Summary Report

2002
Geographic Information Systems
for Transportation (GIS-T)
Symposium

Hosted by Georgia Department of Transportation
Atlanta, Georgia
March 24 – 27, 2002

Introduction

The fifteenth annual symposium on Geographic Information Systems for Transportation (GIS-T) was held in Atlanta, Georgia from March 24 through March 27, 2002. For a list of earlier symposia refer to the inside of the back cover of this report. The sixteenth annual 2003 GIS-T Symposium will be held in Colorado Springs, Colorado.

"Melting Down the Stovepipes" was the theme of this year's Symposium, which was aimed at the use of geospatial technologies to enable transportation agencies to make more integrated decisions both within their organizations and with their external partners. The GIS-T symposium provides a forum for the many state DOTs and regional transportation professionals to develop relationships with other GIS-T managers and practitioners. Throughout the course of the symposium a variety of GIS issues facing the transportation professionals surfaced and were brought forward. Topics of concern were identified throughout the symposium by means of sessions, a pre-symposium survey, and the symposium wrap-up. This report is divided into four parts:

- Part I - summary of emerging issues and technologies impacting the transportation IT community;
- Part II - summary of the GIS-T 2002 symposium;
- Part III - GIS state contacts; and
- Part IV - results of the state survey and roll call.

This year, the conference abstracts and presentations will be available on the GIS-T website found at: www.gis-t.org

Part I. Summary of Emerging Issues

While many issues related to GIS in Transportation agencies were examined at the Symposium, a few emerged as new or overarching.

The excitement at the Symposium this year centered around some claims that LRS (Linear Referencing Systems) will no longer be needed with cheap and easy GPS data collection and navigation tools. The proposed solution is just collect and maintain an X,Y coordinate. Sentiment remained strong, this year, that LRS is still necessary for the foreseeable future. Some of the reasons given were: a coordinate point or line cannot be associated to a route or to other data without GIS manipulation; it cannot be described in human terms; and locational accuracies of different datasets. This debate is sure to grow as GPS technology becomes more ubiquitous.

Another topic of debate was charging fees for data. While some organizations are beginning to implement this strategy, others voiced their negative experience with this approach. Some agencies with a history of charging for data have found that this practice seriously impedes data sharing and encourages the proliferation of stovepipe applications.

Many agencies have finally come to realize the limitations of their spatial data holdings. The most widely held data, the USGS 7.5-minute quadrangle data (1:24,000 scale) are increasingly becoming unsuitable for the uses of a transportation agency. For example, when collecting driveway data with a GPS unit at 1-meter accuracy, centerlines based on 40-foot accuracy do not work well. Updating base maps with greater accuracy has the potential to be an expensive issue.

Some other emerging issues are listed below:

IT Impact

- The adoption rate of GIS technology has moved into the exponential part of the curve in the last 5 years. (which has impacts on the expectations of users, among other impacts)
- Significant growth in web-based GIS.
- Range of GIS applications will continue (rapid) expansion.
- Interoperability -- sharing of data and processes across application/system boundaries.
- Geo-Spatial data -- becoming more accurate and more accessible. (GPS, remote sensing, interagency data sharing)
- Increasing pressure to make geo-referenced transportation data more accessible [and understandable] to the general public.
- Emerging GIS Environment:
  - Ubiquitous Data Availability
    - Clearinghouses, large databases (e.g. SMARTRAQ), parcel attributes
  - Automated Data Acquisition
    - GPS/GIS real-time mapping and location
  - Location Based Services
    - I-Pac, located by GPS, linked to GIS server
  - Enterprise Collaboration
    - Real-time traffic monitoring (linked to updateable traffic signs, emergency dispatch center, and web accessible on the Internet

Organization impact

- Continue to be more critical and more difficult to solve than technological issues.
  - Working through turf issues
  - Adjusting organizational structure
  - Maintaining support of upper management

People impact

- Personal Privacy -- a re-emerging issue.
- Certification of GIS professionals. (Proposal by URISA and other spatial associations)
- There will be increased reliance on outside experts [consultants] for more complex GIS analyses (due to difficulty in finding and keeping expert staff on internal payroll).

