



TriDurLE

**National Center for Transportation
Infrastructure Durability & Life-Extension**

UTC Project Information – National UTC TriDurLE	
Project Title	System Design for Highly Accurate and Efficient Target Detection in Triaxial Testing
University	Missouri University of Science and Technology (S&T)
Principal Investigator	PI: Dr. Xiong Zhang; Co-PI: Dr. Jenny Liu
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Funding Source(s) and Amount Provided (by each agency or organization)	TriDurLE: \$90,000 Missouri S&T: \$29,561 MoDOT: \$60,439
Total Project Cost	\$180,000
Agency ID or Contract Number	
Start and End Dates	07/01/2023 – 06/30/2024
Brief Description of Research Project	For photogrammetry-based volume measurement, existing coded target (CT) recognition and identification algorithms have limitations in perspective deformation, freely rotated CTs, and unfavorable light conditions. This study will develop an innovative system design for highly accurate and efficient target detection in triaxial testing. The proposed method will remain all the merits in existing methods and have several improvements, including blob analysis, automatic outlier identification, and an increased number of points on the membrane for more representative 3-D results.
Describe Implementation of Research Outcomes (or why not implemented)	The developed photogrammetry-based volume measurement method with the target detection technology will be applied in the widely used triaxial tests to evaluate stress-strain behavior of geomaterials. The method will improve the testing accuracy and efficiency. The low-cost testing system has the potential to be widely adopted by government agencies, contractors, and research institutes.
Place Any Photos Here	
Impacts/Benefits of Implementation (actual, not anticipated)	The proposed improved table method can improve the efficiency and accuracy of CT detection, which will further improve photogrammetric analysis results for 3-D volume-change measurement during triaxial testing.

Web links

- Reports
- Project website