SMART Grant: Smarter Intersections Pilot Project

Texas Innovation Alliance

August 6, 2025

Katherine Turnbull, Ph.D.

USDOT SMART Grant – Stage 1

September 15, 2023 – March 15, 2025

College Station, TX

Partners

Texas A&M Transportation Institute

Texas Department of Transportation

City of College Station
Home of Texas A&M University®

Texas A&M University
Transportation Services

Brazos Transit District

beep™

Project Staff

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Project Goals

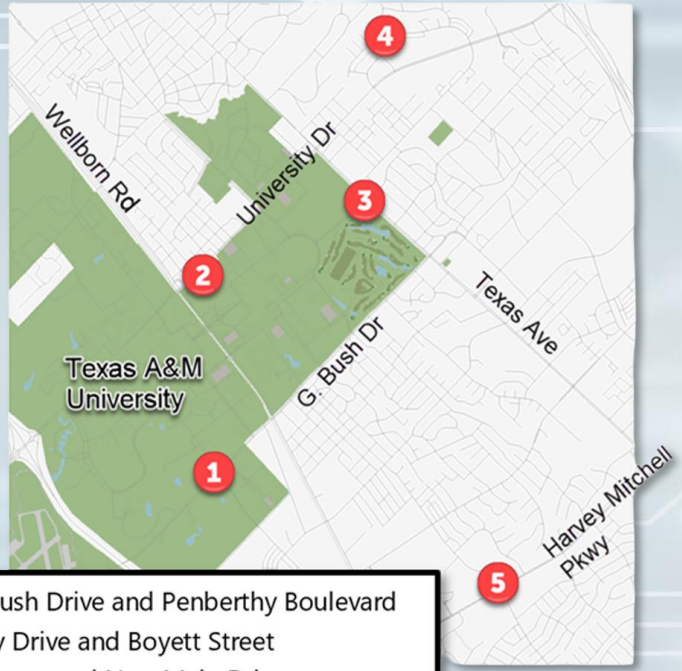
- Improving intersection safety and mobility for pedestrians and bicyclists, including people with mobility and visual disabilities
- Demonstrating C-V2X technologies

Project Elements

- Use C-V2X to provide communication between traffic signals and buses at 5 intersections to alert pedestrians.
- Develop and test smartphone app for use by blind/low-vision individuals to help navigate the intersections.
- Simulate communication with an automated shuttle and a fire truck to alert them of approaching and turning buses.

