

AASHTO
GEOSPATIAL INFORMATION SYSTEMS
TRANSPORTATION SYMPOSIUM

SUMMARY REPORT



Twentieth Annual

**GEOSPATIAL INFORMATION SYSTEMS FOR
TRANSPORTATION SYMPOSIUM**

To provide a forum for transportation officials from State, Province, Federal, and
Municipal Agencies to discuss GIS and transportation issues

March 26 - 28, 2007

Workshops – March 25, 2007

Nashville, Tennessee

2007 GIS-T SYMPOSIUM REPORT

Nashville, Tennessee

Overview of the GIS-T Symposium

The twentieth annual Symposium on Geographic Information Systems for Transportation (GIS-T) was held in Nashville, Tennessee from March 25 through March 28, 2007. The Symposium focuses on providing a forum for transportation professionals interested in the design and use of Geographic Information Systems for Transportation. It brings together individuals from education, the private sector, and all levels of government for a full day of workshops and three full days of activities. For the second year, the Symposium included a Student Paper Contest and a session for the winning papers to be presented. The Symposium also provided an excellent avenue for participants to network with peers to discuss emerging issues of their particular concerns.

“Mileposts to Milestones” was chosen as the 2007 Symposium theme. The theme was in reference to the 2007 Symposium reaching a major milestone in that this celebrates the 20th GIS-T Symposium. Technology providers were able to meet with participants of the Symposium through one-on-one interviews in the technology hall, as well as through the “Birds of a Feather” sessions. These discussions were beneficial in conveying latest trends and technology achievements by the industry suppliers. Director of the New York State Office of Cyber Security and Critical Infrastructure (CSCIC) presented a dynamic, multi-media presentation focusing on the cyber security and critical infrastructure initiatives underway in the New York State through CSCIC as well as nationally.

Throughout the course of the symposium, a variety of key issues surfaced by means of a pre-symposium survey (state summary), session papers, two panel discussions, and the Symposium wrap-up. This report will identify key emerging issues and discuss how their impact might affect the GIS-T Community.

A total of one-hundred and four abstracts were submitted during the time frame for the Call for Presentations. The Program Committee rated the abstracts and developed “like categories” for abstracts with the highest ratings. Three topics for Panel Discussions were submitted and two were selected for presentation during the Symposium. The selected technical papers presented at the Symposium are available along with their abstracts through the GIS-T web page (<http://www.gis-t.org>). The state roll call, state summary and state contacts list can also be obtained from this site.

Emerging Issues and Technologies Impacting the Transportation Information Technology Community

Although many issues related to GIS in Transportation were identified and examined during the course of the Symposium, a few emerged as new or overarching.

These issues include:

- GIS Interactions with Google Earth
- Representation on the Transportation For The Nation

- Transportation Agencies plugging into State and Local – Data Sharing
- Asset Management
- Web Services
- Engineering drawings into GIS software – CADD Integration
- Open Source
- Advanced Research
- Partnering
- Solutions
- Need for comprehensive data, especially imagery, to support linking transportation planning and NEPA
- Enterprise adoption and deployment of GIS data and technology

Over the next year the geospatial technology industry will continue to discuss and take action to gain knowledge and expertise in the above areas.

The 2007 GIS-T Symposium

Symposium Background

The GIS-T Symposium is sponsored by AASHTO and is affiliated with the Highway Engineering Exchange Program (HEEP), the Urban and Regional Information Systems Association (URISA), the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), the Bureau of Transportation Statistics (BTS), Transportation Research Board (TRB), National Association of Regional Councils (NARC), American Metropolitan Planning Organizations (AMPO), U.S. Department of Transportation, Research and Innovative Technology Administration and the American Society of Photogrammetry and Remote Sensing (ASPRS). The Symposium originated to provide:

- Education,
- Information sharing with other transportation agencies,
- Exhibitor displays of new and current technology, and
- Information for individuals who are facing similar problems in other transportation organizations.

