

INDUSTRY TRENDS AND ANALYSIS GROUP

DENVER, COLORADO 2005



ITAG FINAL REPORT 2005

DENVER, COLORADO

KEY ISSUE TOPIC: DEVELOPING THE GEOSPATIAL WORKFORCE OF THE FUTURE

FACILITATOR: Group 1 moderated by Susan Ancel

What will be required to ensure an adequate supply of capable employees is available for our organizations in the future?

- Need to clarify that the education will depend on the type of GIS career being discussed. Analysts need to understand the data issues, developers focus on modeling expertise, users and managers of the technology are different again. They will be less focused on the how to implement vs. the how to maximize use for business benefits. The needs of the vendors, consultants and utilities will all be different for types of employees.
- The State and Province Education groups need to be communicated with as to what our businesses need for GIS educated employees.
- We need to reach out to GIS technical diploma students to give them the business understanding of the technology. Currently we can find trained GIS professionals that understand the technical aspects but are lacking the exposure to how businesses and users rely on and work with the technology.
- For Developers - they need employees with training in programming and geography.
- Spatial understanding is important
- Utility perspective is different than vendors or consultants for requirements
- Employees of vendors must know more than their clients – this will push them to more advanced degree requirements. This will get tougher as GIS knowledge pushes further into the Business community
- Career paths for GIS professionals are required to help students understand their options.
- How companies treat GIS professionals with a 2 year diploma vs. a University degree might be an issue for individuals career growth
- Reaching out to high school and junior high school on how the technology can be used will help build interest in this career path
- Companies should support student interns, develop tasks that are less complex that they can complete – but allows them to get a sense of the business environment and build on their interpersonal skills to help them when they graduate.
- GITA could provide guidance to companies on how to set up an internship program.
- Some companies have programs that allow growth of GIS professionals into different paths – technical vs. management streams. Selection of stream can be done later in one's career path.
- GIS Day is an untapped potential. Businesses need to use this day to reach out to the education community. Identify how we can support teachers and provide more exposure at earlier ages to individuals.
- Also need to consider education programs targeted at the existing workers in the field that are facing more and more of this technology in their work.
- Need to define whether it is a GIS education or a specific technologist diploma with a GIS

minor. In some companies the career paths for the employee will be greater if they have a diploma related to their industry with a solid GIS foundation.

- UCGIS has some curriculum initiatives already underway – we should tap into this rather than reinventing.
- We need to educate the high school guidance counselors on what GIS technology is – so they are providing the correct advice to students
- Have GIS companies offer training in programming at colleges.
- Need a model curriculum developed for what knowledge our companies require in their employees. Encourage our companies to reach out to their local colleges explaining what they need in their community.
- Students tend to work with hypothetical situations not always based on real world. GITA could help by developing a “real data” set of distribution data for use in the schools – masking what community in specific that it is.

What should GITA do to address workforce Challenges to the Geospatial Industry?

- GITA National should tell the Chapters what is going on with specific initiatives and topics in the industry so they can focus their efforts in the same direction.
- Consider grants reaching out to the high school level to encourage careers in GIS
- Encourage the teaching of GIS that includes not just the teaching of the technology but also the teaching of the “why” the technology is important to business.
- Develop an on-line vendor neutral tutorial showing what GIS is.
- Add links to colleges and other educational institutes that provide GIS education on the GITA web site
- Develop a “teachers guide” on the use of GIS for grade school and high school level use
- Have the Chapters develop an outreach program of speaker lists that could be provided to the schools for them to request presenters for their career or other education days
- Ask National Geographic to support GIS Day or Geography Week.
- Support career days at schools
- GITA National to develop “script” ideas for presentations in schools to be used by the speakers list developed through the Chapters
- Encourage employers to support school outreach programs as it allows their staff to also practice their speaking skills
- Participate with the Junior Achievers to provide them information and outreach on career opportunities in the GIS Field
- Develop a portal on the GITA web site that speakers in the schools could access. Have available on the portal sample presentations, data sets, tutorials, graphics, handouts.
- For businesses needing to train existing workers, consider partnerships with other businesses in the region to pool training initiatives (most businesses cannot have all their staff gone at the same time to attend training)
- “Leaders” have a broad skill set and experience, “Workers” typically come into a company with some GIS skills and then learn GIS “the company way”
- GITA should talk to its vendor community to see if they have training materials that could be packaged and available via a GITA web site portal for schools to download.
- Develop a GIS “marketing” campaign focused at kids to get them thinking about GIS as a career path
- Develop an “application” for students to interact with – like a “SIM –GIS” game where they make business decisions and get to see the results

