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/seyoung_adhoc/

Project contacts:

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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

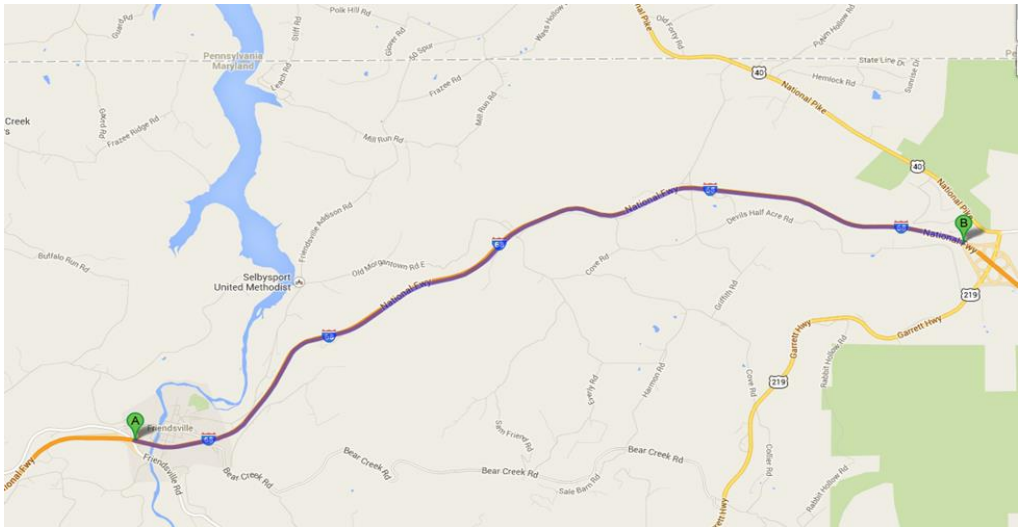
- Initiated in 2013 as an **I-95 Corridor Coalition MCOMP** proposal
  - Foresaw that probe data will ultimately drive many of the operations and planning business processes.
- Goal of project
  - **Accelerate the timeframe** to achieve viable **volume and turning movement data** through **probe data**
- 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

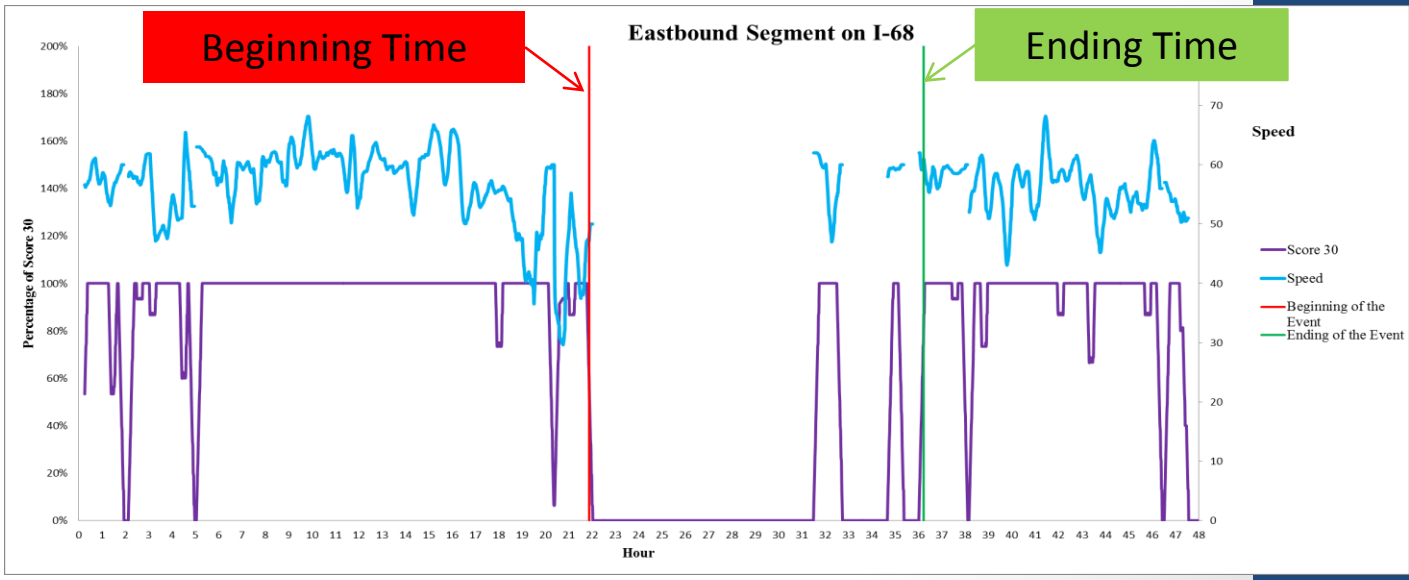
- NEED 24x7x365 VOLUME (or DENSITY) ESTIMATE ACROSS THE NETWORK

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.