The Symposium is managed by a Task Force and organized by a Planning Committee. The Task Force is a seven-member group representing DOTs by AASHTO regions, FHWA and AASHTO. The Task Force members are also Planning Committee members. The Planning Committee is a larger group comprised of subcommittees for each of the Symposium organizing tasks, such as program development, local arrangements, exhibits, workshops, registrations and poster session. This year's Symposium continued the focus on opportunities and issues of applying GIS technology to the business of transportation agencies.

Symposium Structure

The Symposium registration started on Saturday evening, March 24, 2007. The registrant demographics were 424 total attendees, from 42 states and 5 Canadian provinces (City of Calgary, Alberta; Manitoba Infrastructure and Transportation – Winnipeg, MB; Ministry of Transportation, Ontario – St. Catharines, Ontario; Opus International Consultants LTD – Fredericton, New Brunswick; PEI DOT – Charlottstown PE Canada).

Workshops were conducted on the Sunday prior to the Symposium. This year eight half-day workshops were held with 205 participants attending the workshops. A Sunday evening technology hall reception was held in the hotel ballroom to kick-off the Symposium. Thirty-eight GIS exhibitors; including software companies, consultants, and data and equipment suppliers were present this year. The technology hall displaying vendor technology exhibits were available through Wednesday, with a second reception Monday evening.

The Symposium started Monday morning with a welcome from Kim McDonough, Tennessee Department of Transportation, followed by a welcome and introduction of the keynote speaker from Daris Ormesher, GIS-T Task Force Chairman.

The GIS-T 2007 Symposium keynote speaker, Andy Andrews is an internationally known speaker and novelist whose combined works have sold millions of copies worldwide. Mr. Andrews addressed the attendees of the 2007 Symposium by describing decisions he made in his life and how he took a bad situation and made it much worse. It was at that time in his life when he asked himself a profound question that would alter his own life, and ultimately affect millions of people: "Is life just a lottery ticket or are there choices one can make to direct his future?" To find the answer, he first went to the library. There over time, he read more than two hundred biographies of great men and women. "How did they become the people they were?" Mr. Andrew's wondered. "Were they simply born this way? Or were there decisions made at critical junctures in their lives that led to success?" Mr. Andrew's determined there were seven characteristics each person had in common. "What will happen," he mused, "if I study these seven common denominators and harness them in my own life?" The rest is history. The "Seven Decisions," as he calls them, were the engines used to carry Andrews' life in a different direction. And twenty-plus years later these same Seven Decisions became the outline around which he built the story of The Traveler's Gift.

Mr. Andrews identified the Seven Decisions as he spoke about his own life and shared how they changed his life. The Seven Decisions include:

1. The buck stops here
Adversity is preparation for greatness
2. I will seek wisdom
I will choose my friends with care
3. I am a person of action
I can make a decision and I can make it now
4. I have a decided heart
My destiny is assured
5. Today I will choose to be happy
I am the possessor of a grateful heart
6. I will greet this day with a forgiving spirit
I will forgive myself
7. I will persist without exception
I will find a way where there is no way

Mr. Andrews mentioned the following during his speech, and in addition to the Seven Decisions these were the most discussed actions by attendees during the Symposium:

- Smile and shake your head positively when talking
- Surround yourself with people better than you
- Successful people make decisions quickly and change them
- Unsuccessful people make decisions slowly and change them quickly

Mr. Andrew's left the crowd with several areas in their own lives, professional and personal, to think about and informed us all that it will be hard. There will be times that you will think it's over because you are out of money, out of time, and have leadership challenges. We must take responsibility for ourselves and always smile while talking.

Bruce Spear, recently retired from FHWA, next presented the State Summary. The Roll Call of States and other Transportation Agencies followed the State Summary. The Roll Call of States is a tradition that provides an opportunity for a representative from each agency to introduce himself or herself and any other delegates from the agency. Each state was called alphabetically starting with the 2007 host state. Roll Call allows all attendees to connect faces with names and helps people to make contacts and initiate conversation over the course of the Symposium. Frank Winters, AASHTO Region 1 Representative and Roll Call facilitator, again this year challenged participants to use the Roll Call information to start conversations with at least three people they had not met. Copies of the Roll Call of States summary, GIS State Contacts and the State Summary can be found as appendices A-C in this report.

