



# RESEARCH NEED STATEMENT

Call for Projects 2015

Project Research Title: Hernando Desoto I-40 Bridge Seismic Instrumentation Upgrade

TDOT Sponsor Director: Wayne Seger

List TDOT Research Team Lead: Tim Huff

List TDOT Research Team Members: TBD

1. Define the problem or research requested. What is the goal/objective of the research?

The current instrumentation on the Hernando Desoto bridge was installed in 2001. The objective of this research is to replace the existing sensors with a higher quality and industry standard accelerometers.

2. Is this research a continuation of a past or present project?

No  Yes

If yes, provide current research project title, RES # and reason for the project continuation.

It is not a continuation but data gathered from a previous project may provide useful: Vertical Seismic Array DeSoto Hernando Bridge-West Memphis, Arkansas; RES9003.

3. Describe anticipated benefits/expected deliverables.

The current instrumentation which was installed in 2001 have few sensors malfunctioning. Upgrading the current system will significantly streamline routine monitoring of the system state of health. The data from the bridge, free field, and downhole array will be streamed and will be available to the engineering community for research and testing. Rapid availability of data after an earthquake event can be used for ascertaining the structural integrity of the bridge and will open the door for wide use of data.

4. What is your timeline for completion of the research?

1 year

5. List the anticipated tasks for this research.

- a. Upgrade and replace current accelerometers.
- b. Replace the Microsoft Widows PCs with rack mount Linux servers.
- c. Upgrade the power infrastructure and surge suppression to be compatible with the new instrumentation.
- d. A final comprehensive report.

6. Describe how the project results will be implemented?

Contractors will be working with TDOT engineers closely with all aspects of this research.

7. Will this study produce software, web page or other technology that will involve the Information Technology Division?

No  Yes, please describe:

8. Will training be provided to employees as a result of this research?

No  Yes, please describe:

A one day training and site visit will be scheduled.

9. Will this research involve equipment or materials purchase?

No  Yes, please describe:

31 Triaxial EpiSensor Accelerometer Deck Custom made sensor enclosures, mounts, and interface boards with transient suppression Geodes Replacing PC with a rack mount Linux server Upgrading ratios to higher bandwidth

10. Research must support the Long Range Transportation Plan Policy Recommendations **and/or** TDOT Operational Goals and/or Strategic Initiative. *(See attachments for additional information)*  
Please indicate which categories the research will support:

Transportation Long Range Plan Policy Recommendations

(A) Accessibility

(B) Safety, Security, and Transportation Resilience

(C) Coordination, Cooperation, and Consultation

(D) Demographic and Employment Changes and Trends

(E) Freight Logistics and Planning

(F) Financial

(G) Mobility

(H) Travel Trends and System Performance

TDOT Operational Goals and/or Strategic Initiative

(A) Deliver transportation projects on schedule and within budget

(B) Maintain the state transportation system to protect the long term investment in our infrastructure assets

(C) Operate and manage Tennessee's transportation system to provide a high level of safety and service to our customers and workers

(D) Expanding mobility choices to maximize access

(E) Dramatically change the paradigm for delivery of transportation products and service to improve the efficiency and effectiveness of Tennessee's transportation network

11. Please explain how the research supports the Long Range Transportation Plan Policy Recommendations **and/or** TDOT Operational Goals and/or Strategic Initiative selected above:

The new instrumentation will enable the measurement of bridge movements during ground shaking for mild event which occur frequently and this data may be used to calibrate models for expected large magnitude earthquakes to better understand and define the effects of the deep soil deposits of the Mississippi Embayment upon bedrock ground motions.

For additional information, please contact:

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