

INDUSTRY TRENDS AND ANALYSIS GROUP

TAMPA, FLORIDA 2006



ITAG FINAL REPORT 2006

TAMPA, FLORIDA

KEY ISSUE TOPIC: DEFINING AND COMMUNICATING GEOSPATIAL INDUSTRY WORKFORCE NEEDS

FACILITATORS: Susan Ancel and Cindi Salas

a. Training

- **What are your organization's geospatial training needs?**
- **What kind of training would be most effective?**
 - GIS training – in university, in tech colleges
 - Trade schools have no geographical focus
 - Schools have issues with owning and maintaining current GIS tools
 - Have to “bait” people with more 30-day software trials
 - I/T training – not enough domain experience/training
 - Domain training – not enough IT experience/training
 - Shortage of DBAs with geospatial knowledge
 - Development
 - with utility experience (course work focused more on items like forestry)
 - probably due to lack of utility GIS data to train on
 - also due to where GIS training is occurring in university (in urban planning vs. engineering)
 - resource based vs. network connectivity based training
 - Research Item: Need utility datasets that the schools can use to provide the training (have to handle the data security issue)
 - More internship programs – finding mentors for the students
 - Industry needs to tell schools what skills they need to have taught
 - Doers/Viewers/Analysts – Three groups – can have union issues within company on how you define where they land
 - Training – ultimately it is the company's responsibility – but they need to be able to influence the curriculum

b. Staffing

- **Are you having staffing difficulties? In what areas?**
 - Aging workforce
 - Average age of field staff – they need a higher base level of training
 - Union contracts limit ability to raise base skills without huge pay impact
 - Cyclic nature of workers available
 - Churnover versus turnover of employees
 - Career paths – technical level – how quick do they reach the top level

- **What kind of geospatial skills are you looking for?**
 - Engineers trained in CAD and not GIS
 - Universities – want to be “geoscience” versus practical training for business
 - Trained on how to do a GIS query analysis – but not on how the database needs to be structured
- **Where will workforce shortages be in the future?**

c. **The Geospatial Industry**

- **What other “High Growth” industries will be most impacted by increased use of geospatial technology?**
 - Recreation and leisure
 - Public health
 - Any industry Google or Microsoft targets
 - Business geographics
 - Location based industries (where am I in relation to others)
- **How best to improve and communicate our industry ‘image’—to students, displaces workers, etc.**
 - Student chapters
 - Need to be more visible in our communities at the universities
 - Explain profession of GIS
- **How to use image to increase student skills in STEM (Science, Technology, Engineering, Math)?**

FACILITATORS: Bob Austin and Mary Ann Stewart

a. **Training**

- **What are your organization’s geospatial training needs?**
- **What kind of training would be most effective?**
 - Have to do internal and external
 - Programmers from IT, Techs from engineering
 - Easier to take from knowing company business and training in GIS
 - “Train the Trainer” and have those people do other training
 - Skill sets grow incrementally
 - Use everything—operations people, applications developers
 - GeoSearch comment on recent boutique training phenomenon (small organizations offer series of training operations on topics such as recreational mapping)
→ For strategic planning, how to reach this sector for members?
 - Design engineers start to learn GIS, how to train them is big issue
 - Training needs vary with size of the organization
 - Where do you get training for GIO/CIO?

Retraining staff adaptability issues—some are and some aren’t using people in different capacity.

- Retraining issues (A76 & USGS) What to do with these people?
- Issues with people too long in one place

- Engineering companies want summer interns; many ITAG member companies do
- Interns don't know how to communicate in business situation. Universities should help with this.
- Training delivery methods may be an issue—i.e. web based

b. Staffing

- **Are you having staffing difficulties? In what areas?**
- **What kind of geospatial skills are you looking for?**
- **Where will workforce shortages be in the future?**
 - Job titles a big problem, people are sensitive about this
 - Professional certification issues
 - GeoSearch changes job titles. Use what employers come in with—keep it simple
 - Job description more useful than titles
 - Career path very important
 - Training low level techs takes 3 years—working under fire
 - Takes long time before you can turn new staff loose on complex jobs
 - Train utility/business staff in GIS; train GIS staff in utility/business
 - GIS skills getting more like Word/Excel skills; ubiquitous
 - Look for people in organization with aptitude
 - Take as given that people can learn—How do you teach them?
 - Cost of training a challenge (including time to train). Federal funding for training to businesses would increase our industry

Shortages—

- Programmers
- Oracle spatial

How to train upper and middle tier?