Monday afternoon consisted of two paper sessions with four concurrent technical tracks.

A poster exhibit displaying posters from the Symposium attendees started with a poster session Monday evening before the technology hall reception. The poster exhibit provides an opportunity for organizations to share their techniques and applications with peers in the transportation GIS Community. Attendees were able to view the maps for the duration of the Symposium.

The evening ended with a "Birds of a Feather" session. During this session, attendees using the same software network among themselves with representatives from their software companies. The attendees determine the agenda in these facilitated informal sessions and present technology and transportation challenges. This year we provided an on-line form for registered attendees to submit questions in advance in order to provide the software vendors more time to prepare to discuss issues that were of the highest interest to attendees. The questions were submitted to Marvin Koleis, "Birds of a Feather" planning committee chair. He then forwarded the questions to the software companies giving them time to prepare responses for the session.

Tuesday morning started with a panel discussion, Transportation for the Nation, moderated by John Auble, TeleAtlas. Panelists included:

- Stu Davis, NSGIC
- Frank Winters, New York State (CSCIC)
- Oscar Jarquin, California DOT
- Matthew Laick, Delaware DOT

State DOTs are increasingly being asked to expand their roles and responsibilities regarding transportation data. The demand may be internal such as the new requirement to locate accidents on all roads rather than just state highways. Much of the demand is from other agencies, such as those wishing to use the transportation network for address geocoding to correctly apportion tax revenues. During this panel session three state DOT's provided insight on the political, cultural and technical challenges associated with moving toward a single transportation database for all government agencies. Stu Davis, president

of the National State Geographic Information Council, provided a brief outline of NSGIC's charge as well as NSGIC's specific interest in transportation data.

Three more paper sessions with four concurrent technical tracks were offered throughout the day.

Wednesday's schedule started with a panel discussion, Sharing and Integrating GIS Transportation Data Among Jurisdictions, moderated by Tami Griffin, Washington State DOT. Panelists included:

- Michael Leierer, Washington State DOT
- Dave Blackstone, Ohio DOT
- Kim McDonough, Tennessee DOT
- Dennis Schofield, Oregon DOT

The growing need to share common data between all forms of government is being undertaken by a pool fund study in many different states. The panel discussed developing effective collaboration between jurisdictions; how states are working with local governments to translate their data into a centralized data source and the political and administrative efforts as well as some technical efforts necessary to prepare each dataset in each jurisdiction. These processes are designed for initial data submission and for the periodic maintenance of their data by the local jurisdiction; and data submission processes and where they are in the development of software for internet portals for a data provider and data users as well as requirements for integration.

One more paper session with four concurrent technical tracks was offered before lunch. During lunch, awards were handed out and prize drawings were held followed by the Texas DOT, next year's host state, inviting Symposium participants to Houston, Texas for the twenty-first annual GIS-T Symposium. The afternoon featured a presentation by New York State Director of Cyber Security and Critical Infrastructure, followed up by a Wrap-Up session, where the Symposium is "debriefed" by all interested attendees. This is where ideas for next year's Symposium theme and session topics are first discussed.

Workshops

This year eight half-day workshops were held as part of the Symposium experience. Following last year's format, attendees had the ability to mix topics rather than attend a single all day session. All GIS-T workshop registrations included a choice of any two of the below listed half-day workshops. Forty-eight percent of the registered Symposium individuals participated in the workshops.

