AASHTO
GEOSPATIAL INFORMATION SYSTEMS
TRANSPORTATION SYMPOSIUM

SUMMARY REPORT

Twenty-First 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 17 - 19, 2008

Workshops – March 16, 2008

Houston, Texas

2008 GIS-T SYMPOSIUM REPORT

Houston, Texas

Overview of the GIS-T Symposium

The twenty-first annual Symposium on Geospatial Information Systems for Transportation (GIS-T) was held in Houston, Texas from March 16 through March 19, 2008. The Symposium focuses on providing a forum for transportation professionals interested in the design and use of Geospatial 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 professional development and networking. For the third 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.

"Small Steps…GIANT Leaps" was chosen as the 2008 Symposium theme. The theme was in reference to the 2008 Symposium being hosted by Texas Department of Transportation and the relationship between Houston and the United States space program. This years' theme also captures the direction geospatial information has taken in many organizations. 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. A Virtual Tour session presented Microsoft Virtual Earths' Enabling Data Access, Visualization, Analysis and Insight. The session discussed the challenges of government agencies providing an ever-expanding palette of services to their constituents while making critical decisions in a complex world. Microsoft Virtual Earth is a robust platform for building cost-effective, flexible and accurate spatial solutions that disseminate data quickly, streamline processes, and improve users' decision making and response time. The session demonstrated how to extend ESRI investments to include real world Public Sector solutions built on the Virtual Earth platform.

Throughout the course of the Symposium, a variety of key issues surfaced by means of a pre-symposium survey (state summary), session papers, panel discussion, 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 ninety-six 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. Two topics for Panel Discussions were submitted and one was 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 Web Services
    - Google Map & Virtual Earth Implementation
- Advanced Research
- Mobile GIS
- ArcGIS Server application development
- State agency IT consolidations
- Enterprise adoption and deployment of GIS data and technology
- Asset Management
- Linear Referencing Systems
- Data Models
- 3D data integration

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 2008 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), 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, National Association of Regional Councils 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 DOT's 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, moderators, local arrangements, technology hall, workshops, registration, publicity, scholarships, birds of a feather, state summary, roll call of the states, poster session and web. 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 16, 2008. The registrant demographics were 365 total attendees, from 34 states and 6 Canadian Provinces (attendees from Calgary, Ontario, and Alberta and vendors from British Columbia, Ontario and Quebec).

Workshops were conducted on the Sunday prior to the Symposium. This year eight half-day workshops were held with 108 participants attending the workshops. A Sunday evening technology hall reception was held to kick-off the Symposium. Thirty 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 Judy Skeen P.E., Texas Department of Transportation. Her welcome included a timeline of Texas' historical events. This was followed by a welcome and introduction of the keynote speaker from Daris Ormesher, GIS-T Task Force Chairman.

The GIS-T 2008 Symposium keynote speaker, Dr. John Pelizza is a nationally known speaker and a leading authority on wellness, change process, stress management, productivity, team building and personal growth. Dr. Pelizza is a dynamic speaker to over 2000 business, professional and civic groups throughout North America.

The founder of Pelizza & Associates, an organization designed to help people grow personally and professionally, Dr. Pelizza has dedicated himself to helping others feel better and do better. He also is dedicated in helping people maximize their personal wellness and growth.

Dr. Pelizza books include: A Journal to Live By, The Big Secret, There's Magic in Discovery, Foot in the Door and Thoughts to Make You Think and Feel Better. He has also recorded three audio tapes, titled "Keys to High Energy Living", "Staying Motivated During Change" and "21 Ways to Get Up & Go!" He also publishes a quarterly newsletter, "Pelizza's Positive Principles for Better Living".

Dr. Pelizza left the crowd with several areas in their own lives, professional and personal, to think about. He left the crowd with the thoughts of Thinking, Doing, Emotional and Personal Energy, Tracking and the "Bean Thing" - be sure to eat 5 – 7 cups of beans a week.

Roger Petzold, with 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 2008 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 GIS Gallery exhibit displaying posters from the Symposium attendees started with a session Monday evening before the technology hall reception. The session provides an opportunity for organizations to share their techniques and applications with peers in the transportation GIS Community. Attendees were able to vote on their favorite poster for the People's Choice Award and were able to view the posters for the duration of the Symposium.