Do people hire from commercial colleges—are they helpful?

- Dr. Austin teaches at University of Phoenix, but no GIS curriculum
- Telus hires for 4-year programs because they have well-rounded skills
- Should GITA try to shape project manager and other curriculum needs? Yes!
- Industry can have more influence on skills provided by commercial education
- Ability to conceptualize, work with people to achieve business objectives is difficult to find

c. The Geospatial Industry

- **What other “High Growth” industries will be most impacted by increased use of geospatial technology?**
- **How best to improve and communicate our industry ‘image’—to students, displaces workers, etc.**
- **How to use image to increase student skills in STEM (Science, Technology, Engineering, Math)?**

New areas—

- Aviation
- Defense
- Commercial marketing—demographics

- Health services
- 1/3 of GeoSearch clients have nothing to do with mapping
- Insurance industry
- Banking
- Real Estate Development
- Cooperative interaction due to Federal initiatives
- Retail, trucking, navigation
- Everywhere!

How do we make GITA the organization people come to?

How to elevate conversation?

- ROI
- Go where they are—supermarket/banking conventions—meaningful conversations
- Inserts to college course guides
- Consider on-line course material
- GIS CSI show—forensics courses overrun now
- Button on Google Earth
- Advertise field tech jobs in adventure and outdoor magazines
- Need to broaden our market
- This time similar to when we went from paper to electronic. Is GIS a tool? So many applications focus on this vs. GIS as a profession.
- Tech no longer an issue—it's mastered. Now sociology is issue. That's the outreach exercise
- Provide GIS modules to business schools
- Get GIS pros to see how they can find solutions for any industry
- Should G (GITA?) be component of IS?
- Cass Green's online GIS course is with University of Southern Mississippi? Very high quality instruction. Outreach to GITA members.

INDUSTRY BREAKOUT SESSIONS

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TOP APPLICATIONS LIST

1. Trouble Call/Outage Analysis
2. Mobile Work Force Automation
3. Engineering Work Order Design
4. Work Management
5. Asset Management—Maintenance and Capital
6. Automation Vehicle Location

7. CIS Integration
8. Mobile GIS Computing
9. Executive Information/Support System/Access/Public Access
10. Distribution Automation Interface/SCADA Interface

TOP TECHNOLOGIES LIST

1. Internet/Intranet
2. Pen Computing/Mobile Computing/Field Devices/Tablet
3. Disconnected/Connected Data Access
4. EAI
5. Distributed GIS
6. Terminal Services (Citrix)
7. Non-utility Based Map Services (i.e., Google Earth)
8. Data Storage
9. Database Security
10. Interoperability

GEOSPATIAL INDUSTRY TECHNOLOGY REPORT–BENCHMARKING:

- Dollars per ‘subdivision’ is too large
 - Consider having a range (i.e., per average subdivision of 100 lots)
 - Ask for number of lots and cost per lot instead of cost per subdivision
- Make a distinction between overhead versus underground
- Have a checkoff or indication as to whether a design tool was used and design fed to GIS instead of heads-up digitizing
- Have a checkoff list for ‘what’ is mapped:
 - i.e., poles, secondary, transformers, service drops, meters,
- Ask if plats (for subdivisions) are received from developer in digital format
- Are mobile users feeding information back to corporate system? If so, how many?
- Target “GIS Dollars Per Customer”
 - For data maintenance/input versus system care and feeding
 - Exclude large projects that would skew the numbers
- Need to measure quality in some manner
 - Best measure is customers unassigned in GIS
 - Also important, but probably difficult to get is customers that are connected but incorrectly
 - Level of confidence in network connectivity
 - Consider using the Garner type approach (magic quadrants)
- Need to have some qualifiers on costs
 - i.e., excluding labor burden, software and hardware, etc.
- As what ‘percent’ of their facilities are actually mapped

OTHER ISSUES:

- Data security – public/client expectations
- GIS becoming more ambiguous
- Interoperability – platform
- Spatially-enabled data warehouse
- Data sharing

- Regulatory reporting requirements
- Regulatory compliance – Sarbanes-Oxley
- Model simulation and visualization

GAS

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TOP APPLICATIONS LIST

1. Cathodic Protection
2. Field Force Automation
3. Mobile Data Collection/Viewing/Access
4. CIS Integration with GIS/AM/FM
5. Facility Maintenance/Monitoring/Replacement
6. Distribution Integrity for Risk Ranking
7. Work Management/Process Automation
8. Gas Outage Management System
9. System Planning/Modeling
10. Marketing—targeting new customers to hook up onto existing main.