3D Geospatial for Transportation: Best Practices and Project Implementation Methods

The convergence of new technologies and business requirement is fostering a new wave of 3D applications. Implementing these systems in state and local agencies requires a new set of skills and knowledge that most professionals have yet to develop. This course was a great way to get started or to expand attendee's 3D know-how. A wide range of users create, navigate and analyze entire metropolitan regions or a single city block within these systems. Transportation agencies are using 3D data and visualization tools to support public involvement, planning and design, construction management, emergency preparedness, and many other business practices. The course introduced the data,

systems and processes to be considered when implementing 3D applications including Google Earth, ArcGIS Explorer, 3ds Max, and over 30 other software tools. Using extensive case studies, attendee's learned how to navigate the dizzying array of options and prepared for a sustainable 3D geospatial practice. Tim Case of Parsons Brinckerhoff was the instructor for this workshop. Forty-six participants registered for this workshop.

Blazing the Trail: The Transportation Component of Emergency Management

In this workshop, Jo Jordon of FEMA gave twenty students the working knowledge of how FEMA and the Federal government are organized for emergencies and how they coordinate with them. Students learned the procedures, terminology and expectations of an Emergency Operations Center and how it ties in with transportation. Classroom exercises reinforced the topics covered which included:

- What the difference is between "Emergency Management " and "Emergency Response"
- The Emergency Management Cycle
- Who participates in emergency management and response, and their roles
- The Incident Command System, why it is applied in emergency situations and by whom
- Where does geospatial technology fit in?
- Transportation as part of emergency management
- Broken bridges, washed-out roads, constraining culverts and dumpsters of debris: The PA perspective
- Data requirement, sharing and coordination methods
- Preparation: Plans, Models, Agreements and Exercises
- The Fourth Dimension

The National Geodetic Survey's CORS Network and RTK GPS

This workshop presented the national Geodetic Survey's network of GPS Continuously Operating Reference Stations (CORS), the CORS-based Online Positioning User Service (OPUS) utility, and the theory and practice of GPS Real-Time Networks (RTN). The material presented was of interest to professionals involved in surveying, mapping, GIS and related geospatial disciplines. The CORS system comprises a network of about a thousand sites, each containing a geodetic-quality GPS receiver whose data are freely available via the Internet for post-processed applications. Presentation topics included the development of the CORS network, CORS applications and CORS data access. This workshop was presented by Bill Henning and Bill Stone from the National Geodetic Survey. Thirteen participants registered for this workshop.

Visualize Your Assets with HERS-ST

The HERS-ST software is an asset management decision tool used to analyze highway "needs" for programming & planning at the State and MPO level. HERS-ST answers questions such as:

- What level of capital expenditure is justified on benefit-cost grounds
- What user cost level will result from a given stream of investment
- What investment level is required to achieve a certain level of performance
- What is the cost, over 20 years, of correcting all existing and accruing highway deficiencies

This workshop was presented by Simon Lewis, ITSIS, Inc and Robert Mooney, Federal Highway Administration. Twenty-two participants registered for this workshop.

Using LIDAR Workshop: The Basics

Brian Stevens and Qian Xiao with Woolpert covered some of the basics on working with LiDAR data and creating digital elevation models from it. The latest in airborne laser mapping technology was discussed. This workshop focused on the Light Detection and Ranging (LiDAR) data acquired to support the development of Digital Elevation Models (DEMs) and Digital Terrain Models (DTMs). The workshop discussed LiDAR acquisitions, processing and core LiDAR formats and products. Additional topics included:

- Generation of contours
- Line-of-sight analysis
- Volume calculations
- Bare earth and non-ground data
- Canopy and vegetation analysis

A sample LiDAR dataset was provided to participants. Participants were encouraged to bring their laptops with ArcGIS 3D Analyst installed for the workshop. Short-term licenses of ArcGIS and 3D Analyst were available for free if any of the participants did not already have a copy. Twenty-two participants registered for this workshop.