- Update the “world in a Box” video and have available through the Chapters for use by volunteers going into the schools to talk about GIS careers.
- Get teachers involved and excited.
- Give out passes to invite teachers to our conferences
- Find out when teachers start to teach mapping in school and work with the local school boards to provide examples and content relevant for the local area.
- Encourage colleges to add business and administration courses to their Geography/GIS programs.
- Business training – especially ROI understanding – is lacking in the technical GIS training being offered by the colleges – this is a central corporate decision when trying to get a project approved.
- GITA should actively promote the ROI workbook when it is complete with a series of sessions at Chapter events and conferences
- GITA should do a better job to invite local citizens around annual conference, including utility executives, business and school leaders and media
- Have a session specifically targeted for emergency responders
- Start presenting content at conferences for CIO/CFO to explain ROI of GIS. We could do this by submitting papers in their call for papers and/or publish in some of their magazines.

Information to the Public

- Encourage user companies to have spatial information on their corporate web sites. Types of information that could be provided are location of outages.
- GITA could have a “for kids” section on their website.
- Expand circulation of interesting GITA Networks articles beyond members only.
- Help increase the public exposure to the uses of spatial info – via the media
- Provide info/data for students to prepare data model
- Have focus groups in the schools to explain the technology
- Increase the accessibility of student memberships.

FACILITATOR: Group 2 moderated by Bob Samborski

Workforce Of The Future--Ensure Supply Of Employees – What Can GITA Do??

- Intertwine course work around industry infrastructure and GIS technology
- Develop more co-op and internship opportunities
- Environmental protection (EAST) project work in addition to training
- Programs In Junior High, since Mid-90's
- Tap into Community Projects (Community College)
- Provide training specific to utilities, look at I/T Types
- Utilities/Companies should be encouraged to participate on local advisory groups
- Utilize Junior Achievement program
- Develop programs to be delivered at the chapter level
- Include educating Human Resource departments in utilities and companies. In many HR organizations, GIS is drafting
- Develop more active systems – repository of job opportunities
- User the Web (ie: Website For Hong Kong)
- Include multiple industries and universities, broaden network

- Certification programs have value if skill-based; these programs could have important role. The problem is these certificates were not always credible in the past
- Many times contractors are used instead of trained GIS employees (one estimate: 75%)
- There are different groups of employees -- digitizers, techies
- There is also high turnover in this field, coupled with a small pool of potential employees – that has to change
- GITA’s chapters could do more – get them some help: packages and training materials
- need employee development plans – how to progress to “professional practitioners”
- More effort on charting a Career Path, including opportunities, definition of industry
- Use the Junior Achievement approach
- Discussion on Discipline Vs. Tool -- we need to frame the issue!
- GIS impacts many functions - marry tool development perspective with various broad needs
- Universities don’t know about GIS like engineering; bring value-added knowledge to engineering/GIS
- Provide training by consultants to augment government and industry; develop education/training centers, form teams to ‘train the trainers’
- Someone who understands both engineering and GIS is hard to find
- Concentrate on teaching industry to people right out of college
- I/T Is Not GIS — in most companies it is segregated
- Develop a Web-Based Recruitment Center (Consultant Training Program)
- Identify and clarify unionized workforce issues
- A lack of formal education can be offset somewhat by apprenticeship programs, but there are not enough program developers and teachers
- Consider the resource issues --- how can and should academia and industry complement each other?
- Required skills for workforce need more definition
- How can we influence universities and program development?
- Define ongoing educational opportunities and develop a ‘roadmap’ to the geospatial profession
- Learn From other groups (i.e., chartered surveyors, etc --- syllabus). A taxonomy for GIS is desperately needed.
- Work with the Department of Labor on these and other issues related to defining the geospatial workplace and workforce
- What are base courses, prerequisites, core courses, and electives --- for techies, practitioners, other workers? They will likely be different.
- We need more marketing to addresses these issues, particularly in public awareness, outreach
- Executives still don’t know or understand geospatial technology – what are the benefits? The ROI project should help!
- The education system will not come to us. We need to identify appropriate organizations to reach educators. Also, we need to create interest from the bottom up, not top down. Get teachers energized.
- The education process for GIS professionals is not clear. We need to link education and training with careers and jobs. The GIS job market is changing rapidly! We have to keep up.