TOP TECHNOLOGIES LIST

1. Pen/Mobile Computing
2. Document Management/Workflow
3. GPS
4. Internet/Intranet
5. Imagery: Satellite and/or aerial
6. Data Exchange/OGIS
7. Information Security
8. LIDAR: Terrestrial and/or aerial
9. Wireless Access
10. Spatial Data in Standard RDBMS

GEOSPATIAL INDUSTRY TECHNOLOGY REPORT–BENCHMARKING:

None

OTHER ISSUES:

- Addressing is everyone’s issue (house number & street name). Have a “round robin” session to get everyone’s input, as opposed to a panel of “experts”. Even a couple hour session to brainstorm what the problems are and to record everyone’s best practices. The published result would be a tool bag that utilities could follow up on with individuals who contributed ideas.
- “Data Exchange/OGIS” – need to clarify for us. Is it meant to emphasize:
 - internal or external data exchange?
 - Process or technology
- The term “asset management” has become too broad, we chose to narrow it.
- GIS is still separate from CIS – how can we work to move from those silos?
- Cathodic Protection tracking methods/systems are decades old, and are separate from GIS
- Aging work force – with replacement staff over next 5 to 10 years, there is opportunity to implement more technology and change processes to offset loss of corporate knowledge.

LOCAL GOVERNMENT AND PUBLIC WORKS

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TOP APPLICATIONS LIST

1. Emergency Management
2. Economic Development
3. One call Center/Call Before you Dig
4. Planning/Zoning
5. Right of Way Management
6. Land Development
7. E-government
8. Airport Management
9. Sub-surface Utility Engineering
10. Decisions Support/Management Information Systems
11. Public Health & Safety

TOP TECHNOLOGIES LIST

1. Web Internet/Intranet
2. GIS
3. Mobile Computing
4. GPS
5. Wireless Solutions
6. Systems Integration (External/Internal Enterprise Integration)
7. Intelligent Transportation Systems
8. SCADA
9. Data Warehousing/Document Management
10. Electronic Memory Locators

GEOSPATIAL INDUSTRY TECHNOLOGY REPORT-BENCHMARKING:

- What are the dollars spent per square mile
- How much money is spent per citizen
- Benchmark on population base
- The other benchmarks could be added to this list because the local government in some cases are involved with or has a gas, electric, water/ wastewater department.

Questions to ask regarding Benchmarking to the other Public Sector people.

- Define the Public Sector?
 - a. What makes up this sector
 - b. What parts of your sectors use GIS
 - c. Are the GIS user integrated?

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Land Management

Public Awareness

Data Sharing = 1 way only

would be a help

need more

with counties, other pipelines increasing in past years

ERP profitability by section (executive)

911 is impetus

Dashboard? How track significant metrics?

More seamless information flow

ROI? US mandates

BPM

Many Data Models

Standardization?

GAP between mid – upper management

TECHNOLOGIES

In line inspection

Data Management

Increase in technology — LIDAR?

Increasing in value as tool

Relates to volume of data

Technology overkill? Best Practices!

Accuracy management tool and change detection

Data Migration

To better technology

Maintenance

Visualization

EAI

HCA Analysis—Apps ok?

BENCHMARKING METRICS

\$ to get solution in place? Maintain?

Per mile?

Cost to manage in GIS environment

App cost, s/w cost per mile

Labor hours for:

Risk Assessment

Cost! Define parameters

What labor? Outsource vs in-house

What is being outsourced?

How much \$ per miles

Levels of accuracy (processes)

How many companies are using PODS, other data models?

Distinguish between size of company

small/large

urban/rural

What other divisions in the company are using geospatial?