The evening also included 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. As part of the 2008 Symposium the "Birds of a Feather" session included a discussion on the Synthesis of State Practices in Developing Linear Referencing Systems.

Tuesday morning started with a panel discussion, Disaster Response in Transportation Agencies, moderated by Marvin Koleis with the Colorado Department of Transportation. Panelists included:

- Dan Ross, Minnesota DOT
- Chris Van Slyke, Houston-Galveston Area Council
- Oscar Jarquin, California DOT
- Jim Mitchell, Louisiana DOTD

The panel discussion included a presentation from each of the panelists and a question and answer session. Events over the past decade have placed a spotlight on the complex nature and numerous challenges faced by transportation practitioners as it relates to dealing with disasters. Forced to the forefront during these events is the importance of the nation's transportation infrastructure in supporting daily life and commerce, as well as the critical role transportation plays in rendering necessary aid to areas impacted by a disaster. Panelists used the recently published report titled Disaster Response in Transportation Planning, which was prepared as part of NCHRP Project 08-36, Task 69(03), National Cooperative Highway Research Program, Transportation Research Board, as a foundation upon which to discuss their experiences and perspectives relative to disaster preparedness and response.

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

Wednesday's schedule before lunch offered two more paper sessions with four concurrent technical tracks. During lunch, awards were handed out and prize drawings were held followed by the Oklahoma DOT, next year's host state, inviting Symposium participants to Oklahoma City, Oklahoma for the twenty-second annual GIS-T Symposium. The afternoon featured a Virtual Tour using Microsoft Virtual Earth, 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. Thirty percent of the registered Symposium individuals participated in the workshops.

Bringing GPS Into Perspective – A Workshop for GIS Managers and Practitioners

This workshop incorporated a combination of lecture, dialogue, and hands-on field exercises to introduce participants to the benefits, limitations, and future potential of the global positioning system (“GPS”) as a tool for capturing and/or verifying feature locations and attributes for use in a GIS environment. This workshop was appropriate for individuals with minimal to moderate experience with GPS and was comprised of four primary elements:

1. GPS: A Brief History
2. Current Status of GPS and Complementary Systems
3. A Look Into the Future of GPS
4. Field Exercise

Jonathan Cobb with Waypoint Technologies was the instructor for this workshop. Eighteen participants registered for this workshop.

A Six-Pack of Avoidable, Seemingly Difficult, Major RFP Problems and Their Simple Solutions

This workshop given by Michael Asner with Michael Asner Consulting lead a discussion of issues related to design evaluation for requests for proposals to twenty-three students. There are

- Not any six problems….there are hundreds available
- Avoidable problems…. problems that can be mitigated or eliminated by activities you can do before issuing an RFP or be requirements or information that you put into the RFP.
- Difficult problems…..problems that have been identified by procurement people over the last five years.
- Major problems…..problems that can poison the RFP process, problems that can produce high risk solutions that are likely to fail.
- Avoidance technique….. avoid these problems by adopting well established best practices selected from more than sixty jurisdictions.

A Six-Pack of Avoidable, Seemingly Difficult, Major RFP Problems and Their Simple Solutions:

1. Budget – Every proposal is over budget
2. Risk – All the proposals are mediocre and contain significant risks of failing
3. Expertise – You can't tell if the key players possess the critical skills needed for the project
4. Project Plan – You can't tell if the project plan will actually work
5. Staffing – You don't know if the proposal staff can do the job nor if they will show up
6. Past Performance – You don't know how to evaluate the vendor's past performance or whether they are embellishing their record, misleading you, or simply writing fiction.

Workshop attendees learned how to avoid major problems by creating a better RFP, by inserting additional requirements or conditions.

- Three simple ways to get every proposal within your budget
- How to perform a risk analysis
- How to specify expertise in an objective, measurable way
- The critical elements of a project plan
- The information required on a resume
- How to contractually ensure that proposed people show up
- How to evaluate past performance

Attendees were given a copy of Mr. Asner's publication on designing evaluation processes for RFPs, "RFPs and the Evaluation Process: Getting it Right!!".

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

This workshop presented that the convergence of new technologies and business requirements 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 expand your 3D know-how.

A wide range of users may 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 may other business practices.

This 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, attendees learned how to navigate the dizzying array of options and prepare for a 3D geospatial practice. This workshop was presented by Tim Case with Parsons Brinckerhoff and Ben Williams of FHWA's Resource Center. Twenty-six participants registered for this workshop.

