

PEER EXCHANGE ON APPLICATIONS OF GEOGRAPHIC INFORMATION SYSTEMS IN THE RIGHT-OF-WAY AREA

August 8–9, 2007, Lee's Summit, Missouri

Peer Exchange Report

Prepared for the Office of Interstate and Border Planning
and the Office of Real Estate Services
Federal Highway Administration
U.S. Department of Transportation

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I. Summary

In August 2007, the Federal Highway Administration's (FHWA) Office of Interstate and Border Planning and Office of Real Estate Services sponsored a 1.5-day peer exchange focusing on select State Departments of Transportation (DOTs) applications of Geographic Information Systems (GIS) in the Right-of-Way (ROW) area. The purpose of the peer exchange was to allow State DOTs with noteworthy GIS applications for ROW to share their knowledge and experiences with each other and with State DOTs in the beginning stages of implementing GIS in the ROW area. Participants at the event, which was hosted by Missouri DOT at its District 4 Office in Lee's Summit, Missouri, consisted of staff from FHWA Headquarters, FHWA Kansas Division, FHWA Missouri Division, Illinois DOT, Kansas DOT, Minnesota DOT, Missouri DOT, Ohio DOT, Oregon DOT, USDOT Volpe Center, Virginia Tech University, and Washington DOT (See Appendix A for complete participants list).

II. Background

The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (the Uniform Act), establishes the rules, policies and procedures for acquiring real property – or right-of-way (ROW) – and the relocation of individuals and businesses affected by Federally-funded projects. Congress enacted this law to ensure that people whose real property is acquired, or who move as a result of projects receiving Federal funds, will be treated fairly and equitably, and will receive assistance in moving from the property they occupy. The Surface Transportation and Uniform Relocation Assistance Act of 1987 designated the USDOT as the Federal Lead Agency for the Uniform Act. This responsibility has been delegated to the FHWA and is carried out by the Office of Real Estate Services; state DOTs generally implement statewide ROW programs.

Recognizing that geospatial applications can be effective and efficient ROW decision-support tools, some state DOTs have begun using GIS to automate ROW functions. Published in December 2006, TRB's National Cooperative Highway Research Program (NCHRP) *Research Results Digest 310: Integrating Geospatial Technologies into the Right-of-Way Data-Management Process* (NCHRP Project 8-55)¹ describes the first steps in automating the information technology process required for ROW acquisition and management. In order to follow-up on this work, as well as to promote and encourage both the exchange of experiences and knowledge, FHWA sponsored a peer exchange focusing on GIS applications in the ROW area.²

This report provides a summary of the presentations made and discussions taking place at the peer exchange. It should serve as a resource for other DOTs and transportation agencies looking to learn more about successful implementations – or planned implementations – of GIS for ROW. Lessons learned by the participating DOTs can be found in the concluding section.

¹ *Research Results Digest 310: Integrating Geospatial Technologies into the Right-of-Way Data-Management Process*, NCHRP Project 8-55: http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rrd_310.pdf, Appendices: http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_w95.pdf.

² Related research that FHWA's Office of Real Estate Services has sponsored includes *Geographic Information System Implementation of State Department of Transportation Right-of-Way Programs*, published in July 2004. The report documents best practice methods for implementing GIS in the ROW functional areas most likely targeted for GIS application. www.fhwa.dot.gov/realestate/rowsurvjuly04.htm

III. Presentations and Discussion

Day 1 – Wednesday, August 8, 2007

The first day of the peer exchange included an overview of NCHRP Project 8-55, a roundtable discussion concentrating on each participating DOTs' GIS for ROW activities and challenges faced, as well as demonstrations of some of their respective geospatially enabled ROW systems. For purposes of organizing this report, summaries of Oregon DOT's and Washington DOT's presentations, which were given on Day 2 of the peer exchange, are included here as part of the Day 1 description.