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. CIS Integration
6. Mobile GIS Computing
7. Executive Information/Support System/Access
8. Distribution Automation Interface/SCADA Interface
9. Data Migration
10. Asset Management – Maintenance and Capital
11. Automatic Vehicle Location

TOP TECHNOLOGIES LIST

1. Internet/Intranet
2. Pen Computing/Mobile Computing/Field Device
3. Disconnected/Connected Data Access
4. Web Services
5. EAI
6. Tablet
7. Wireless
8. Data Storage
9. GIS Software Choices
10. GPS
11. Database Security
12. ROI

CRITICAL ELECTRIC INDUSTRY ISSUES

1. **How can GITA achieve deeper penetration of existing markets?**
 - a. Go after co-ops and public power, there are about 2,500 of them.
 - b. GITA should go to the trade shows of others in our companies who use GIS, and/or geospatial information: IEEE; AGA; ASCE; APWA; APPA, NRECA; APA; Distributech; Entelec. Pursue this first at association staff level, and then attend conferences.
 - c. Have different (cheaper) pricing structure, to encourage municipals to attend.
 - d. Attract others to GITA conferences: CIO; CFO; other executives
 - e. Write up case studies to specific target audiences, to make GITA and what it does compelling.
 - f. GITA should provide information to its members on how to market / explain GIS value to others in organizations. Information should tie GIS to operations and other departments, so corporately is seen as more than just pretty maps.
 - g. GITA Members present “GIS value” to managers in own company, so they “get it” and become advocates.
 - h. Change how we communicate about our projects – less on “the technology is cool” and more on “here is why we did it” – and provide measurement of results.
 - i. Draw department Managers to GITA conference who would benefit from GIS, have conference track of presentations by successful users, not the project mangers who did

it. GITA should go (or sponsor members to go as ambassadors) to the conferences of those other corporate managers, who would benefit from GIS.

- j. GITA should distribute success stories in publications to executives.
 - k. Find ways to leverage “Executive Sponsor of GIS,” find ways to help them sell GIS to others in organization.
 - l. Promote the convergence of technologies to GIS so others conclude , “I better find out about this!”
 - m. No new corporate project can deployed by itself apart from other projects. Everything is now inter-related. The budget process of many utilities is left over from when projects did not have to integrate. Do an “Information Flows and Functions” study to determine and display how all is inter-related.
 - m. GIS group in a company needs to understand business drivers of other departments, and find out how to meet those needs.
 - n. Have GIS serve SCADA like it serves other enterprise systems.
2. **Suggested items for a GITA research agenda (please state what need(s) would be addressed):**

- a. Have a dedicated place on GITA website to post what is happening in each company: projects, new developments.
- b. Ability for a utility to audit itself (Sarbanes-Oxley), next step beyond R.O.I documentation that GITA is putting out. To Sarbanes Oxley, add Homeland Security – and there is the need to disclose if you did something wrong with data.
- c. Sharing cadastral and other data, free vs. paid. How much gets shared: locates, common trench, etc – this can lower costs for independent utilities operating in the same area.
- d. Security in an unfunded mandate – implication is funding by rate increases. This is similar to Y2K (except it had a firm cut-off date!). GITA should figure out how to implement infrastructure protection. Learn how to have GIS help with security, and to not be vulnerable.
- e. Develop the basis of how GIS contributes to utility security.
- f. Figure out how to start the discussion of what security measures do and do not work – nobody wants to say what they are doing that works or what they tried that did not work.
- g. Look at municipals, since Mayors always have microphones stuck in their faces.
- h. Trend is to react to security breaches, so show how data must be readily available for operations to recover.
- i. Document how to tie together various geospatial technologies and operations needs – integration and architecture.
- j. Sensor Web technology

OTHER ISSUES

ISSUE: Make a matrix of technologies, projects, applications and companies – so members can call and discuss with users / implementers to gain from their experiences (include why each utility did their project “objective”).