Multi-Level Linear Referencing for State Transportation Databases

MLLRS was defined within the work of NCHRP 20-27 a number of years ago. Some of the promise of MLLRS was to provide support for: a) Multiple LRMs, b) Temporality, c) Event stability and d) Multiple cartographic datasets. In recent years and driven by Safety, Gas Tax, HPMS and R/W exchanges, there has been a growing need to expand support from "on system roads" to support "all public roads" within the DOTs. Yet to date, relative few commercial products have been built to realize the promise of MLLRS.

In the past couple of years, Nevada DOT, along with a major GIS vendor and ITIS, teamed to create commercial products to perform MLLRS maintenance. ITIS, as NDOT's primary consultant overseeing the implementation of this work, has gained considerable knowledge in how to implement MLLRS Maintenance within DOTs.

In order to share some of the knowledge gained from this experience, ITIS volunteered to provide this workshop on MLLRS Maintenance. This workshop covered the following major topics:

- Understanding MLLRS
- MLLRS data model and extensions for local roads
- Dealing with time in the model
- Maintenance functions necessary for MLLRS
- Approaches to managing statewide transportation databases
- Maintenance function extensions for statewide transportation databases
- Integrating local government transportation-related data into statewide databases
- Standards issues and coordination approaches for statewide databases
- Implementing MLLRS in a multi-vendor environment

This workshop was presented to thirty-five students by Gerald Dildine and Jeff Tomlinson from ITIS, Inc. and provided "real-world" experience and "how-to" direction on how to move forward with implementation of MLLRS.

Requirements for a Statewide 3-D, Real-time Positioning Infrastructure to Support Transportation Systems

Tony Cavell with the Louisiana State University, Center for GeoInformatics and Dr. Jim Mitchell, with the Louisiana Department of Transportation and Development were the instructors for this workshop. Participants were exposed to the theory of real-time satellite positioning networks (RTNs), their design and construction, operational capabilities, and spatial limitations of current technology. Discussions also included spatial datums and how RTNs can support GIS accuracy assessment, and construction. Presentation highlighted transportation examples form Louisiana. Nineteen participants registered for this workshop.

Enterprise Information Integration

Information integration has been a driving purpose behind geographic information systems for decades. This is due in large part to so many items modeled by information systems having an associated location which may be mapped, queried, and correlated. This is particularly true for location-rich transportation data. Through the years however, GIST professionals have focused more on the mechanics of getting spatial data to work together and less on the greater information integration objective.

This workshop discussed enterprise information integration (EII) as the established discipline and united approach to assimilation of all information types into homogenous corporate information. A detailed look at how EII precursors such as enterprise resource planning (ERP), data warehousing (ETL), enterprise application integration (EAI), and other technical approaches may compare with EII. And lastly, criteria for comparing and selecting various information integration strategies will be compiled, together with techniques for calculating the return on investment for various information integration methods. Throughout the workshop, emphasis was placed on GIS as a means to integration rather than an integration end: in essence a tool rather than a trade.

Dr. Max Wyman with Terra Genesis was the instructor for this workshop and twenty-five participants registered for this workshop.

Microsoft Virtual Earth – In Depth

The Virtual Earth Platform from Microsoft is an integrated set of services that combines unique aerial, and satellite imagery with best-of-breed mapping, location and search functionality. Marc Schweigert from the Microsoft Public Sector Developer and Platform Evangelism Team provided a technical instruction on adding mapping capabilities to government applications with Virtual Earth. Participants learned to program with the Virtual Earth Map Control and to take their websites and applications to the next level by integrating the Virtual Earth Platform to deliver highly visual and locally relevant information consumers most care about. Marc also covered how to extend agency's ESRI investment with fusion server technologies made possibly by their partner ecosystem.

After attending the session participants:

- Had a thorough understanding of the capabilities and features of the Virtual Earth platform
- Know what it takes to build their own solutions leveraging Virtual Earth
- Learned about third party products which enable them to leverage their existing GIS information visualized using Virtual Earth faster.

Thirty-five participants registered for this workshop.