Welcome and Introductions

Mark Sarmiento, FHWA Office of Interstate and Border Planning

Mr. Sarmiento opened the peer exchange by describing the suite of activities FHWA Office of Interstate and Border Planning has supported over the last several years that promote GIS implementation and/or knowledge exchange at and among state DOTs. Some of these activities have been:

- Development of a GIS in Transportation website (www.gis.fhwa.dot.gov), which is home to a searchable database of state DOTs' GIS applications
- Coordination and participation in an executive-level domestic scan of the state of the practice of GIS for transportation decision making, as well as what advancements are expected in the field in the near future³
- Convening of an executive-level workshop to develop an action plan for FHWA's involvement in promoting GIS for improved transportation decision making, a plan from which the GIS for ROW peer exchange originated

To conclude, Mr. Sarmiento presented several graphs illustrating the results from the American Association of State Highway and Transportation Officials' (AASHTO) previous annual surveys on GIS and transportation presented. By describing some of the recent national trends, peer exchange participants were given an opportunity to understand where the GIS for ROW discussion falls into the broader context of GIS implementation across the current transportation enterprise. Peer exchange participants were encouraged to submit GIS for ROW papers to be considered for inclusion in next year's – and future years' – GIS-T Symposium.

Comments, Questions, and Answers

- Comment: It is increasingly difficult to quantify what the benefits of GIS to State DOTs are because geospatial applications are becoming integrated into a wide array of DOTs' decision making. Additionally, the intangibles that having a robust GIS produces, such as adding to a DOTs intellectual capital, is hard to measure.

Overview of NCHRP Project 8-55

Kitty Hancock, Virginia Tech University

Ms. Hancock discussed her work and involvement with the NCHRP Project 8-55, which began three years ago. The project has been divided into two phases. The objectives of the phase 1 research, which is now complete, were to (1) identify the data elements that need to be included in a data model for a ROW information system that includes a geospatial component and (2) provide examples, if possible, of return on investment when geospatial capabilities are added to such systems. Phase 1 products include a literature review, an annotated bibliography, available vendor sources for GIS for ROW, and case studies for:

- Illinois DOT: South Suburban Airport Project

³ The final report for the Executive Scan is available at www.gis.fhwa.dot.gov/execscan.asp.

- Maryland DOT: MdProperty View
- New Mexico DOT: Non-Right of Way Parcel and Improvement Inventory
- Pennsylvania DOT: ROW Application
- Texas DOT: Main Street Texas, and
- Virginia/Minnesota DOTs: RUMS/REALMS

The final report⁴ also includes a discussion on how the case studies relate to developing a fully integrated ROW data management system, as well as challenges faced in implementing them.

NCHRP Project 8-55 A – Phase 2

The purposes of the phase 2 research, which focuses on the appraisal, acquisition, relocation, and property management aspects of ROW, are to create a logical model describing how and where ROW activities at state DOTs can be geospatially enabled, as well as to demonstrate where there are opportunities for various enterprise systems within DOTs to be integrated with geospatially enabled ROW systems.

Having determined a second phase of this research is practical, the NCHRP panel has approved moving forward with the following eight tasks:

- Update literature review from Phase 1
- Outline logical model of ROW process and opportunities for geospatial enablement
- Create logical model
- Develop test plan
- Draft three case studies that will include guidance and information on the costs and benefits of implementing the ROW GIS system
- Draft work plan for implementing the logical model and creating budgets/requesting bids
- Create executive summaries that demonstrate the usefulness and validity of the logical model
- Produce final report

Developing the logical model is a complex task because:

- ROW deals with state laws (e.g. eminent domain and taxation authority). It is difficult to capture the variety of state laws in one tool.
- State DOTs are organized differently. There is great variability in office names, titles for ROW managers and staff, and classifications of where ROW is located in the organization.
- There is variability across states in physical ROW characteristics such as urban vs. rural, federal land vs. private land, and history of parcel ownership.
- Although state DOTs are moving towards a service-oriented information technology architecture that does not require staff to move data to a central location, they have varying abilities to adapt with the quick changing technology.

