Final Program

GIS-T

Crossroads in the Heartland

DES MOINES, IOWA ▪ APRIL 19-22, 2015

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

April 19– 22, 2015
Workshops – April 19, 2015
Des Moines, Iowa

Sponsored by:

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS

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guidebook

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Welcome to the twenty-eighth annual GIS-T Symposium – *GIS-T 2015* – which provides a forum for professionals interested in the design and use of Geospatial Information Systems for Transportation. These meetings bring together individuals from education, the private sector, and all levels of government for a full day of workshops on April 19, 2015 and three full days of conference activities on April 20-22, 2015.

Check WWW.GIS-T.ORG for the most current information.

GIS-T 2015 PLANNING COMMITTEE

Eric Abrams Iowa DOT	**Deb Alfonso Michigan DOT**
Bruce Aquila Intergraph	**Dave Blackstone Ohio DOT**
Shawn Blaesing-Thompson Iowa DOT	**Mark Bradford USDOT/RITA/BTS**
Rose Braun Nebraska Dept. of Roads	**Teague Buchanan Georgia DOT**
Van Colebank Tennessee DOT	**Jonathan Croft Vermont Agency of Transportation**
Drew Davis Larimer Country Public Works Division	**Frank DeSendi Pennsylvania DOT**
Eric Fitzsimmons Kansas State University	**Eric Green University of Kentucky**
Sharon Hawkins Arkansas HTD	**Joseph Hausman USDOT/FHWA**
William Holmes Kentucky Transportation Cabinet	**Ian Horn Kentucky Transportation Cabinet**
Kevin Hunt New York State DOT	**Stephanie Magnan Vermont Agency of Transportation**
James Meyer Arizona DOT	**James Mitchell Louisiana DOT**
Mary Beth Pfrang Kansas DOT	**James Ramsey ASSHTO**
Mark Sarmiento USDOT/FHWA	**Ben Williams USDOT/FHWA Resource Center**

Check WWW.GIS-T.ORG for the most current information.

Welcome to the 2015 AASHTO GIS-T Symposium!

Upon Arrival

- Get familiar with the layout of the symposium facility by consulting the diagram in the program.
- Know the nearest emergency exits from the conference center and your hotel room.
- Get the most out of your time. Plan your itinerary by reviewing the scheduled sessions in the program. GIS-T uses Guidebook to aid you. Get GIS-T's Guidebook at: http://m.guidebook.com/guide/16484/ or scan the QR Code to the right.
- Watch for last minute updates to the program. Substitutions or other adjustments will be communicated via the GIS-T Twitter Account: gis_t_symposium. You can also follow GIS-T on Facebook and LinkedIn.

Technology Hall

- Vendor attendance keeps symposium costs low. Please show your support by visiting the technology hall. The hall is open from the Sunday evening reception through noon Wednesday. See program for specific hours.
- Feel free to meet with vendors anytime outside of the scheduled receptions.
- Vendors may sponsor food, beverages, entertainment, or additional hospitality rooms. Restrictions may apply.

Sessions

- Food and beverages are available during breaks.
- **Opening Session and Keynote Speaker** –Presenters may or may not take questions.
- **State Summary** – Results of the State DOT surveys are presented as a technology and current practice benchmark.
- **Roll Call of States**
  - Each state should have a designated presenter. However, if you are the lone representative from your state DOT, you are welcome to speak, even though you are not named on the slide. In fact, you don't even need to address the slide's contents, just introduce yourself and tell us what you are interested in learning about. Please don't be shy! This is how others identify people with similar interests.
  - State DOT's in attendance speak for their slide, but not every State DOT can attend. If nobody is up from your state, but you can give a quick idea of the projects or interests in your state, then come forward. We keep it rolling, so your time to speak is one minute or less.
  - Take the queue from the moderator. We go in alphabetical order starting with the host state.
  - Canadian Provinces, Tribal Representatives, and Federal Agencies are encouraged to do the same after we get through all 50 states.
- **Concurrent Sessions**
  - Each room contains a series of presentations grouped by topic.
  - The presentations are timed to allow you to switch from one room to another. You are encouraged to session hop to the most interesting presentations.
- **Mapping Gallery** - Come vote on the work of your peers at the Mapping Gallery showcase. All votes count. Refreshments are provided.
- **Roll Call Round Tables** –These moderated sessions feature audience discussion on hot topics.

Spouse Tours

- Generally requires advanced registration.
- Open slots during the symposium may be limited, inquire at the registration desk for availability.

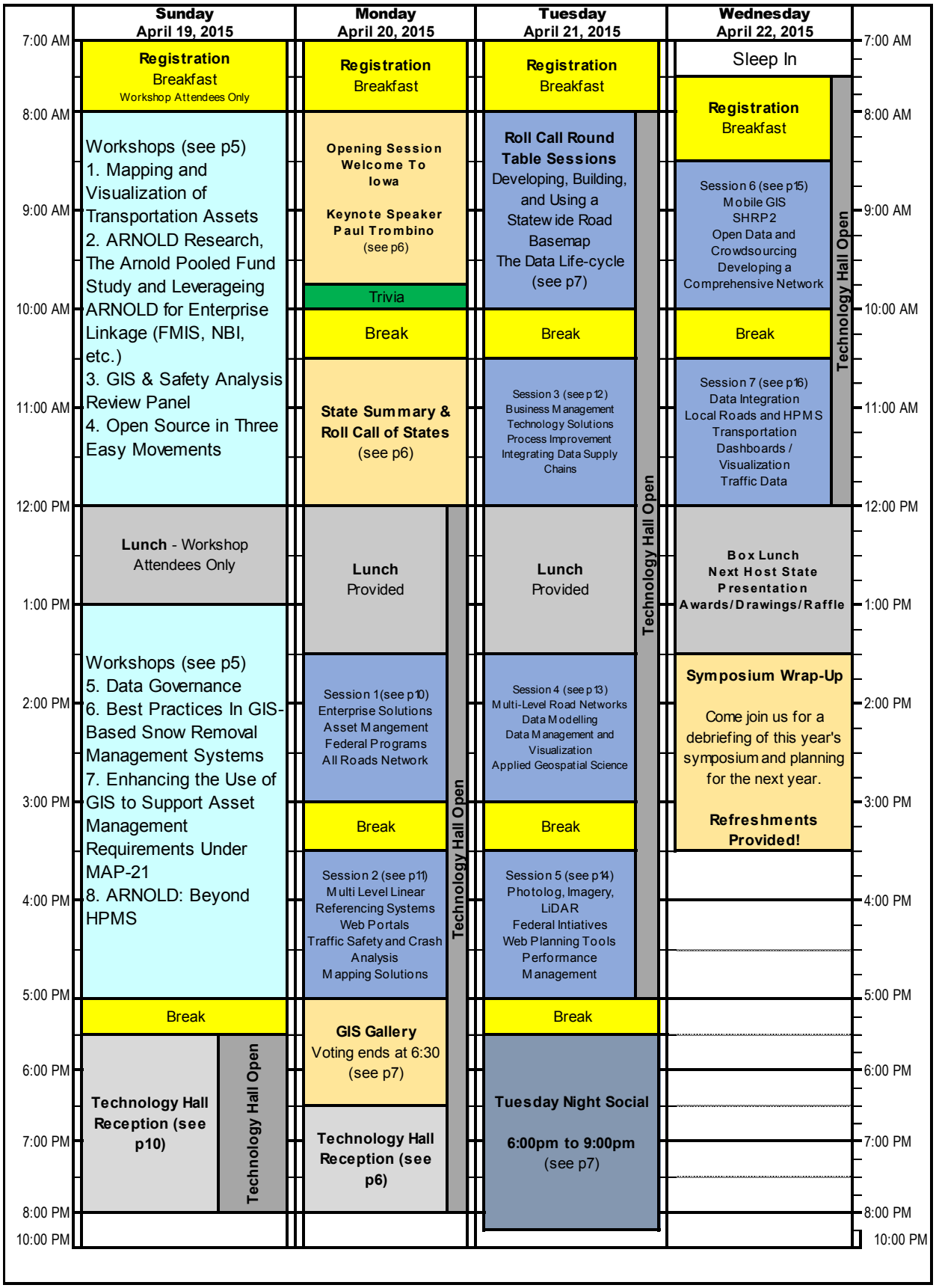
Tuesday Evening Social

- Arrive early to get ground transportation to the Tuesday evening social. Dinner is included.
- Bring a camera. It is a fun and unique experience crafted by the host state.
- Return transportation details will be announced.

Before Departure

- Return your name tag holder to the Registration Desk.
- Complete the surveys in your information packet or come to the **Symposium Wrap-up**.
- We listen to your feedback and plan out the workshops/program for next year using your input. Be heard; let us know where we can improve and what we did right.

General Schedule



GIS-T Workshops – Sunday, April 19

Four tracks for workshops are available at the 2015 GIS-T Symposium. Participants may pick one from the morning and one from the afternoon. Lunch is provided to workshop attendees.

7:00 AM - 8:00 AM		
Workshop Registration / Breakfast (Workshop Attendees Only) Iowa Ballroom		
8:00 AM - 12:00 PM		
Workshop Title	**Presenter**	**Room**
Mapping and Visualization of Transportation Assets	**Connie Gurchiek,** Transcend Spatial Solutions **Brad Adams,** Transcend Spatial Solutions **Stephen A. Ellis,** Langan Engineering	**Salons E**
ARNOLD Research, The Arnold Pooled Fund Study and leveraging ARNOLD for Enterprise Linkages (FMIS, NBI etc.)	**Joe Hausman,** FHWA **Phil Troutman,** FHWA **Max Grogg,** FHWA Iowa Division	**Salon D**
GIS & Safety Analysis Review Panel	**Eric Green,** University of Kentucky **Ted Grossardt,** University of Kentucky **Leverson Boodlal,** KLS Engineering	**Salon F-H**
Open Source in Three Easy Movements	**Michael Terner,** AppGeo **Rich Grady,** AppGeo **Peter Girard,** AppGeo	**Salon A-C**
12:00 PM - 1:00 PM		
Lunch (Workshop Attendees only)		
1:00 PM - 5:00 PM		
Workshop Title	**Presenter**	**Room**
Data Governance	**Zeke Bishop,** Oracle **Denise Hesselroth,** MinnDOT **Eric Abrams,** Iowa DOT	**Salons A-C**
Best Practices In GIS-Based Snow Removal Management Systems	**Simon Lewis,** McMahon **Mark McCart,** Iowa DOT **Frank Desendi,** PennDOT	**Salon F-H**
Enhancing the Use of GIS to Support Asset Management Requirements Under MAP-21	**Frances Harrison,** SpyPond Partners **Ben Williams,** FHWA **James Hall,** University of Illinois, Springfield	**Salon E**
ARNOLD: Beyond HPMS	**Steve Lewis,** BTS **Tom Roff,** FHWA	**Solons D**
BREAKS SCHEDULED FOR 10:00 AM AND 2:30 PM		

Sunday, April 19

TRB ABJ60 Mid-Year Meeting– Standing Committee on Geographic Information Science and Applications

(Sunday 4:30 PM to 5:30 PM)

The scope of this committee includes all aspects of the spatial, locational and temporal data used in transportation. The committee is interested in both research into and applications of this information and its associated information systems, commonly referred to as Geographic Information Systems in Transportation (GIS-T). The committee will provide a focal point for and promote coordination of GIS- T activities within the TRB committee structure. Relevant activities include the application of spatial data and spatial sciences across.

Technology Reception – Technology Exhibits Open

Des Moines Exhibit Hall
(Sunday 5:30 PM to 8:00 PM)
(Monday 6:30 PM to 8:00 PM)

The Technology Hall opens on Sunday evening at 5:30 pm with a reception for all Symposium attendees and guests. On Monday, Symposium participants are welcome to attend another reception starting at 6:30 pm. The Technology Hall will open at 12:00 noon and close at 8:00 pm on Monday. On Tuesday, it will be open from 7:00 am to 5:00 pm. On Wednesday, the Technology Hall will open at 7:30 am and end at noon. Participants are encouraged to visit with industry specialists to discuss solutions available in today's consulting community.

GENERAL SESSIONS

Monday, April 20

Opening Session / Keynote Speaker

Iowa Ballroom
(Monday 8:00 AM to 10:00 AM)

Paul Trombino was appointed director of the Iowa Department of Transportation May 9, 2011, and confirmed by the Iowa Senate June 28, 2011. Prior to this position, Mr. Trombino worked at the Wisconsin Department of Transportation (WisDOT) for 17 years. At WisDOT he held several positions, serving as director of the bureau of transit, local roads, rails and harbors; regional operations director of the highway division; director of the statewide structures; and manager of highway bid lettings. Before coming to WisDOT, Mr. Trombino spent four years in the finance and banking industry in Chicago and Washington, D.C. He holds a Bachelor of Science degree in Civil Engineering from the University of Wisconsin-Milwaukee and Bachelor of Science degree in Economics from the University of Wisconsin-Madison. He is a licensed professional engineer in the states of Iowa and Wisconsin.

Transportation agencies collect manage and maintain data on hundreds if not thousands of assets. Sometimes these agencies are stuck in old business practices and philosophies that hinder innovation and openness of information. Paul will provide an overview on how Iowa Department of Transportation is changing to become smarter, simpler and customer driven. This change has many moving parts from strategic planning to staff leadership to risk taking. To be smarter, simpler and customer driven we all need to embrace not only data, but big data to drive better decisions.

STATE SUMMARY AND ROLL CALL OF STATES

Iowa Ballroom
(Monday 10:30 AM to 12:00 noon)

Summary results from a detailed survey sent to GIS representatives in each state will be presented. The Roll Call of States also features one representative from each country, state, province, or local agency briefly describing the status of their GIS implementations and the challenges that they face. Additionally, the Roll Call offers a time for attendees to put a face with a name and to make plans for continuing discussions with their peers.

