Probe Data Analytics User Group Web Meeting
March 8, 2018

Agenda:

#	Topic	Speaker
1	Welcome & Coalition Update	Kelly Wells, NCDOT Denise Markow, I-95 Corridor Coalition
2	PDA Suite: What's New	Michael Pack, UMD CATT Lab
3	Spotlight Presentation: PennDOT-sponsored Enhancements to the Probe Data Analytics Suite	Steve Gault, Michael Baker International
4	Feature Spotlight: What's New in the Bottleneck Ranking Tool	Mark Franz, UMD CATT Lab
5	Coming Soon	Michael Pack, UMD CATT Lab
6	Agency Input Session	All Agencies
7	Wrap-up / Next Meeting	Denise Markow, I-95 Corridor Coalition

Next User Group Meeting: TBD

Meeting Highlights:

- **Welcome & Coalition Update**:
  - Kelly Wells (NCDOT) welcomed the group, thanked them for their participation, and introduced the topics/speakers for the meeting.
  - Denise Markow reviewed several recent Coalition meetings that have taken place in an effort to keep all apprised of Coalition activities.
    - RITIS User Group: January 18, 2018. (*Note: John Allen has retired and Michael Pack is now hosting both the RITIS and PDA Suite User Group meetings, therefore, questions can be directed to him.)*
    - I-95 CC Steering Committee meeting: January 25, 2018.
    - I-95 CC Executive Board Strategic Planning Session: February 27, 2018.
    - I-95 CC Bi-Annual Validation Meeting: January 29, 2018.
    - Southern HOGS Exchange: Jan 31 - Feb1, 2018.
    - Volume and Turning Movement Steering Committee meeting: February 13, 2018.
  - Denise Markow mentioned several upcoming Coalition meetings.
    - Maine Heavy Towing Workshop #2: Being rescheduled from March due to weather.
    - TSMO Strategic Planning Session: March 14, 2018.
    - Traveler Information Services Annual Meeting: March 15, 2018.
    - A Work Zone Monitoring Tools National Webinar: April 19, 2018.
    - Computer Aided Dispatch Data Integration Workshop: April 23 and 24, 2018 in Baltimore.

- **PDA Suite: What's new:** Michael Pack discussed new features that have recently been added to the PDA Suite and or will soon be available. Below is an overview of these features.

- PennDOT funded an Application Programming Interface (API). This is for users who want to develop their own applications. It allows users to write code and access their database for the same type of information that can be accessed through the suite.
- MAP-21 Subpart G has now been enabled. Users can see annual hours of peak hour excessive delay per capita after providing UMD Catt Lab with their speed limit data.
- Multi-year MAP-21 visualization has been enabled. **For states that have already purchased RITIS/PDA Suite these data and tools are already available to you.**
- The Trend Map has now been modernized and no longer requires flash player. It uses less memory, can handle more TMCs and has finer granularity; it now has percent readings over time charts.

- **Spotlight Presentation: PennDOT-sponsored Enhancements to the Probe Data Analytics Suite –** Steve Gault (Michael Baker International for PennDOT) discussed enhancements to the Probe Data Analytics Suite that were sponsored by PennDOT.
  - **Background:** The driving force behind these enhancements is PennDOT's goal of establishing a Performance Metrics Program. This program focuses on three areas: Identify the congestion, classify and mitigate. The PDA Suite Enhancements focus on identifying the congestion and answering four basic questions about congestion: how intense is the congestion, how reliable is travel time, when is the congestion occurring, and where is the congestion occurring. Congestion has both spatial and time dimensions. These dimensions can be held constant to visualize variation in the other dimension. The Trend Map tool helps visual where congestion occurs and the timeline within the Bottleneck Ranking Tool helps understand when congestion occurs. It also provides a preliminary screening to differentiate between recurring and non-recurring congestion.
  - **Enhancements:** The enhancements that PennDOT sponsored focused on three areas: calculation of metrics to answer the four identification questions previously mentioned as well the enhancements of the bottleneck metrics, ensuring graphics produced from the PDA Suite would be suitable for reports without editing, and being able to generate similar metrics on a recurring basis through the API.
  - The Trend Map allows the following metrics to be shown visually on a map by time of day: speed, travel time index, buffer time index, and planning time index. The trend map now allows data to be grouped into buckets from 1 minute to 1 hour and can include multiple days to compare results. Steve Gault provided an example of using the trend map for each metric. Steve also showed how the trend map data can be exported as an XML document and can be opened with excel. This provides a spreadsheet with results for the metric that was selected and provides data for every segment that was shown on the map while also color-coding the cells.
  - Performance charts can be customized and new features have been added for customization. Colors and font sizes can be adjusted, and chart titles can be changed. It is recommended to use a large pixel size for printing, and a transparent background. Charts can also be set up to compare different days of the week. It is also possible to include a metric definition on a chart that is being exported.
  - A bottleneck exists when speed drops below 60% of free-flow speed. Bottlenecks have a head location and can grow or shrink upstream of that location. The traditional metric for ranking bottlenecks is the impact factor which considers the time duration of the bottleneck and the queue length. This method did not consider how severe the congestion was. PennDOT and the CATT Lab worked together to develop a new metric that would quantify the severity of the congestion based on the speed differential and the volume. This resulted in the total delay measure which considers volume, magnitude of speed drop, and the length of queue. It is recommended to rank

