Education

- M.Eng., Electrical Engineering, Texas A & M University, 1990
- B.S., Electrical Engineering, Texas A & M University, 1985

Background and Qualifications

Mr. Ruback has more than 35 years of research experience in transportation related electrical/electronic and telecommunication-oriented projects. Since he joined the Texas A&M Transportation Institute in 1995, he has led system design, field deployment, and operation of numerous ITS projects. He has experience in many electronic and telecommunication systems including wireless, wireline, telephony, fiber optics, networking, personal computers, micro controllers, single board computers, and software systems.

Past research has been conducted in the area of off right-of-way train detection and tracking for use by municipalities to provide accurate and timely information on the location, speed, and length of trains along a corridor. The research produced a complete vertical integration of field components, back-office processing software, and multiple information dissemination solutions. Other larger research efforts include the development and deployment of travel time calculation and dissemination systems. The solution utilizes radio frequency tag and Bluetooth technology to measure crossing times of both commercial and private vehicles coupled with a high reliability field cabinet design. Several of the past projects have led to patentable technology.

Current research interests include artificial intelligence / machine learning systems in transportation, detection systems using LIDAR and radar, connected vehicle systems, field solutions to support connected vehicle operations, and large-scale corridor deployment of traffic sensor systems.

Recent Work Experience

Dates	Position(s)	Organization
1995 - Present	Senior Research Scientist / Associate Research Scientist / Assistant Research Scientist	Texas A&M Transportation Institute

Accomplishments and Professional Affiliations

- Intelligent Transportation Society of Texas**:** Member, 2000-Current

Relevant Project Level Experience

Grade Crossing Monitoring for Traffic Management – The project set out to design and deploy a system that would monitor a section of railroad track with the purpose of detecting trains, measuring the train's speed and direction and to predict when the train would arrive and depart at downstream grade crossings. The system utilized off right of way sensors to identify trains and grade crossing preemption detection to monitor intersections. The prototype was built in College Station, TX and operated for years. Full deployments have also been done in the cities of Sugar Land and Garland in Texas, the city of Fremont, Nebraska and a project was just completed at the Port of Beaumont, TX.

I-35 Traveler Information During Construction – TTI has developed a one-of-a-kind integrated system that provides TxDOT with unmatched work zone monitoring and traveler information dissemination. The system collects and integrates planned lane closure schedules from the multiple independent contractors working on the 100-mile I-35 corridor, automatically assesses the traffic queuing and delay potential associated with those closures and disseminates advance notification of the closures and potential impacts to various users across multiple outreach channels, including social media. The system has also been designed to assist TxDOT and contractors with deployment decisions of portable end-of-queue warning systems and integrates inputs from those systems with various other traffic monitoring technologies in the corridor to develop accurate delay forecasts for travelers in the corridor.

Anonymous Wireless Address Matching for Travel Time Measurement – This effort explored Bluetooth technology as a method for obtaining a unique yet anonymous identifier from passing vehicles for use in travel time measurement. The project fully developed field hardware and back-office software to support a complete product which can be licensed to private sector vendors or be used as part of future TTI research projects.

Commercial Vehicle Crossing Times at International Ports of Entry – The project developed a technology using Radio Frequency Identification (RFID) readers to gather and time stamp anonymous data from passing commercial vehicles with RFID tags. The anonymous ID is then re-identified downstream and producing the travel time for one vehicle between gathering points. Five of the most heavily traveled border crossings (accounting for 90 percent of all truck traffic from Mexico into Texas) have been equipped and are in operation.

Connected Vehicle Test Bed on IH-35 and at the Riverside Campus – This project is developing the implementation guidance and the first steps of a physical connected vehicles test bed at the TTI Riverside campus and along a portion of IH-35 in Temple, TX. The project focuses on test bed design and development, technology implementation, and proof of concept application testing for dynamic mobility applications.

Technical Assistance in Developing and Implementing Variable Speed Limit Pilot Projects – This project has developed the algorithms, deployment packages, and operational guidelines for three variable speed limit pilot projects mandated for study by the Texas state legislature. Each pilot deployment is unique, addressing weather, construction, and congestion.