Geography, the Census Bureau and Transportation – Where It All Begins

The 20th anniversary of GIS-T conference would not be complete without a workshop on the latest innovations at the Census Bureau, especially those with a transportation flavor. The instructors discussed the 2010 Census Local Update of Census Addresses (LUCA) Program, Participant Statistical Areas (PSA) Program and the Master Address File / Topologically Integrated Geographic Encoding and Referencing system (MAF/TIGER) Accuracy Improvement Project. The instructors tossed in a discussion of the interrelationships between the Census defined urban and urbanized areas, FHWA “adjusted” urban and metropolitan planning areas and they developed a top notch workshop. The only thing missing was the latest developments in the preparation of Traffic Analysis Zones (TAZs) for the Census Transportation Planning Products (CTPP) that will be coming from the new American Community Survey (ACS). The instructors demonstrated a new tool that FHWA developed for its staff and others known as HEPGIS. HEPGIS is an interactive, web-based GIS that enables users to access transportation-related geo-spatial data using their web browser. Simple navigation tools allow users to locate and zoom-in to a geographic area of interest, and to create maps showing various geographic features and themes. This tool is now available to the public. Michael Ratcliffe with the Census Bureau, Ed Christopher of Federal Highway Administration and Bruce Spear, recently retired from the Federal Highway Administration were the instructors for this workshop. Thirty-five participants registered for this workshop.

Dynamics of Environmental GIS- Persuading Information to Multitask Through Applied Technologies and Methods

Robert Fuhler of the Arkansas State highway and Transportation Department lead this workshop with an interactive discussion of environmental GIS data and how it can be used to aide the NEPA process. GIS is a science that is multi-faceted and has come to the forefront of many disciplines. One of the most dynamic and diversified is the Environmental/Planning relationship for transportation. This workshop was informal and

discussion-based, and delved into the methodology for effective coordination and data sharing between State, Federal, Local and Private agencies; the collection, portrayal and analysis of field data (the GPS/GIS relationship; and multitasking those data into a variety of formats. There were examples of several successful projects developed by the Environmental Division at the Arkansas State Highway and Transportation Department. Resources were provided throughout the workshop to allow participants to follow-up with additional contacts after the Symposium. Thirteen participants registered for this workshop.

A Powder Keg of Usability: Implementing Ajax in Web-based Mapping Applications

In this workshop instructors Fred Riethmiller, Steve Korzekwa, and Nate Reck all with GeoDecisions - discussed why there is so much talk about Ajax (Asynchronous JavaScript and XML). They explained to the thirty-four participants where this technology came from, how it has evolved, who is adopting it and whether it is right for participant agency's enterprise. Discussion focused on best-practices when implemented Ajax-solutions, overall design strategies and real-world case-studies. Demonstrations walked through employing Ajax-based solutions in both Java and .Net. The workshop was divided into two distinct parts:

Part 1 of the workshop focused on the practical implication of using Ajax. The instructors answered the following questions:

- Is it more than just a popular buzzword
- What are the advantages of using Ajax
- What does it mean from the user's perspective
- How can Ajax be leveraged in a GIS/Mapping application
- What is the value of the technology in business terms
- Can deployed applications be retrofitted

The instructors demonstrated practical, non-technical examples to show the dramatic differences Ajax can bring to a web application.

Part 2 of the workshop provided more technical information. A discussion of the available tools and implementation techniques provided guidance to avoid common pitfalls while reaping the benefits discussed earlier in the workshop. Topics included:

- The basic components of the Ajax technology
- Language specific implementations and tools
- Top 10 Ajax mistakes
- Design considerations for the typical GIS environment
- Lessons learned through multiple implementations

State GIS Activities

This is the 12th year that the GIS-T Symposium has conducted a survey of GIS activities at State DOT's. The survey was combined with an information request for the State Roll Call, and administered using a web-based survey instrument that was begun last year, and resulted in a 100 percent response, with all 50 States plus the District of Columbia and the Commonwealth of Puerto Rico completing the survey. These responses were tabulated and are presented in a separate summary table.

One new question was added this year on whether the State DOT had developed or was planning to develop a GIS strategic plan.

GIS Organizations Structure and Development Stage

A majority of the States (55%) report having an organizational structure consisting of a GIS core unit, providing technical support to a much larger group of end-users throughout the agency. The second most prevalent structure (25%) is an “enterprise” GIS organization with agency-wide data integration. However, the number of States reporting this type of organization actually declined from last year's survey. Only one State (HI) reports that, although they have “pockets” of GIS applications, there is no agency-wide coordination of geo-spatial data or services.