the bottlenecks based on total delay rather than the base impact factor. Note: the total delay is not an exact delay measure due to the complexity of the computations to allow results to be calculated in a timely manner.

- Steve showed an example using the bottleneck timeline to visualize when congestion is occurring in a particular bottleneck. The timeline can be changed into an elements table for further analysis to show when speed drops below 60% of free flow or the queue length has changed. The elements table can be exported into excel.
- The elements graph visualization shows a combination of the timeline view and a queue length.
- These features are being used with the regional operations plans to identify which projects should be deployed to address congestion. The goal is to give planners the ability to compare congestion with other data via mapping tools to understand how congestion is affecting things and what mitigation strategies would be appropriate to use. PennDOT's One Map platform is being used for this. Currently, the Central Region is being analyzed by looking at the top 50 bottlenecks ranked by total delay.
- In summary, Mapping tools can be used to identify congestion using bottlenecks from PDA Suite. Then they can be used to classify congestion with layers of potential causes by looking at traffic signal locations, crash clusters, weather data, and constructions projects. Then they can be used mitigate potential solutions.
- API is useful in having the congestion identification metrics from the PDA Suite to feed into the mapping platform. There are three basic categories in the APIs. The first category is the segment search which determines TMCs meet defined criteria. The second category is the bottleneck search which lists the bottlenecks and allows the user to request the elements associated with each bottleneck. Everything else falls under the jobs category which entails submitting a request, checking the status, and then retrieving results. This works for exporting performance metrics, and user delay cost. Steve then provided several examples about the APIs for bottlenecks, performance measures, and user delay cost.
- **Q&A:** Steve conducted a brief Q&A session after presenting.
- John (PA Turnpike) asked if once things are grouped for the API, are they always in that group automatically. Steve answered that the same alias name would be used each time a request is submitted for the same group of TMCs.
- (PA Turnpike) asked if these methods would be used for nonrecurring congestion also. Steve answered that this has not been done yet, but possibly in the future it will be possible to take an individual element from the bottleneck elements table and compare it to other systems to determine if there was a specific reason for this to classify probable causes.
- Zoe Neaderland (Vermont Agency of Transportation (VTrans): Asked if the API will be available through Task 4 of the Pooled Fund Study? Michael Pack (CATT Lab) noted that the API is unrelated to the AASHTO PM3 Pooled Fund Study. The API is a provided to those who are funding RITIS and the PDA Suite.
- Patrick Zilliacus (MWCOG) asked if the PennDOT One Map and the metrics presented are available for anyone from outside of PennDOT to use. The response was that they are available for use with an email login, except for some maintenance layers that are unavailable for public use.
- Denise Markow asked Steve to explain using these metrics with work zones. Steve answered that a process of elimination could be used to determine if there was a work zone at a specific time and location by comparing data from the elements table to PennDOT's RCRS program.
- Denise Markow asked Michael Pack if there is any overlap from these metrics to his work zone monitoring tool. Michael answered that Steve is doing in house

development work for PennDOT and that the work zone monitoring tool is a way to visualize performance measures that can come out of probe data and other data elements from RITIS, but he does not believe that they can be compared directly. Steve added that the work zone monitoring tool is real time, while PennDOT is looking to consider congestion over a period of time.