Project Advisory Committee

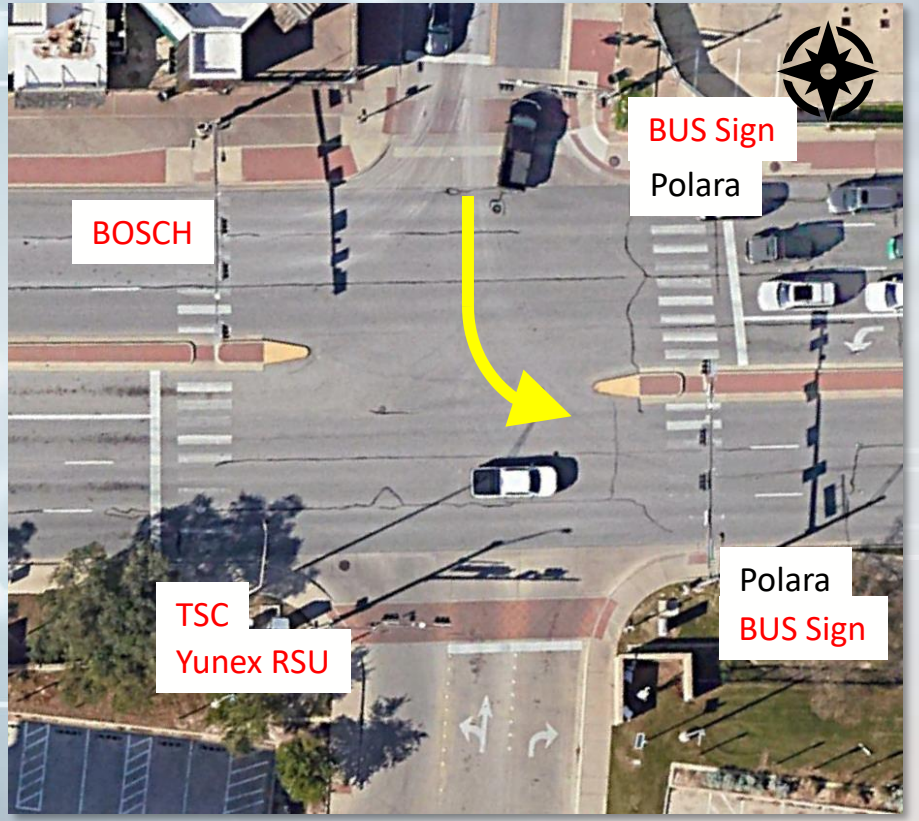
Pilot Intersections



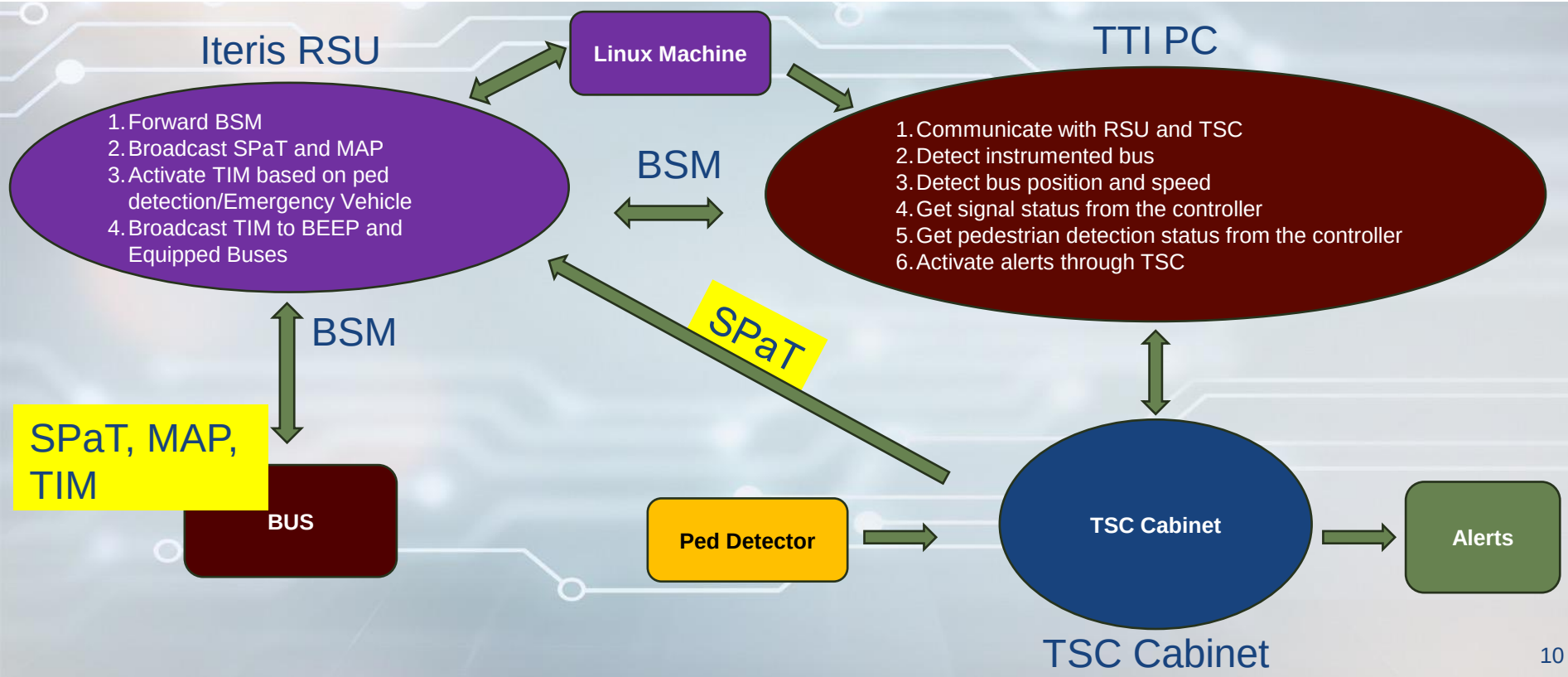
1. George Bush Drive and Penberthy Boulevard
2. University Drive and Boyett Street
3. Texas Avenue and New Main Drive
4. Spring Loop and Tarrow Street
5. Harvey Mitchell Parkway and Welsh Avenue

