VTRC Virginia Transportation Research Council

VDOT Virginia Department of Transportation

VIRGINIA TECH

Emerging Data Streams for Pavement (Asset) Health Monitoring and Management

35th RPUG Annual Conference: *New Technology for an Old World*

St. Augustine, FL, USA

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VIRGINIA TECH TRANSPORTATION INSTITUTE

Center for Sustainable & Resilient Infrastructure

Membership

TPF TRANSPORTATION POOLED FUND

TPF-5(513) - **Emerging Data Streams for Pavement (Asset) Health Monitoring and Management**

Partners: FHWA, ND, TX, VA

TPF-5(463) Objective

- ✓ *To identify, test and evaluate emerging big data stream that may enhance the process we use to evaluate the performance and manage our pavement assets.*
- ✓ The technologies considered will include at a minimum:
  - **Vehicle response data collected by connected and automated vehicles**
  - Smart infrastructure sensors (e.g., internet of things)
  - Mobile devices and
  - E-construction and
  - BIM technologies (e.g., digital twins).

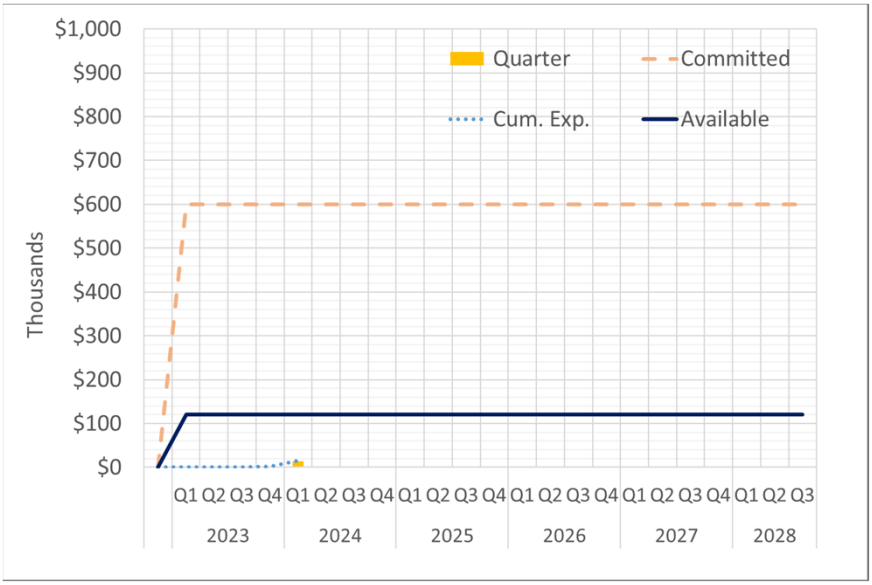
3

Potential Specific Activities

- ✓ Identify potential available emerging data streams that could be useful measuring pavement functional, safety and structural condition
- ✓ Asses the ability of the technologies by comparing them with results obtained with “traditional” pavement evaluation equipment.
- ✓ Identify the most promising technologies, methods or approaches and define performance measures
- ✓ Demonstrate the use of the information provided by the most promising emerging data streams

4

Financial Status



5

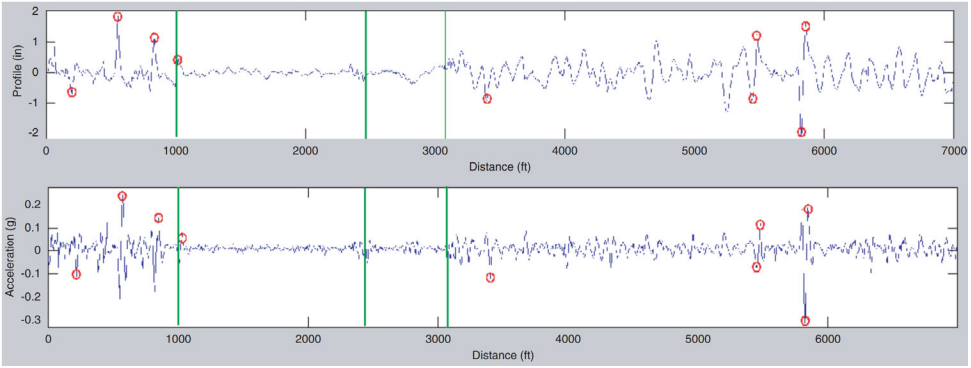
Initial Efforts

- ✓ Initial thesis focused on connected vehicles for data collection
  - – Pavement roughness (ongoing) – partnership with NIRA Dynamics to compare data from a district
  - – Road friction (pending)
- ✓ Determine whether and how connected vehicles can be a valuable addition to the traditional data collection methods employed by agencies.
- ✓ Working on e-circular based on 2024 TRB workshop

6

Roughness Efforts Buils on Previous Work

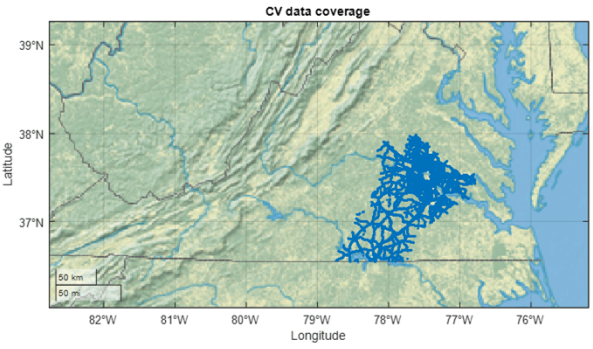
- Flintsch et al. (2012)
  - Probe vehicle vs inertial profiler



7

Very Preliminary Results

- ✓ Network-level
  - – General assessment
  - – Lane differences
  - – Secondary roads
  - – …
- ✓ Project-level
  - – Localized issues
  - – Seasonal changes
  - – ,,,



8

Technology Assessment Criteria

- ✓ Possible start points

INFRACOMS

- Toolkit development
- Gaps of each technology
- Description of technology
- Application of technology

NASA TRL

- Maturity level of technology
- Levels 1 to 9 (9 most mature)
- Better funding strategy

9

Feedback

- ✓ Other ideas for research efforts?
- ✓ Other technologies
- ✓ Priorities
- ✓ Any other feedback

10

11