GAS BREAKOUT

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TOP APPLICATIONS LIST

1. Mobile Data Collection/Viewing/Access
2. Work Management/Process Automation
3. CIS Integration with AM/FM/GIS
4. Facility Maintenance/Monitoring and Management – Asset Management/Plant Maintenance
– Replacement Maintenance Monitoring/Management
5. Leak Detection/Management
6. Asset Management/Plant Maintenance
7. Gas Outage Management System
8. Cathodic Protection
9. Replacement Maintenance Monitoring/Management
10. One-Call Application
11. Pipeline Integrity/Public Awareness
12. Integrated Design

TOP TECHNOLOGIES LIST

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

CRITICAL GAS INDUSTRY ISSUES

1. How can GITA achieve deeper penetration of existing markets?

- a. Collaborative efforts of GITA and AGA or other industry groups. Others to consider include Geomatics (Canadian version of GITA), or IRWA (international right-of-way association).
- b. Align with influential groups (i.e., Gartner)
 - credible source of benchmarking
 - education about GIS
- c. Common ground alliance (INGAA)
- d. One Call industry

2. Suggested items for a GITA research agenda (please state what need(s) would be addressed):

- a. Industry performance measures
- b. Ground penetrating radar as it pertains to GIS
- c. Use of non-invasive technologies for GIS (i.e., LIDAR, etc.)
- d. Industry process work flows
- e. Funding resources for capital investments for small/medium size companies
- f. Emerging Markets
- g. Clusters of R&D institutions
- h. Organizational alignment of GIS (personnel). Consider skills, aptitude tests, training needs. Address alternate approaches to alignment. Consider including job descriptions, salaries.
- i. Scholarships/grants/funding for GIS professional development.
- j. Analysis of current and future industry trends

LOCAL GOVERNMENT AND PUBLIC WORKS BREAKOUT

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TOP APPLICATIONS LIST

1. Emergency Management
2. Economic Development
3. Public Safety
4. One Call Center
5. Community Planning
6. Right of Way Management
7. Parcel Development and Management
8. E-government
9. Cadasteral Mapping
10. Sub-surface Utility Engineering

TOP TECHNOLOGIES LIST

1. Web
2. GIS
3. Mobile Computing
4. GPS
5. Wireless Solutions
6. Systems Integration (Inter-Enterprise Integration)
7. Intelligent Transportation Systems
8. SCADA
9. IT Architecture
10. Data Warehousing

CRITICAL LOCAL GOVERNMENT AND PUBLIC WORKS INDUSTRY ISSUES

1. How can GITA achieve deeper penetration of existing markets?

- a. Get involved with Associations. (APWA, AWWA, WEF, SWANA, NACE, ACSM, State Mapping Associations GIS)
- b. Attend yearly functions of the above associations
- c. Have information on the above associations web-sites
- d. Run Membership ad in the above associations
- e. Offer free registration to GITA meeting to the above Associations
- f. GITA presentation to the above associations
- g. Online newsletter to High school kids
- h. Free newsletter

- i. Chapters need to send this information out to the schools
- j. Online information page for future GIS Professionals
- k. Chapters to get this information out the schools
- l. Provide 5 to 10 free GITA Memberships out to each chapter for interested high schools in the GIS profession.
- m. Cross network with the Science Olympics and Boys Scouts of America to get the information out about GITA.
- n. Send Networks Magazine out to all the public Libraries. (Include also schools and universities)
- o. Closer relationship with the trade magazines
- p. Get information out to the state GIS websites. (Talk to GIS State Directors)
- q. GIS Road show at the chapters
- r. Board representation (shows the National GITA level is involved with the chapter level; could identify some possible research topics in chapter meetings).

2. Suggested items for a GITA research agenda (please state what need(s) would be addressed):

- a. ROI
- b. Training (Costs, agenda, CEU's, topics)
- c. More joint research with other organizations (ex: Transportation, Survey, Scanning)
- d. Geospatial One-stop- NSDI
- e. Research for one-stop for each ITAG area.
- f. Call before you dig research (One call for each state)
- g. What are they doing
- h. What are the results of each states efforts.
- i. Data Sharing
- j. Costs
- k. Laws (local, state, federal)
- l. Methods of sharing information
- m. Public vs. Private sharing
- n. Education of data sharing
- o. Definition of GIS - What is it?
- p. What are the profession involved in the geospatial field, and what does it mean to be a GIS professional?