- Kelly Wells (North Carolina DOT) asked if RCRS is integrated with RITIS, and Steve answered yes. They are working through some challenges about how the data feed is being interpreted because there are currently some fields missing, but ultimately that is the goal.
- David Heller (SJTPO) asked if the PennDOT sponsored improvements cover non-PennDOT facilities as well. Michael Pack (CATT Lab) noted that in general, if one agency pays for an enhancement to the system, the CATT Lab makes that enhancement available to other states, too. Everything that Steve presented is available to other agencies using the PDA Suite.

- **Feature Spotlight: What's new in the Bottleneck Ranking Tool –** Mark Franz (UMD CATT Lab) discussed the new features of the bottleneck ranking tool and demonstrated how they can be used via a case study.
  - A new algorithm is being used. It has been available for over a year; however, users previously had the option to use the old algorithm. The old algorithm has now been retired. Mark discussed the advantages of the new algorithm vs the old algorithm. The old algorithm used the average queue length and the average duration of a given bottleneck multiplied by the number of occurrences. The new algorithm can handle the dynamic evolution of congestion within bottlenecks which is a more accurate representation of the queue lengths within each bottleneck. Another advantage of the new algorithm is that it considers the evolution of congestion.
  - Mark discussed the new bottleneck ranking metrics. There are four new metrics: the base impact, speed differential, total delay, and congestion. The base impact is the summation of the queue lengths over time. The severity of the bottleneck is looked at by considering the speed drop of the bottleneck. Multiplying the speed drops by the queue provides the speed differential. Multiplying the speed differential by the AADT then provides the total delay which is recommended when looking at overall cost to society. Multiplying the base impact by the speed percentage drop provides the congestion.
  - Mark showed the format of the new bottleneck table with the new metrics incorporated. This new table also includes links to external tools within the PDA Suite.
  - Mark provided a case study using DC, MD, and VA Interstate Bottlenecks to demonstrate the use of these new metrics and visualizations. These visualizations include a timeline chart, time spiral, and an elements chart.
  - Steve shared that sometimes the probe data can be skewed, especially overnight data. This is a rare occurrence in low volume areas.
  - Steve recommended clarifying what exactly a bottleneck is.

- **Coming Soon –** Michael Pack discussed features of the PDA Suite that are currently being worked on
  - OD Analytics - The State of Maryland is using a new OD Analytics tool. This tool is for integrating OD data from INRIX and allows the user to see where people are moving.
  - XD Support – The CATT Lab is actively working on integrating INRIX XD data into the tools, or at least creating the capability to use the data. This will result in finer granularity, coverage beyond TMCs, higher storage costs, and greater computational load.
  - PennDOT is funding the buildout of arterial performance measures tools. An update and more information will be provided at the next meeting.
  - Sanhita Lahiri (VDOT) asked if other agencies have access to OD tool? Michael Pack (CATT Lab) responded - Yes and No. The tool will work in any geography, BUT it requires the purchase of this new data set from INRIX. Additionally, the CATT Lab would need a little extra funding to process and archive it. If you want more information on the cost of the OD data, you should reach out to INRIX. He also noted that the OD tool also has the ability to visualize Activity Based Model output data--when it's mapped to TMCs. Michael noted that with the model data, is it makes it possible to visualize FUTURE OD patterns based on different scenarios.