Comments, Questions, and Answers

- Question: In the context of Phase 2 of NCHRP Project 8-55, what is meant by “geospatial enablement”?
Answer: In the proposed flowchart, it is assumed that ROW is not a geospatial activity per se. Instead the flowchart outlines the entire ROW process and suggests where it makes sense to add a geospatial component(s) and how that might be done.
- Question: Will the tool that is being developed as part of NCHRP Project 8-55 Phase 2 assist in task planning (e.g. so tasks can be completed concurrently instead of sequentially)?
Answer: In the system that is currently being developed, a scheduling feature is not being added. However, users would be able to specify tasks that must be sequential. It is

⁴ Appendices for NCHRP Project 8-55 are available at http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_w95.pdf.

foreseeable that future iterations of the system could include features such as resource allocation and management, scheduling, and status tracking.

One example to consider is Virginia DOT's (VDOT) Right of Way and Utilities Management System (RUMS): www.virginiadot.org/business/row-rums.asp. A bonus of having a central system is that all staff can have quick access to information that various offices have worked to update. Where appropriate, some information in the system can be made available to the public (e.g. purchases, condemned properties, etc.)

- Question: Will the final product of NCHRP Project 8-55 Phase 2 be an AASHTOWare⁵ product or simply a report?
Answer: The product will be a report and an Enterprise Architect Project (.EAP) file. The idea of the work was to produce something that every state could use as a reference or a basis on which to build needed functionality. The final Phase II product will be a template that states will use to develop coding to meet their specific needs.

State DOT Roundtable

All Participants

Kathy Facer (FHWA Office of Real Estate Services), facilitated

In order to introduce participants to each other as well as to give an overview of their respective DOT's GIS for ROW activities, a brief roundtable discussion was held. Using a questionnaire distributed in advance of the peer exchange to guide the discussion, participants broadly outlined what interested them about the planned peer exchange agenda topics and how their own DOT's experience related and could contribute to the dialogue. Since the information put forward during the roundtable was a snapshot of the more detailed demonstration and/or presentation each state gave later, the roundtable descriptions of participants' GIS for ROW activities have been folded into the summaries in the section below.

Demonstrations and Presentations

All Participants

Kansas DOT

Nancy Mattson

Kansas DOT (KDOT) participated in the peer exchange for the first half of Day 1. No formal demonstration or presentation was given. During the roundtable discussion, it was noted that KDOT is at the early stages of looking into how GIS applications can assist with ROW activities; it is currently geospatially enabling data on salvage yards and outdoor advertising boards.

A lesson DOT has learned is that a state-level strategic plan for GIS is vital to the development of a successful, statewide GIS. In line with this, KDOT's geospatial efforts have extended beyond the DOT, with coordination and partnering with other state agencies, local governments, and private sector occurring frequently. Executive buy-in through the Kansas Collaborative – a joint effort between the State of Kansas, the Kansas Association of Counties, and the League of Kansas Municipalities that formalizes collaboration between local and state government – has made strides in GIS education and outreach.

Missouri DOT

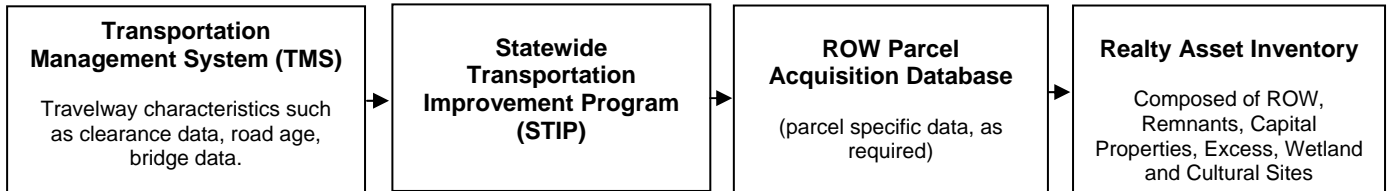
All Missouri DOT Participants

Missouri DOT (MoDOT) demonstrated its Realty Asset Inventory Management System (RAI), which was developed by a consultant and became operational on July 1, 2007. The system is a

⁵ AASHTOWare is software jointly developed by transportation agencies to address commonly perceived needs and problems. The AASHTOWare website is www.aashtoware.org/?siteid=28.

statewide, computerized, relational database (data are stored in Oracle 10G) that allows staff to identify all the DOT's realty assets and assists in identifying properties that are no longer needed for highway purposes. It also houses documentation on all sales, leases, and excess properties, as well as references to other realty of interest, such as environmental, cultural, historical, and wetland mitigation sites.