Business impact

- Increasing conflict between free data distribution and charging for data.
- Common/interrelated reference systems -- need and difficulty in achieving will continue.
- Map publishing -- growing, tools needed to simplify.

- Place-based decision making.
  - Use of GIS database in the decision making process (how used)
  - How GIS data in one part of agency is leveraged by use in another part of agency
- Data collection -- ease of data collection may actually impede the sharing of data collection and sharing of common databases.
- GIS in transportation agencies will continue to grow, primarily as an "end user" tool.
- LIDAR as an effective data collection technology (supplemental rather than replacement technology), for transportation agencies.
- Failure to document the many realized benefits of GIS will continue to slow down the adoption of GIS.
- New Transportation Models -- will require more accurate location data.

Data Sharing
- Will increase as barriers are overcome, primarily with technology.
- Sharing will increase as barriers are overcome, primarily with the improvement in institutional and organizational arrangements.
- Requires resolution of:
  - Who is data custodian?
  - Who owns the data?
  - Who funds the collection and maintenance of data?
- Will receive a big boost if and when stovepipes are successfully broken down.
- State DOTs being more willing to share their rich database could lead to more political support for not only GIS-T, but transportation programs in general.

GIS-T technology issues:
- Identifying limiting technology.
- Educate personnel as to new opportunities.
- Look to future, but not too far into future.
- Match technology to architecture environment.
- Dealing with lack of industry standards.

Part II. Summary of the GIS-T Symposium

Symposium Background

The GIS-T Symposium is organized by AASHTO and co-sponsored by 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 Broad (TRB) and the American Society of Photogrammetry and Remote Sensing(ASPRS). The Symposium originated to provide:
- education,
- information sharing with other transportation agencies,

- vendor 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 conference organizing tasks, e.g. program development, local arrangements, exhibits, workshops, and poster session. This year's conference continued the focus on opportunities and issues of applying GIS technology to the business of transportation agencies.

Symposium Structure

This year several half-day workshops were held on the Sunday preceding the Symposium. The attendance at the Symposium workshops has continued to grow with 176 participants attending the workshops. The Workshops are summarized below.

A vendor reception began Sunday evening with a full ballroom spilling over into the entrance hall. Twenty-eight GIS vendor exhibits; including software companies, consultants, data and equipment vendors were present this year. The vendors' exhibits were available through Wednesday, with another reception Monday evening followed by software-focused "Birds of a Feather" discussion groups.

The conference registration started on Saturday afternoon. The registrant demographics were 412 total attendees, from 47 states, 4 Canadian provinces and 3 countries outside of North America.

Conference started Monday morning with a welcome by the Paul Mullins, Georgia Department of Transportation and was followed by the keynote speaker, Dr. Steve French, Director for the Center of GIS in Atlanta, Georgia and a summary of states by Bruce Spear, Federal Highway Administration. Finishing up Monday's plenary session was the traditional Roll Call of States, MPOs, etc. This is where a representative from each agency introduces his or herself and any other delegates from the agency. The Roll Call slides are shown later in this document. Each state was called alphabetically starting with the host state. States were asked prior to the Symposium to submit slides. Blank slides have been deleted although the state may have made a report. Roll Call allows all attendees to connect faces with names and helps people to make contacts and initiate conversation over the course of the week. Monday afternoon consisted of paper sessions with four concurrent technical tracks and technical tours.

A new feature at the Symposium this year was 5 technical tours on Monday afternoon. These tours offered an opportunity for symposium participants to see GIS and data in action. Tours provided were:

- DOT: Atlanta's Traffic Management Center (TMC)
- Transit: Metropolitan Atlanta Rapid Transit Authority (MARTA)

- Airport: Hartsfield International Airport
- MPO: Atlanta Regional Commission (ARC)
- Digital Imagery: Leica GeoSystems (ERDAS)

A poster exhibit displaying maps and posters from many of the DOTs, MPOs, and Regional Councils started on Monday. This Symposium feature continues to be popular, providing an opportunity for organizations to share their techniques and applications with peers in the transportation GIS community.

Tuesday and Wednesday morning started with a plenary panel session, each are summarized in a later section. Each panel session was followed by additional technical paper sessions.