GIS GALLERY

Hall of Cities Ballroom
(Monday 5:00 PM to 6:30 PM)

GIS-T 2015 invites registered attendees to participate in the GIS-T Mapping Gallery. In this showcase attendees will be able to display the creative ways they have found to communicate their work through Web applications, GIS generated mapping and poster products. This is an opportunity to share techniques and applications with peers in the transportation GIS community. Come and see how states are using GIS to advance their work. A panel of judges will evaluate each map and mapping application; awards will be presented during the Wednesday Box Lunch. Awards for the maps displayed will be given in the categories of: Transportation Publication, Information Usage, Public Presentation, and Effective Cartography. Winners in the Savvy Web Mapping category will also receive awards. This year presenters are also asked to submit a PDF of their map or poster.

Tuesday April 21

Roll Call Round Table Discussion Session

(Tuesday 8:00 AM to 10:00 AM)
TWO CONCURRENT SESSIONS

The following discussion themes were chosen by the GIS-T Planning Committee based on a review of topics submitted by symposium participants for the 2015 Roll Call of States: Symposium participants are encouraged to participate in the discussions, bring their issues, and share their experiences.

Data Governance Roundtable: "Data Governance – It's Not Just Your Data Anymore!"

Moderator: James Hall PhD, University of Illinois
Salon A-D

The increasing demands by a wide spectrum of internal and external interest, for access and to transportation agency data and geospatial information has heightened the need for effective data governance practices in DOTs. Data governance is defined as the execution and enforcement of authority over the management of data assets and the performance of data functions. Data Governance institutionalizes and assigns responsibilities around traditional data management practices focusing on data collection, storage, security, data inventory, analysis, quality control, reporting, and visualization. Data Governance also involves administering spatial-related data from a strategic perspective. This Roundtable will provide the opportunity for spatial data collectors, users, managers and agency leaders and to discuss general principles of effective data governance, spatial data governance issues, and the challenges to implement in transportation agencies.

Data Sharing and Open Data Roundtable:
"Data Sharing - Are We Opening Pandora's Box?
Moderator: John Farley, NCDOT
Salon E-H

GIS professionals have a long history of sharing data. Geospatial analysis and mapping often requires data from disparate sources. GIS is a perfect technology to deal with this. However, finding and accessing data are often difficult tasks, even within a single DOT. GIS technology and service oriented architectures (SOA) have made the ability share data much simpler. But technology is not the only road block. This Roundtable will explore the issues related to data sharing, best practices, and what "Open Data" really means.

STUDENT PAPER PRESENTATION

(Monday 3:30 PM)

Katie O'Sullivan, a Masters student in the transportation track of SUNY Albany's Urban and Regional Planning program is this year's student paper awardee. Come and see Katie present her paper Monday April 20th at 3:30 in session 2.4.3. See page 28 for more details on her talk.

TUESDAY NIGHT SOCIAL

A Night at the Museum

(Tuesday 6:00 PM to 9:00 PM)

Dine at the Science Center of Iowa. Socialize with new GIS fans, vendors, and cohorts. Have hors d' oeuvres and adult beverages while mingling. Enjoy the music with a DJ and the live acoustic sounds of local artist Danny Grause. There are plenty of options for entertainment at the Star Theater or use augmented reality and interactive games.

A guided walk to the museum: Meet in the hotel lobby starting at 5:30pm.

WEDNESDAY LUNCH

Iowa Ballroom

(12 – 1:30 PM)

A boxed lunch is provided for presentation of awards, next host state presentation, and drawings for prizes.

SYMPOSIUM WRAP-UP AND DEBRIEF

Iowa Ballroom

(1:30 – 3 PM)

Come join us for a debriefing of this year's conference and preliminary planning for next year.
Refreshments provided.

GUEST TOURS

Monday, April 20th –
(8:00 AM to 3:30 PM)

Salisbury House Tour - http://salisburyhouse.org/
Botanical Center Visit - http://www.dmbotanicalgarden.com/
Jasper Winery Tasting Room - http://www.jasperwinery.com/

Tuesday, April 21st –
(9:30 AM to 3:30 PM)

D Line tour to:
World Food Prize Tour - http://www.worldfoodprize.org/
State Historical Museum - http://www.iowahistory.org/museum/
East Village for Shopping

Wednesday, April 22nd –
(9:30 AM to 11:00 AM)

Iowa Capital Tour - https://www.legis.iowa.gov/resources/tourCapitol

CONCURRENT SESSION 1

1:30PM MONDAY, April 20

1.1	**Enterprise Solutions**		**Salons A-C**
	Moderator: Sarah Wray – North Carolina Department of Transportation		
1.1.1	Oklahoma Transportation Asset Browser(OK TAB)	Jeremy Planteen Oklahoma Department of Transportation Oklahoma City, Oklahoma	Bruce Aquilla Intergraph Corporation Huntsville, AL
1.1.2	ODOT's Enterprise GIS Framework for the Web	Brian R. Sovik, PMP, GISP Data Transfer Solutions, LLC. Orlando, Florida	David Blackstone Ohio Department of Transportation Columbus, Ohio
1.1.3	ESRI Roads and Highways Implementation at WVDOT	Emiko Hori West Virginia Department of Transportation Charleston, West Virginia	
1.2	**Asset Management**		**Salon D**
	Moderator: Connie Gurchiek – Transcend Spatial Solutions		
1.2.1	DCSign: GIS Inventory and Analysis of Traffic Signs	James K. Graham DC Department of Transportation Washington, DC	John Hudler Transcend Spatial Solutions Sarasota, FL
1.2.2 GS-T	Secondary Roads Leveraging Enterprise GIS	Brad Ketels Linn County Secondary Road Department Marion, IA	Matt Boyle Linn County Cedar Rapids, IA
1.2.3	LRS maintenance and Asset Management Systems	Phil Hardy AgileAssets San Clemente, CA	
1.3	**Federal Programs**		**Salon E**
	Moderator: Sharon Hawkins – Arkansas Highway Department		
1.3.1	Latest Developments in the National Transportation Atlas Database and Future Direction	Mark Bradford USDOT/BTS (Bureau of Transportation Statistics) Washington, DC	
1.3.2	The 3D Elevation Program	Jim Langtry U.S. Geological Survey Lincoln, Nebraska	
1.3.3	Mississippi DOT's Approach to FMIS Modernization	Mike Cresap Mississippi Department of Transportation Jackson, MS	Bruce Aquila Intergraph Corporation Huntsville, AL
1.4	**All Roads Network**		**Salon F-H**
	Moderator: Richard Grady – Applied Geographics		
1.4.1	Show me your assets! Transitioning to a geo-spatial LRS	Aja Davidson Texas Dept. of Transportation Austin, TX	
1.4.2	Moving beyond Linear Reference Systems	Tom Roff FHWA Washington, DC	
1.4.3	Building an All-Roads LRS Network for Alaska	Bruce Spear, Ph.D. Cambridge Systematics Cambridge, MA	Kerry Kirkpatrick Alaska DOT&PF Juneau, AK

The GS-T symbol indicates a session from Iowa, the Host State.

CONCURRENT SESSION 2

3:30PM MONDAY, April 20

2.1	**Multi-Level Linear Referencing Systems**		**Salons A-C**
	Moderator: Nate Reck - Geodecisions		
2.1.1	Implementing an Authoritative LRS: The ALDOT Experience	J.D. D'Arville Alabama Department of Transportation Montgomery, Alabama	Troy Marsh PMG Software Professionals Marietta, Georgia
2.1.2	Implementing the Roadway Information Management System (RIMS): An enterprise LRS upgrade marathon	David Blackstone Ohio Department of Transportation Columbus, Ohio	Bryan Kelley Transcend Spatial Solutions Sarasota, Florida
2.1.3	ADOT's New LRS - Roads and Highways	Patrick Whiteford, GISP Arizona Department of Transportation Phoenix, Arizona	Mark Flahan Arizona Department of Transportation Phoenix, Arizona
2.2	**Web Portals**		**Salon D**
	Moderator: John Wisdom – CDM Smith		
2.2.1	CPMS Portal – ALDOT's Web-based Project Mapping Integration Tool	Joe Lambrix Atkins Atlanta, GA	Ronan Flannery Alabama DOT Montgomery, Alabama
2.2.2	Leveraging ArcGIS Online to federate and organize disparate government ArcGIS Online implementations	Ray de Leon JMT Technology Group Washington, DC	Jay Mukherjee Maryland-National Capital Park and Planning Commission Silver Spring, MD
2.2.3 GS-T	Iowa DOT portals leveraging COTS	Eric Abrams Iowa Department of Transportation Ames, IA	Derek Peck Iowa Department of Transportation Ames, IA
2.3	**Traffic Safety and Crash Analysis**		**Salon E**
	Moderator: Patrick Broussard – PMG Software		
2.3.1	Analyzing State and Local Safety Data Using AASHTOWare Safety Analyst™	Doug Argall, GISP, OCA GeoDecisions Camp Hill, PA	
2.3.2	GIS-Based Evaluation of Crash Reductions for Selective Law Enforcement Campaigns	Jenna Simandl The University of Alabama Tuscaloosa, AL	Andrew Graettinger, Ph.D. The University of Alabama Tuscaloosa, AL
2.3.3	Wisconsin Statewide Crash Mapping Automation Enhancements	Steven T. Parker Univ. of Wisconsin-Madison TOPS Lab Madison, WI	
2.4	**Mapping Solutions**		**Salon F-H**
	Moderator: Brad Adams – Transcend Spatial Solutions		
2.4.1	Leveraging Python to Revolutionize the Production of the Vermont Town Highway Maps	Johnathan Croft Vermont Agency of Transportation Montpelier, VT	Michael Trunzo Vermont Agency of Transportation Montpelier, VT
2.4.2 GS-T	A GIS Tour of Des Moines	Anna Whipple, GISP City of Des Moines Des Moines, IA	
2.4.3	Mapping Bike Share Trips: A Spatial Approach to Evaluating Supply and Demand for On-Street Bicycle Facilities in New York City	Katie O'Sullivan University at Albany, SUNY Albany, NY	

The GS-T symbol indicates a session from Iowa, the Host State. The symbol indicates Student Presentation.

CONCURRENT SESSION 3

10:30AM TUESDAY, April 21

3.1	**Business Management**		**Salons A-C**
	Moderator: Bruce Aquila – Intergraph Corporation		
3.1.1	Smarter Work Zones – Leveraging GIS-T Tools to Meet FHWA Goals	W.D. Baldwin, PE HDR Bellevue, WA	Todd Peterson, PE, PTOE USDOT Federal Highway Administration Washington, DC, DC
3.1.2	Making GIS the Keystone of PennDOT's Maintenance Operations	Matthew Long PennDOT Harrisburg, PA	Nate Reck GeoDecisions Camp Hill, PA
3.1.3	Managing Road Dedications at South Carolina DOT	Donny McElveen South Carolina DOT Columbia, South Carolina	Mitch Stephens PMG Software Professionals Cumming, GA
3.2	**Technology Solutions**		**Salon D**
	Moderator: Richard Paddock – Traffic Safety Analysis, Systems & Services, Inc.		
3.2.1	Snowplows & AVL (Year 4)	Eric Abrams Iowa DOT Ames, IA	
3.2.2	Development of Railroad Highway Grade Crossing Closure Rating Formula: Database Creation	Zachary Hans INTRANS - Iowa State University Ames, IA	Patrick Johnson INTRANS – Iowa State University Ames, IA
3.2.3	Mapping Safer Routes to School: An Ohio Collaboration Success Story from Toledo, Columbus, and Akron School Districts	Douglas Lynch TranSystems Cincinnati, OH	
3.3	**Process Improvement**		**Salon E**
	Moderator: Frank DeSendi – Pennsylvania Department of Transportation		
3.3.1	Spatially Enabling the STIP at South Carolina DOT	Mitch Stephens PMG Software Professionals Cumming, GA	
3.3.2	Innovative use of GIS for Utility Permitting	Madduri Raghunath Delasoft, Inc. New Castle, DE	Don Burris Delasoft, Inc. New Castle, DE
3.3.3	When Scale Matters: The Re-Design and Deployment of the DriveTexas Website	Michael Terner Applied Geographics, Inc. Boston, MA	
3.4	**Integrating Data Supply Chains**		**Salon F-H**
	Moderator: Jonathan Croft – Vermont Agency of Transportation		
3.4.1	TxDOT Local Streets and the ARNOLD Initiative	Jenn Sylvester TxDOT Austin, TX	
3.4.2	Using Open Data in a GIS-Based Web Portal for Crash Mapping GIS	Brittany Shake The University of Alabama Tuscaloosa, Alabama	Randy Smith, Ph.D. The University of Alabama Tuscaloosa, Alabama
3.4.3	Local Centerline Evaluation with LRS Data Reviewer	Ryan Blum Works Consulting LLC Gilbert, AZ	Joe Breyer Works Consulting LLC Gilbert, AZ