The following flowchart describes the stream of information entering into the RAI:



Before the RAI, MoDOT kept acquisition records in a database. Historically, fields were not populated with great frequency because the system was not data-entry friendly. Auditors recommended that MoDOT staff be able to quickly know what the inventory is. In response, the RAI was developed, and now once parcels are acquired they flow in the RAI. Using the system, staffs are able to quickly search by parcel ID or by county, as well as update information specific to each parcel. This helps to mitigate latency and data integrity issues while streamlining data entry and reporting.

Other important features of the RAI include the ability:

- To accept GPS coordinates entered into a "location description" field. ROW staff do not have to gather log mile data, because the system does this automatically
- To pull cost data from the financial management system
- To have parcel records updated to include information on floodplains, hydrography, soil, adjoining zoning type, and various media files (e.g. videos, aerial imagery, and other images), etc. Users can also upload documents such as appraisals, plans, and deeds. Where there are conflicts of interest and/or controversy, text can be added to describe the issues.
- To send automatic emails to notify when leases will expire and when transactions are complete
- To quickly access and sort additional information such as payment frequency, proof of insurance type, insurance expiration date, and/or amount of ROW in the area.

Future of the RAI

In order to bring staff up to speed on how to use the system MoDOT plans to train two staff members from each district. Training sessions are planned to be three days long with half of the first day focused primarily on the TMS.

MoDOT also has plans to create a Google application programming interface (API) of the RAI to give users the look and feel they have grown accustomed to and expect.

Comments, Questions, and Answers

- Question: Is there an outward facing component of the Realty Asset Management System?
Answer: Portions of the system have been made available.
- Question: Are the files that the Automatic Road Analyzer (ARAN) van captures stored in Oracle?
Answer: The files are stored on another server, not in the Oracle database. MoDOT has recently completed converting some of the large ARAN files to high definition, 120-degree field of view images. Cost and storage space are limiting 360-degree field of view images.

Illinois DOT

Terry Tappenbeck, Illinois DOT, and Dave Schinneer and Christina Pearce, Hanson Professional Services Inc

In 1998, IDOT prepared an engineering study and Airport Layout Plan (ALP) for the construction and operation of a commercial service airport at the South Suburban Airport site in Will County, Illinois. The purpose and need for the airport, as stated in its Tier 2 Environmental Impact (EIS), is “to satisfy the need to provide airport facilities to meet the existing and anticipated demands for air carrier, air cargo and general aviation use within the south suburban area of the greater Chicago region.”

Since the project covers an area requiring the acquisition of many parcels (122 parcels are in inaugural area, with approximately 2000 for the entire site), Illinois DOT (IDOT) wanted to create a geospatially enabled information management system to assist in managing the ROW process. The outcome was the Aeronautical Land Acquisition System (ALAS). Participating remotely via tele- and web-conference, Mr. Tappenbeck, Mr. Schinneer, and Ms. Pearce discussed some of ALAS’ functionality and features.

One important feature of the web-based system, which allows for the input of a variety of parcel attributes, is its “electronic file cabinet.” The cabinet allows users to scan and link documents to related parcels, then print and/or email them as necessary. Currently, there are over 800 fields available to store information for each parcel, and the number of documents that can be linked is unlimited. Because the system interfaces graphical and non-graphical data, ALAS allows for the quick searching of parcel documents via a map viewer. Users can also check to view where parcels have been acquired or where there has been no activity.

ALAS gives users flexibility in making reports necessary for effective project management. Customized parcel-specific and/or reports by function (such as maintenance expense) across an entire project, including financial cost data and notification of parcel acquisition, can be quickly created then emailed to appropriate staff.