- **Agency Input Session**
  - Denise Markow asked if any agencies have thought about using probe data to look at performance of roadways relative to snow operations. Solomon Caviness (NJTPA) responded that from an MPO standpoint, they have not engaged the agencies to that direction but may be something they will discuss at TSMO or HOGS. Jesse Buerk (DVRPC) responded that in the past he has looked at snow days from previous years with the I-95 incident management task force. He stated it is necessary to realize having a short analysis period can cause skewed results. He also stated that it is possible to pick specific dates and look at them as a group.
  - Zoe Neaderland (VTRANS) asked how people are communicating their results of congestion/other analyses and if anyone is using ESRI story map to put together their results. Currently, VTRANS is working on a story map for a large corridor study where they are exploring how to do that. Kelly Wells asked if they have conflated their TMCs to their GIS system yet. Zoe answered that they have completed that for the corridor.
  - Kelly Wells (NCDOT) asked Steve if any of the work he has done with PennDOT was completed in GIS. Steve answered that one map was a GIS based platform. To avoid the conflation issue, they plot the bottlenecks using the coordinates through the API.
  - Kelly Wells (NCDOT) asked Michael Pack if it is possible to have boundaries in parts of VPP other than MAP-21 performance measure widgets. Michael answered that he will work with development to discuss making this possible.
  - Solomon Caviness (NJTPA) replied to Zoe's question regarding evaluating strategies using PDA. They are working on a TSMO business case project and they are looking at some of the strategies in the region.
  - Jungwook Jun (VDOT) noted that the Trend map analysis is not working well for him - most of time (9 out of 10) it crashes so they cannot download background data as an excel format. Michael Pack (CATT Lab) noted that he should his specific query parameters and screenshots to support so they can investigate and resolve the issue. Other members noted issues with the Trend Map. Michael Pack (CATT Lab) stated that their Tier 2 Tech support would look into the issues and recommended providing specific information to them.

- **Wrap Up** – Denise Markow thanked the users for participating. The date for the next PDA Suite User Group meeting has not been set yet.

CONTACT INFO:

PDA Suite and I-95 Corridor Coalition:	
Denise Markow	301.789.9088 or dmarkow@i95coalition.org
PDA Suite Technical Support:	
vpp-support@ritis.org or Michael Pack (packml@umd.edu)	
Logistics:	
Joanna Reagle	610.228.0760 or jreagle@kmjinc.com

ACTION ITEMS:

#	Action Item	Whom	Status
1	Any agency having difficulty getting the trend map analysis data should contact vpp-support@ritis.org or Michael Pack (packml@umd.edu)	Agencies	
2	Michael Pack will look into development alternative boundaries (as available in the MAP-21 PM widget) within the PDA Suite tools.	CATT Lab	

Participants:

User Group Participants:	
John Borowski	AutoReturn
Ed Stylc	Baltimore Metropolitan Council
Mohamed Kaddoumi	Charlotte (NC) DOT
John McFadden	City of Tallahassee
Chad Reese (WRA)	Delaware DOT
Jesse Buerk, Justin Neff	DVRPC
Juanshawnta Dallam	FEMA
James Paral, Martha Kapitanov	FHWA
Kara Schwartz, Robert Murphy (AECOM)	Florida DOT
Mark Metil	Gannett Fleming, Inc.
Hari Salkapuram	HDR
Rick Schuman	INRIX
LKiesha Markley	MDOT-SHA
R Mukai	MDTA
Daniel Szekeres	Michael Baker International
James Li, Patrick Zilliacus	MWCOG
Ira Levinton, Neha Galgali, Sushant Darji	New Jersey DOT
Kitae Kim	New Jersey Institute of Technology
Solomon Caviness, Kyle Winslow (WSP)	NJTPA
Kelly Wells, David Keilson, Thomas Chase (ITRE)	North Carolina DOT
Harun Rashid	NVTA
Ted Bobowsky	PANYNJ
Steve Gault (Baker), Ted Lucas (KMJ), Mark Metil (Gannett Fleming)	Pennsylvania DOT
Mike Pack, Stacia Ritter	Pennsylvania Turnpike Commission
Greta Ryan	Richmond Regional Planning District Commission
Andrew Tracy, David Heller, Stephanie Wakeley	SJTPO
Diane Lackey, Dipak Patel	South Carolina DOT
Bhavik Trivedi	Transcom
Greg Jordan, Drew Lund, Michael Pack, Mark Franz	UMD CATT Lab
Ek Phomsavath	USDOT – FHWA New Jersey Division
Zoe Neaderland	Vermont Agency of Transportation
Amy McElwain, Scott Cowherd, Jungwook Jun, Sanhita Lahiri, Joshua Byrd, Ed Azimi	Virginia DOT
Tom Batz	Consultant
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