University Drive and Boyette

- Install New Equipment
  - M60 Controller
  - Yunex CV2X RSU
  - BUS Signs
  - BOSCH Camera for ped detection
  - Existing Polara equipment



Iteris Setup



Roadside Unit Processor

CV2X Roadside Unit

Processor in the signal cabinet

Pedestrian Push Buttons and Bus Signs

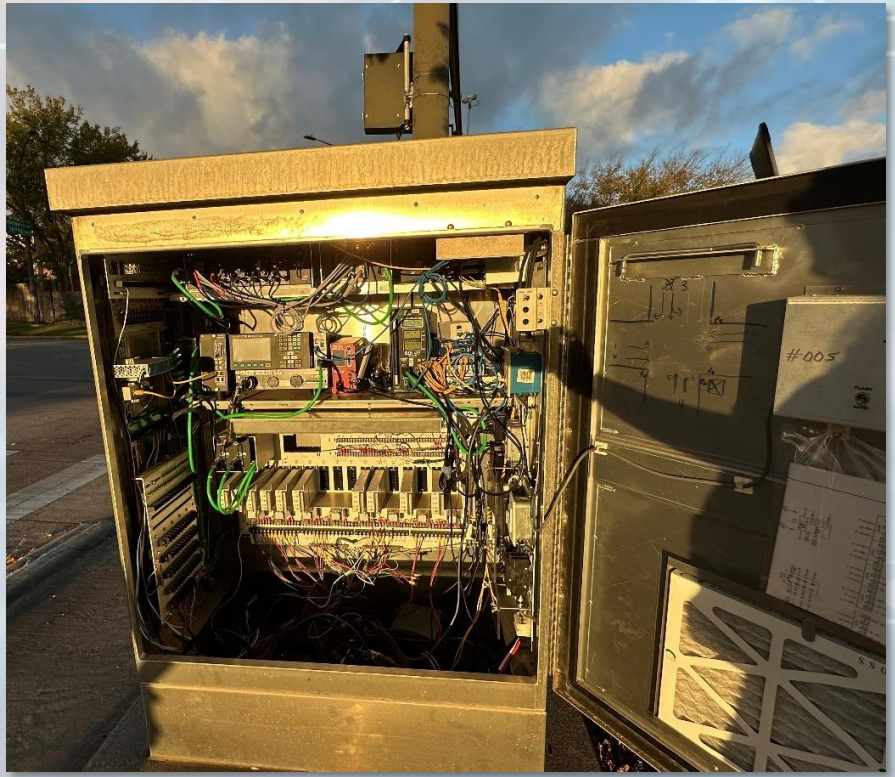
North End of Cross Walk

Bus Sign

Polara Push Buttons

South End of Cross Walk

Installing and Testing C-V2X Equipment in Traffic Signal Cabinets



Installing and Testing C-V2X Equipment – TAMU Buses

George Bush and Penberthy Avenue

Bus Turning at Boyett Street

Bosch Camera – Pedestrian Crossing Detection

Communicating with Automated Shuttles

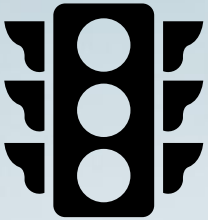
- Shuttles are currently getting
  - Signal Phasing and Timing (SPaT) message
  - MAP message
- Useful to get:
  - Turning bus movements
  - Emergency vehicles
- Simulate sending SPaT, RSA and TIM

Communicating with a Fire Truck

Tested sending and receiving messages with a TTI vehicle leading a fire truck.