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CONCURRENT SESSION 4

1:30PM TUESDAY, April 21

4.1	**Multi-Level Road Networks**		**Salons A-C**
	Moderator: Tom Saltzer - Geodecisions		
4.1.1	(WisDOT) (ARNOLD): Enhancing the Spatial Resolution with an Active Linear Referencing System (LRS)	Mark Simpson The University of Alabama Tuscaloosa, AL	
4.1.2	New Jersey's Enhanced Road Centerline Data Model	Kenneth Contrisciane Michael Baker International Hamilton, NJ	
4.1.3	NCDOT Roads and Highways RoadMap	Tim Sheldon Timmons Group Richmond, VA	John Farley NCDOT Raleigh, NC
4.2	**Data Modeling**		**Salon D**
	Moderator: Sarah Kepchar – PMG Software		
4.2.1	Overview of the Second Generation of Iowa Statewide Traffic Analysis Model (iTRAM)	Eric Wilke Iowa Department of Transportation Ames, Iowa	Jeff von Brown Iowa Department of Transportation Ames, Iowa
4.2.2	Developing interactive mapping for supporting county roads improvement and transportation planning	EunSu Lee, GISP Upper Great Plains Transportation Institute Fargo, ND	Bradley Wentz Fargo, ND
4.2.3	Developing Travel Shed TAZ Using ArcGIS	Erich Rentz RSG Salt Lake City, UT	
4.3	**Data Management and Visualization**		**Salon E**
	Moderator: Jesse Jay – Transcend Spatial Solutions		
4.3.1	Tennessee Department of Transportation's Straight Line Diagram Application	Brian Terrell Tennessee Department of Transportation Nashville, Tennessee	Bruce Aquilla Intergraph Corporation Huntsville, AL
4.3.2	New Jersey Department of Transportation Pedestrian Safety Analysis Tool	Justin Furch, MCTS Michael Baker International Hamilton, NJ	
4.3.3	CTPP Crash Course - Emphasis on new mapping capabilities	Phil Mescher Iowa DOT Ames, IA	
4.4	**Applied Geospatial Science**		**Salon F-H**
	Moderator: Mary Beth Pfrang – Kansas Department of Transportation		
4.4.1	A Viable Solution for Curvature and Gradient Calculation	Joe Breyer Works Consulting LLC Gilbert, AZ	
4.4.2	Enabling elevation information on a road network for routing applications	Jay Sandhu, Ph.D. Esri, Inc. Redlands, CA	
4.4.3	Coastal Surge Inundation Mapping on the New Jersey Turnpike and Garden State Parkway	Thomas Tiner Michael Baker International Hamilton, NJ	

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CONCURRENT SESSION 5

3:30PM TUESDAY, April 21

5.1	**Photolog, Imagery, LiDAR**		**Salons A-C**
	Moderator: Michael Umansky – Applied Imagery		
5.1.1	Automated Enforcement of High Resolution Terrain Models	Brian Gelder Iowa State University Ames, IA	
5.1.2	Tennessee Department of Transportation's Image Viewer Application	Jeff Murphy Tennessee Department of Transportation Nashville, Tennessee	Bruce Aquila Intergraph Corporation Huntsville, Alabama
5.1.3	Managing Remote Sensing Data With Erdas Apollo	Tom Samson Iowa Department of Transportation Ames, Iowa	
5.2	**Federal Initiatives**		**Salon D**
	Moderator: John Farley – North Carolina Department of Transportation		
5.2.1	Geospatial Data Collaboration	Mark Sarmiento FHWA Office of Planning Washington, D.C.	
5.2.2	Utilizing ARNOLD to Support National Performance Management Initiatives	Tom Roff FHWA Washington, DC	
5.2.3	The All Public Roads Geospatial Study (ARNOLD) Final Report and Pooled Fund Study Status	Joseph Hausman US DOT - FHWA Washington, DC	
5.3	**Web Planning Tools**		**Salon E**
	Moderator: Mary Gail Broussard – PMG Software		
5.3.1	Exploring Varied Uses of ArcGIS Online within the WSDOT Online Map Center	Heath Brackett Washington State Department of Transportation Olympia, WA	
5.3.2	Integration of GIS and EDMS at Ohio DOT	Walter (Terry) Cline tsaADVET New Providence, PA	
5.3.3	North Jersey Transportation Planning Authority Asset Management Model	Nick Hutton Michael Baker International Hamilton, New Jersey	
5.4	**Performance Management**		**Salon F-H**
	Moderator: Brian Andersen – Montana Department of Transportation		
5.4.1	Improving Safety Programs through Spatial Data Governance and Business Planning	James Hall University of Illinois Springfield Springfield, IL	
5.4.2	PennDOT Bridge Scour Initiatives	Frank DeSendi Pennsylvania Department of Transportation Harrisburg, Pennsylvania	
5.4.3	Paint Reflectivity Analysis for Decision Making	Shawn Blaesing-Thompson Iowa Department of Transportation Ames, IA	Joseph Drahos Iowa Department of Transportation Ames, IA

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CONCURRENT SESSION 6

8:30 AM WEDNESDAY, April 22

6.1	**Mobile GIS**		**Salons A-C**
	Moderator: Bryan Kelley – Transcend Spatial Solutions		
6.1.1	The Use of Tablet Technology for Roadside Feature Condition Reporting and Decision Making	Shawn Blaesing-Thompson Iowa Department of Transportation Ames, IA	Brad Cutler Iowa Department of Transportation Ames, IA
6.1.2	Mobile Strategy: Making the Choice to Go Mobile	Matt McCracken Timmons Group Richmond, VA	
6.1.3	Mobile GIS for Airports	Raymond Mandli Mandli Communications, Inc. Madison, WI	Mitch Caya Mandli Communications, Inc. Madison, WI
6.2	**SHRP2**		**Salon D**
	Moderator: Bo Guo – Gistic Research, Inc.		
6.2.1	SHRP2 Roadway Information Database: Data and Applications	Zachary Hans INTRANS – Iowa State University Ames, IA	Skylar Knickerbocker INTRANS – Iowa State University Ames, IA
6.2.2	FHWA Support of SHRP2 Safety Data Analysis	Craig Thor Federal Highway Administration McLean, VA	Charles Fay Federal Highway Administration McLean, VA
6.2.3	GIS Linkage with the SHRP2 Roadway Information Database	Bruce D. Spear Cambridge Systematics Cambridge, MA	Michael Dimaiuta, P.E. Genex Systems McLean, VA
6.3	**Open Data and Crowdsourcing**		**Salon E**
	Moderator: Doug Argall - Geodecisions		
6.3.1	New TDOT SmartWay Solutions and Open Data	Van Colebank TN Dept. of Transportation Nashville, TN	
6.3.2	Data Transparency for Collaboration	Becky Hjelm Utah Department of Transportation Salt Lake City, Utah	
6.3.3	Crowdsourcing Strategies Involving Users In Pedestrian System Inventory and Analysis	Christopher J. Seeger Iowa State University Ames, IA	
6.4	**Developing a Comprehensive Network**		**Salon F-H**
	Moderator: Lori Judge – Iowa Department of Transportation		
6.4.1	The Past, Present and Future of Manitoba's Road Network	Andrew Lindsay Manitoba Infrastructure and Transportation (MIT) Winnipeg, Manitoba, Canada	
6.4.2	Managing Pavement Information with LRS	Mark Yerington MAGIC Muscatine, IA	Randy Hill City of Muscatine
6.4.3	Calculating Cumulative Non-Negative Elevation Gain for Bicycle Route Choice Modelling	Erich Rentz RSG Salt Lake City, UT	

The GS-T symbol indicates a session from Iowa, the Host State.

CONCURRENT SESSION 7

10:30 AM WEDNESDAY, April 22

7.1	**Data Integration**		**Salons A-C**
	Moderator: Darryl Spears – Alabama Department of Transportation		
7.1.1	Arkansas vs. ARNOLD - Creating an All Public Roads LRS in Razorback country	Sharon Hawkins Arkansas State Highway and Transportation Department Little Rock, Arkansas	Jonathan Duran Arkansas Geographic Information Office (AGIO) Little Rock, Arkansas
7.1.2	Mississippi Dept. of Transportation - Crash Edit Tool (CET)	Chris Kimbrell Mississippi Dept. of Transportation - MDOT Jackson, MS	Bruce Aquila Intergraph Madison, AL
7.1.3 GS-T	Transforming 511 GIS with FME	David Runneals Iowa Department of Transportation Nevada, Iowa	Sinclair Stolle Iowa Department of Transportation Ames, Iowa
7.2	**Local Roads and HPMS**		**Salon D**
	Moderator: Russell Minich – Timmons Group		
7.2.1	Visualize and Analyze Your LRS Data	Bo Guo Gistic Research Inc. Tempe, AZ	
7.2.2	Michigan's Geospatial Enterprise Information Management	Joshua Ross State of Michigan, Department of Technology, Management & Budget, Center for Shared Solutions Lansing, MI	
7.2.3	Modernizing the HPMS Process at ALDOT	J.D. D'Arville Alabama Department of Transportation Montgomery, Alabama	Troy Marsh PMG Software Professionals Marietta, Georgia
7.3	**Transportation Dashboards/Visualization**		**Salon E**
	Moderator: Becky Hjelm – Utah Department of Transportation		
7.3.1	ITMS: Information Inside and Out	Donny McElveen South Carolina DOT Columbia, South Carolina	Mitch Stephens PMG Software Professionals Cumming, Georgia
7.3.2 GS-T	The Iowa DOT Interstate Condition Evaluation (ICE) Tool	Adam Shell Iowa DOT Ames, Iowa	Kyle Barichello Iowa DOT Ames, Iowa
7.3.3 GS-T	Iowa Pavement Management Program: Towards a more interactive asset management paradigm for local agencies	Inya Nlenanya Intrans, Iowa State University Ames, Iowa	
7.4	**Traffic Data**		**Salon F-H**
	Moderator: Patrick Whiteford – Arizona Department of Transportation		
7.4.1	Automated Turning Movements and Traffic Counts Using Video Analytics	Connie Gurchiek Transcend Spatial Solutions Sarasota, FL	Bill Schuman Transcend Spatial Solutions Sarasota, FL
7.4.2	Improving Traffic Data Collection and Analysis using innovative technologies	Greg Ulp GeoDecisions Camp Hill, PA	
7.4.3	Transferability of Activity-Based Travel Demand Model to Small/Medium Size Region	Mohammad M. Molla North Dakota State University Fargo, North Dakota	

The GS-T symbol indicates a session from Iowa, the Host State.

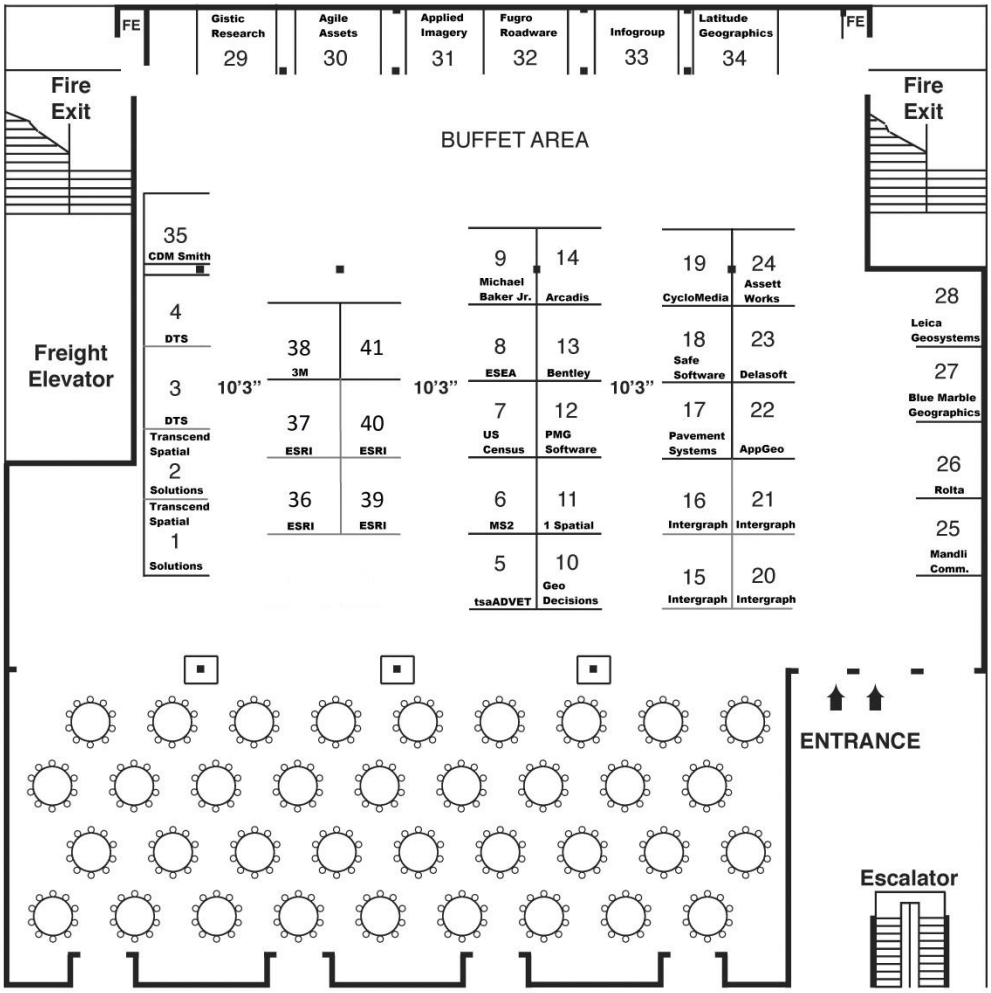
NOTES

TECHNOLOGY HALL EXHIBIT AREA

GIS-T Symposium Technology Hall

DES MOINES MARRIOTT HOTEL
3rd Floor, Hall of Cities
Des Moines, Iowa

10' x 8' Booths



GIS-T 2015 EXHIBITORS

Company Name	Booth
1 Spatial	11
3M	38
Agile Assets	30
AppGeo	22
Applied Imagery	31
ARCADIS	14
AssetWorks	24
Bentley	13
Blue Marble Graphics	27
CDM Smith	35
CycloMedia	19
Delasoft	23
DTSGIS	3, 4
ESEA	8
ESRI	36, 37, 39, 40
Fugro Roadware	32
Geo Decisions	10
Gistic Research Inc.	29
Infogroup	33
Intergraph Corp.	15, 16, 20, 21
Latitude Geographics	34
Leica Geosystems	28
Mandli Communication	25
Michael Baker Jr.	9
MS2	6
Pavement Systems, Inc.	17
PMG Software	12
Rolta	26
Safe Software	18
Transcend Spatial	1, 2
tsaADVET	5
U.S. Census Bureau	7

CONFERENCE CENTER FLOORPLAN

Second Floor

Third Floor

1.1.1 Oklahoma Transportation Asset Browser(OK TAB)

Presenter(s)

Jeremy Planteen
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Bruce Aquilla
Sr. System Consultant
Intergraph Corporation
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Session Description: Phase 2 scheduled for completion in the fall of 2015. / OKDOT identified a need to develop a modern and robust system for accessing, visualizing, and disseminating transportation data across the enterprise, while also providing a data collaboration platform for non-DOT users. This web-based application provides users numerous visualization and analytical tools along with a sleek, modern, graphical user interface. OKDOT's new system, Transportation Asset Browser (TAB), needed to display OKDOT data sources while also providing users an intuitive workflow for interacting with data from MPO's, COG's, Counties, Cities, as well as other state, local and federal agencies. As a role based system, TAB allows for data owners to determine the parameters for access to either all or selected parts of their data. In addition, data custodians may determine which users have access to its information enabling OKDOT to provide a more robust and seamless decision support environment to its users.