Before the Wednesday Panel, it is traditional for the next year's host state to be given an opportunity to invite Symposium participants to GIS-T 2003. GIS-T 2003 will be in Colorado Springs, Colorado and hosted by Colorado DOT. The afternoon winds down the symposium with a Wrap-up session, where the conference is "debriefed" by all interested attendees. This is where ideas for next year's conference theme and session topics are first discussed.

This year the American Association of Airport Executives (AAAE) held their fifth annual airport GIS conference in the same hotel facility. The AAAE co-sponsored several Sunday workshops in conjunction with GIS-T, had access to the vendor displays and shared the GIS-T vendor reception Monday evening. This year's event as presented by the AAAE Airport GIS Committee was designed to help airport personnel and consultants understand new applications, strategies for implementation and lessons from examples and case studies at other airports.

Workshop Summary

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. The workshops were crafted to give students the knowledge to start more integrated enterprise wide solutions.

Land Use Models and GIS –by Dr. Paul Waddell, University of Washington

This workshop addressed the topic of land use modeling within the context of integrated land use and transportation planning. It focused on the methods and data used to predict the effects of transportation investments on land use patterns, and on the effects of those patterns on travel demand. It explored techniques and data used in land use modeling, and ways in which GIS can be used to aid the modeling process. The workshop also included a review of the range of current practice in land use and transportation modeling approaches, including spatial interaction, spatial input-output, and dynamic micro-simulation.

GIS-T Project Management by Dr. Simon Lewis, GIST/Man, Inc.

Geographic Information Systems for Transportation (GIS-T) projects are not exempt from best project management practices. Despite the recognized potential of GIS-T projects to

significantly enhance decision making through data sharing and communications, on some counts, as many as half fail to meet the stated goals and objectives.

This session identified some unique aspects of GIS-T projects and some rules-of-thumb for the management of a more successful projects. Experiences from the consultant and client viewpoints, common stumbling blocks, and successful project management techniques were also covered.

NCITS ANSI-TriServices GIS/CADD Standards –by Mr. David Tamer, Carter Burgess

The National Committee for Information Technology Standards (NCITS) approved the "Spatial Data Standard for Facilities, Infrastructure & Environment" November 15, 2001. NCITS 353 is a nonproprietary geographic standard for use with off-the-shelf GIS, CADD and relational database software. The Corps of Engineers, Tri-Services Center, developed the standard. Military facilites, NASA and commercial airports use it.

This workshop provided an overview of the national GIS standard and demonstrations and group exercises on how to use the free computer software tools, which allow implementation of the standard. Exercises were designed for transportation and airport applications. The standard and its associated software tools were distributed to all workshop participants.

Implementing Road Data Models: Detailed Requirements for Selected Location Reference System Components –by Mr. Tom Ries, GeoAnalytics

This workshop was part of the Implementing Road Data Models series. It provided a detailed understanding of two or three location reference system components primarily from the transportation asset management perspective. Students were able to take the results of this workshop and jump-start their own location reference system design or improve their existing systems. Detailed data, process, organizational and technical requirements for these components, and some implementation business rules/procedures were presented. Breakout groups discussed specific cases and developed student-specific advantages and disadvantages to implementation strategies. Two or three components were chosen from the following list: (A) Integrating Coordinate-Based Data Collection (GPS, maps) and Linear Reference Systems, (B) Routes and Networks, (C) Linear Datums, (D) Street Addressing, (E) Cross-Streets Linear Referencing, (F) Integrating Linear Reference and Cartography of Different Resolutions.

Advances in Remote Sensing and Data Capture Technologies –by Dr. Keith Turner, Colorado School of Mines, and Mr. Jack Hansen, University of Tennessee Space Institute

One of the biggest difficulties in using GIS is getting the right data, in the right format, at the right time. Fortunately a convergence of several technologies provides several new sources of digital data in formats that can be readily digested by your favorite GIS. The workshop reviewed the sources, technical specifications, and economics of acquiring and using these new data sources in GIS applications of special interest to the transportation field.

The new data sources range from new commercial satellites offering images with 1-5 meter resolution, to new digital camera technologies that can provide high quality images with

significant cost-savings compared to conventional photography. When these data capture and remote sensing technologies are combined with advanced GPS location systems, substantial improvements in field data gathering costs can be achieved. These advanced technologies will impact several applications, planning, environmental assessment, design, maintenance, facility monitoring, and infrastructure inventory and assessment.