Blind/Low Vision Mobile App

Approaching Bus

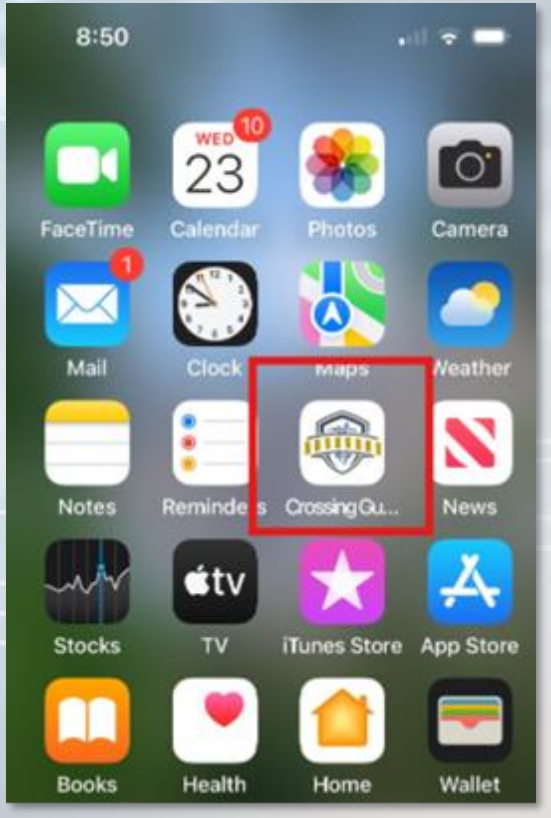


Traffic Signal Cabinet

User Phone: “Warning, bus in intersection”

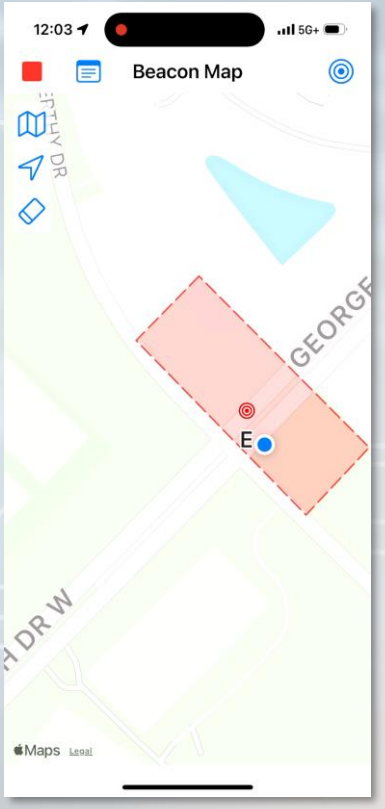
Mobile App for Blind/Low Vision Individuals

- Apple-compatible mobile app to alert users of turning buses
- Microcontroller queries traffic signal controller and detects bus turning feature
- Microcontroller broadcasts message in form of Bluetooth low Energy Beacons
- App detects beacon message, phone vibrates continuously and announces “Caution Bus Turning” every few seconds



Mobile App for Blind/Low Vision Individuals

- Developed geofence for George Bush Drive and Penberthy Avenue intersection
- Demonstrated at a Project Advisory Committee meeting
- Conducted Test and Interviews – Positive Feedback from 3 visually impaired individuals and 3 normal vision individuals