1.1.2 ODOT's Enterprise GIS Framework for the Web

Presenter(s)

Brian R. Sovik, PMP, GISP
Vice President, GIS-Transportation Solutions
Data Transfer Solutions, LLC.
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David Blackstone
GIS Manager - Office of Technical Services
Ohio Department of Transportation
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Session Description: ODOT has developed an enterprise Transportation Information Mapping System (TIMS) in response to challenges in simple dissemination of mission critical information. TIMS has been upgraded to an HTML5/JavaScript/Leaflet ArcGIS Server architecture, providing responsive desktop and smart phone usability. The TIMS enterprise framework provides ODOT GIS management with a simple administration tool for modifying and updating content, enabling quick responsiveness to customer's changing needs. The improved TIMS system provides on-the-fly PDF map generation, bulk-data download capabilities, intelligent search features, GIS data upload functions, a system wide searchable data glossary, and linkages to other ODOT systems. This presentation will review the business case for the TIMS system, provide attendee's insight to the technical architecture and development of the system, and live system demos.

1.1.3 Esri Roads and Highways Implementation at WVDOT

Presenter(s)

Emiko Hori
GIS Programmer Analyst
West Virginia Department of Transportation
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Session Description: An Enterprise Linear Referencing System (ELRS) is being developed at West Virginia Department of Transportation (WVDOT). Esri Roads and Highways (R&H) Solution is chosen to manage the LRS, including WVDOT LRS-based roadway network data and roadway characteristics data. WVDOT has been deploying R&H since 2013 and is approaching completion with the coming final step to have R&H in its production environment. This presentation will update the audience on goals, challenges, and experience learned from implementing Esri R&H and related system integration for supporting the ongoing West Virginia state Enterprise Resource Planning (ERP) project.

1.2.1 DCSign: GIS Inventory and Analysis of Traffic Signs

Presenter(s)

James K. Graham
GIS Developer
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John Hudler
Project Manager
Transcend Spatial Solutions
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Session Description: With an over 1 million traffic signs to manage and no GIS inventory, Washington DC had a huge problem on its hands. We had no idea where the signs were, what was old and in need of replacement, or if existing signs conflicted with each other or with existing regulations. DDOT was even the subject of several local news articles which highlighted our 'conflicting signage'. This presentation shows how we built our inventory with an LRS approach, using Transcend's MAVRIC and ESRI's Roads and Highways. We will also highlight the Python tools we built to help identify signage conflicts and preserve the integrity of the data.

1.2.2 Secondary Roads Leveraging Enterprise GIS

Presenter(s)

Brad Ketels
Assistant County Engineer
Linn County Secondary Road Department
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Matt Boyle
GIS Analyst
Linn County
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Session Description: Linn County, Iowa is working towards GIS being a part of the everyday work flow for many departments. An overview of the current and future enterprise GIS projects within Linn County will be discussed. The Linn County Secondary Road Department is a piece of the enterprise GIS puzzle that is currently being developed in Linn County, Iowa. The presentation will focus on the GIS initiatives that are taking place within the Secondary Road Department. A current project includes the Road Department's asset management model for recording, maintaining and managing physical assets such as roads, culverts, bridges, entrances, signs, shops, etc. These datasets will be described and how the Road Department utilizes the data from each. This session will discuss the web and mobile based applications used by Linn County to create the most effective asset management models and how to portray this information both internally and externally.

1.2.3 LRS maintenance and Asset Management Systems

Presenter(s)

Phil Hardy
LRS Product Manager
AgileAssets
phardy@agileassets.com

Session Description: We will discuss various strategies for the maintenance of a dependable Linear Referencing System (LRS) so as to support an Asset Management System (AMS). Advantages and disadvantages of the various strategies will be explored. Specific challenges will be identified and solutions described. Strategies for implementing Roads and Highways for managing the LRS for an AMS are discussed.

1.3.1 Latest Developments in the National Transportation Atlas Database and Future Direction

Presenter(s)

Derald Dudley

USDOT/BTS (Bureau of Transportation Statistics)
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Session Description: The National Transportation Atlas Database (NTAD) has been making transportation data freely available to the public since 1995. Recognizing NTAD as a useful tool in transportation planning and analysis, the Bureau of Transportation Statistics (BTS) continues to mold the NTAD to meet the needs of the continuously changing and evolving transportation industry. This presentation will talk about the many changes that have recently occurred with the NTAD and those that are planned. Also, what will the NTAD of the future look like and what will be most useful to the user community

1.3.2 The 3D Elevation Program

Presenter(s)

Jim Langtry
National Map Liaison
U. S. Geological Survey
jlangtry@usgs.gov

Session Description: The U.S. Geological Survey National Geospatial Program is developing the 3D Elevation Program (3DEP) to respond to growing needs for high-quality topographic data. The primary goal of 3DEP is to collect 3D elevation data in the form of light detection and ranging (lidar) data over the Nation over an 8-year period. The 3DEP initiative is based on the results of the National Enhanced Elevation Assessment that documented more than 600 business uses. Fully funded and implemented, 3DEP would provide more than $690 million annually in new benefits. This would result in a nearly 5:1 return on investment, save lives, and improve our environment through informed decisions. Key components of 3DEP are a cooperative funding model, options for data quality upgrades to meet State and local needs, and partnerships designed to bring Federal agencies, academia, corporate entities, states, tribes, and communities together to develop advanced 3-dimensional mapping data of the United States.

1.3.3 Mississippi DOT's Approach to FMIS Modernization

Presenter(s)

Mike Cresap
Transportation Information Director
Mississippi Department of Transportation
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Bruce Aquila
Senior Systems Consultant
Intergraph Corporation
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Session Description: As part of the Moving Ahead for Progress in the 21st Century Act (MAP-21), the USDOT is transitioning to a performance and outcome based program. At the state level, DOT's have been tasked with the requirement to submit geospatial data for each project programmed in FHWA's Fiscal Management Information System (FMIS). Prior to MAP-21 implementation, MDOT already had a system in place to capture project locations. However, the workflows originally developed to capture project geometries did not meet the FMIS requirements. As a result, MDOT contracted with Intergraph to re-design the Project Location Tool (PLT) to address the applications shortcomings. This presentation will review the project requirements, discuss the hurdles encountered, and demonstrate the tool used to accomplish these new FHWA requirements.

1.4.1 Show me your assets! Transitioning to a geo-spatial LRS

Presenter(s)
Aja Davidson
GIS Analyst II
Texas Dept. of Transportation
aja.davidson@txdot.gov

Session Description: The Texas Dept. of Transportation is implementing an asset management system to integrate roadway polylines maintained in ArcGIS and roadway inventory data currently maintained in a legacy, non-spatial mainframe system. The process has required extensive data translation and migration solutions and the preservation of multiple linear referencing systems. Upon project completion, all roadway inventory data will be integrated with the GIS roadway linework for the first time. / In the new data management workflow, measured roadway linework will be maintained in ArcMap, then extracted, translated, and loaded into the asset management system. All data analysis of both the linework and assets will be completed in ArcMap. This approach ensures accurate linework and inventory data and the ability to complete complex analyses, while maintaining four distinct linear referencing methods.

1.4.2 Moving beyond Linear Reference Systems

Presenter(s)
Tom Roff
Transportation Specialist
FHWA
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Session Description: Linear Referencing Systems (LRS) have traditionally been the solid foundation of surface transportation GIS. State DOTs rely on measured routes to maintain and manage the inventory of assets to find solutions to complex issues that require spatial analysis. The LRS is somewhat easy to understand. Developers have freedom to use tabular data without worrying about the spatial component. It provides standard method to collect data in the field without having specialized software. The question remains if the LRS provides a complete and most efficient method for doing advanced spatial analysis to meet the expanding requirements of transportation data. As State Departments of Transportation are merging their networks into a seamless dataset as part of the ARNOLD initiative, it is becoming apparent that topologic relationships are becoming just as critical as an accurate LRS. This presentation will explore the world beyond LRS and the utility of introducing topology into the ARNOLD model.

1.4.3 Building an All-Roads LRS Network for Alaska

Presenter(s)
Bruce Spear, PhD
GIS Team Leader
Cambridge Systematics
bspear@camsys.com

Kerry Kirkpatrick
Alaska DOT&PF
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Session Description: This presentation will describe how Alaska DOT&PF is building a road centerline/LRS network Geodatabase covering all public roads in the state to meet FHWA ARNOLD requirements. In building the road centerline/LRS network, ADOT&PF encountered and developed methods to address several unusual technical issues that may be transferrable to other states, including: 1) creating a simplified LRS for local roads; 2) identifying and labeling large numbers of centerline features (e.g., stairways, 4-WD trails) that do not qualify as public roads; 3) lack of consistent orthoimagery coverage across the state; 4) over 300 rural villages with no year-round road connections to the state road system; and 5) large portions of the state that are not under any county jurisdiction. The presentation will discuss how each of these issues was resolved, along with ADOT&PF plans for long-term maintenance and updating of the centerline network Geodatabase.

2.1.1 Implementing an Authoritative LRS: The ALDOT Experience

Presenter(s)

J.D. D'Arville
GIS Administrator
Alabama Department of Transportation
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Troy Marsh
Program Manager
PMG Software Professionals
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Session Description: Just over ten years ago, ALDOT began efforts implementing Enterprise GIS technology. As GIS awareness increased, the various bureaus within ALDOT initiated their own projects to collect spatial data for a variety of transportation assets including, but not limited to bridges, traffic counters, road segments, and pavement. As a result, ALDOT was left with many disparate and complex GIS datasets, often housing duplicate data with no clearly defined authoritative source. To address this issue, ALDOT established the new EGIS program in 2013. The first goal of this program is to establish an authoritative Linear Referencing System using Esri's Roads and Highways. The new LRS will serve as the foundation for other systems including Road Inventory, HPMS reporting, Traffic, and Field Data Collection in the future. This presentation provides an overview of the project, ALDOT's new Governance Model, the planning process, and lessons learned from implementing Esri's Roads and Highways at ALDOT.

2.1.2 Implementing the Roadway Information Management System (RIMS): An enterprise LRS upgrade marathon

Presenter(s)

David Blackstone
GIS Manager
Ohio Department of Transportation
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Bryan Kelley
Project Manager / Business Analyst
Transcend Spatial Solutions
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Session Description: The Ohio Department of Transportation initiated the Roadway Information Management System (RIMS) as a multiphase project to upgrade the architecture, software, and provision of LRS and road inventory data to the enterprise. The strategy behind the phased multi-year approach should allow the components of the project to build off of one another in a manner such that critical business processes and data reporting requirements could be maintained. While only partly through the effort, several lessons have been learned while implementing new software (Esri Roads & Highways), migrating data architecture (normalized table structures), and integrating other enterprise systems (Traffic, Assets, Crashes). Bring your favorite sports drink and come hear the details of how this sometimes rewarding and sometimes grueling LRS marathon experience is going.

2.1.3 ADOT's New LRS - Roads and Highways

Presenter(s)

Patrick Whiteford, GISP
Senior GIS Analyst
Arizona Department of Transportation
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Mark Flahan
Sr. GIS Coordinator
Arizona Department of Transportation
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Session Description: ESRI's Roads and Highways is currently being implemented at the Arizona Department of Transportation. The new GIS/LRS will allow for versioned temporal data editing and have the ability to support multiple divisions within ADOT. The goal of using Roads and Highways at ADOT is to have an LRS that can be used by the entire agency, which in turn will breakdown historic data silos. During the presentation I will discuss challenges ADOT faced, why the agency is using Roads and Highways, lessons learned, pros/cons of the system, desktop tools, the Roadway Characteristics Editor and have a demonstration of the tools.

2.2.1 CPMS Portal – ALDOT's Web-based Project Mapping Integration Tool

Presenter(s)

Joe Lambrix
Geospatial Consultant/Project Manager
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Ronan Flannery
GIS Specialist Sr.
Alabama DOT
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Session Description: The Alabama DOT (ALDOT) developed the Comprehensive Project Management System (CPMS) in 1995 using Mainframe DB2. CPMS is the largest application developed by ALDOT and has been a vital tool used across the DOT to manage both projects and day-to-day activities. With the latest implementation of the Financial Management Information System (FMIS) 5.0, ALDOT requested the assistance of Atkins to develop a web-based mapping portal to be integrated with CPMS. This presentation will describe how CPMS Portal was developed and integrated with CPMS, how it assists ALDOT in meeting FMIS 5.0 guidelines, and how the accuracy of data entered into CPMS has increased.