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TOP APPLICATIONS LIST

1. Integration of Facility/ Operational/Maintenance Data
2. Risk Management
3. Regulatory Compliance—Integrity Management Regulations
4. Field Operations/Reporting
5. Work Process Management
6. Planned Outage Management
7. Environmental Management
8. SCADA
9. Engineering Design
10. Land Management

TOP TECHNOLOGIES LIST

1. Integration Software
2. Internet/Intranet
3. Field Computing/Field Data Collection
4. Open GIS—ISAT/PODS
5. Data Security
6. Data Maintenance Tools
7. Survey Data Capture
8. CIS, ILL, and SOILS Data Integration
9. Electronic Document Management
10. Change Detection

CRITICAL PIPELINE INDUSTRY ISSUES

1. **How can GITA achieve deeper penetration of existing markets?**
 - a. Collaborate efforts with other industry groups – ie AGA, SGA,INGAA – give presentations at their industry meetings, roundtables , etc
 - b. Align with influential groups that are credible resources for benchmark studies to educate about GIS - Gartner
 - c. Interface with CGA – Common ground alliance – underground utilities, etc., also with One

Call groups

- d. Marketing the different uses of GIS Technologies - what uses does the data have, what different departments, etc.

2. Suggested items for a GITA research agenda (please state what need(s) would be addressed):

- a. Ground Penetrating Radar – interacting with GIS for location information and underground studies
- b. Skills assessment – certification for GIS – how – what level, who – etc.
- c. Organizational alignment of GIS professionals – titles, salaries, expertise, job descriptions, etc.
- d. Define a curriculum for junior high and high schools to introduce GIS at that level.

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TOP APPLICATIONS LIST

1. Engineering Work Order Design
2. Engineering Analysis / Network Analysis
3. Spatial Asset Management
4. Customer Care (including ADSL / TV prequel)
5. CIS / ERP Integration with GIS
6. Facility Model Analysis and Planning
7. Field Force Automation (to include Work Force Management, ie. Dispatch, scheduling)
8. Legal and Regulatory Support Applications
9. Network Inventory Management (Provisioning / Facilities interoperability)
10. Marketing / Business Geographics

TOP TECHNOLOGIES LIST

1. OGC
2. Wireless (802.11G, 802.16)
3. Internet / Intranet
4. Data Access
5. Configuration Management / Workflow
6. Nonproprietary Programming / Open source / OLE-COM
7. GPS
8. LIDAR, IPSAR
9. Process & Methodologies
10. BB Commerce / Fiber, Microwave

1. How can GITA achieve deeper penetration of existing markets?

a. Deeper within a TELECOM organization

- Need to go beyond Engineering and Planning:
- Into Marketing, Operations Provisioning, Tie to customer service, service fulfillment, service assurance, workforce management.
- Particularly key as a driver of GIS is the increased focus on Fiber Deployment, both from a network pre-qualification point of view but also if tied to demographic data to target deployment strategy.

b. What GITA involvement?

- More GIS use in Telecom will drive GITA interest.
- If GIS deployed more deeply into organization, GITA relevance to management will more likely to be seen.
- Possible GITA presence at Supercom, OSS, or OSP expos.
- Use GITA Chapters to possibly be a better way to engage the smaller Telecoms in their regions.
- Possibly get on the slate of speakers at I.E.E.E. which sponsors speakers and has a Telecom audience.
- Encourage the existing ‘Champions’ of GIS Technology within organizations to more to promote GIS.
- Use the FLAG to bring a proposal to ‘Highfield’ to get a telecom focused event in May, possibly with Bob Austin and Bob Samborski.

c. In SBC in California and Nevada they use their GIS land base as a way to help bring smaller counties into using GIS where they could not fund that themselves.