Intercept Interviews and Bus Operator Surveys

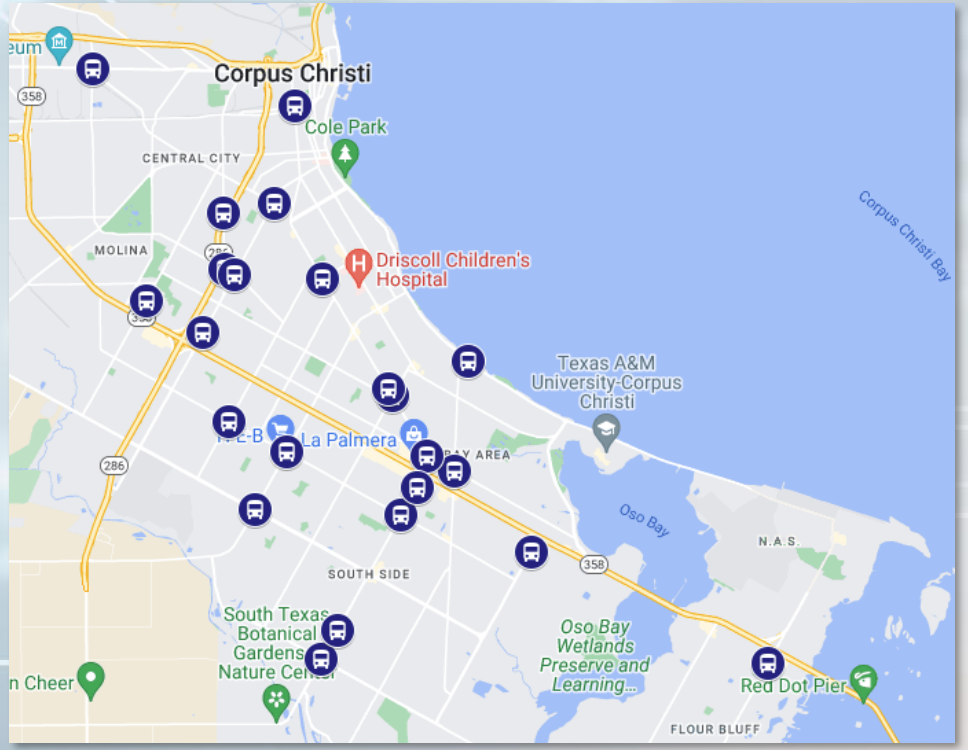
- Positive Feedback from Pedestrians, Bicyclists, and Scooter Users
- Positive Feedback from Bus Operators
- Additional Suggestions from All Groups

Monitoring Intersection Operations

- Daily Logs
- Time Stamp of Approaching Buses
- Status of Traffic Signal Cycle
- Start and End of Audio Alert
- Start and End of Bus Sign Illumination

Possible Stage 2 Proposal – Corpus Christi

- City of Corpus Christi
- Corpus Christi Regional Transit Authority (CCRTA)
- 12-15 Intersections
- 118 Buses



Lessons Learned

- Strong partners/working group critical
- Always takes longer
- Short time to evaluate impact
- Funding for local partners

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Technology and Innovation Program Project Update

Summary of Projects

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Completed AV Projects

Project	Description	Agency	TIP Code	Funding	Status
IH - 30 Test Corridor	Support TX dot connected freight corridor (TCFC) project along IH 30 from Dallas to FW	NCTCOG	11670	$250,000	Completed
TxDOT-Dallas Connected Freight Corridor	Smart freight corridors through deploying advanced vehicle-to-vehicle and vehicle-to-infrastructure communication technologies	TxDOT-Dallas	11670.2	$1,000,000	Completed
Multi-Purpose AV Design and Development	Multipurpose automated vehicle design, development, testing and deployment	NCTCOG	11671	$549,780	Completed
AV Planning	Procure planner(s) to assist public entities attracting or facing AV deployments	NCTCOG	11685	$1,666,000	Completed
Paul Quinn College Food & Internet (Infrastructure)	Infrastructure improvements (e.g., sidewalk repairs, clearing obstructions) to support autonomous delivery bots' operations	NCTCOG	11684	$250,000	Completed
UTA/Arlington AV Deployment	Support deployment of low-speed shuttles/AVs on UTA campus	City of Arlington	11684.8	$1,520,000	Completed
5G Infrastructure Test Platform	5G Testbed and Laboratory for Advanced Mobility Research and Development	AT&T/NCTCOG		$1,460,000	Completed
Optimized Freight Movement Project	Freight signal priority technology automatically extends green or reduces red lights for trucks to keep freight moving efficiently.	NCTCOG	11696.2 & 11696.1	$5,000,000	Partially Completed