2.2.2 Leveraging ArcGIS Online to federate and organize disparate government ArcGIS Online implementations

Presenter(s)

Ray de Leon
Project Manager
JMT Technology Group

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Jay Mukherjee
GIS Specialist II
Maryland-National Capital Park and Planning Commission
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Session Description: Inter-agency organizations are taking ArcGIS Online (AGO) to a new level by implementing a federated AGO portal as a single source for collaborating, publishing and sharing their AGO data, map and applications. Many Department of Transportations and supporting inter-agencies are applying AGO as an extension to their existing enterprise GIS infrastructure to facilitate data sharing within their organization, presenting information to decision makers, telling stories through story maps, and supporting community engagement through an Open Data Portal. This presentation will introduce a use case of federated AGO where inter-agencies are sharing their AGO data content into a federated portal. This presentation will address how federated inter-agency repository of data, web maps and applications are being used to identify new opportunities for cost-share, improve communication and transparency, as well as challenges in implementing a federated inter-agency portal, and lessons learned.

2.2.3 Iowa DOT portals leveraging COTS

Presenter(s)

Eric Abrams
Geospatial Manager

Iowa Department of Transportation
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Derek Peck
Office of Location and Environment - GIS Coordinator
Iowa Department of Transportation
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Session Description: Presentation will focus on three portals; Highway Division Portal, asset performance site and Winter Operations Portal (WOPR). We will show how leveraging and investing in COTS products like Geocortex Essentials or ArcGIS Online along with web services can create easy and cost effective interfaces.

2.3.1 Analyzing State and Local Safety Data Using AASHTOWare Safety Analyst™

Presenter(s)
Doug Argall, GISP, OCA
Senior Data Architect
GeoDecisions
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Session Description: Two factors have impeded traditional techniques for identifying safety improvement priority locations. First, Traditional techniques lacked the methodological rigor necessary to produce reliable results. Second, Data on locally-owned roads often was not available, making location-based analyses incomplete. The Federal Highway Administration (FHWA) addressed the first deficiency by sponsoring development of AASHTOWare Safety Analyst™ to manage safety data analysis and countermeasure selection. To address the local roads data issue, the FHWA Office of Safety established the Roadway Safety Data Program (RSDP) to advance State and local safety data systems and safety data analyses. The Arizona Department of Transportation (ADOT) is currently in the process of deploying AASHTOWare Safety Analyst™. This project will directly benefit ADOT, as well as the participating agencies, by developing the tools and methodology to make local data part of the complete highway safety analysis regime.

2.3.2 GIS-Based Evaluation of Crash Reductions for Selective Law Enforcement Campaigns

Presenter(s)
Jenna Simandl
Graduate Research Assistant
The University of Alabama
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Andrew Graettinger, Ph.D.
Associate Professor
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Session Description: State DOTs fund selective enforcement campaigns to improve traffic safety. Evaluating the impact of these campaigns is difficult. Geographic Information Systems (GIS) was used to integrate officer patrol routes, citations issued, crashes and selective enforcement periods into one spatial and temporal map to evaluate selective enforcement in Alabama. Electronic Citations in Alabama do not require location data, but do have an electronic time-stamp indicating when the citation was issued. Each State Trooper's vehicle is polled every 30 seconds recording the trooper's location along with a time-stamp. Using a spatial-temporal analysis in GIS, the time-stamps were cross-referenced to accurately locate more than 90% of citations. The geolocated citations, officer patrol routes, and crash data were spatially and temporally assessed using map clustering analysis to locate crash hotspots before, after and during selective enforcement. The developed methodology is extensible to other states.

2.3.3 Wisconsin Statewide Crash Mapping Automation Enhancements

Presenter(s)
Steven T. Parker
IT Program Manager
University of Wisconsin-Madison TOPS Lab
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Session Description: In 2011, the Wisconsin Department of Transportation completed implementation of a multiyear, statewide map of highway and local road crashes with respect to a single GIS roadway network. This map, which has been integrated into an online crash data query and retrieval tool at the University of Wisconsin-Madison, has been updated on a monthly basis since then and now includes crashes from 2005 through the current year. The monthly update process incorporates a "map merge" sequence which combines highway crashes that are manually located to the GIS network with local road crashes that are mapped through an automated location matching algorithm. This presentation will report on the results of a current enhancements project to streamline the overall crash map maintenance effort and, in particular, to improve the overall level of automation by including highway crashes in the location matching algorithm.

2.4.1 **Leveraging Python to Revolutionize the Production of the Vermont Town Highway Maps**

Presenter(s)

Johnathan Croft
AOT GIS Database Administrator
Vermont Agency of Transportation
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Michael Trunzo
AOT Technician III
Vermont Agency of Transportation
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Session Description: ESRI and the Vermont Agency of Transportation (VTrans) have developed a way to produce 284 town highway maps using 1 MXD, without using Data Driven Pages or Production Mapping's MPS-Atlas. Through the use of creative programming with Python, and the development of a MXD that functions as a template, the production of the Town Highway Map series has become very efficient. What makes the Town Highway Map series so unique is that each town map contains a different layout with a different number of insets (which may be at different scales) and detailed mileage summaries for the town featured in the map. Through the single MXD and Python code, the maps can be generated directly from the VTrans road centerline data and a page layout table. This presentation will describe the initial issue that faced the VTrans Mapping Section and how the creative use of Python and custom scripting has solved issue, and provided a far more efficient system.

2.4.2 **A GIS Tour of Des Moines**

Presenter(s)

Anna Whipple, GISP
GIS Manager
City of Des Moines
awwhipple@dmgov.org

Session Description: The City of Des Moines is pleased to welcome AASHTO to Iowa's capital for GIS-T 2015. Let us take you on a virtual tour of Des Moines as seen through the eyes of our GIS Team. We will present some of our local challenges and how we use GIS to address them. Stops on the tour will include: - Vibrant Downtown Des Moines and the perplexing skywalk system - Shared 911 dispatch centers and the Des Moines Area Regional GIS collective - Des Moines' four seasons: snow, flooding, construction, and sports/politics

2.4.3 **Mapping Bike Share Trips: A Spatial Approach to Evaluating Supply and Demand for On-Street Bicycle Facilities in New York City**

Presenter(s)

Katie O'Sullivan
Graduate Student
University at Albany, SUNY
kaosullivan@albany.edu

Session Description: The mode-share of cycling is growing in cities across the U.S, though counts do not yet capture AADT or other measures of where cyclists travel across street networks. Understanding the spatial distribution of cycling within a city would help officials prioritize facility improvements according to where they're most demanded, which has powerful implications for improving ridership and safety. Bike share system data provides an opportunity to begin illuminating this spatial blind spot. This presentation describes an application of GIS line density analysis to a sample of three months of bike share trips, approximated by origin-destination pairs from Citi Bike system data. Trip density is overlaid with New York City's on-street bicycle facility network to evaluate the strengths and weaknesses of the network in accommodating demand for bicycle travel. Future research implications include coordination with the Citi Bike expansion, alternative metrics and analyses, and technological developments in data collection such as individual activity tracking and GPS-enabled bikes.

3.1.1 Smarter Work Zones – Leveraging GIS-T Tools to Meet FHWA Goals

Presenter(s)

W.D. Baldwin, PE
Associate VP/NW Region Traffic Leader
HDR
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Todd Peterson, PE, PTOE
Transportation Specialist on FHWA's Office of Operations Work Zone Management Team
USDOT Federal Highway Administration
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Session Description: Effective traffic management during construction is necessary to minimize travel delays, ensure motorist and worker safety, maintain access to local businesses and residences, and complete road work on time. While several options are available to establish efficient work zones, one aspect of FHWA's new EDC-3 smarter work zones effort focuses on project coordination between agency units and with external agencies. Cities and regions around the country are efficiently synchronizing projects at various levels, combining multiple projects in a corridor or network, correlating right-of-way acquisition and utility work, and coordinating work between different transportation agencies. The presentation will explain how GIS-T tools have and can be used to track work zones and shared among agencies for coordination discussions during the planning, design, and delivery of projects. We will also explain federal funding available for GIS-T tool development to support this coordination.

3.1.2 Making GIS the Keystone of PennDOT's Maintenance Operations

Presenter(s)

Matthew Long
Transportation Planning Specialist II
PennDOT
matlong@pa.gov

Nate Reck
Director
GeoDecisions
nreck@geodecisions.com

Session Description: GIS is a perfect fit for maintenance planning due to its ability to gather and visualize disparate data and perform numerous types of analyses (temporal analysis, spatial analysis). That being said, PennDOT's Bureau of Maintenance and Operations developed a GIS application (named Maintenance-IQ) to improve the planning and scheduling of its maintenance activities stored in SAP. PennDOT anticipates a reduction of non-productive travel time/costs (mobilization/fuel costs) and elimination of rework due to performing maintenance activities out-of-sequence (paving then performing pipe replacement). More importantly, this application supports getting selected maintenance activities 'on-cycle' and decrease on-demand maintenance (potholes, crack sealing), thus generating additional cost savings. Maintenance-IQ provides a framework of GIS technology/services that is configurable for purposes beyond this specific business need as part of PennDOT's overall enterprise GIS upgrade initiative.

3.1.3 Managing Road Dedications at South Carolina DOT

Presenter(s)

Donny McElveen
GIS Manager
South Carolina DOT
mcelveende@scdot.org

Mitch Stephens
Vice President
PMG Software Professionals
mitch.stephens@pmgpro.com

Session Description: SCDOT has recently implemented a new spatially based solution which is used to manage the various dedicated roads, bridges and intersections. Not only does this solution allow SCDOT to create and edit the various dedications, but it is also tightly integrated with the Department's Integrated Transportation Management System so that all SCDOT employees can query and view the data. Dedications are made to a specific location so the software is implemented in such a way so that the dedication always remains in the correct location even though the underlying route may be modified.

3.2.1 Snowplows & AVL (Year 4)

Presenter(s)

Eric Abrams
Geospatial manager
Iowa Department of Transportation
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Session Description: Snowplows & AVL (Year 4) will review Iowa DOT automatic vehicle location (AVL) system for winter operations. We will show AVL sensors, dash camera technology, processes used to store and display data, plus review tools used by field staff and the public. The presentation will touch base on AVL technology, Oracle, ArcGIS Services, Data integration, FME, ArcGIS Online and GeoCortex Essentials.

3.2.2 Development of Railroad Highway Grade Crossing Closure Rating Formula: Database Creation

Presenter(s)

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Patrick Johnson
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Session Description: The 2011 Iowa Highway-Rail Grade Crossing Safety Action Plan recommended creation of a formula to evaluate highway-rail grade crossings for potential consolidation (closure). The formula will be used to generate an objective rating for public at-grade crossings in Iowa that will aid public agencies and railroads in the decision making process. GIS tools were utilized to create, derive and assimilate multiple disparate data sets in support of the formula. This presentation will provide an overview of formula development, while focusing on the database creation process, including the data sets employed, methodological approaches, limitations and challenges.

3.2.3 Mapping Safer Routes to School: An Ohio Collaboration Success Story from Toledo, Columbus, and Akron School Districts.

Presenter(s)

Douglas Lynch
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Session Description: Providing safer routes to school is one of many objectives for the Ohio Department of Transportation Safe Routes to School (SRTS) program. Federal funding is made available to improve infrastructure around schools. Recently, as part of an overall Large District School Plan, the Toledo, Columbus, and Akron School Districts used GIS to identify sidewalk and crosswalk gaps by integrating student locations with most likely routes to school. GIS data and mapping was then used to help inform various stakeholders involved in the project. This presentation will focus on how GIS was used for the project, including geospatial analysis and mapping, network analyst extension involvement, and about a custom ModelBuilder tool that was developed to supplement the project. The presentation will pay particular attention to how GIS technology was used as successful collaboration and decision support tool in effort to identify key projects to prioritize yielding safer routes to schools for students.

3.3.1 Spatially Enabling the STIP at South Carolina DOT

Presenter(s)
Mitch Stephens
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Session Description: The STIP is a Federally mandated document required of every DOT. The STIP must include a listing of projects planned with federal participation. South Carolina DOT has historically maintained the STIP data in Excel but with the recently implemented eSTIP, they now manage the STIP in a spatially-based web application. This presentation will focus on how SCDOT has tied their STIP information to their road network. This has allowed them to provide accurate location, where applicable, to their internal and external users. The solution includes a public interface which allows the general public to build and submit spatial queries for STIP data. Additionally, users can view budget and expenditure information for various projects. The eSTIP is tightly integrated with the Project Programming System so that information is updated in multiple systems as changes in budgets, funding and authorizations are made on a day-to-day basis. STIP items are now easily mapped which increases the unde

3.3.2 Innovative use of GIS for Utility Permitting

Presenter(s)
Madduri Raghunath
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Don Burris
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Session Description: HPMS is a national level information system that includes data on the extent, condition, performance, use, and operating characteristics of the Nation's highways. This information is used to support a data driven decision process within FHWA, the DOT, and Congress. The HPMS data are used extensively in the analysis of highway system condition, performance, investment needs and Performance Reports to Congress. DelDOT has a manual process of requesting 68 HPMS Data items through spreadsheets and keeping track of these items, which is labor intensive. There was no Map Reference to validate the data. DelDOT engaged Delasoft to create a web based GIS application that automates and monitors the workflow for preparing and submitting the HPMS data to FHWA. This presentation will explore the project's journey, including its successes, challenges, and GIS technologies utilized to benefit the DOT's HPMS needs.

