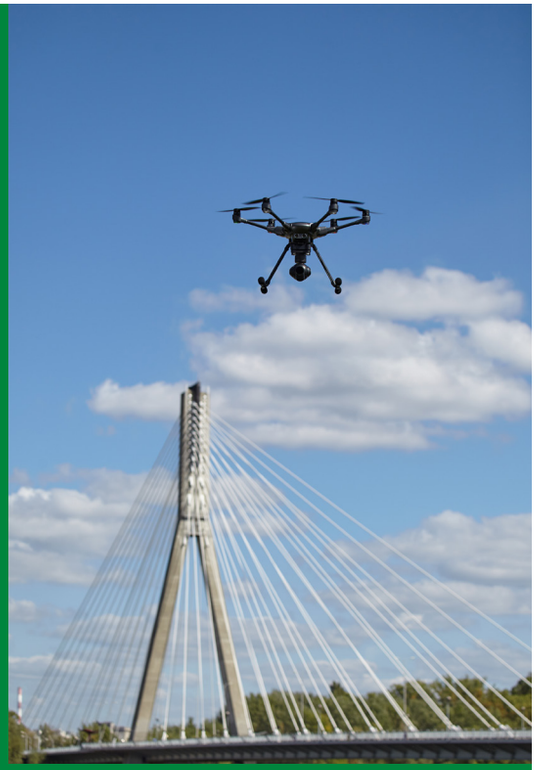

5-YEAR GOAL

The overarching goal of the center in five years is to transform in at least two demonstration cases from manual to automated inspection and preservation of bridges with sensors, nondestructive evaluation (NDE) devices, multi-modal unmanned vehicles, and data logistics, thus providing cost-effective, consistent, and reliable solutions in bridge condition assessment and maintenance, and to develop diverse transportation workforces mastering the advanced technologies.

INSPIRE

INSPECTING & PRESERVING INFRASTRUCTURE
THROUGH ROBOTIC EXPLORATION

CONSORTIUM MEMBERS

MAJOR PARTNERS- Support all research activities

Missouri University of Science and Technology (Missouri S&T)- Lead
City College of New York (CCNY)
Georgia Institute of Technology (GT)
University of Colorado, Boulder (CU)
University of Nevada, Las Vegas (UNLV)
University of Nevada, Reno (UNR)

MINOR PARTNERS- Provide a conduit to develop the next-generation transportation workforce

Lincoln University (LU)
St. Louis Community College (STLCC)
East Central College (ECC)
Ozarks Technical Community College (OTCC)

INSPIRE University Transportation Center
112 Engineering Research Laboratory
500 West 16th Street, Rolla, MO 65409
573-341-6114 | inspire-utc@mst.edu
http://inspire-utc.mst.edu

INSPIRE
University Transportation Center

Inspecting and Preserving Infrastructure Through Robotic Exploration

MISSOURI S&T

PRESERVING INFRASTRUCTURE WITH ADVANCED ROBOTICS

In the next 30 years, our highway and railway system will face many challenges. Cheaper, faster, and safer inspection and preservation tools are needed to maintain our nation's ground transportation system in a state of good repair. Currently, bridges and tunnels are visually inspected and manually maintained under traffic control with the aid of boom and snooper trucks. In the future, with successful development and implementation of robotic platforms such as unmanned aerial vehicles (UAVs), these structures will be evaluated and sometimes maintained underneath bridge decks with no access equipment and no traffic control, reducing labor hours, avoiding rental, transportation and mobilization costs of equipment, saving fuel and indirect costs associated with service interruption, alleviating traffic congestion, and promoting work zone safety.

Interdisciplinary Research

Faculty from civil, electrical, and mechanical engineering, engineering management and computer science are collaborating to develop remotely-controlled robotic platforms for the inspection and preservation of bridges and tunnels and a robot-enabled resilience analysis and intervention framework for post-disaster assessment and recovery. Key technologies include mobile platforms, point and distributed sensing systems, nondestructive evaluation devices, data fusion and analysis and workforce development.

Workforce Development

A simulation-based training and control system will be designed to develop the next-generation transportation workforce. Video games will be developed to attract more students and the public to robotic inspection. A robotic simulator will be designed for professional training.

VISION

The INSPIRE UTC envisions that with the successful development and implementation of robotic platforms, future inspection and preventative maintenance of highway bridges will be transformed into an automated and integrated process in a bridge asset management system.

Unmanned aerial vehicles (UAVS) with cameras can be used to help inspect bridges and capture information such as high-resolution images of corroded and other damaged bridge structures.

Multi-modal flying and climbing robots can collect information, seal cracks and perform other minor bridge repairs.

NEW TECHNOLOGIES

- MOBILE PLATFORMS
- POINT AND DISTRIBUTED SENSING SYSTEMS
- NONDESTRUCTIVE EVALUATION DEVICES
- DATA FUSION AND ANALYTICS
- WORKFORCE DEVELOPMENT