TELECOMMUNICATIONS

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TOP APPLICATIONS LIST

1. Emergency Management
2. Interoperability
3. Enterprise Integration
 - Legal and Regulatory Support Applications
 - CIS Integration
 - Accounting and Financial System Interface
4. New Service Delivery Support (Customer Care)
 - Loop Qualification
 - Network Readiness
 - xDSL
 - Fiber To Everywhere
 - Broadband Entertainment Service Introduction
5. Business Decision Support
 - Related to Enterprise Integration
 - Marketing
 - Business Geographics
 - Geospatial Informatics
6. Field Force Automation
 - Dispatch
 - Scheduling
 - AVL—Fleet Management
 - Field Data Acquisition
7. Wireless (mobility) Support
8. Wireless/Wire Line Integration
9. OGC/Open Source
10. Fibre Management

TOP TECHNOLOGIES LIST

1. Web Services
 - XML
 - SOAP
 - AJAX
 - GML
2. Interoperability
 - Intra-enterprise architecture as an antidote for the 'Stovepipe' environment
 - Inter-enterprise collaborative GIS workspaces
3. Web Portals
 - Web Portals
4. Wireless
 - 802.11G, 802.16, 802.20
 - 1X and high speed wireless networks
5. Google Earth
6. Hardware Interoperability
 - MSIP Multi-Source Interface Processor
7. GPS
8. Satellite Imagery
9. Ortho Photography
10. LIDAR/LIFSAR

TOP 10 BUSINESS DRIVERS (OF GIS) IN TELECOM

1. Emergency Responses
2. Data Sharing
 - External Portal Access
 - Licensing and agreements
 - Meta Data
 - OGC and Open Standards
3. ROI
4. Change Management
 - IT Integration
 - Enterprise Integration
5. Regulatory / tax reporting
6. Enterprise integration
 - Including Configuration Management
7. Business Process Integration
8. Outsourcing
 - As it relates to ROI
 - As it relates to Business Process Integration
 - As a Change Management Challenge
 - Acceptance of GIS as integral and mainstream source of Enterprise Decision Support
9. Competition
 - CLEC Overlay

There was much interest and discussion, if not full resolution, on how broader, or 'higher level' categories might aid in the classification of issues. Clearly asking a room full of engineers to create a simple list is inviting anarchy. We could not suppress our inherent need to create sub-categories, classifications, bulleted items and a 'matrix' identifying relationships across 'verticals'. Fortunately, time was limited, and we were unable to fully realize such a model. The preceding three bulleted lists represent a reluctant compromise.

Enterprise Architecture/IT Architecture

Perhaps it would be worthwhile to focus more on the business aspects, including:

- ROI
- Enterprise integration

Would 'Business Drives' possibly be a third category (technology/applications/business driver)?

The user's biggest concerns are simply:

- Being productive,
- Being competitive
- Making money

How well GIS practitioners market Geospatial Information Technologies' capacity to help achieve these ends will drive much of the investment and development of GIS in the Telecommunications industry over the coming years.

GEOSPATIAL INDUSTRY TECHNOLOGY REPORT—BENCHMARKING:

CALS growth needs to be adjusted to allow for a negative figure. In the foreseeable future, and perhaps way into the future, the trend of wire line operations losing customer lines due to wireless and high speed data services will continue to pressure operations.

If obtainable, more meaningful measures would include:

- Wireless
- ADSL
- VOIP (difficult to report)
- PON (Passive Optical Network)

What does FCC require? Simply measuring 'customers' would probably be best, but how that number is obtained would be a challenge, and would likely vary widely across companies, depending on service offerings and other variables. Miles of fiber may be more helpful than, or as a supplement to the 'Miles of Copper'

OTHER ISSUES:

The consensus opinion is that the key issue for Telecom, if not all sectors, is:

- Emergency Management
- Including such topics as:
 - Data Sharing
 - The MSIP Gold – Federal Data Set

- Emergency Management Reporting,
- Tying to non-GIS Data in the aid of Emergency analysis and response.

Wireless/Wire line Interface

With convergence of many Telcos' wire line and wireless operations, and notwithstanding those companies divesting of wire line, there is an increased demand on GIS and other Telco operating areas to respond to the integration of wireless and wire line systems, processes and technology.

Cost implications of the wireless / wire line integration of network infrastructure is huge, and any application or technology, including GIS, which can make such integration more effective or efficient, will be called upon.

Acquisitions and Divestitures

Integration of applications during acquisitions is becoming a more prevalent challenge. Hand in hand with that are the requirements to migrate or convert GIS data to a common platform as a result of acquisitions. Often there are regulatory reporting obligations dependent upon the GIS applications which drive not only funding, but the urgency and timeline for such GIS integration.