A public version of the system that offers access to a subset of the information available to IDOT staff can be found at www.southsuburbanairport.com/la-welcome.htm.

Comments, Questions, and Answers

- Question: Does the system capture and document communications with land owners?
Answer: Users could attach signed negotiators’ reports and/or relocation reports to a project.
- Question: Is ROW financial data (e.g. maintenance expenses) gathered centrally?
Answer: ROW financial data is gathered in the field and then delivered to Illinois DOT Headquarters. It is approved locally, then paid and recorded centrally.
- Question: Is Illinois DOT using the ROW application for anything other than planning for the airport project?
Answer: It is being used for other aeronautics projects. The system is beginning to be piloted for highway projects.
- Question: What is the estimated amount of full time staff required to entire the entire ROW program into the system?
Answer: Assuming that Illinois DOT wants and needs the same information for highways as it does for aeronautics activities, it is estimated that two full time employees are required.

Minnesota DOT

Jay Krafthefer and Kevin Leonard

In the early 2000s, Minnesota DOT (Mn/DOT) recognized the need to develop a GIS-based system to maintain and track ROW functions. At the time, there was some inconsistency in how Mn/DOT's eight districts were each performing ROW business functions. This need was not only the result of a large and expanding program but also the recognition that agency downsizing and staff retirements would result in the loss of significant institutional memory⁶. In 2003, Mn/DOT purchased a software product used by VDOT, the Right-of-Way and Utilities Management System (RUMS), and modified it to meet their own needs. The system, called REALMS – the **R**ight of Way **E**lectronic **A**cquisition **L**and **M**anagement **S**ystem, was developed over two years at a cost of approximately \$2 million (VDOT built RUMS for \$4 million over 4 years). The first phase of REALMS, which was implemented in August 2005, allows users to quickly access and search right of way information, and then customize and generate reports.

Mn/DOT's Right of Way Mapping and Monitoring (RWMM) service, a system designed to support communication of spatial ROW information was designed, built and tested in ArcIMS environments, and resulted in an enterprise ArcIMS web interface template – and included an enterprise spatial data warehouse (SDW). The system links the DOT's ROW maps to corresponding map project management data in REALMS, providing staff a single, real-time source for all ROW maps and their status information. Future plans include expanding the GIS capability based on these developments.

In Phase II, MnDOT enhanced the system by creating a single user map interface that allows users to query CAD and raster data, as well as overlay raster data on satellite images of property data. Key deliverables for Phase II included:

- Development of a textual query tool
- The ability to view a ROW map in a separate window
- The ability to print to scale
- A fully populated SDW with ROW spatial data (18,000 geo-referenced raster images, 200+ CAD files)

A challenge has been that county-level mapping data that is collected for tax purposes is not typically at the level of detail required for Mn/DOT's purposes.

For the public, Mn/DOT built on REALMS to provide an Internet-based REALMS Maps application⁷. The system allows users to locate specific maps that are part of the State's mapping records. A mark-up feature allows drawing on the maps to illustrate current features or proposed modifications.

Comments, Questions, and Answers

- Question: How did Mn/DOT learn about VDOT's (VDOT) system?
Answer: Staff at Mn/DOT worked with AASHTO to scan the country for applications like that which it wanted to develop. VDOT had published some magazine articles describing their system and announcing that it would be willing to share the system for a fee. After closer investigation, VDOT's system had functionality closely matching Minnesota DOT's needs.