The workshop discussed the technical and economic aspects of several advanced technologies for transportation-related applications. Information concerning those capable of providing services was provided, and case histories were described where possible.

Census Data Workshop –by Ms. Elaine Murakami and Mr. Ed Christopher, FHWA and Mr. Bob LaMacchia and Mr. Leo Dougherty, Census Bureau Geography Division

This workshop described standard Census data (such as SF1 and SF3) as well as the Census Transportation Planning Package (CTPP) and the decennial Census PUMS (Public Use Microdata Sample). A copy of the SF1 data was given to attendees. The workshop included a demonstration of extracting data from the Census Bureau's data and using it one's own GIS. Background on the American Community Survey, which is expected to replace the decennial census long form, was provided.

It reviewed Census geography (metropolitan areas, urbanized areas and urban clusters, tracts and block groups, PUMAs), the Census Bureau Master Address File, TIGER files. The Census Bureau provided an update on the MAF/TIGER Modernization program and discussed opportunities for the involvement of local governments in this activity. Impacts of new Census geographic areas on transportation programs (especially MPO and TMA designation) were discussed.

Understanding Traditional and New Age Software Development Models – by Dr. Paul Scarponcini, Bentley Systems

Your IT department has just embarked upon a major software development project for you. Or perhaps you have just hired a "competent" consultant to develop a new GIS application. A key success factor is how well they understand your requirements before they begin writing code. What should you expect from them in terms of the models they will build that will capture the system requirements?

This workshop taught the students how to understand the models so they can determine whether or not the developers have understood your requirements before their agencies spend the big bucks to have them code it up. This is especially critical in the development of an enterprise wide system to overcome existing stovepipe applications, because of the disparate terminology and concepts from different parts of the organization.

Covered in the workshop were traditional and new age methodology models. The former include data models called entity relationship diagrams, which provide the basis for designing the database tables, and data flow diagrams, which depict how information flows (or should flow) through your organization. Newer UML models include use cases, which describe how

the system will work from the user's perspective, and object models, which layout the components from which the system will be built. Actual models from transportation GIS projects provided the basis for presentations and attendee exercises.

Cutting the Wire to GIS – by Ms. Marsha Anderson-Bomar, Street Smarts

The concept of integrating Geographical Information Systems (GIS) and real-time positioning devices like Global Positioning Systems (GPS) is relatively new but is being employed in many different ways.

Some interesting innovations are being conducted in the fields of GIS, GPS, and wireless communicators/computers. For example, one can dynamically locate, and track the position of a probe vehicle for use in travel time studies or real-time traffic monitoring. The information can be temporarily stored in a handheld computer and then transmitted via wireless communication to a base station. The data can be displayed and overlaid on GIS mapping. The information can be used to determine travel speeds along a corridor and isolated and system delay.

Topics covered in the workshop were:

a. The difference between wireless GIS and GPS
b. The types of tools needed to create wireless GIS applications
c. Issues to be resolved such as Interoperability, earth projections, formats, objects and security.
d. The general types of applications, such as: Optimization, visualization and Route/Schedule
e. The general arenas in which these are being used: Government, real estate, utilities, public safety, and transportation
f. The specific applications that are in practical use today, such as: E911, Air Cargo and Ship Cargo management (including landside equipment)

Several successful implementations of handheld GIS and some new technologies that promise to be the next generation of wireless mapping were explored. A number of Wireless GIS applications have gone live and are proving that it can be done successfully in many different environments. They include the landside of most transportation modes. A challenge to developing more of these applications is availability and reliability of bandwidth. The creation of applications that work while vehicles are moving is still a great challenge.

Introduction to Airport GIS - by Randy Murphy, Grafton Technologies and Mark Ricketson, Geonetics

This half-day workshop was an introduction to airport GIS for managers, engineers, information systems personnel and others interested in developing and/or using this technology. A basic definition of what GIS is and spatial data were discussed. How airports are currently applying GIS technology was reviewed highlighting success stories and lessons learned. Different implementation approaches were discussed along with the benefits and drawbacks of the various choices.