The organizational location of GIS core units seems to be equally split between Planning (33%) and Information Services (34%). Another 25 percent of States report that their core unit is located in two or more departments. Even in those States that have instituted an enterprise GIS, there is no significant difference in where the GIS core unit is located.

Nearly half of the States (46%) report that they already have developed a Strategic Plan for implementing GIS within their agency, and another 38 percent report that they are currently developing such a plan. Only five States (IN, MA, NM, ND, & RI) report that they do not expect to develop a Strategic Plan.

The average staff size of the GIS core unit rose slightly from last year's survey, increasing from 7.0 to 7.6. Over 90 percent of the States responded that at least one staff member has a geography or cartography background, and a majority of States (69%) also reported having staff with an information technology or computer science background. GIS professional certification still remains a relatively minor factor in current staff hiring. Only 21 percent of the States reported having a certified GIS professional on staff, and only six States (CA, GA, MD, MT, NC, & VA) indicated that certification would be a factor in future hiring decisions.

The allocation of GIS staff time across core functions shows a fairly even distribution of 16 - 17 percent for LRS maintenance, data warehousing, technical support, and web application, with slightly more time spent on base map maintenance (23%). However, the distribution of staff activities varies considerably across agencies, and even within an agency from one year to the next.

On average, States outsource about 40 percent of their GIS application development work, with an average annual expenditure of about \$406,000 per agency.

GIS Software

The percentage of States who reported using use GIS software from two or more companies increased significantly, from 75 percent last year to 85 percent in this year's survey. All of the “single vendor” States use GIS software from ESRI.

Respondents were also asked to identify what software products were used “principally” by GIS core staff for desktop/workstation applications and for web applications. For desktop operations, 71 percent of those responding use ESRI products, 23 percent use Intergraph products, and 2 percent use Caliper products as their principal GIS software. For web applications, 63 percent of those responding use ESRI's ArcIMS® or ArcGIS Server®, and 25 percent use Intergraph's WebMap®.

Most States use commercial relational database management software (RDBMS) in combination with GIS software to manage their geo-spatial data. Oracle® is used by 73 percent of the States, either alone or in combination with other database software. Other commercial database software used by the States include SQL Server® (40%), and Microsoft Access® (21%). Only two States (LA & NE) report using DB2, and only one State (OH) reports using Sybase.

ArcSDE® (75%) and Oracle Spatial® (44%) are the principal software packages used to manage the geo-spatial attributes in enterprise data warehouses. A significant number of States (27%) report using both spatial data managers in combination.

Road Centerline Networks and Other Geo-Spatial Databases

A key component of most transportation GIS activities is the road centerline network database. All States reported that they maintain a digital road centerline database. Both the spatial accuracy and coverage of these databases continue to improve. Two-thirds (67%) of the States report that their road centerline databases have a spatial resolution of 1:12,000 scale or better. Much of the improved accuracy has been achieved through the use of high-resolution orthoimagery and/or kinematic GPS. With respect to coverage, 62 percent of the States report that their road centerline database includes all public roads, and another 23 percent include all State and county routes.

The majority of States (73%) distribute their road centerline database free of charge to whoever wants it. Most other States (21%) have policies that allow the data to be shared with other public agencies, but place restrictions on its use for commercial purposes and/or redistribution. Only one State (OR) does not distribute their databases outside their agency.

States were asked if they maintain any other statewide geo-spatial data layers, beyond the road centerline database. Seventy-five (75) percent of those responding reported that they also maintain some other geo-spatial database, generally other transportation networks or features, such as rail lines, airports, etc. Other “framework” geo-spatial data maintained by State DOTs include political and administrative boundaries (52%), orthoimagery (42%), and geodetic control points (38%). State DOTs are less likely to maintain other framework layers such as elevation (19%), water features (27%), or land parcels (13%).