3.3.3 When scale matters: the re-design and deployment of the DriveTexas web-site

Presenter(s)
Michael Terner
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Session Description: The DriveTexas web-site is an important tool for the Texas Dept of Transportation (TxDOT) to communicate to the public the current status of roadway conditions. The site shows current information on both planned construction conditions & unplanned and unfolding conditions from situations such as weather events. A key use cases for the site is communicating information in the event of a hurricane threatening the Gulf Coast. Thus, it is critical that the site be able to handle a potentially massive load of public users. To address this requirement, in 2014 TxDOT replaced the original 2011 site with a re-designed and modernized web-site using Google Maps technology. This presentation will cover: Design of the modernized site including building a responsive “all device” user interface; Differences between the 2011 (Esri) and 2014 (Google) approach for scaling; Pre-launch stress testing; Interfacing with Esri technology used for data management; and Lessons learned & future directions

3.4.1 TxDOT Local Streets and the ARNOLD Initiative

Presenter(s)

Jenn Sylvester
GIS Analyst II
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Session Description: This presentation details the addition of over 68,000 miles of local city streets to the existing Texas Roadway Network. It describes the outreach program to local data maintainers, methods of processing, data cleansing, and creating the linear referencing system. It also describes the road ahead and how we are approaching new requirements for dual carriageway and addressing. This project helped us launch a statewide data sharing initiate and highlighted the need for a statewide data warehouse as well as interactive online tools for local data providers to access their roads and attributes as well as submit their changes to the TxDOT network.

3.4.2 Using Open Data in a GIS-Based Web Portal for Crash Mapping

GIS

Presenter(s)

Brittany Shake
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Randy Smith, Ph.D.
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Session Description: Transportation agencies are successfully implementing Geographic Information Systems (GIS) to map, manage, and analyze vehicle crashes. Currently, the Puerto Rico Department of Transportation and Public Works (DTOP) does not currently have the ability to map crashes on both state and local routes due to an incomplete route inventory. This research created a linear referenced GIS roadway utilizing existing DTOP line work supplemented with open-source line work. Extensive editing was required to stitch together the different sources. One community in Puerto Rico was used as a prototype to test editing and data entry methods. Three linear referencing methods (LRMs) were integrated into the basemap: route-kilometer, route-route, and link-section. By combining these LRMs into one GIS basemap, crash locations for the Puerto Rico highway system as well as the local roadway network can be mapped and analyzed by the Puerto Rico DTOP.

3.4.3 Local Centerline Evaluation with LRS Data Reviewer

Presenter(s)

Ryan Blum
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Joe Breyer
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Session Description: Centerline files are maintained with a focus on specific local business needs. These files are a rich source of local roadway data, but many times are limited to local policy, especially when re-utilizing these centerlines in larger geographic regions. In response to Arizona's E-911 initiative, county government agencies are consolidating their focus on the greater good for regional and statewide planning. A reusable workflow is now available for LRS implementation across regions and the entire state. The LRS Data Reviewer workflow is a comprehensive procedure that removes the barrier between the local centerlines and their efficient use in a LRS. It builds upon Esri's tools and framework, allowing for quick assessments leading to reporting of issues to the local centerline owner. This presentation will discuss the workflow including common issues found with centerline files, automated solutions to these issues, and the process itself.

4.1.1 (WisDOT) (ARNOLD): Enhancing the Spatial Resolution within an Active Linear Referencing System (LRS)

Presenter(s)

Mark Simpson
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Session Description: WisDOT maintains two distinct LRSs. The State Trunk Network (STN), which represents state roads only, and the Wisconsin Information System for Local Roads (WISLR), which represents all roads but focuses on local roads. As previous research developed methods for joining the two data sets, little was done to improve the resolution of the state roadway system within WISLR. Improving this resolution will greatly enhance the functionality of the Incident Location Tool (ILT) along state routes, as well as crash data analysis across the state and the reporting requirements of ARNOLD. Therefore, it is desirable to edit WISLR to accurately reflect all state roads. This ongoing research presents the technical details associated with interpreting the two distinct LRSs spatially, the technique used to edit the data through remote access, naming conventions of the various roadway components to aid in final route sorting, and coordination with WisDOT so that daily use of WISLR is uninterrupted.

4.1.2 New Jersey's Enhanced Road Centerline Data Model

Presenter(s)

Kenneth Contrisciane
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Session Description: In a coordinated effort with the New Jersey Department of Transportation (NJDOT) and various partners at the state, county and local levels, the New Jersey Office of Information Technology (NJOIT) has established a new segment-based enhanced GIS roadway centerline data model. Several improvements were performed to the former NJDOT roadway network to provide a single statewide roads centerline dataset that now serves the needs of extended New Jersey GIS user community. This enhanced network includes support for features such as address ranges, multiple LRMs, multiple roadway aliasing, multiple roadway shielding, and turning restrictions. Maintenance of the new centerline dataset has brought about numerous challenges and continues to be evolving process as input is received from a growing number of GIS partners. This presentation will provide an overview of the NJ Road Centerline data model and highlight the current challenges involved in maintaining the segment-based dataset.

4.1.3 NCDOT Roads and Highways RoadMap

Presenter(s)

Tim Sheldon
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John Farley
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Session Description: The North Carolina Department of Transportation (NCDOT) is implementing Esri's Roads & Highways (R&H) to maintain its' Enterprise LRS of approximately 104,000 road miles (80,000 system, 24,000 non-system roads). Project tasks include: R&H implementation, legacy systems integration, business processes re-engineering, and distributed maintenance using Esri's Roadway Characteristics Editor (RCE). This presentation will provide key success factors and lessons learned to current and potential R&H adopters.

4.2.1 Overview of the Second Generation of Iowa Statewide Traffic Analysis Model (iTRAM)

Presenter(s)

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Jeff von Brown
Transportation Planner II
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Session Description: The second generation Iowa Statewide Traffic Analysis Model (iTRAM) (completion pending) continues to evolve how future traffic forecasts and scenarios are analyzed. In addition to updating the data, the new model includes; destination choice distribution, a passenger rail model and a multi-modal freight commodity model. An FRA grant allowed the inclusion of the freight rail component, which is unique to the practice. This component estimates national commodity movements to the sub-county TAZ level, allowing analysis of potential impacts to the infrastructure. This state-of-the-art, new generation model allows for a wide variety of scenario testing including changes to; modes, commodities, and network locations. Analysis of potential impacts to the state transportation networks will make the power of this tool a cornerstone to Iowa's transportation planning. An overview of the new components, as well as scenarios and capabilities of the model will be discussed in this presentation.

4.2.2 Developing interactive mapping for supporting county roads improvement and transportation planning

Presenter(s)

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Bradley Wentz
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Session Description: Due to increase of oil traffic and agricultural movements in North Dakota, country road needs study became one of critical necessities to support energy and agricultural logistics throughout the state. Travel demand modeling forecast the future 20-year traffic data, which can be used as a source of life-cycle cost analysis. In addition to traffic data, infrastructure status and current economic activities on county roads are critical information for economic analysis. County engineers provide this information to address realistic situations. A research team developed a questionnaire and paper map survey tool for data gathering. The process is costly and time-consuming process in that the travel demand model and economic analysis are conducted every the other year by updating all those input parameters. This presentation provides an interactive online tool for county engineers, therefore up-to-date information can be shared and better forecasting results are expected.

4.2.3 Developing Travel Shed TAZ Using ArcGIS

Presenter(s)

Erich Rentz
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Session Description: Transportation models delineate their jurisdictions into Traffic Analysis Zones (TAZ) based on travel barriers such as ridge lines, rivers, railroad tracks, and major roadways in order to disaggregate a planning region's socio-economic characteristics. RSG developed a semi-automated ArcGIS based TAZ delineation approach in which roadway facilities are viewed as catchments akin to rivers in a hydrological system. This presentation will describe the process that was developed to automate the TAZ delineation on a statewide scale.

4.3.1 Tennessee Department of Transportation's Straight Line Diagram Application

Presenter(s)

Brian Terrell
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Bruce Aquilla
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Session Description: The Tennessee Department of Transportation (TDOT) provides a robust set of decision support tools to its enterprise in analyzing its road network. One method of linear analysis not available to TDOT was the ability to generate a straight line diagram (SLD). The Planning Department at TDOT then began the process of interviewing the various operational divisions. Among the departments that were identified as needing the SLD are planning, traffic engineering, maintenance and safety. TDOT wanted its SLD application to be an enterprise solution. This entailed designing a flexible architecture that would allow the application to be launched from the Image Viewer system and also in a standalone capacity. This presentation will address the business drivers, development methodology and functionality of TDOT's enterprise SLD solution.

4.3.2 New Jersey Department of Transportation Pedestrian Safety Analysis Tool

Presenter(s)

Justin Furch, MCTS
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Michael Baker International
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Session Description: The New Jersey Department of Transportation (NJDOT) contracted to develop a Pedestrian Safety Analysis Tool (PSAT) to assist the New Jersey Department of Transportation (NJDOT) in focusing investments in areas of high need. The primary goal of the PSAT is to prioritize pedestrian improvements throughout the state and has the capability of identifying potential projects to improve pedestrian access and mobility. The application was designed as a user-friendly, LRS-based application that creates a numerically ranked list of locations for potential pedestrian project based on spatial data. This output is used to assist in developing statements of need for pedestrian specific improvement projects and/or expand the scope of other construction or maintenance projects to improve the pedestrian environment. Participants attending this presentation will be shown how different datasets were combined using LRS techniques, and the methodology used to score and prioritize roadway sections.

4.3.3 CTPP Crash Course - Emphasis on new mapping capabilites

Presenter(s)

Phil Mescher
Travel Modeling, Forecasting & Telemetrics Team Leader
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Session Description: Census data on demographics and journey to work travel flows are key inputs to a variety of state, regional and local transportation policy and planning efforts. They also support corridor and project studies, environmental analyses and emergency operations management. In 1990, 2000, 2006, and again in 2014, AASHTO partnered with all of the states to support the development of special census products and data tabulations for transportation. These census transportation data packages have proved invaluable in understanding characteristics about where people live and work, their commuting patterns and the modes they use for getting to work. This presentation will be a brief guided tour to the CTPP program with emphasis on the CTPP Data, The CTPP software has recently been improved to be able to map aggregated geographies and to show flows, cloropleths and other capabilities for small users who may not have access to GIS.

4.4.1 A Viable Solution for Curvature and Gradient Calculation

Presenter(s)

Joe Breyer
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Session Description: Elevation data are abundant from GPS traces, but often exist in separate data stores apart from master street centerlines. HPMS requires gradient and curvature for sample panels. Safety analysis will benefit from the same. A state and county DOT were recent recipients of enhanced data stores that are endowed with Z-coordinates from GPS onto (previously) 2-D master street centerlines. The delivered centerline allows for automatic calculation of HPMS curve and grade attributes for any component of the same centerline file. This presentation reviews the workflow for accomplishing these feats in ArcGIS Desktop. Options for auto-populating curves from GPS - or from existing 2-d centerlines - will be shown. For gradients, an entire library of grade profiles can be created even when your elevations are not stored on the master centerline. Profiles are further augmented with any event data from a straight line diagram. Examples from Arizona DOT and Adams County CO are proposed.

4.4.2 Enabling elevation information on a road network for routing applications

Presenter(s)

Dr. Jay Sandhu
Lead Product Engineer - Network Analyst
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Session Description: Street data available for transportation applications usually ignores terrain information. Recent advances in modelling 3D enabled networks is opening new possibilities for their use in transportation. The 3D aspect can enable applications for interior spaces as well as for terrain. However simply having elevation information on a road geometry is not enough for optimal use. This paper discusses how to model the third dimension and derive useful measures for further use in routing and related applications.

4.4.3 Coastal Surge Inundation Mapping on the New Jersey Turnpike and Garden State Parkway

Presenter(s)

Thomas Tiner
National Transportation GIT Manager
Michael Baker International
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Session Description: In October 2012, Hurricane Sandy made landfall in New Jersey and caused widespread damage and disruptions. The New Jersey Turnpike (NJTP) and Garden State Parkway (GSP) and their related facilities were inundated with massive amounts of water during the storm. As part of a plan to mitigate and forecast future flooding from coastal events, the NJTA asked Michael Baker International (Baker) to assist in mapping specific coastal flood elevations throughout the NJTA network, including interchanges, ramps, and police and maintenance facilities. This presentation will demonstrate the GIS tools and methodologies leveraged to deliver a planning tool to support predictive modeling and related emergency response planning. In the event of an approaching storm, the NJTA will be able to refer to these detailed, network-specific map products and the dynamic web-enabled application interface to select an appropriate expected flood elevation based on forecasted storm surges.

5.1.1 Automated Enforcement of High Resolution Terrain Models

Presenter(s)

Brian Gelder
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Session Description: The use of high resolution topographic surveys in hydrologic and hydraulic simulations often present problems due to numerous flow obstructions such as roads, bridges, and trees. To overcome these difficulties we propose an automated hydrologic enforcement algorithm that connects areas of channelized flow and replaces elevations in the DEM as needed to enable flow. The proposed method consists of five main procedures: initial DEM cleaning and pit filling, fill region (depression) delineation by hole punching, preliminary channel enforcement, channel cutting, and validation. A comparison of connections enforced by the algorithms versus connections delineated by a trained analyst indicates accuracy better than 95% in a variety of situations. The automated algorithms also detect channelized flow in some situations that trained analysts do not.

