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**Sponsor**

USDOT Research and Innova-  
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(RITA)

**Project Title**

Bridge Condition Assessment  
Using Remote Sensors

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[www.mtti.mtu.edu](http://www.mtti.mtu.edu)

# Project Summary

Technology Transfer Outreach Publication

## Bridge Condition Assessment Using Remote Sensors

The condition of the nation's infrastructure has gained increased attention in recent years, primarily as a result of catastrophic events such as the I-35W collapse in Minneapolis. However, deteriorating transportation infrastructure has burdened transportation agencies for many years. Bridges continue to age, and funds for the repair and replacement of this infrastructure are insufficient at current funding levels. Remote sensing technologies, which enables non-contact data collection at great distances, offer the ability to enhance inspection and monitoring of bridges.

### Research Objectives

The objective is to explore the use of remote sensing technologies to assess and monitor the condition of bridge infrastructure and improve the efficiency of inspection, repair, and rehabilitation efforts to develop unique signatures of bridge condition.

### Methodology

Remote sensing technologies will be correlated with in-place sensors to obtain bridge condition assessment data without the need to place heavy instrumentation on the structure. This information will then be analyzed by a computer decision support system to develop unique signatures of bridge condition. Monitoring how these signatures change over time will provide state and local engineers with additional information used to prioritize critical maintenance and repair of our nation's bridges. The ability to acquire this information remotely from many bridges without the expense of a dense sensor network will provide more accurate and near real-time assessments of bridge condition. Improved assessments allow for limited resources to be better allocated in repair and maintenance efforts, thereby extending the service life and safety of bridge assets, and minimizing costs of service-life extension.

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## University Facts

|                     |       |
|---------------------|-------|
| Total Enrollment    | 6,550 |
| Graduate Enrollment | 916   |
| Number of Faculty   | 417   |
| Placement Rate      | 95%   |

*Michigan Tech is located in Houghton, MI on the south shore of Lake Superior. This rural area is known for natural beauty, pleasant summers, abundant snowfall, and numerous all-season outdoor activities. In addition, the University maintains its own downhill and cross-country ski facilities and golf course. There are numerous cultural activities and opportunities on campus and in the community. Michigan Tech has also been rated as one of the safest college campuses in the United States, and the local community provides excellent resources conducive to an outstanding quality of life.*

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## Anticipated Research Findings

This research is expected to be completed in January, 2012. The final product will be a narrated report that summarizes the results of the literature reviews and field investigations conducted during the project. Important findings will be identified and their relevance to the project will be highlighted.

## Benefits

A primary outcome of this research effort is the creation of remotely sensed bridge health indicators that can be used in combination with physical inspections for condition assessment. We also will investigate how to combine these measures into a single, integrated bridge signature that can be used as an overall appraisal of bridge condition. This integrated bridge signature is expected to provide inspectors and transportation officials with both a baseline measure of condition and a measure of changes in bridge behavior over time.

[www.mtti.mtu.edu/bridgecondition](http://www.mtti.mtu.edu/bridgecondition)

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