The primary sources of geo-spatial data used by State DOTs are other state and local agencies (identified by 92% of those responding), followed by statewide geo-spatial clearinghouses (75%), and geo-spatial data maintained by federal agencies (50%). Less common sources include data purchased from commercial data vendors (28%), data acquired through the Geo-Spatial One-Stop (28%) and data provided or purchased from GIS software vendors (23%).

Benefits and Costs of GIS Applications

Several questions introduced in 2005 regarding the perceived benefits and costs of geo-spatial technology were asked again in this year’s survey. Enterprise data integration continues to be cited by most States as yielding the greatest current benefits (69%), but also being the most difficult and costly to implement (48%). Asset management and corridor/systems planning were rated as having the next greatest current benefits (42%). Asset management was also cited as being the second most difficult to implement (34%),

followed by CAD/GIS integration (33%). Asset management and enterprise data integration were also seen as having the greatest expected future benefits (62%)

Current Activities

Respondents were asked to list up to four of their current GIS activities for the State roll call. Listed activities were grouped into similar categories and then ranked based on the number of times that they were cited by the respondents. Table 1 lists those GIS activities cited five or more times by the State DOTs.

GIS Activity	# of Citations
Development of web-based GIS applications	31
Migration to new GIS software / hardware	20
Data warehouse / enterprise GIS	16
Road inventory management	15
Road centerline database development / enhancement	13
Environmental / cultural analysis	12
Orthoimagery data collection / integration	10
Map production and publication	10
Photolog / videolog data collection and integration	9
Location referencing system maintenance	8
Traveler advisory / information systems	8
Truck routing and permitting	7
Roadside maintenance project planning	7
ITS / traffic management	6
Project management	6
Safety / crash analysis	5
GPS data collection / integration	5

Table 1 - High priority GIS activities at State DOT's

GIS has finally become an important tool for data management and integration, analysis, and visualization in every State DOT. The key question is no longer whether the agency should invest in GIS, but rather how much of the agency's program data should be integrated using geo-spatial technology. Many State DOTs are currently investigating or are actively developing an enterprise GIS data warehouse. Enterprise data integration is seen as yielding the greatest agency benefits from geo-spatial technology, but it is also cited as one of the most difficult applications to implement.

Web-based GIS applications continue to grow, facilitating information exchange both to the traveling public and to DOT field staff. GIS also seems to be used more frequently in specific analysis and planning applications, particularly environmental studies, safety/crash analysis, and project management.

GIS core staffs continue to function effectively in either planning or information management organizational divisions. Important GIS core staff activities continue to include the maintenance and enhancement of the road centerline database, linear referencing, and migration of legacy applications to new and upgraded commercial software. Increasingly,

however, application-specific geo-spatial analyses and map products are being carried out by end-users throughout the agency, both with and without assistance from GIS core staff.

Student Paper Contest

For the second year GIS-T Symposium sponsored a student paper contest. The contest was open to essays on Geospatial Information Systems for Transportation as well as technical research papers around developing solutions for current GIS-T issues. Papers relating to any field of geo-spatial science were considered. Students were encouraged to display original thought and creativity in the development of the essays, which included a comprehensive bibliography on which the paper was based.

Eligibility Requirements included:

- The applicant must be a current enrolled student
- Only one paper contest entry per student
- Willingness to attend and present at the GIS-T Symposium

Submission Guidelines included:

- The paper was to be prepared by one author
- The original work of the author as much as possible (if a faculty member is listed as co-author, a letter from the faculty member confirming that the student was the primary author must be attached)
- Papers must have been submitted electronically in a sharable format
- Papers must have been written in English, utilizing good communication skills
- Paper must have been neither less than 4,000 nor more than 8,000 words (cover page and bibliography not included in the word count)
- A cover letter from a faculty member verifying the author's graduate or undergraduate status and original contribution
- Front page included complete address, telephone, fax and e-mail information
- Winning papers presented at the Symposium and posted on the GIS-T website

Papers were judged by members of the GIS-T Planning Committee and were rated on the following categories:

- Significance of topic
- Literature review
- Conceptualization
- Methodology (if applicable)
- Data analyses (if applicable)
- Interpretation
- Clarity of presentation
- Validity of conclusions
- Reader interest

Out of three entries three winners were selected and awards were given out. Two winners received \$500.00 and one winner received \$250.00 and all were given a round trip airline ticket to Nashville, Tennessee and two nights stay to attend the Symposium. The winners presented their paper at the Student Paper Session on Monday, March 26, 2007. Appendix E in this report contains the winning papers. Winning authors were:

Justin LeBeau
Regional and City Planning
University of Oklahoma
Norman, OK

Paper: A Critical Review and Integration of GIS-Based Spatial Databases for Multi-Commodity and Multi-Mode Freight Movement Modeling and Security Analysis in USA

Subhro Mitra
Doctoral Student – Transportation and logistics
Upper Great Plains Transportation Institute
Fargo, North Dakota

Paper: Analyzing satellite imagery to develop freight generation data

Peng Wu
Transportation Technology and Policy Graduate Group
Institute of Transportation Studies, the University of California, Davis

Paper: Modeling Transportation-Related Emissions Using GIS

Poster Session

The 2007 GIS-T Symposium poster entries showcased how agencies are using GIS technology to display data. Posters were reviewed and the following awards were given to those chosen as the best:

Cartographic Presentation

- **1st Place: City of High Point, North Carolina**
“2006 – 2007 Transportation Projects”
- **Honorable Mention: Oregon Department of Transportation**
“Transportation and Topography”
- **Honorable Mention: South Dakota Department of Transportation**
“Governor’s Hunt Team Locations”

Analytical Presentation

- **1st Place: Colorado Department of Transportation**
“Travel Time Corridors”
- **Honorable Mention: Oklahoma Department of Transportation**
“2007 – 2014 Construction Workplan – Bridge Replacements”
- **Honorable Mention: Colorado Department of Transportation**
“Mobility Analysis”

Official Transportation Published Map

- **1st Place: Province of Manitoba, Canada**
“Official Highway Map 2007 – 2008”

- **Honorable Mention: Oklahoma Department of Transportation**
"2007 Centennial State Map"
- **Honorable Mention: South Dakota Department of Transportation**
"The State of South Dakota"

People's Choice Award

- **Province of Manitoba**
"Official Highway Map"

Concurrent Sessions

During the Symposium, concurrent technical sessions were attended in large numbers. Each room was more than full and in some cases there was standing room only.

Monday:

- | | |
|--------------------|------------------|
| State of Tennessee | GPS / GIS |
| Student Papers | Web Applications |
| Web Portals | Federal Data |
| Data Collection | Enterprise GIS |

Tuesday:

- | | |
|-----------------------|------------------|
| Enterprise Data & GIS | Google Earth GIS |
| Asset Management | GIS-T Research |
| Management Systems | LRS / LRM |
| Environmental | MPO GIS |
| Database Design | |
| Safety / Traffic | |
| Web Data Integration | |
| GIS Analysis | |

Wednesday:

- GIS Databases
- Web GIS
- Geocoding & Routing
- Planning

Symposium Summary

The twentieth annual Symposium on Geographic Information Systems for Transportation (GIS-T) was held in Nashville, Tennessee from March 25 through March 28, 2007. The Symposium identified emerging issues and technologies impacting the Transportation Information Technology Community. The Symposium included a selection of eight workshops; a technology hall with thirty-eight exhibitors; Andy Andrews, a modern day Will Rogers, who has quietly become one of the most influential people in America as keynote speaker; state summary; roll call of states; seventy-three paper presentations; poster session; student paper contest; "Birds of a Feather" sessions; two panel discussions; and a Cyber Security Presentation to complete the Symposium. Appendix D in this report contains the General Schedule showing all Symposium activities.

Technical papers presented at the Symposium are available along with their abstracts through the GIS-T web page (<http://www.gis-t.org>). The state roll call, state summary, state contact list and Symposium attendee list can also be obtained from this site.