Volume and Turning Movements from Probe Data

Kick-Off Webinar
Friday, July 15, 2016, 10:00AM – 12:00 noon (EST)
UMD Center for Advanced Transportation Tech (CATT)
&
National Renewable Energy Laboratory (NREL), US DOE
Sponsor: I-95 Corridor Coalition - MCOMP
How to connect?

• Conference call link:
  • Toll: 203-418-3123
  • Toll Free: 866-692-3158
  • Participant Passcode: 8249622

• Web link (for visuals):
  • https://webmeeting.umd.edu/seyer_adhoc/

Project contacts:

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  • Stanley.Young@nrel.gov

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Please mute phones, unless speaking
Agenda

- Introductions
- Project overview
- Steering committee expectations
  - Why are you here?
  - Survey
  - Testbed donations
- Vendors
- Project deliverables & timeline
- Next meeting/webinar
Introductions

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Project overview

• Initiated in 2013 as an I-95 Corridor Coalition MCOMP proposal
  • Foresaw that probe data will ultimately drive many of the operations and planning business processes.

• Goal of project
  • Accelerate the timeframe to achieve viable volume and turning movement data through probe data

• UMD and NREL recognize that the success of this project is critical to broader national initiatives which require quality data to operate and model the transportation system with the goal to optimize for safety, mobility, and energy efficiency.
Project background

• Network wide **volume and turning movement data** remains key **missing dimensions** for operational awareness and assessing transportation system performance.
  • **Information in existing probe data can be used to infer volume thresholds**
• Highway Performance Monitoring System (HPMS) data is currently state-of-the-practice in providing volume data
  • Annual Average Daily Traffic (AADT)
  • 2-3 year lag in reporting
  • Disaggregated into hourly volumes – TAMTI methodology
• Turning movement data is only available in special studies

• **NEED 24x7x365 VOLUME (or DENSITY) ESTIMATE ACROSS THE NETWORK**
Hurricane Sandy impact on I-68 in Western Maryland (2012)

- One segment
- Between MD-42 / Exit 4 intersection and US-219 / Exit 14 intersection
- Eastbound with 9.2 miles length.

<table>
<thead>
<tr>
<th>Beginning Time</th>
<th>Ending Time</th>
<th>Duration</th>
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<tbody>
<tr>
<td>21:53</td>
<td>36:13</td>
<td>14:20</td>
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</table>
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• NEED 24x7x365 VOLUME ESTIMATE ACROSS THE NETWORK
Project objectives

• Define a practical and logistical framework for the delivery of probe-based volume and turning movement data.
• Understand, document, and share data requirement needs for a variety of DOT applications requiring such data.
• Create a calibration and validation testbed to assist vendors’ initial development efforts.
• Provide representative data products, and set appropriate expectation for data fidelity, form, granularity, and usability.
• Anticipating the need for an ongoing calibration network, estimate resources needed to maintain/operate a national calibration/validation testbed.
Volume data uses

• Public sector
  • Performance measurement needs (weighted average)
  • Planning/Energy/Environment (projections, fuel, air & noise)
  • Project Development (design & maintenance)
  • Operational Awareness (signal timing, HOV, work zone)
  • ???

• Private sector
  • Retail and marketing
  • Automotive industry
  • Insurance companies
  • Financial services

• Unlike speed/travel time, public sector may be primary market for volume data
Expectations of steering committee

• Provide feedback from experience with agency needs
  • Participate in the use/application survey
  • Volunteer perspectives and experience

• Contributing to the calibration and validation testbed
  • Quality volume data is expensive, pool our resources

• Volunteer perspectives and experience on...
  • Product specifications (coverage, granularity, accuracy, etc.)
  • Product delivery (archive, real-time, etc.)
  • Product use (performance management, operations, planning, etc.)
Steering committee

• We want to hear from you...
  • Why were you interested in participating?
  • What do you want to get out of this project?
Steering committee - Survey

• User Survey – by end of 2016
  • Draft is ready
    • [http://tinyurl.com/zozbnvm](http://tinyurl.com/zozbnvm)

• Steering committee
  • To review and comment
    • What is missing/confusing?
    • What needs to be added/dropped?