There are still a surprisingly significant number of Telecommunications companies which are not using Enterprise GIS yet, but are instead continuing to use CAD or rudimentary AM/FM applications.

Change Management

Change Management, particularly in respect to corporate and departmental culture perhaps presents more of a challenge than any pure technology or application issue in the Telecom sector.

Most key application deployments in GIS in the Telecom sector, from extending GIS into the corporation beyond AM/FM to dealing with the ever evolving relationship between GIT and IT, depend more upon how the culture change is managed than on how the technological issues are handled. In any case, IT is taking a larger role in GIS.

Industry Survey

The Telecom sector of ITAG agreed there could be some value in canvassing IT departments in larger Telcos as a supplement to its annual survey. Questions could investigate how, specifically, these groups are integrating GIS into an enterprise.

Perhaps a panel on GIS integration in light of the Geospatial Line of Business would be of interest to members.

ITAG members concurred that despite the investment in time and dollars to create massive GIS databases, we still seem to be missing several levels of complexity and value at various levels. As a whole, we may not be leveraging the network fully at this point.

After wrestling to fit the discussion to the framework of 'Top 10 Technologies' and 'Top 10 Applications' there was agreement that either a change to the format or an additional category was required. In either case, it would be much more manageable, and relevant, to deal with 'Top 10 Issues', all of which had cultural, technological and application components. Not only is it getting more difficult to distinguish particular technologies from the supporting applications, but it is becoming impossible to speak to the most urgent issues without seemingly 'forcing them' into the existing ITAG framework of 'Top 10 Technologies' and 'Top 10 Applications'.

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TOP APPLICATIONS LIST

1. Asset Management
2. Workflow Applications
3. Document Management
4. Facility Management
5. Leak Management
6. GIS Migration/Integration
7. Routing to support field work
8. Integrity Project Management
9. Water Quality and Collection system analysis
10. Field GIS/GPS Enabled condition assessment

TOP TECHNOLOGIES LIST

1. GPS differential for higher accuracy
2. Mobile Computing
3. WiFi/Wireless
4. Field Data Capture
5. Multimedia technology enabled through GIS (Video, Digital pictures etc)
6. Data Exchange OGIS
7. Database Management
8. Application Integration
9. Data Model Standards
10. Sensor web technologies

GEOSPATIAL INDUSTRY TECHNOLOGY REPORT–BENCHMARKING:

- How many active GIS users do you have?
- What is the cycle time reduction using GIS technology for business process?
- Time from construction in field to posting to GIS?
- Time from field notification of error to update/fix in GIS?
- Is GPS required on all updates to the database?
- What is the number of recording staff to miles of main?
- What is the number of notifications from field staff of error per miles of main
- What is the positional accuracy of the facility database?
- What are your biggest roadblocks to updates in the database (check the following)
 - Landbase availability
 - Digital submittal
 - Resources
 - Equipment Tablets, GPS. Etc
- Do you have in house staff or out source the GIS updates?
- Do you do Hydraulic Modeling?
- Is your Hydraulic Model built from GIS or integrated?
- How long does it take to update the Hydraulic model?
- Are your other business systems/databases integrated with GIS (check all that apply)
 - CIS
 - Asset Management
 - Workforce management
 - LIMS
 - SCADA
 - EDMS – document management systems
 - Hydraulic Model
 - Regulatory Reporting
 - Future Capital Investment CIP
- What is the length of time it takes to prepare regulatory reports?
- Are you analyzing your records management and the impact of digital documents/e-mail/.digital submittals to your process?
- Are your GIS people involved in interagency data sharing effort to do any of the following?
 - Support emergency management
 - Disaster recovery
 - System planning
 - Incident scenarios
- Do you participate in One Call?
- Do you do your own locates? If yes, how many people per mile of main does it take to do locates?
- Do you contract out your locates? If yes how much to you spend on your outsourced locates?
- So you share your GIS data? If yes, check the following:
 - Do you limit who has access?
 - Provide everything to anyone who asks
 - Paper only
 - Subsets of data
 - Graphics only? If yes, complete or subset?

OTHER ISSUES:

Other emerging issues we discuss but couldn't quite fit within the Applications or Technologies.

- Interaction/Communication between Office and field staff
- Interagency coordination on projects to expand "Call before you Dig" efforts
- Wastewater/Stormwater infiltration analysis