

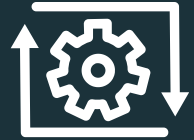


Autonomy

Autonomous Safety, Alignment & AI-Cybersecurity for Electrified Transit

The Challenge

As electric transit moves toward increasingly connected and automated operations, vehicles must be able to **respond safely to changing road conditions, align precisely with wireless charging infrastructure, anticipate energy needs, and securely communicate with connected systems.**



ASPIRE has established dynamic wireless power transfer infrastructure, but realizing its full potential requires an intelligent vehicle-side autonomy layer that connects **sensing, vehicle control, wireless charging, AI analytics, and cybersecurity.**

What We're Building

Autonomy is developing and testing an integrated autonomy framework for electric transit vehicles operating with dynamic wireless charging infrastructure.

The project brings together four interconnected areas of research to support safer vehicle operation, more reliable wireless charging, data-driven decision-making, and secure vehicle-to-infrastructure systems.

Expected Outcomes

- ✓ Improve safety for electric transit operations
- ✓ Improve power transfer of dynamic wireless charging
- ✓ Improve route energy & roadway condition awareness
- ✓ Strengthen cybersecurity across connected transit systems
- ✓ Improve wireless charging infrastructure reliability
- ✓ Progress autonomy technologies' validation in real-world transit environments
- ✓ Advance open-source tools for electrified transportation

Key Focus Areas

- **Autonomous Safety**
 - Developing vehicle-specific autonomy tools for electric transit, including friction estimation, emergency braking, and an ADA-focused comfort layer.
- **DWPT Lane Alignment**
 - Using magnetometer sensing and advanced vehicle control to help buses maintain alignment with embedded wireless charging coils and maximize power transfer.
- **AI Situational Awareness**
 - Using advanced tools and machine learning to understand road conditions, predict route energy needs, and monitor the health of wireless charging infrastructure.
- **Cybersecurity**
 - Developing layered protections for vehicle-to-infrastructure communications, sensor systems, and vehicle networks.



Help Shape the Future of Electrification

Seeking Engagement

Transit Operators & Fleet Partners

- Electric bus operations
- Vehicle and route data
- Safety and braking requirements
- Energy management needs
- Field-testing opportunities

Transportation & Infrastructure Partners

- Dynamic wireless charging deployment
- Vehicle-infrastructure integration
- Operational requirements
- Infrastructure performance

Technology & Industry Partners

- Sensors and vehicle systems
- AI and machine learning
- Wireless power transfer
- Cybersecurity and connected systems

Research & Community Partners

- Transit applications
- Field deployment environments
- Data and validation
- Future research opportunities

Scan to connect

