



UTC Project Information	
Project Title	Towards Autonomous Drone-Based Dynamic and Seismic Response Monitoring of Bridges
University	UNR
Principal Investigator	Mohamed Moustafa
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Funding Source(s) and Amounts Provided (by each agency or organization)	ABC-UTC Funds: \$65,000 UNR matching funds: \$32,500
Total Project Cost	Total Funds: \$97,500
Agency ID or Contract Number	Accelerated Bridge Construction (ABC-UTC) 69A3551747121
Start and End Dates	01/01/2021 - Active
Brief Description of Research Project	<p>Several global technologies are on the rise such as aerial robotics, which are commonly referred to as unmanned aerial systems (UAS) or unmanned aerial vehicles (UAVs), or simply “drones”. Many of the critical lifelines and infrastructure systems such as bridge networks or power grids and transmission lines have taken serious steps towards adopting UAVs for regular maintenance and inspection. Using bridges as one example of critical infrastructure systems, we find that a large deal of research studies has been sponsored, mostly through various Departments of Transportation (DOTs), to use UAVs for visual bridge inspections. However, none of the ongoing or emerging efforts have properly considered the use of UAVs for dynamic vibration and structural system identification of bridges or other infrastructure systems, nor considered real-time or near real-time structural assessment in the case of extreme events such as earthquakes. Future applications of UAVs to rapidly inform post-disaster decisions such as assessing a bridge condition to open it for traffic or not would be of great importance, which is the specific motivation of this project. The specific objectives of this project are: (1) validate and verify (V&V) the use of UAVs videos along with principles of digital image correlation (DIC) and target-tracking for dynamic displacement measurements and structural health monitoring (SHM); and (2) provide foundational work towards establishing the done-based inspection framework such as exploring target-based and targetless UAVs vibration monitoring, exploring feasibility of two- versus</p>

	three-dimensional (2D vs. 3D) and one vs. two UAVs-based measurements.
Describe Implementation of Research Outcomes (or why not implemented) Place Any Photos Here	The outcomes will be tracked and reported once they are identified.
Impacts/Benefits of Implementation (actual, not anticipated)	The impacts will be tracked and reported once they are identified.
Web Links <ul style="list-style-type: none"> • Reports • Project website 	https://abc-utc.fiu.edu/research-projects/unr-research-projects/towards-autonomous-uav-based-dynamic-and-seismic-response-monitoring-of-bridges/