Those who seek or allocate funds to develop GIS benefited from a discussion of costs and benefits that typically accrue from a GIS program. Different sources of funding that can be

tapped were also identified. The human sides of GIS implementation including staff resources, consultants and training requirements were covered as well.

Technical and non-technical perspectives of spatial data were covered. Students learned about existing sources of data along with the standards that that data should be held to maximize its use. Almost all airports struggle with the important topic of how CADD and GIS operations can coexist. That topic was covered including integration of the GIS with legacy and enterprise wide systems.

Keynote Address Summary

Dr. French entitled his talk "This is Not Your Father's GIS". Why? He identified 5 convergent technologies: GIS, GPS, Wireless, Remote Sensing, and the Internet. These 5 technologies result in an emerging environment characterized by

- Ubiquitous data availability
- Automated data acquisition
- Location based services
- Enterprise collaboration

Ubiquitous data availability and automated data acquisition enable GIS users to spend more time on analysis instead of data collection. Location based services enable GPS and palm-top devices to support rapid and automated data collection in the field. Enterprise collaboration enables this data to be collected by one part of the enterprise, and shared with and used by the rest of the enterprise.

He posed the question: "What's the value of a piece of data?" His opinion is that the purpose of data is to be used to make better decisions. He challenged us to be adamant about melting down the funding stovepipes, thus enabling the data to be used to its highest value.

State GIS Activities Summary

This is the 7th year that a state summary has been presented at the GIS-T Symposium. A total of 41 states responded to this year's survey, which included several new questions and clarifications on responses to some past questions. Based on the survey responses, the following observations were presented:

- Nearly all State DOTs have now initiated some GIS activity.
- Budgets for GIS activities continue to grow, with nearly half of the DOT's reporting annual GIS budgets in excess of ½ million dollars.
- There is an emerging trend to locate the core GIS unit in the DOT's information services department.
- GIS use throughout the DOT continues to grow rapidly, with the average number of end users tripling since 2000.
- Staff size of the GIS core unit has remained relatively stable, averaging just over 8 persons in 2002.

- GIS software continues to migrate away from UNIX and toward a Windows operating environment.
- Over 80 % of State DOTs use GIS software from more than one commercial vendor.
- There is continuing market penetration in state DOTs among most GIS software packages, with major growth in end user and web-based software.
- There is a significant increase in the number of state DOTs developing more accurate road base maps using digital imagery and kinematic GPS.
- There is significant growth in web-based GIS applications and use of GIS for managing road feature inventories.
- GIS continues to be used principally for visualization and presentation, with few reported applications involving complex spatial or network analyses.

Poster Summary

The 2002 GIS-T Symposium poster entries showcased how agencies are using GIS technology to display data. Posters displayed information covering airport access, alternate transportation modes, statewide bicycle routes, natural resource boundaries, functional classified roads and state highway maps. Posters were voted upon and the following awards were given to those chosen as the best:

Best Cartographic Presentation:
Georgia Bicycle Map 2002 – Georgia Department of Transportation
Best Data Integration:
Nebraska Airport Access via State Highway System – Nebraska Department of Roads
Best Analytical Application:
Alternate Transportation in Cheyenne, Wyoming – City of Cheyenne
Analytical Application Honorable Mention:
Roadway Characteristics Affecting Bicycle Travel in South Dakota – South Dakota Department of Transportation

Panel Sessions Summary

Tuesday Panel - What is GIS?

Moderator: Diane Pierzinski
Panel Members:
Don Kiel - GeoDecisions, Pennsylvania
David Loukes - Geo Plan, New Brunswick, Canada
Marc Kratzschmar - Exor Corporation, California
Bruce Spear - FHWA, Washington, DC

Ms. Pierzinski opened the discussion with a bit of GIS history, looking at different definitions given to the term GIS over the last 20 years from DIME, the first attributed map, to a Point on the Earth, to a Toolbox. She laid out the context of GIS in the last decade which spans several disciplines such as geography, cartography, remote sensing, image processing, surveying,

engineering, environmental science, and computer science. She handed off to the panel members by asking for today's definition of GIS.

