Title:	Synthesis: Commercial Air-Coupled Ground Penetrating Radar Systems to Be Used for Pavement Evaluations in Texas
The Problem:	The air-coupled ground penetrating radar (GPR) actively used since early 2000s in TxDOT has proven to be invaluable non-destructive testing (NDT) equipment to evaluate in-situ pavement condition. The GPR, equipped with 1-GHz antenna and a video camera, is utilized to measure layer thicknesses, locate possible subsurface defects, and offer visual surface pavement conditions through synchronized video imagery. The raw GPR data is processed through PaveCheck, a software package that can integrate GPR, falling weight deflectometer (FWD), and digital video images. This integration provides comprehensive evaluation of both surface and subsurface conditions. The GPR system customized within TxDOT has limitations for maintenance and repair in cases of mechanical issues or part replacements due to its age. Federal regulations impose restrictions on the acquisition of additional high-frequency GPR antennas due to security and safety considerations. It is anticipated that the current GPR systems will be retired, in turn contingency strategies need to be developed.
Technical Objectives:	The objectives of this synthesis project are: • Conduct a literature review and summarize state-of-the practice and key findings. • Review and identify the usage requirements and purposes of the current GPR system. • Investigate GPR systems, software packages for GPR data analysis, and usage requirements and purposes of other state, local, and/or international transportation agencies. • Review and investigate commercially available GPR systems and corresponding analysis software to ensure their compatibility for replacing the current TxDOT GPR system. • Investigate the data formats of commercially available GPR systems and their compatibility with PaveCheck software. • Recommend new system based on capabilities, compatibility, required training, and minimum impacts to current operations. The system need to align with TxDOT's specific requirements for pavement evaluation and to determine what upgrades in software and hardware would be required to minimize impacts in current operations. The expected technology readiness level (TRL) for this project is 3.
Anticipated Deliverables:	1. Technical memorandum for each task completed. 2. Monthly progress reports. 3. Project Summary Report 4. Research report documenting the findings of this research, including: • Recommendations of GPR systems • Implementation guidance.
Proposal Requirements:	1. The project duration shall not exceed 12 months. 2. The project budget shall not exceed $65,000.00. 3. RFP#1 Q&A Deadline: 12:00 p.m. Central Time, **Tuesday, February 20, 2024.** 4. Proposal Deadline: 12:00 p.m. Central Time, **Thursday, March 21, 2024**. 5. Use the current "ProjAgre" and "PA Forms" templates located at the RTI Forms webpage. 6. Proposals will be considered non-responsive and will not be accepted for technical evaluation if they are not received by the deadline or do not meet the requirements stated in RTI's University Handbook. 7. Proposals should be submitted by the University Liaison in PDF format; (1) PDF file per proposal. File name should include project name and university abbreviation. 8. This project will be tracked during the life of the project using the Technology Readiness Level (TRL) scale. 9. The 2021 Texas Legislative Session requires that universities be in compliance with Senate Bill 475 by submitting a completed and signed TxDOT Security Questionnaire (TSQ) to RTIMAIN@txdot.gov in advance of a proposal submission. Universities that have not submitted a completed and signed TSQ one week after award will be considered non-compliant and unable to participate in the Program.