5.1.2 Tennessee Department of Transportation's Image Viewer Application

Presenter(s)

Jeff Murphy
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Bruce Aquila
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Intergraph Corporation
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Session Description: The Tennessee Department of Transportation (TDOT) was looking to upgrade its photo-log application to a more modern browser based web application to support our ETRIMS web application. The viewer was to be designed without using browser based plug-ins so it can be used on multiple browsers such as Safari, Chrome and Internet Explorer. Also, the viewer will include map and data grids that will provide access to supplemental information for more detailed analysis.

5.1.3 Managing Remote Sensing Data With Erdas Apollo

Presenter(s)

Tom Samson
Information Technology Specialist
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Session Description: The Iowa Department of Transportation recently purchased Erdas Apollo to help manage their vast amount of LiDAR and aerial imagery data currently available to its internal users. Examples of how the Iowa DOT is using Apollo Advantage-Professional to distribute large amounts of imagery and LiDAR data to client desktop software will be shown in this presentation. Interoperable web services such as WMS, WMTS, WCS, WFS and others may be enabled along with clip-zip-ship workflows for data distribution are available through Apollo. Last, how spatial and non-spatial data is cataloged, managed and delivered using this product will be discussed.

5.2.1 Geospatial Data Collaboration

Presenter(s)

Mark Sarmiento
GIS Planning Analyst
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Session Description: The Federal Highway Administration's (FHWA) Every Day Counts: Geospatial Data Collaboration initiative focuses on the use of geospatial tools to increase collaboration, improve information-sharing, and streamline transportation decision-making. To explore the use of geospatial tools to improve data-sharing in more depth, FHWA and the U.S. Department of Transportation's Volpe Center interviewed 22 transportation agencies, developed case studies highlighting their efforts, and sponsored two peer exchanges that convened these agencies to discuss their experiences. This presentation will highlight themes and findings from the case studies and peer exchanges, including how transportation agencies are collecting, integrating, and consolidating geospatial data into a common framework; and how they are using these frameworks to improve transportation decision-making. The presentation will highlight examples of noteworthy practices and successful strategies to address common challenges.

5.2.2 Utilizing ARNOLD to Support National Performance Management Initiatives

Presenter(s)

Tom Roff
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Session Description: In August 2012, the Federal Highway Administration (FHWA) issued a memo to the State Departments of Transportation (DOTs) which expanded on the requirement to submit geospatial network data representative of Federal-aid roads, via annual Highway Performance Monitoring System (HPMS) reporting activities. Per the memo, the State DOTs were required to submit geospatial network data representative of all public roads, i.e., ARNOLD (All Roads Network of Linear Referenced Data), via HPMS beginning in June 2014. This presentation will discuss ways in which ARNOLD will serve as the framework for integrating various forms of State DOT-provided transportation infrastructure data to help support various national-level analysis, reporting, and performance management initiatives.

5.2.3 The All Public Roads Geospatial Study (ARNOLD) Final Report and Pooled Fund Study Status

Presenter(s)

Joseph Hausman
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Session Description: Last year, HPMS reporting requirements expanded from mapping just the Federal-Aid System to include ALL public roads. Many States have been challenged by this expanded requirement. FHWA recognizes that working with local authorities and partnering with non-State DOT organizations is important to build a cohesive spatial network of roadways as envisioned BY NSGIC and represented in the vison for the Transportation for the Nation (TFTN). The final guidance document for the All public Roads Geospatial Representation Study (ARNOLD) was released on 9/15/2014. The first part of the presentation will present an overview of this document. As a follow-up to the guidance, FHWA has initiated a Pooled Fund Study (PFS) to assist States in developing their ARNOLD and to meet the HPMS requirements. The second part of this presentation will update the PFS status of the participating States and lessons learned so far.

5.3.1 Exploring Varied Uses of ArcGIS Online within the WSDOT Online Map Center

Presenter(s)
Heath Brackett
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Session Description: In August 2012 the Washington State Department of Transportation launched the WSDOT Online Map Center – our instance of ArcGIS Online for Organizations – through an AASHTO TIG grant. Since then, we have witnessed substantial changes to the ArcGIS Online platform along with consistent membership growth and usage in the WSDOT Online Map Center. WSDOT business offices are increasingly identifying the need to share information publicly and have been looking to ArcGIS Online to accomplish their goals. This talk will highlight a few unique use cases from the WSDOT Online Map Center and identify the goals, strengths, weaknesses and obstacles pertaining to each of these projects.

5.3.2 Integration of GIS and EDMS at Ohio DOT

Presenter(s)
Walter (Terry) Cline
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Session Description: This session will focus on Ohio DOT's development of a Geotechnical Data Management System (GDMS). The GDMS is a one stop shop for all geotechnical information related to ODOT projects. The GDMS has a graphical user interface driven by ESRI's web based products, with document access provided by tsaADVET's Falcon/DMS product line. This session will include a live, online demonstration of the current GDMS system

5.3.3 North Jersey Transportation Planning Authority Asset Management Model

Presenter(s)
Nick Hutton
Senior Project Manager
Michael Baker International
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Session Description: The North Jersey Transportation Planning Authority (NJTPA) has contracted with Michael Baker to develop a unified asset management (geo) database model that is designed to support the agency with their regional-level transportation planning activities. The project included the gathering and assessment of the county-level data and then publishing the data (as feature services) to NJTPA's ArcGIS Online (AGO) Organizational Account. A series of ETL scripts were then developed to programmatically extract the county-level data (from AGO) and load it into the unified data model on a periodic basis. This presentation will provide the participants with an overview of the entire project workflow process; it will highlight some of the key challenges that the project team encountered along the way particularly those associated with harvesting and maintaining data from external sources - and will include a demonstration of the solutions implemented.

5.4.1 Improving Safety Programs through Spatial Data Governance and Business Planning

Presenter(s)

James Hall
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Session Description: Data Governance and data business planning are essential components of effective GIS implementation. The distribution of a wide variety of spatially-referenced data for safety-related decision making across the agency is a high benefit area for transportation agencies. MAP-21 establishes a performance-based transportation program with a strong emphasis on information systems for collecting, analyzing, and managing safety data. Safety-related data spans multiple business areas and requires a formalized and attentive data governance and data business planning process focused on the safety program decision making needs. This session explores the scope of agency spatial safety data planning activities. The presentation will also highlight the results of a peer exchange on Improving Safety Programs through Data Governance and Data Business Planning. Participants included FHWA, AASHTO, and ten State DOT representatives from safety, statewide data, GIS, and information technology.

5.4.2 PennDOT Bridge Scour Initiatives

Presenter(s)

Frank DeSendi
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Session Description: PennDOT has undertaken several bridge initiatives over the last twelve months. An area of primary concern has been bridge scour. Bridge monitoring and scour inspections occur during and after significant rain or flood events. Monitoring and inspections are not just the responsibility of PennDOT, but local bridge owners too. PennDOT has developed a Bridge Scour inspection tool to quickly identify structures requiring inspection. The tool saves many man days and eliminates delays occurring from the old methodology. Additionally, PennDOT has developed a mapping web site for local municipalities. The site identifies the bridges they are responsible for monitoring during flood events. This presentation will discuss PennDOT's effort facilitating bridge scour monitoring and inspection through GIS-T tools.

5.4.3 Paint Reflectivity Analysis for Decision Making

Presenter(s)

Shawn Blaesing-Thompson
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Joseph Drahos
Program Planner
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Session Description: Iowa Department of Transportation (IA DOT) spends almost $7 million in paint, equipment, and staff repainting the yellow and white pavement markings across six maintenance districts. While traffic account for part of the wear and tear of these markings, some of the degradation is thought to be due to the use of snow plows and deicing materials in winter. As part of the performance measure of paint reflectivity, data is collected every spring and fall which can be used to evaluate the longevity of paint. IA DOT is working towards a process to compare fall and spring for the same location, to identify where paint is under-performing. This will leverage existing datasets such as historical reflectivity readings, snow plow passes through our GPS AVL system and identifying existing areas of grooved stripes to assess paint longevity.

6.1.1 The use of tablet technology for roadside feature condition reporting and decision making

Presenter(s)

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Brad Cutler
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Session Description: In 2013, Iowa DOT finished research to streamline field inventory/inspection of culverts by Maintenance and Construction staff, maximizing the use of tablet technologies. After a small-scale deployment of tablets in spring 2013, the DOT moved forward with a plan to use ArcGIS Server, ArcGIS Online and Collector for feature inventory and inspection. The roll out of the first of a series of production field inspection applications on a tablet is scheduled for November 2014 beginning with guardrail and expanding to culverts, signs and a series of other features over the following months. The development of inspection documents and an updated workflow process is underway. Inspection information will feed into IA DOTs LRS and asset management system and make the information available enterprise-wide for decision making.

6.1.2 Mobile Strategy: Making the Choice to go Mobile

Presenter(s)

Matt McCracken
Project Manager
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Session Description: From basic form data collection to asset inventory and inspection, commercial off-the-shelf(COTS) products like ArcGIS Collector are transforming mobile data collection and validation. Although these products are simple to use, it does require some setup knowledge and configuration. This presentation will focus on lessons learned from previous mobile projects and it will provide case studies to better under understand the options for going mobile.

6.1.3 Mobile GIS for Airports

Presenter(s)

Raymond Mandli
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Mitch Caya
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Session Description: Airport runways are a difficult and costly environment for the collection of pavement condition data. In order to be most effective the entire width of the runway must be collected, requiring several overlapping passes with a collection vehicle. For years manual referencing has been the most popular method available for ensuring that no gaps occur in the collection. Additionally, runways are most often collected at night to minimize traffic downtime, making the use of manual reference methods all the more difficult. In order to increase collection efficiency Mandli Communications has integrated drive by wire technology to create a tier III autonomous data collection vehicle. The autonomous vehicle follows a shapefile route to guarantee that there are no gaps in collection. The perfect routing system has lead to a 30% gain in efficiency in initial testing, and Mandli believes that with further testing those gains can be increased. With the collection of full pavement condition information, as well as imaging and LiDAR data, there are multiple additional use cases for the dataset, including asset extraction and FOD inventory. By utilizing drive by wire technology to create an autonomous vehicle Mandli is able to see a substantial increase in efficiency, accuracy, and confidence when collecting data on airport runways.

6.2.1 SHRP 2 Roadway Information Database: Data and Applications

Presenter(s)

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Session Description: Under SHRP 2 Project S04A, a Roadway Information Database (RID) encompassing data from the SHRP 2 mobile data collection project (S04B), other existing roadway data from public resources and supplemental traffic operations data was designed, built and populated. The RID was designed to provide high-quality data that are linkable to the SHRP 2 Naturalistic Driving Study (NDS) database and accessible using GIS tools. A mobile data collection vendor was selected after a broad technology evaluation. A quality assurance and quality control plan defined data accuracy requirements and tolerances and outlined the handling of non-conforming data. Data are referenced to a national basemap for a consistent centerline across the six NDS sites, and users can employ dynamic segmentation to produce road segments with any variable of interest. This presentation will provide an overview of the RID with emphasis on data collection, quality control techniques and demonstration applications/linkages.

6.2.2 FHWA Support of SHRP2 Safety Data Analysis

Presenter(s)

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Charles Fay
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Session Description: To add context to the SHRP2 NDS data, detailed roadway information was collected to populate the GIS-based Roadway Information Database (RID). This presentation will showcase FHWA efforts related to this data and the value to State DOTs in particular. This includes the Safety Training and Analysis Center (STAC), which will provide webinars, provide SHRP2 data access support, and technical assistance and training. Also, FHWA partnered with AASHTO to solicit research proposals from State DOT-led project teams through the Implementation Assistance Program (IAP). These project teams are using the SHRP2 Safety data to explore research topics that include speeding, high-visibility markings, distraction in work zones, and horizontal and vertical alignment interactions. In addition, there are other GIS-related opportunities associated with this data including a review of the RID data collection and QA/QC methods, data integration, standards for data collection, or accuracy specifications.

6.2.3 GIS Linkages with the SHRP2 Roadway Information Database

Presenter(s)

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Michael Dimaiuta, P.E.
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Session Description: The Roadway Information Database (RID) combines road geometry and inventory data with supplementaal data on vehicle crashes, weather, and traffic conflated to a common road centerline network for 6 study areas participating in the SHRP2 Naturalistic Driving Study. The RID provides transportation researchers with unique opportunities to explore relationships between roadway characteristics, driver behavior, crash rates and other factors in a single geospatial database. FHWA is sponsoring a research study to assess potential applications of the RID for highway safety data collection and analysis. This presentation will discuss findings from the research study, including a review of the current RID data, additional data that could be merged with it using geospatial analysis and linear referencing methods, promising safety related research and applications that could be supported, and implications for future roadway data collection activities to support highway safety planning and analysi

6.3.1 New TDOT SmartWay Solutions and Open Data

Presenter(s)
Van Colebank
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Session Description: The TN Department of Transportation (TDOT) has been working on new architecture and solutions to support public availability of data and traffic information. The creation of an Open Data API has been created to provide a framework for users to consume data feeds for a variety of transportation information and integrate into their own applications or solutions. The new SmartWay Traffic application is built to improve user experience for accessing real-time traffic information and consumes the Open Data API. The Open Data API is populated by source information reported by TDOT's Traffic Management Centers through the SWIFT incident and traffic operations dashboard. SmartWay Traffic is built using responsive design to optimize for a wide variety of devices and compatible with modern web browser technology. TDOT has also established streaming video technology making real-time traffic camera video available to partnering agencies.