Don Kiel felt that the acronym GIS was becoming more well understood and common. His definition described the marriage of data and maps used for display and analysis and felt that GIS was also a method of integrating data. He talked about the change GIS has undergone using a pyramid to visualize GIS users' roles. In the old days the GIS guru was the wide base of the pyramid and viewers were the small top, with users in between. Today the pyramid is turned over with viewers forming the wide base and gurus becoming the smaller number.

Mr. Kiel brought stovepipes into the discussion by talking about legacy GIS applications which were hard to share, the tools were new, and synchronization was difficult. These obstacles, along with agency organizations and the Federal push for management systems in the 90s, steered DOTs into stovepipe situations, where systems didn't talk to each other and where data was duplicated throughout an agency to feed these separate systems. Other factors contributing to stovepipe systems were the emphasis on data collection versus integration, the lack of common referencing and conversion capabilities, and the lack of standards. Don ended by saying that what the Web environment will bring to GIS and stovepipes is still somewhat unknown.

David Loukes talked about trends and issues affecting GIS today. He focused on the quest for interoperability between systems and lamented the lack of standards (or perhaps the plethora of standards) to ease this along. He envisions a proliferation of personal geodatabases and feels the complexities of today's technical architectures adds to the issue. In Canada, Intellectual Property policies have hindered integration and sharing of geospatial data. Dave listed the different clearinghouse and standards initiatives around the globe. Optimistically, these efforts will shake out and the result will be a cohesive global infrastructure that encourages data sharing and interoperability.

Dave also asked us to think about the enterprise as something beyond a DOT's walls. He encouraged collection of data at its source and the sharing of that data throughout the enterprise. David pointed out some of the difficulties with this model today, such as no GIS-T data model standard yet but several "best practices". He feels the technology is now easy to use and cost effective to implement. This encourages stovepipe development because a group can justify the acquisition of systems without being influenced to consider the enterprise.

Marc Kratzschmar opened by talking about life before GIS. He described what many DOTs had and still have in the legacy systems, a logical network model. There is overlap with this and the GIS data model. At this point LRS (linear referencing system) still wins over geographic referencing because of the interoperability it provides. But GIS brings new tools to the analyses DOTs have always done. These tools present both opportunity and challenge, the opportunity to integrate and the challenge not to duplicate data, applications, and organization. The capabilities now exist to do either, the obstacles to integration and enterprise data have become more organizational in nature.

Mr. Kratzschmar described the movement of GIS' place in our lives over time. It began in many agencies as a project specific platform. Over time it became departmental - this may have been a department within an organization or an agency-wide implementation. GIS is now moving from an enterprise solution toward a societal tool for location based services, with the Census American Fact Finder Web Site, etc. The technology has evolved to support these new uses but organizations must evolve to meet the expectations that are now enabled by the technology. These challenges will include negotiation of agreements to initiate data sharing, standards to support data sharing, and metadata to facilitate data sharing.

Bruce Spear looked at GIS across agency types. For DOTs most applications focus on facilities management and are limited to visualization. DOTs generally do not perform software assisted spatial or network analysis but rely on human interaction to perceive relationships. MPOs generally use GIS for public presentation and preparing data for planning models. At this point Transit's use of GIS is limited to a few applications. Transportation Management Centers and ITS users focus on visualization, public dissemination with limited use of ITS data in operational and planning analyses.

Bruce feels that "GIS" to transportation agencies is by and large a visualization tool. Some of the barriers to more fully utilizing GIS capabilities are; not well understood benefits; high costs of data development; competing non-GIS tools; and different business application requirements. Additional barriers to sharing data are; no standards; different accuracies and detail needs; incompatible formats; and again, different application requirements. Why use GIS to share data? To make better decisions. Some promising trends Bruce noted were the UNETRANS model led by ESRI, TRANSCAD GIS based transportation modeling software, increased Federal emphasis on location specificity, and geospatial data becoming more accurate and more accessible.

The future of GIS in transportation agencies is growth. Growth in data accessible to the public, increased data sharing, and increased use of outside experts for complex analyses. At this point, to be on the safe side, you should put a place holder in your database for location expressed as LRS and as X,Y.