Introduction to GIS Web Services

In this workshop instructor Frank Winters with the New York State Office of Cyber security and Critical Infrastructure Coordination discussed GIS web services with twenty-nine participants. The use of GIS and web services by State agencies and local government has grown rapidly. We have witnessed the growth of both GIS and web services uses by emergency services, capital project planning, real property assessment, economic development, health services, environmental analyses, land use planning, facility management, highway safety, and much, much more. In short, both GIS and web services are vital tools for effective decision-making and improving government services.

This workshop introduced attendees to the fundamental concepts of GIS web services and raised their awareness of how to leverage the Internet to utilize geographic data without having the need to host the GIS data and/or develop necessary tools. Topics incorporated into the workshop included an explanation of web services, the various web service types and their application, the basics of data used via web service platforms and current programs and available resources for use in the integration of web service with GIS

technologies. Demonstrations covered the existing methods of integrating GIS data with web services. The target audience for this workshop was GIS practitioners and those who like to understand what web services are and how they can be utilized in the workplace.

State GIS Activities

This is the 13th 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, and resulted in a ninety-six (96) percent response, with 48 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.

Nine new questions were added this year to address the new issues facing State DOT's:

1. Where do you see geo-spatial technology adding the most value to your agency in the future?
2. To what degree is your State transportation agency involved in your state GIS coordination Program?
3. Does the roadway transportation data include source data from local government?
4. Does your data include commercial data? Indicate which vendor.
5. Does your DOT use your roadway transportation data for federal reporting of the Highway Monitoring System (HPMS) data to the Federal Highway Administration?
6. Has your state provided centerline data to the U.S. Census Bureau for the upcoming Enhanced TIGER release?
7. Is your agency using or considering the use of any of the following tools? Google Earth, Google Maps, Microsoft Virtual Earth, Yahoo Maps, Other
8. Does your agency's road inventory file account for the z-value (other than odometer readings) when calculating roadway length?
9. What research is needed in GIS for transportation? (Write description)

GIS Organizations Structure and Development Stage

A majority of the States (53%) 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 (40%) 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 split between Planning (44%) and Information Services (36%) with 20% reporting other locations. Even in those States that have instituted an enterprise GIS, there is no significant difference in where the GIS core unit is located.

The average staff size of the GIS core unit is 6.8 persons. Over eight-seven (87) percent of the States responded that at least one staff member has a geography or cartography background, and a majority of States (77%) 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 twenty-eight (28) percent of the States reported having a certified GIS professional on staff.

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 (21%). 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 forty (40) percent of their GIS application development work, with an average annual expenditure of about $406,000 per agency.

GIS Software

Respondents were asked to identify what software products were used by GIS core staff for web applications. Seventy-two (72) percent of those responding use ArcIMS products, twenty-seven (27) percent use Geomedia Webmap, while forty-eight (48) percent use other products for web applications.

Most States use commercial relational database management software (RDBMS) in combination with GIS software to manage their geo-spatial data. Oracle® is used by seventy (70) percent of the States, either alone or in combination with other database software. Other commercial database software used by the States includes SQL Server® (44%), and Microsoft Access® (19%). Louisiana and California also use ESRI File-Base Geodatabase and PostgreSQL respectfully.

ArcSDE® (80%) and Oracle Spatial® (48%) are the principal software packages used to manage the geo-spatial attributes in enterprise data warehouses.

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. Sixty-three (63) percent 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, sixty (60) percent of the States report that their road centerline database includes all public roads, and another twenty-two (22) percent include all State and county routes.

The majority of States (63%) distribute their road centerline database free of charge to whoever wants it. Most other States (33%) 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.

States were asked if they maintain any other statewide geo-spatial data layers, beyond the road centerline database. Seventy-seven (77) 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 (60%), orthoimagery (51%), and geodetic control points (49%). State DOTs are less likely to maintain other framework layers such as elevation (23%) or water features (34%).

The primary sources of geo-spatial data used by State DOTs are other state and local agencies (identified by 85% of those responding), followed by statewide geo-spatial clearinghouses (77%), and geo-spatial data maintained by federal agencies (52%). Less common sources include data purchased from commercial data vendors (25%), data acquired through the Geo-Spatial One-Stop (23%).

Benefits and Costs of GIS Applications

Several questions introduced in 2006 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 (60%), but also tied with Asset management as being the most difficult and costly to implement (48%). CAD/GIS was also cited as being the next most difficult to implement (28%), followed by Enterprise data integration were also seen as having the greatest expected future benefits (67%).