⁶ FHWA Domestic Scan Program: Best Practices in Right-of-Way Acquisition and Utilities Relocation: www.fhwa.dot.gov/REALESTATE/scans/bprowscan.htm

⁷ REALMS Maps: http://dotapp3.dot.state.mn.us/cyberdocs_quest/Libraries/Default_Library/Groups/GUESTS/frameset.asp

Mn/DOT's Interactive Basemap, see: www.dot.state.mn.us/maps/gisweb/

Mn/DOT ROW Mapping & Monitoring: <http://www.dot.state.mn.us/maps/gisweb/row/>

Mn/DOT Office of Land Management: <http://www.olmweb.dot.state.mn.us/>

Mn/DO Geodetics: <http://www.olmweb.dot.state.mn.us/geodetic/home.html>

Minnesota Statewide Parcel Map Inventory: <http://www.lmic.state.mn.us/chouse/SPMI/Reporting/>

- Question: Did MoDOT or Mn/DOT use State Research and Planning (SPR) funds for developing their systems?
Answer: Yes, both did. Ohio DOT also uses this funding source. Real estate acquisition could be considered a planning activity and is, thus, eligible for SPR funding.
- Question: Did Oregon DOT cut its long, linen map scrolls in order to scan them?
Answer: Photos of the scrolls were taken with a 35 mm camera and were then scanned. The DOT now wants to rescan the photos at 400 dpi. A challenge will be updating the raster imagery for photos that have stamped-in edits to them.

Ohio DOT

Dave Blackstone and David Seasley

Mr. Blackstone and Mr. Seasley discussed the current status of Ohio DOT's geospatial and parcel data as it relates to its processes for acquiring ROW. Historically, Ohio DOT's GIS activities have not focused on ROW. Some of the obstacles limiting GIS for ROW have included a lack of parcel data sets for the entire state, difficulty in determining how to add parcel data into the existing GIS, and a lack of training for survey teams on some technologies such as GPS.

Although Ohio DOT is not doing much with GIS in the ROW area yet, there are a couple activities related to both that Ohio DOT is pursuing. First, a consultant is currently developing a system for Ohio DOT to help staff prepare title reports. At its initial delivery (anticipated October 2007), the system will not be geospatially enabled, but future enhancements are possible. Second, Ohio DOT, in coordination with other state and local agencies in Ohio, has pooled funding to support Ohio's Statewide Imagery Program (OSIP). By the end of 2007, the OSIP will have produced 1-foot, color, orthorectified imagery for the entire state, which Ohio DOT will use to update the road network. During imagery acquisition, counties were given the opportunity to request 6-inch data, in addition to the 1-foot data available for free; counties were only asked to pay the difference in cost between the two. Twenty-two of 88 counties opted to fund acquisition of the 6-inch imagery. The cost to fly then entire state cost approximately \$5 million.

Oregon DOT

Darlene Gowen and Mike Stone

Ms. Gowen and Mr. Stone gave a brief presentation on the GIS interface Oregon DOT uses for accessing property files.

Oregon DOT currently stores ROW document content in FileNet, an Internet-based Enterprise Content Management (ECM) suite of tools; it is several SQL database with a Web front-end. For the technically oriented, the metadata is stored in a SQL database and content is stored in a file store. Currently, the Department uses 2 legacy systems that are Access front end user interfaces that interact with a single SQL database for workflow activities. Oregon DOT is working to replace the legacy systems and use the FileNet ECM system, which is envisioned to include Business Process Management, eForms functionality, Records Management and Email Management, along with traditional ECM content management such as check in/check out and versioning. As part of these enhancements, all of Oregon DOT's parcel maps were scanned and georeferenced and data regarding each parcel (township/range/section) data is being captured by the placement of centriods. Users will be able to select both maps and parcel files directly by using an enhanced GIS presentation tool.

A challenge has been identifying a consistent level of geography for the state's parcel data. For example, some of the parcel maps were at the milepost level, while others were at the culvert number or parcel level. Oregon DOT is currently working to develop a way to reconcile these data.

Oregon DOT captures ROW files by scanning them and putting them into the FileNet enterprise content management system. Thought it would be cool to offer these data via a GIS interface. Now georeferencing the scanned parcel maps. By the end of the year, the GIS interface will show footprints and centriods of every parcel the DOT owns.