Wednesday Panel - Melting Down the Stovepipes

Moderator: Roger Petzold, FHWA
Panel Members:
William Schuman, Iowa Dept. of Transportation
Mavis Georgalis, Florida Dept. of Transportation
Jay Adams, Oklahoma Dept. of Transportation

This panel discussion asked the panelists to discuss their approaches to melting down their unintended stovepipe applications, and to turn these stovepipes into an enterprise approach to GIS in their organizations.

Bill Schuman began by describing the reasons behind stovepipe development at the Iowa DOT. He identified problems found with "data islands". Among them are ill-defined update cycles, duplicate application software, redundant data, and redundant data collection. There are two types of requirements to overcome these problems, user and enterprise. User requirements include accessing all data, using a simple interface, and relying on dependable and accurate databases. Enterprise requirements include making better decisions, reducing storage requirements, and easing maintenance demands.

Bill identified four parts of an enterprise architecture: data, technology, process, and organization. He then identified four types of enterprise architectures.

- Independent architectures, where separate organizations within the enterprise each build their own architectures. These are stovepipes.
- Interfaced, where organizations have defined processes to acquire and share their data with other organizations. Most organizations fall into this type.
- Interoperable, where organizations own and maintain their data, but that data is based on standards and processes that are adopted throughout the enterprise. This is Iowa's choice.
- Integrated, where all systems and processes are part of a single data warehouse.

In choosing an interoperable enterprise architecture, Bill discussed several factors that influenced their decision, in light of the four parts to an enterprise architecture.

- Organization is crucial to the decision. Factors to consider were organizational turf, upper management, needing a coordinator, emotional responses of the staff, and the organizational structure.
- Technology - Identify limiting technologies, and match the technology to the intended architecture. Educate staff in the technology, but not too far into the future. Use scalable, industry-standard technology.
- Process - Try not to automate old process. Identify cost or time savings in adopting new processes. Maintain data closer to the source of that data.
- Data - Identify the real data needs. Consider the data maintenance architecture, in addition to the query and analysis needs.

Mavis Georgalis began by asking the question that the Florida DOT faced: Do you really want an enterprise solution? They had 12 separate stovepipes, and were not successfully integrated. Florida's solution hinged on organizational decisions. Ownership of the enterprise solution is located at the Asst. Secretary level. This location of ownership is critical for success. They decided that stovepipe budgeting would not be centrally funded. When enterprise solutions were funded, and stovepipe funding was left to individual organizations, the stovepipes disappeared and the enterprise solutions grew.

Florida began to melt their stovepipes by identifying the target, and enterprise architecture, and then take the shot. They took the initiative and risk to begin building that architecture. They met with resistance, but the most effective means to overcome it was proof, not promises.

Jay Adams identified the main goal for Oklahoma's DOT to increase staff productivity and efficiency. Challenges to this goal were in the areas of change, ownership, and control. He then listed factors that contributed to success in these challenging areas.

- Change - Flexibility is necessary for success. They improved information access without changing data storage.
- Ownership - Increased usability successfully overcame ownership challenges. With more users comes increased usability. When the data is advertised, cooperation of data owners with the enterprise advocates increased.
- Control - Patience is necessary for success. Let the organizations that own the data make decisions about their data.

Concurrent Sessions Summary

The following is a list of the concurrent tracks. In pass years the host state has developed one of the conference tracks. This year Georgia papers were incorporated into papered sessions throughout the tracks. They were noted in the program with a Georgia peach logo. Session topics were:

Monday:

* Enterprise Architecture
* Interagency
* Data Collection
* Path Finding

Tuesday:

* LRS Development
* Enterprise Access
* Data Model
* Web GIS
* Temporal
* Tools
* Data Collection using Remote Sensing
* Transit Systems
* Dynamic Segmentation
* Transportation Planning – Part I
* GPS
* Transportation Planning – Part II

Wednesday:

* LRS in Action
* GIS on the Web
* Case Study
* Spatial Analysis
* Data Integration
* Travel Behavior
* ITS
*Asset Management

Part III. GIS-T State Contacts:

http://www.gis-t.org/dot_gis_contacts.htm

Part IV. State Summary & Roll Call of the States:

State Summary - http://www.gis-t.org/yr2002/2002_State_Summary.htm

Roll Call of the States - http://www.gis-t.org/yr2002/2002_Roll_Call_of_States.htm