PRISM: AI-Powered Platform for Real-time Intelligence in Shared Mobility

What if transportation intelligence became a shared, real-time predictive layer across vehicles and infrastructure?

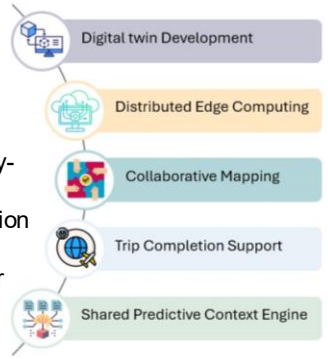
PI - Mina Sartipi, PhD & **Lead Institution** – University of Tennessee at Chattanooga

Problem

- Transportation data is fragmented across vehicles, infrastructure, and agencies
- AVs rely on limited onboard perception + static maps
- IOOs lack unified, real-time operational awareness
- No shared, predictive context layer across the ecosystem

Objective

- Develop real-time multi-source platform
- Build dynamic, city-scale distributed digital twin
- Enable predictive, uncertainty-aware intelligence
- Support both AV trip completion + IOO operations
- Validate in real-world corridor deployment



Impact

Safety Benefits
- Enhanced Situational Awareness
- Proactive Risk Management
- Dynamic Safety Adjustments
- Advanced Hazard Detection

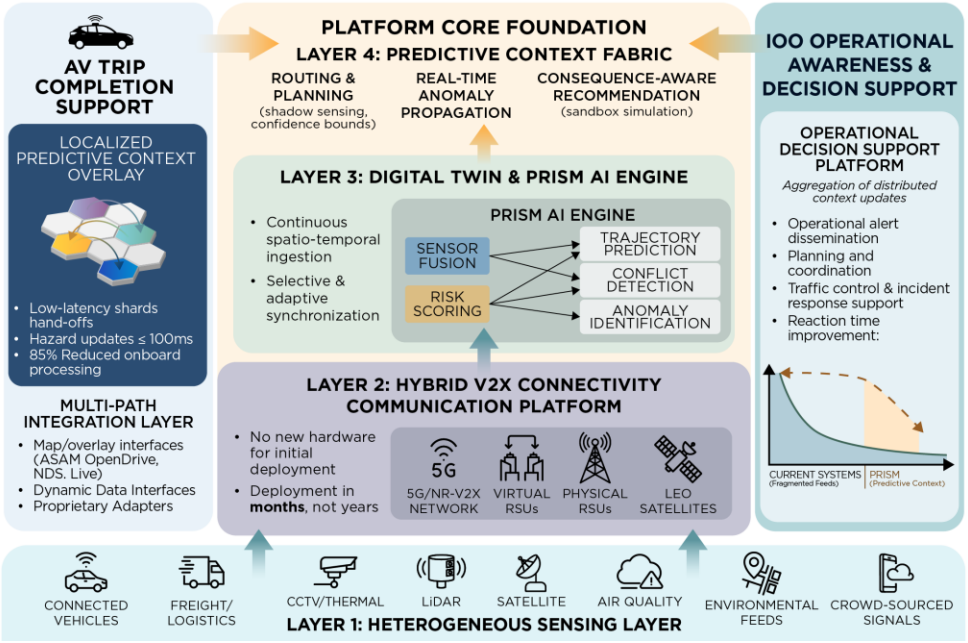
Infrastructure & Operational Benefits
- Comprehensive Network Intelligence
- Optimized Operations
- Seamless Integration
- Coordinated Safety Responses

Societal & Economic Impact
- Accelerated AV Adoption
- Improved Transportation Access
- Data-Driven Planning
- Economic Growth
- Reduced Traffic Fatalities

Environmental & Efficiency Benefits
- Reduced Emissions
- Smart Traffic Management
- Sustainable Infrastructure

Novel Technical Approach

- Multi-source sensing + V2X data fusion
- Real-time digital twin of transportation systems
- Predictive AI context layer for safety and operations
- Edge–cloud deployment for low latency and scale
- Dual-use outputs: AV decision support + IOO coordination
- Secure, authenticated data exchange with privacy-preserving edge processing
- First deployment in Chattanooga, leveraging partners including OEMs, and industry partners to validate and replicate across regions



Impact (Continued)

- **Ultra-low latency**: ≤60ms end-to-end decision support
- **Near Real-time awareness**: <1s continuously updated digital twin
- **High-confidence intelligence**: >90% multi-source fusion accuracy
- **High reliability**: ≥99.9% system uptime
- **Rapid hazard response**: ≤500ms from detection to actionable context

Transition & Commercialization

- Deployable as an overlay on existing infrastructure (no system replacement)
- Validated with infrastructure operators and industry partners as early adopters
- Platform-as-a-Service model enabling scalable deployment across corridors and cities
- Pathway to commercialization via pilot deployments and spin-off transition
- Total estimated project cost: $2,396,000 (Year 1: $1,298,000; Year 2: $1,098,000)

Future R&D Program

PRISM lays the foundation for AI-powered transportation where infrastructure understands, cities anticipate, and all vehicles operate within a shared intelligent context.

Partners: The University of Tennessee Chattanooga · The University of Tennessee Oak Ridge Innovation Institute · The City of Chattanooga, Tennessee · ITS America · Volkswagen · Audi · WSP