- This grows the industry and builds good will.
- It might promote and enable data sharing for CIP in conjunction with DHS.

d. Geospatially Enabling Community Collaboration (GECCO)

- How can CIP initiatives be used to increase Telecom usage more broadly and deeply?
- GECCO style events are a great way to open senior management’s eyes regarding the value and the essential nature of GIS within their Telco.
- CIP drives OGC issues to be addressed in a Telco, which can benefit internal operability as well.

2. Suggested items for a GITA research agenda (please state what need(s) would be addressed):

a. Availability of Skilled Workforce

- Look at what skills and backgrounds make us successful today.
- Research could help determine if certification was on/off
- States such as Oregon already have mandatory certification in GIS required for PM’s who are to work on a GIS project.
- What States are considering? What will be the Certification landscape over the next few years?
- Will GITA be involved or on the sidelines?

- b. Look at the Legal issues surrounding GIS today and in the future.**
 - Licensing
 - Sarbanes / Oxley
 - Freedom of Information Act
 - Patriot Act
 - Proprietary issues
 - Brooks Act
 - Intellectual Property / Intellectual Capital

- c. Definition of GIS**
 - Is it a profession or a tool?
 - Some argued it was simply a tool
 - How do we define GIS as a profession, or area of specialty?
 - Develop a Taxonomy of GIS in the Business Landscape.
 - Consider the various perspectives of viewing in how GIS professionalism is defined.

- d. Certification**
 - Study New Zealand & South African models, among others, to examine their experiences.
 - Can serve to promote GITA internationally as well.

- e. Process & Methodologies**
 - Increased focus on adhering to certain process methodologies of process design, such as:
 - Tele Management Forum's
 - eTom
 - Next Generation Operation Support Systems (NGOSS)
 - CMMI (Software development procedures)
 - This would enable better clarity on how GIS use maps across the enterprise:
 - Inventory Management
 - Service Provisioning
 - Customer Care
 - Billing
 - Finance
 - Workforce Management
 - Process & Methodologies

- c. Review usefulness of the Geospatial Technology Report**
 - Show analysis of Telecom
 - More useful information
 - Provide insight, just not numbers
 - Respond to top 10 list and do analysis based on what is identified.

- d. How to get better operations satisfaction from Telecom GIS / IT departments**
 - Solution needs to address the operations needs.
 - Users need to drive the GIS development plan for applications deployment and enhancement.
 - How can GITA help avoid the Tail Wagging the Dog.

OTHER ISSUES

OGC and interoperability is considered a hot topic as it has been controversially implemented/interpreted in some instances this past year.

We changed Data Exchange to Data Access. Data does not have to be exchanged, rather it can be accessed, and in fact a single 'database' can have co-ownership.

LIDAR combined with IPSAR and broken away from Wireless.

Finance dropped off of top 10 list. Often considered to be driven and affected from the finance side, rather than being a key GIS issue. While some schema and data format / content issues need to be taken into account for finance, it does not really qualify as a GIS application.

WATER/WASTEWATER BREAKOUT

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TOP APPLICATIONS LIST

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

TOP TECHNOLOGIES LIST

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

1. How can GITA achieve deeper penetration of existing markets?

- a. Maintain a presence with AWWA and WEF groups. Coordinate conference dates for annual conferences to eliminate water users having to choose between AWWA's ITEC conference and GITA conference. Have a GITA booth at the AWWA ITEC conference, WEFTEC

- and the main conferences for both agencies. Possibly piggyback a day at the end of the AWWA and WEF conferences for GIS technology. Publish in the AWWA newsletter
- b. Understand the different business needs between profit and not for profit agencies such as water/wastewater
 - c. Determine why Water/Wastewater is so poorly represented in the GITA membership
 - d. Do a publication on practical applications relative to water/wastewater. Do so in a timely manner so the content is still relative. Possibly a quarterly time frame.

2. Suggested items for a GITA research agenda (please state what need(s) would be addressed):

- a. Mobile applications and the technology surrounding the need. Wireless potential and directions for future.
- b. Survey hurricane areas to learn what they experienced about emergency response. How did the interdependence between utilities succeed or fail in the aftermath?
- c. Security when transferring data over wireless networks
- d. Coordination among infrastructure agencies for projects that are non-emergency related. Dig one hole and do all the work needed at that location.
- e. More GIS functionality in the planning and development process for property infrastructure and other support of development.