
 - Hiring GIS Coordinators
 - Hiring staff for lower-risk system construction and sustainment tasks rather than hiring consultants
 - Still outsourcing advanced development tasks
- Accreditation:
 - Movement towards accreditation of GIS practitioners



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2E: Best Practices & Ideas

- **GIS Advice:**
 - The web is a major source of GIS plans, database design, application specifications, etc.
 - e.g. see URISA's website for publications
- **GIS Results:**
 - GIS and Organizations - How Effective are GIS in Practice? (Campbell & Masser - 1995)
 - Geographic Information Management in Local Government (Gilfoyle & Thorpe - 2004)



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Wrap-Up

When you listen to today's papers, try to:

1. **Understand the Needs:**
 - Who are the users?
 - What do they need?
 - How can GIS help?
2. **Understand the key elements of the solution being discussed:**
 - A. Software / Applications
 - B. Data
 - C. Information Technology
 - D. People / Organizations
 - E. Best Practices / Ideas



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- Mr. Johnstone is a Principal Consultant and Founding Partner of Spatial Vision Group Inc. His firm provides planning, project management, systems design and delivery services to clients who use Geographic Information (GI) and Automated Mapping (AM) technology to meet the needs of business and government.
- Mr. Johnstone has planned, designed, developed and delivered solutions in a wide range of application environments including planning, civil infrastructure, insurance, agriculture, environment and utilities. His clients include municipal, regional and federal government, the private sector and crown corporations.
- With over 22 years' experience working with geospatial technologies, he has completed over 100 consulting assignments encompassing the architecture, planning, design and/or management of approximately \$27,000,000 in GIS implementation projects. The systems implemented via these projects manage spatial information that describes the location and status of over \$7 billion in fixed, mobile, and natural resources assets.
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