• Identify potential users/responders within agency
Steering committee – Donate to the Test Bed

• Test-bed - functional by end of 2016, refined in 2017
  • To be representative of different ...
    • Geometries / road classes
    • Times of day / days of week / seasons
    • Traffic operation regimes (no incident, accident, traffic mix, congestion level, etc.)

• Steering committee
  • Identify available data sources
  • Identify locations/corridors/time periods critical to own agency
  • Contribute data for product calibration/validation
  • Identify point of contact(s) within agency to start the conversation
Vendor Participation

• VPP aims to foster cooperative relationship with industry
• All VPPII vendors have expressed desire to collaborate
  • HERE
  • INRIX
  • TomTom
• Currently in contract phase for participation to evaluate probe data feasibility for use as volume surrogate
• A calibration/validation testbed is needed to enable product development – a pooled approach to limit cost
• Current 1-3% probe sample rates appears on verge of feasibility – but many questions/concerns unanswered
Unanswered Questions

• Coverage area (functional road class, corridor, etc.)
• Event identification (accident, planned road closure, weather, special events, etc.)
• Historic archive and/or extent of real-time
• Aggregation in space and time (Space: TMC/LRS; Time: 1,5,10,... minute)
• Fidelity expectations: accuracy (±100, ±200,... vphpl, ±20% if capacity) levels
• Reporting (API, FTP, monitoring site, etc.)
• Validation method (sampling, error measures, etc.)
• Use of volume to capacity relationship to augment sampling data for better accuracy / self-calibration
• Freight – heavy vehicle applications
Unanswered Questions

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- Freight – heavy duty vehicle applications
Project timeline/deliverables –

- Phase 1: Proof of concept (Q1 2017)
  - M: Vendors under contract – end of Q3 2016
  - M: Survey, compiled feedback – start now, complete end of Q3
  - M: Test bed – functional by end Q4, refined in 2017
  - M: Specifications & validation/calibration methodology – Q1 2017
- Go / No-Go / Re-Scope Decision – End of Q1 2017
- Phase 2: Product development and refinement (Q4 2017)
  - Begin Q2 2017
  - Test historical archive products/concepts
  - Test real-time assessment of data products
# Timeline

<table>
<thead>
<tr>
<th>Schedule</th>
<th>Months from beginning of project</th>
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<tbody>
<tr>
<td>PHASE I</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 .. .. .. 24</td>
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<tr>
<td>1 Project Management</td>
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<tr>
<td>2 Specifications and Requirements</td>
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<tr>
<td>2-1 Use Survey</td>
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<tr>
<td>2-2 Recommended Spec</td>
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<td>2-3 Freight data practices</td>
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<tr>
<td>3 Testbed</td>
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<tr>
<td>3-1 Validation Methodology</td>
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<tr>
<td>3-2 Testbed Preplanning</td>
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<tr>
<td>3-3 Initialize Testbed</td>
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(Steel grey area: AS NEEDED up to 24 months)

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<thead>
<tr>
<th>PHASE II</th>
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<tbody>
<tr>
<td>1 Project Management</td>
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<tr>
<td>4 Product Development and Refinement</td>
<td>(Made between 6-9 months after start)</td>
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<tr>
<td>4-1 Testbed Production</td>
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<tr>
<td>4-2 Historical Archive Approach</td>
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<td>4-3 Real-Time Approach</td>
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<-- Go / No-Go / Rescope Decision

AS NEEDED up to 24 months
Wrap up

- Next meeting/webinar
  - Thursday, October 13, 2016
  - 1:30p.m.-3:00p.m. (EST)
  - TAMTI & Minnesota concept

- Action items
  - Confirm steering committee / POC for your organization
  - Engage in survey – feedback on survey
  - Testbed data donation – coordinate with jurisdictions