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 (Categories with at least 5 citations)	# of Citations
Development of web-based GIS applications	33
Road centerline database development / enhancement	22
Road inventory management	19
Migration to new GIS software / hardware	11
Safety / crash analysis	11
Location referencing system maintenance	8
Project management	8
Orthoimagery data collection / integration	7
Enterprise application	7
Environmental / cultural analysis	6
Truck routing and permitting	6
GPS data collection / integration	5
Strategic Planning	5
Right-of-Way	5
Data Warehouse Activities	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 third 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)
- Reader interest
- Data analyses (if applicable)
- Interpretation
- Clarity of presentation
- Validity of conclusions

Out of four entries three winners were selected and awards were given out. Two winners received $500.00 and one winner received $250.00 and all had their transportation

expenses paid to Houston, Texas and two nights stay to attend the Symposium. The winners presented their paper at the Student Paper Session on Monday, March 17, 2008. Appendix E in this report contains the winning papers. Winning authors were:

Chang Yi
University of Texas
Austin, TX

Paper: *Utilizing GIS to Measure Street Connectivity and Pedestrian Accessibility: Comparing Cul-De-Sac and Grid Neighborhoods in the Houston Metropolitan Area*

Martin Thomen
University of Texas
Austin, TX

Paper: *Carsharing in Austin: A Service Based Approach Using GIS to Locate Carshare Typical User and Non Typical User Groups in Travis County*

Eric Foster
Northwest Missouri State University
Maryville, MO

Paper: *Using Geographic Information Systems to Determine Street, Road, and Highway Functional Classification Accuracy.*

GIS Gallery

The 2008 GIS-T Symposium entries showcased how agencies are using GIS technology to display data. Posters were reviewed and the following awards given to:

Effective Cartography

- **1st Place: City of High Point, North Carolina**
  "City of High Point Transit System Map"

- **Honorable Mention: Vermont Department of Transportation**
  "Transportation Map of the State of Vermont"

- **Honorable Mention: Colorado Department of Transportation**
  "Traffic Volume Analysis 2008"

Use of Information

- **1st Place: Oregon Department of Transportation**
  "Traffic Flow Map 2006 – Oregon State Highway System"

- **Honorable Mention: Oklahoma INCOG**
  "Existing Tulsa Commuter Shed Statistics"

- **Honorable Mention: Oregon Department of Transportation**
  "Winter Levels of Service"

Transportation Publication

- **1st Place: Michigan Department of Transportation**
  "Bay Region Road & Trail Bicycling Guide"

- **Honorable Mention: Oklahoma Department of Transportation**
  "2008 Official State Map"

- **Honorable Mention: Michigan Department of Transportation**
  "Northeast Region Road & Trail Bicycling Guide"

Public Presentation

- **1st Place: North Central Texas COG**
  "Super Bowl XLV (2011): Transit & Aviation System Plan"

- **Honorable Mention: Yakima Valley COG**
  "Funded Regional Transportation Improvement Projects Map"

- **Honorable Mention: Whatcom County, Washington**
  "Projects Identified in Other Plans – Birch Bay Subarca Plan"

People's Choice Award

- **Oregon Department of Transportation**
  "Impact of Transportation on the Human Footprint"

Concurrent Sessions

During the Symposium, concurrent technical sessions were attended in large numbers.

Monday:

State of Texas	Google Earth Applications
Student Papers	Enterprise GIS
GIS Planning	ITS / GIS
Mobile GIS	LRS / LRM

Tuesday:

Enterprise Data	GIS Data Sharing
Web GIS	GIS / CADD Integration
Federal GIS	Imaging
Safety	GIS Planning

Wednesday:

Management System	Data Management
Data Collection	LRS / LRM
Right-of-Way GIS	Database Design
Routing	Local Government GIS

Symposium Summary

The twenty-first annual Symposium on Geographic Information Systems for Transportation (GIS-T) was held in Houston, Texas from March 16 through March 19, 2008. 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 exhibitors; Dr. John Pelizza a nationally known leading authority on wellness, change process, stress management, productivity, team building and personal growth was the keynote speaker; state summary; roll call of states; ninety-six paper presentations; GIS Gallery; student paper contest; "Birds of a Feather" sessions; one panel discussion; and a Microsoft Virtual Earth 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.

GIS-T 2009 will be hosted by the Oklahoma Department of Transportation