6.3.2 Data Transparency for Collaboration

Presenter(s)
Becky Hjelm
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Session Description: The Utah Department of Transportation is a data rich and highly transparent organization. Our goal is to provide public access to our data and project information for improved collaboration both internally and externally. We chose to incorporate Open Data into our existing data portal because it adds functionality, improves our interface and reduces our dependency on custom development. It has streamlined the way we provide public access to our data. Our original portal allowed for download of shapefiles and kmls only, now we offer csv and easy access to APIs. The attribute and area filtering have received positive feedback from our users because of the improved interface. During our implementation, we addressed several data issues and incorporated data assessment into our workflow. In six months were able to move Open Data to production. We will to share our challenges and our success with Open Data and what the next phase looks like for our DOT.

6.3.3 Crowdsourcing Strategies Involving Users In Pedestrian System Inventory and Analysis

Presenter(s)
Christopher J. Seeger
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Session Description: Many small communities face challenges collecting the data necessary to map, visualize and model the existing pedestrian and bike systems data needed to analyze factors affecting use (connectivity, condition, adjacency and accessibility). As a community-planning component in Iowa, crowdsourcing has proven a viable method for gathering georeferenced information about the local network in more than 60 communities. This presentation discusses how technology and crowdsourcing techniques have been implemented to help communities map the location and condition of sidewalks around elementary schools as part of their Safe Routes to School (SRTS) program as well as locations where older residents desire to walk/bike (parks, downtown, grocery store). The presentation contrasts two approaches. The first uses GIS-enabled smartphones while the second approach utilizes web-mapping technologies. Both approaches allow citizens to contribute their local knowledge of the community transportation system.

6.4.1 The Past, Present and Future of Manitoba's Road Network

Presenter(s)

Andrew Lindsay
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Session Description: MIT requires an improved GIS road network to support its internal operations such as locating assets, routing service vehicles, routing oversize/overweight vehicles, highway conditions reporting (Road Info) and to support capital planning. Currently no single organization has overall responsibility for managing and maintaining a GIS road network for Manitoba. Various components are maintained in a piecemeal fashion with no coordination. Some components are not maintained at all. MIT established the Manitoba Road Network Program to improve and expand the scope of the current GIS road network. One of the principal objectives is to use the best information available from all sources to create the best possible GIS road network.

6.4.2 Managing Pavement Information with LRS

Presenter(s)

Mark Yerington
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Randy Hill
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Session Description: In the City of Muscatine, IA keeping pavement information current proved to be troublesome, so the right information is handed over to CTRE and roadware for compilation of pavement condition information. The City of Muscatine and MAGIC (Muscatine Area Geographic Information Consortium) decided to implement a new solution that will keep data current and in sync through LRS (Linear Referencing) in an enterprise geodatabase. MAGIC used a database model provided by ESRI, and modified it to fit the needs of the City of Muscatine and the data that they had available. This project proved to be very beneficial in the last update of pavement condition information. It allowed the City of Muscatine to export information to CTRE. The updated pavement condition was then used to update the master GIS database. This information can be used to analyze and develop a master plan for the next 5 years of budget using dTIMS and GIS.

6.4.3 Calculating Cumulative Non-Negative Elevation Gain for Bicycle Route Choice Modelling

Presenter(s)

Erich Rentz
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Session Description: One decision that cyclists confront is whether or not to choose routes with steep grades. Transportation modelers account for elevation as a factor in bicycle route choice modeling with an implicit assumption that steep slopes will be avoided where/when possible. But, how can modelers relate elevation gain over network links as a variable in such a way as to relate perceived effort to traverse those links? Cumulative non-negative elevation gain is one such way to quantify travel in an uphill direction. This presentation will cover the method developed to calculate cumulative non-negative elevation gain and the advantages that this measure holds over other measures such as slope and absolute elevation gain.

7.1.1 Arkansas vs. ARNOLD - Creating an All Public Roads LRS in Razorback country

Presenter(s)

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Jonathan Duran
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Session Description: Since the August 2012 memorandum came out requiring all states to develop an All Public Roads LRS, Arkansas has been busy developing a methodology to complete the Federal requirement. This presentation will highlight that methodology including funding, partnering with our Geographic Information Office, promoting county and city involvement and ingesting addressing in the LRS. In addition, we will share our hiccups along the way and demonstrate how we plan to carry out the goal of having one network across the state that can be used to accomplish any number of initiatives and analysis all the way down to the local level. We will also present our current data set and demonstrate its functionality in the real world.

7.1.2 Mississippi Dept. of Transportation - Crash Edit Tool (CET)

Presenter(s)

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Bruce Aquila
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Session Description: In 2010, MDOT implemented the Crash Edit Tool (CET), an application to manually edit crash data for use with MDOT's Safety Analysis Management System (SAMS). Built as web app, a data analyst has the ability to open the CET application with any browser and query for crash records by date range or crash id, and edit a crash record's text attributes and spatial location. With the ability to have human eyes look at every record coming into SAMS and the ability to check and improve each record's accuracy, it makes for much greater confidence in the SAMS analyses and produces more reliable results. With CET, MDOT cleans current and historical crash records at a swift pace and maintains a high percentage of accuracy and validity as well as providing MDOT with an activity log of information related to each user's edit history and an agency quality log to help determine the quality of each agency's crash reports.

7.1.3 Transforming 511 GIS with FME

Presenter(s)

David Runneals
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Sinclair Stolle
511/Traveler Information Program Engineer
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Session Description: David will detail his work with Sinclair and the Iowa DOT's Traffic Operations Center (TOC) to transform and format Iowa's CARS XML feed into a GIS friendly format. He will also detail about his work transforming surrounding states data. Sinclair will talk about how the Iowa TOC plans on utilizing the data to evaluate surrounding events and their potential impact on traffic in Iowa. The presentation will conclude with details on how you can transform your 511 data with FME and how you can sell change to those naysayers in your organization.

7.2.1 Visualize and Analyze Your LRS Data

Presenter(s)

Bo Guo
President
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Session Description: Voluminous LRS data has been accumulated at state DOTs as the result of years of HPMS reporting effort. However, successful HPMS submissions to the Feds are only half the battle. Transportation professionals are looking for ways to access and analyze LRS data with ease and consistency. The author first introduces and demonstrates various dimensions and angles to visualize LRS data through tools like the straight-line diagram, time-space diagram, layer attribute diagram, charts, reports, and of course, maps. The author then presents an LRS data analysis and reporting framework that help to overcome the challenges resulting from LRS data normalization. The author will demonstrate these functions to generate and visualize an overlay operation involving multiple LRS layers, and QC reports of LRS network anomalies through the use of LinearBench products.

7.2.2 Michigan's Geospatial Enterprise Information Management

Presenter(s)

Joshua Ross
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Session Description: Through the Michigan Geographic Framework (MGF) Program, the State of Michigan, Department of Technology, Management & Budget has developed a holistic approach for managing and maintaining the core enterprise spatial assets including one integrated transportation network that houses both the Linear Referencing System and the addressing system for all roads. During this presentation, the Michigan Center for Shared Solution will provide details on their approach, highlighting the data model and integration process into other agency business databases, business and sustainability model, and best practices / lessons learned to be considered when building the national file.

7.2.3 Modernizing the HPMS Process at ALDOT

Presenter(s)

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Troy Marsh
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Session Description: Over the last several years, ALDOT has undergone widespread modernization to improve the annual HPMS submittal. Data deficiencies, duplicate data, changing FHWA requirements, and other issues contributed to a challenging submittal process. ALDOT initiated several projects to overcome these challenges and improve the quality of ALDOT's HPMS submittal. One of those projects is ALDOT's new EGIS program. A key EGIS program goal is to improve the HPMS process by leveraging Enterprise GIS as the authoritative data source. To achieve that goal, the EGIS Program has established a new, authoritative Linear Referencing System using Esri's Roads and Highways. The new LRS and data model, supported by a broad suite of tools to streamline the data maintenance and submittal process, will serve as the foundation for HPMS at ALDOT in the future.This presentation will review the history of HPMS at ALDOT and provide an overview of the new data model and tools implemented under ALDOT's EGIS program.

7.3.1 ITMS: Information Inside and Out

Presenter(s)

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Mitch Stephens
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Session Description: The Integrated Transportation Management System (ITMS) has been deployed for years and is one of the most comprehensive enterprise query tools in production in a DOT. ITMS offers users the ability to query for data across multiple enterprise solutions in real time. As new management systems have been implemented in SCDOT, ITMS now offers users the ability to query and report on information from just about every major system in SCDOT. This presentation will focus on SCDOT's efforts to enhance ITMS for both the everyday SCDOT user and the new external website for the general public.

7.3.2 The Iowa DOT Interstate Condition Evaluation (ICE) Tool

Presenter(s)

Adam Shell
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Kyle Barichello
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Session Description: The Interstate Condition Evaluation (ICE) tool is the combination of seven individual criteria that were merged through a linear overlay process including the Iowa DOT's in-house Geographic Information Management System (GIMS) and Pavement Management Information Systems (PMIS). Through the ICE tool, the Iowa DOT is able to evaluate the entire Interstate mainline system using a single composite rating. This evaluation was the basis for development of the Interstate Corridor Plan. Development of the ICE tool relied heavily on the use of LRS and linear overlay processing. Through the Linear Overlay process, a single table is created and stored in Oracle Spatial. This table is then further analyzed and processed using Structure Query Language (SQL) to achieve data normalization, weighting, and composite rating as determined by input from the internal stakeholder group. The results from the ICE tool are presented in the plan and in webmap applications including ArcGIS Online and Geocortex /

7.3.3 Iowa Pavement Management Program: Towards a more interactive asset management paradigm for local agencies

Presenter(s)

Inya Nlenanya
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Session Description: The Iowa Pavement Management Program (IPMP) provides information and tools that assists local transportation agencies in making decisions about spending roadway maintenance funds. The IPMP has been in operation since 1999 and was developed in a geographic information system (GIS) environment to facilitate data integration and to support easier access and use of information. However, as part of its support of asset management activities for local agencies, the Iowa DOT will fund collection and processing of automated pavement distress data for all paved public roads in Iowa beginning in 2013 prompting the need for the use of ESRI's ArcGIS Online to deliver the data to the agencies and to package it in a way that provides for a more interactive engagement with the data. This presentation will briefly discuss the results of the user needs analysis and explore the ongoing stage of the project to deliver to these needs.

7.4.1 Automated Turning Movements and Traffic Counts Using Video Analytics

Presenter(s)

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Bill Schuman
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Session Description: This presentation highlights the use of video analytics to automate the capture of turning movements and traffic counts at intersections. Traditionally, DOTs and engineering firms have captured turning movements at intersections manually at the intersection or back in the office with recorded video. Using these same output video files, Transcend has developed Intersection AnalyzerTM that utilizes video analytics as the foundation for automating these counts and providing an easy-to-use interface for querying and reporting the resulting counts. Videos from several clients will be used to illustrate the capabilities and discuss the standards and processes needed to help ensure that 95% or better accuracy is obtained. Intersection Analyzer has been integrated with Transcend's straight line diagramming tool called Road Analyzer and intersection data can be stored in Esri's Roads and Highways.

7.4.2 Improving Traffic Data Collection and Analysis using innovative technologies

Presenter(s)

Greg Ulp
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Session Description: PennDOT currently maintains a Traffic Data System (TDS) comprised of multiple computer applications that manage traffic data collection and reporting from 92 permanent collection sites and more than 45,000 short-term collection sites. In 2013, GeoDecisons was awarded a contract by the Pennsylvania Department of Transportation (PennDOT) Bureau of Planning and Research to redesign its TDS. The new TDS enables PennDOT personnel to better manage, analyze, and report traffic data; automates procedures; consolidates duplicate functionality; and improves workflow management. The TDS improvement project transformed PennDOT's nine existing traffic data applications into 2 main modules. With a traffic data portal as the centralized hub, new TDS modules streamline PennDOT's procedures for managing traffic site information, polling and data processing, validating traffic counts, and accessing reports and statistics. The new design incorporates new mapping and plotting capabilities.

7.4.3 Transferability of Activity-Based Travel Demand Model to Small/Medium Size Region

Presenter(s)

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Session Description: The traditional four steps travel demand modeling is widely used and well recognized, albeit the derived demand of multivariate fuzzy transportation network systems and its components dynamics and characteristics are very complex in nature. The traditional approach are not capable of producing accurate and reliable estimates. Therefore, an activity based travel demand modeling is necessary for accurate and precise transportation planning. However, an activity based travel demand modeling requires an extensive data collection and analysis which require high level of skills, time, and heavy cost. Therefore, the main aims of this ongoing study is to discover the transferability of the existing activity based travel demand model to Fargo-Moorhead Metro Area. It was strongly hypothesized that a significant number of sub-models might be able to transfer though each region travel demand model is derived demand which is unique in nature and can influence the credibility of the transfer model.

1987	**Tempe, Arizona**
1989	**Orlando, Florida**
1990	**San Antonio, Texas**
1991	**Orlando, Florida**
1992	**Portland, Oregon**
1993	**Albuquerque, New Mexico**
1994	**Norfolk, Virginia**
1995	**Sparks, Nevada**
1996	**Kansas City, Missouri**
1997	**Greensboro, North Carolina**
1998	**Salt Lake City, Utah**
1999	**San Diego, California**
2000	**Minneapolis, Minnesota**
2001	**Arlington, Virginia**
2002	**Atlanta, Georgia**
2003	**Colorado Springs, Colorado**
2004	**Rapid City, South Dakota**
2005	**Lincoln, Nebraska**
2006	**Columbus, Ohio**
2007	**Nashville, Tennessee**
2008	**Houston, Texas**
2009	**Oklahoma City, Oklahoma**
2010	**Charleston, West Virginia**
2011	**Hershey, Pennsylvania**
2012	**Loveland, Colorado**
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