Beginning Time	Ending Time	Duration
21:53	36:13	14:20



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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
  - 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

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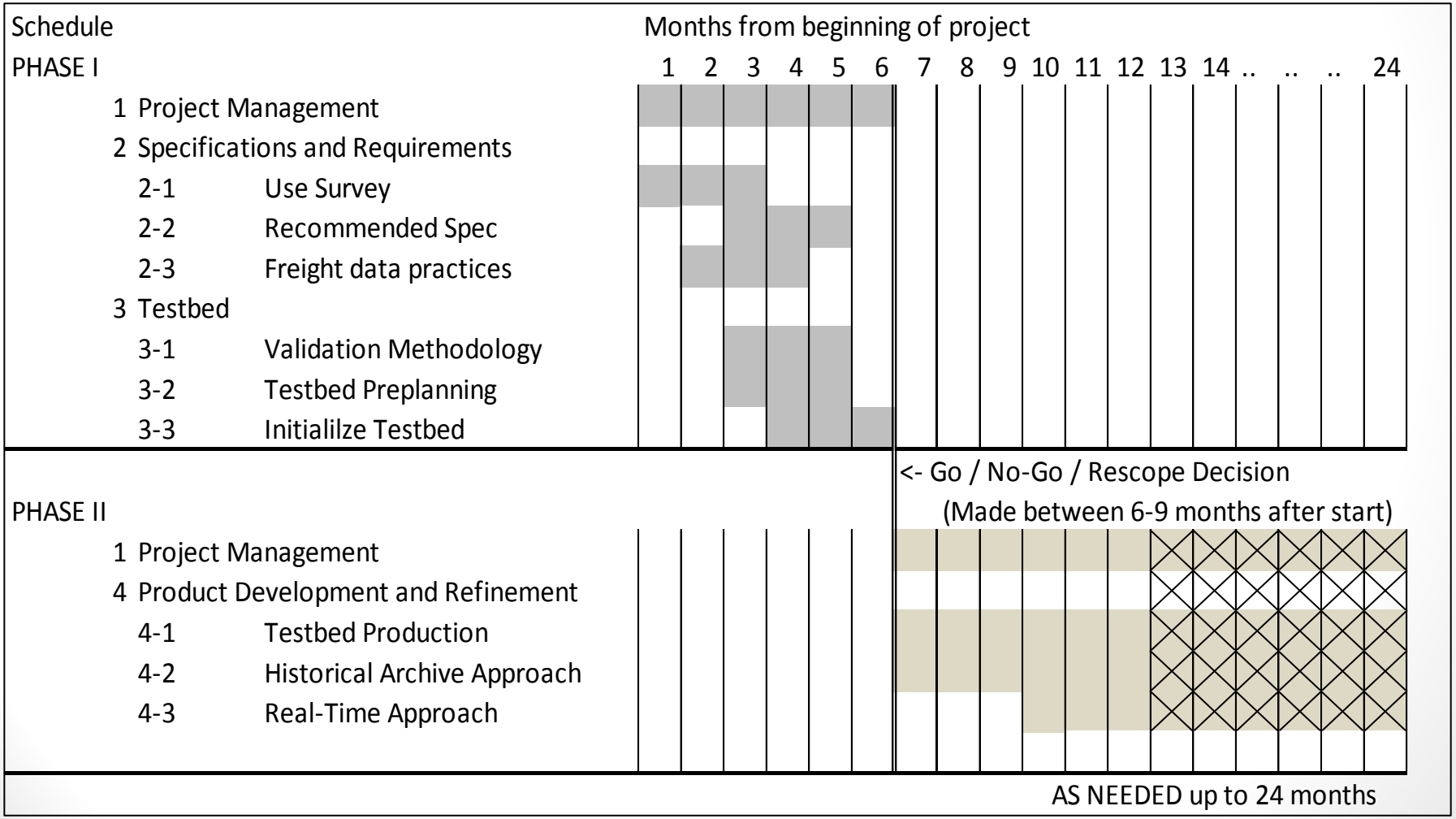
- **Freight – heavy duty vehicle applications**

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


Schedule
Months from beginning of project
PHASE I
1 2 3 4 5 6 7 8 9 10 11 12 13 14 24
1 Project Management
2 Specifications and Requirements
2-1 Use Survey
2-2 Recommended Spec
2-3 Freight data practices
3 Testbed
3-1 Validation Methodology
3-2 Testbed Preplanning
3-3 Initialilze Testbed
<- Go / No-Go / Rescope Decision
(Made between 6-9 months after start)
PHASE II
1 Project Management
4 Product Development and Refinement
4-1 Testbed Production
4-2 Historical Archive Approach
4-3 Real-Time Approach
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