RUTGERS
Center for Advanced Infrastructure and Transportation

PROJECT OVERVIEW REPORT

1. UTC Identifying Number
   69A3551847102

2. Center Identifying Number
   CAIT-UTC-REG9

3. Project Title
   Delivering Maintenance and Repair Actions via Automated/Robotic Systems

4. Principal Investigator & Contact Information
   Dr. Jie Gong
   Associate Professor
   500 Bartholomew Road
   Piscataway, NJ 08854

5. Rutgers/CAIT Project Manager
   Patrick Szary, Ph.D.

6. Customer Principal
   Robert Kumapley, Senior Program Manager
   Port Authority of New York and New Jersey
   4 World Trade Center, 150 Greenwich Street
   New York, NY 10007

7. Project Description
   Robots have become an emerging force in some of the most challenging working environments. Whether they are flying drones or climbing robots, rigid machinery systems or soft robots with a mix of mobility, strength, and configurability, robots are poised to revolutionize the field of infrastructure maintenance and repair. Nevertheless, there is currently no systematic investigation on how robots can be leveraged to deliver maintenance and repairing actions to transportation infrastructures. In particular, there is a lack of understanding on how robotic systems can be used to go beyond detecting defects in infrastructures and to actually deliver repairing actions.

   The primary goal of this proposal is to identify and evaluate the feasibility of developing and deploying autonomous systems to streamline and enhance the quality of common repair and maintenance activities. The robotic systems currently used in construction offer examples of the feasibility of such robotic systems to safely conduct physical interventions. This project aims to build upon these examples to examine how autonomous systems will be able to intervene and take corrective actions to enhance the durability of transportation

infrastructure. The results of this project have the potential to spawn a new research direction that may revolutionize the way infrastructure is managed, preserved, and renewed.

8. Implementation of Research Outcomes (or why not implemented)

   The intended outcome of the project will be documented in training modules, technical reports, and peer-reviewed publications. It is expected that the products will be available for registered users to download at the CAIT's website. The outcome of this project will also include the number of downloads from the website, the number of infrastructure customers who have expressed interests in exploring robotic solutions to assist their daily operations.

9. Impacts/Benefits of Implementation (actual, not anticipated)

   To Be Determined

10. Dates and Budget

    Start date: 9/1/2018
    End date: 9/30/2021
    UTC (CAIT) Dollars: $252,531
    Cost Sharing: $82,941
    Total Dollars: $335,472

11. Keywords

    Infrastructure maintenance and repair, robotics, automation, and transportation asset management

12. Web Links (Reports and Project Website)

    https://cait.rutgers.edu/research/delivering-maintenance-and-repair-actions-via-automated-robotic-systems/