Comments, Questions, and Answers

- Question: How did Oregon DOT capture non-DOT parcel data?
Answer: Oregon DOT has captured all parcels the DOT has purchased, and now there is a database with a lot of data, which has not all been processed. The DOT does not have parcel data for parcels the DOT has not bought. However, the 1999 Oregon Legislature provided funding for the Oregon Map (ORMAP)⁸ through a document-recording fee collected by the counties. This money is put into a fund to be used only for the development of the Oregon Map, which will develop be statewide property tax parcel base map that is digital, publicly accessible, and continually maintained.
- Question: Did Oregon DOT cut its long, linen map scrolls in order to scan them?
Answer: Most were scanned as a single file. Some long maps were cut to accommodate the limitations of the scanner. Approximately, 17,000 maps were scanned and only a handful were cut. Some of the maps were scanned from each end so that the entire map is on two images (about 1600) but this did not require cutting. The scanner has a 25-foot limitation, so, the few maps longer than 50 feet required cutting to scan portions of them.
- Question: Does the system display parcel shape or only the centroid?
Answer: Because of the amount of data that Oregon DOT has and sales of parcels, it was not feasible to show the parcel shapes. Going forward, Oregon DOT hopes to pass polygon shapes through for each parcel.

Washington DOT

Shawn Blaesing-Thompson and Gerry Gallinger

Ms. Blaesing-Thompson and Mr. Gallinger briefly discussed the background leading to NCHRP Project 8-55. For several years, WSDOT worked to obtain funding for a feasibility study for adding GIS capabilities to all its computers. During this time period, ROW staff was looking for opportunities to demonstrate to executives why it is important to geospatially enable a ROW system. Ultimately, NCHRP funding was acquired to investigate the need for and a process to move GIS activities into the ROW area. Now moving into its second phase, the NCHRP project aims to set forth a model for how WSDOT meets the requirements of the Uniform Act. Flowcharts are being developed to assist in the thinking about how to go about meeting ROW needs of projects.

Current WSDOT Activities

- Washington DOT's (WSDOT) ROW system, which is currently under development, is expected to be functional by the end of calendar year 2007. It is a server-based system that will eventually be tied to geospatial data. The system, which will be a reporting tool and not a scheduling tool, will be able to track the progress of individual parcels through the ROW process. There is also a proposal to integrate GIS with a real estate module.
- In coordination with Washington Geographic Information Council Framework Management Group, WSDOT sponsors the Washington Transportation Framework. The Framework is a statewide transportation database of location-based transportation data to use in GIS across the state. WA-Trans will contain the best data available from all levels of government including tribal nations. The compiled data will be provided to counties without data for free with agreement that locals will keep data current.

⁸ ORMAP: www.ormap.com/

Challenges WSDOT Faces in the GIS for ROW Area

- Parcel data is not the highest state data priority, but it is often the most requested data at the DOT that cannot be provided.
- WSDOT and the Washington Department of Natural Resources (DNR) entered into partnership to fly aerial imagery every five years. The question to answer now is how to serve out the data to all the other agencies in the state.
- There are discrepancies among counties on the availability, quality, and accessibility of parcel data and/or a GIS.

Comments, Questions, and Answers

- Question: What is “cold fusion?”
Answer: Cold Fusion is a software package that provides a way to easily create Internet applications.

IV. Lessons Learned and Recommendations

On Day 2 of the peer exchange, participants from each state DOT highlighted the lessons they had learned and are learning in their efforts to geospatially enable their respective ROW management systems. These lessons and recommendations are listed below:

- ***Continue to communicate with regions about the benefits of a geospatially enabled ROW system to encourage its use*** – ROW may be behind in the GIS arena because the ROW director and/or staff do not immediately see the value of having a geospatially enabled system.
- ***Consider including a workforce assignment feature to new GIS for ROW applications*** – The ability for a manager to track staff workloads from his/her desktop, as well as to easily communicate work-stream issues related to specific projects is very valuable. This feature would be useful to personnel beyond just that in ROW divisions.
- ***Advocate that geospatial information be viewed as an asset*** – Work to encourage decision makers that geospatial information is integral to all infrastructure decisions the DOT makes, including ROW decisions.
- ***Clearly define what “GIS-equipped” or “geospatially enabled” when outlining work scopes with contractors*** – These terms can mean different things to different companies, which have varying degrees of geospatial expertise.
- ***Determine whether ROW activities in addition to real estate acquisition could be eligible for various funding from various sources, such as FHWA’s SPR funding*** – It is important to be aware of how potential sources of funding can be applied. FHWA’s Guidance on the Use of Planning and Research Funds for Travel and Training is available at www.fhwa.dot.gov/hep/sprt.htm. Information on FHWA’s Pooled Fund Projects is available at <http://maintenance.transportation.org/?siteid=76&pageid=1690>. In addition, FHWA’s Technology Transfer funding may be available for other peer exchange events similar to the one described here.
- ***Avoid using obscure acronyms when trying to convince management of the value of geospatially enabling ROW systems*** – Obscure acronyms such as “GUI” (graphical user interface) and “BLOB” (Binary Large Object) can create confusion among those unfamiliar with the terms. Sometimes funding is directed towards topic areas that people construe as easily understandable.

- ***Stay in contact with the National States Geographic Information Council (NSGIC) you're your state's Statewide GIS Coordinator*** – DOTs sometimes live in their own world, when, in fact, they are each facing similar problems. The NSGIC, Statewide GIS Coordinators, and/or other entities can help provide a unified voice on geographic information and technology issues, including the promotion of prudent geospatial information integration and systems development.
- ***Keep the end product in mind when beginning to design it – Know upfront what the desired end product is*** – If reasons for why a data field(s) is to be included cannot be provide, then leave this field(s) out. All data fields should be “operational fields.” If one of the system requirements is to link parcel data to a GIS, it is then also critical to plan to include the ability to assign a unique number for records entered into the system.
- ***Develop systems that are able to support the accuracy level needs of various business units within an organization*** – Sometimes a single IT solution is sought to solve all of the problems of all the business units within an organization. It is important to keep in mind that different business units need varying degrees of accuracy of data, as well as varying attribute information to support their work. Understand the needs of the entire organization before developing geospatial applications.

Recommendations

- ***Organizers of the annual GIS-T Symposium should consider adding an annual ROW track and/or a ROW CAD track.***
- ***It may be helpful for FHWA to convene a small user group to discuss effective practices for bringing raster data into a CAD environment. This could also be a good NCHRP research topic to propose.***

Appendix A. Participants List

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Appendix B.

GIS for ROW Agenda
August 8–9, 2007
Lee's Summit, Missouri

Tuesday, August 7

Travel Day Coordinate rides from the airport to hotel on the KC Shuttle as flight arrival times allow.

Wednesday, August 8

8:00 Meet in hotel lobby to travel to MoDOT District 4 Conference Room
600 NE Colbern Rd., Lee's Summit, MO 64064

8:30 – 9:00 **Welcome and Introductions**
Mark Sarmiento, FHWA

9:00 – 10:15 **Overview of NCHRP Report**
Kitty Hancock, Virginia Tech

10:15 – 10:30 Break

10:30 – 12:00 **State DOT Roundtable**

12:00 – 1:30 Working Lunch – Presentations from Minnesota DOT and Washington DOT on current status of GIS/ROW activities

1:30 – 4:30 **Demonstrations/Presentations**

1:30 – 2:30 Missouri DOT – *MoDOT staff will present information on their geo-spatially enabled ROW information system and demonstrate actual use of the system.*

2:30 – 3:30 Illinois DOT – *IDOT will present information on how its geospatial ROW information system is set up, how it is used, who has access to data, and how it has helped IDOT project managers.*

3:30 – 4:30 Ohio DOT – *Discuss current status of GIS/Parcel data as it may relate to ROW*
Oregon DOT – *Presentation of GIS interface for accessing property files*

Thursday, August 9

8:00 Meet in hotel lobby to travel to MoDOT District 4

8:30 – 9:15 **Day 1 Discussion Re-cap and Next Steps**
Kitty Hancock, Virginia Tech

9:15 – 10:30 **Roundtable Question and Answer**

10:30 – 11:00 **Peer Exchange Key Points and Wrap-Up**
Mark Sarmiento, FHWA

Adjourn