Partially Completed Project

Optimized Freight Movement Project

Project Overview: A regional initiative to deploy smart freight signal priority at up to major intersections in North Central Texas. The project aims to reduce truck delays, emissions, and operating costs by using real-time location data to adjust traffic signals for freight vehicles.

Key Elements:

- Freight signal priority technology automatically extends green or reduces red lights for trucks to keep freight moving efficiently.
- Integration with existing city traffic systems and freight operator apps enables automated, real-time signal adjustments.

Status:

- System design, agency training, security plans and outreach complete.
- **Project Terminated** due to low enrollment/participation and remaining funds will be used to try a new freight optimization deployment.

Cancelled AV Projects

Project	Description	Agency	TIP Code	Funding	Status
Paul Quinn College Food & Internet (Service)	Deployment of delivery robots on campus to provide students with convenient access to meals and internet connectivity services.	NCTCOG	11684	$1,325,000	Cancelled
DFWIA Automated Parking Project	Automated parking test bed implementing low-speed vehicle automation, supervisory management, and active curb management systems.	DFWIA	11684.7	$1,500,000	Cancelled
McKinney/Dallas AV Wellness Wagons	Mobile telemedicine vans using teleoperation technology to deliver healthcare services and supplies in McKinney and South Dallas.	NCTCOG	11684.6	$5,000,000	Cancelled

Ongoing AV Projects

Project	Agency	TIP Code	Funding
Fort Worth Broadband	City of Fort Worth	11684	$3,000,000
Work Zone Data Exchange	NCTCOG	11678	$2,500,000
Cedar Valley and Eastfield Campus AV Service/Workforce Dev	Dallas College	11684.3	$8,700,000
IH 35W AV Truckport	City of Fort Worth	11684.2	$4,797,578
Richardson CAV Infrastructure	City of Richardson	11684.5	$4,800,000
DART Love Link AV Bus Service	DART	11684.1	$1,750,000

Ongoing AV Projects

Fort Worth Broadband

Project Overview:
The City of Fort Worth is deploying broadband infrastructure along E. Rosedale and E. Lancaster as a virtual mobility strategy to expand digital access and improve connectivity in underserved areas.

Key Components:
- Installation of fiber-optic infrastructure.
- Support digital equity with low-cost service options and device access.

Status:
- FY 2023 Agreement.
- Interlocal agreement executed: December 12, 2024.
- **Project completion:** June 2027.

Ongoing AV Projects

Work Zone Data Exchange

Project Overview: A regional project to standardize and share real-time work zone data to improve safety, mobility, and information access using TxSHARE approved Work Zone Data Exchange (WZDx) vendors.

Key Components:

- Creation of an open data feed for live work zone information.
- Seven cities in the region were selected and approved for projects totaling approximately $2.5 million, including the city of Arlington, Denton, Duncanville, Frisco, Garland, Lewisville and Mckinney.

Status:

- Scope of work has been drafted for all projects.
- Cities are currently reviewing the interlocal agreement.
- **Project completion:** 3 years from notice to proceed.

Ongoing AV Projects

Dallas College AV Workforce

Project Overview:
A workforce development initiative preparing students for careers in automation, cybersecurity, logistics, and AV technologies.

Key Components:
- Development of curriculum and training programs.
- Exploration of autonomous freight applications for hands-on experience.
- Early-stage planning for a campus autonomous people mover to enhance student mobility.

Status:
- Notice to proceed received: Mar 25, 2025
- Project is mobilizing, and budget is under internal review with TxDOT.
- **Project completion:** January 2028

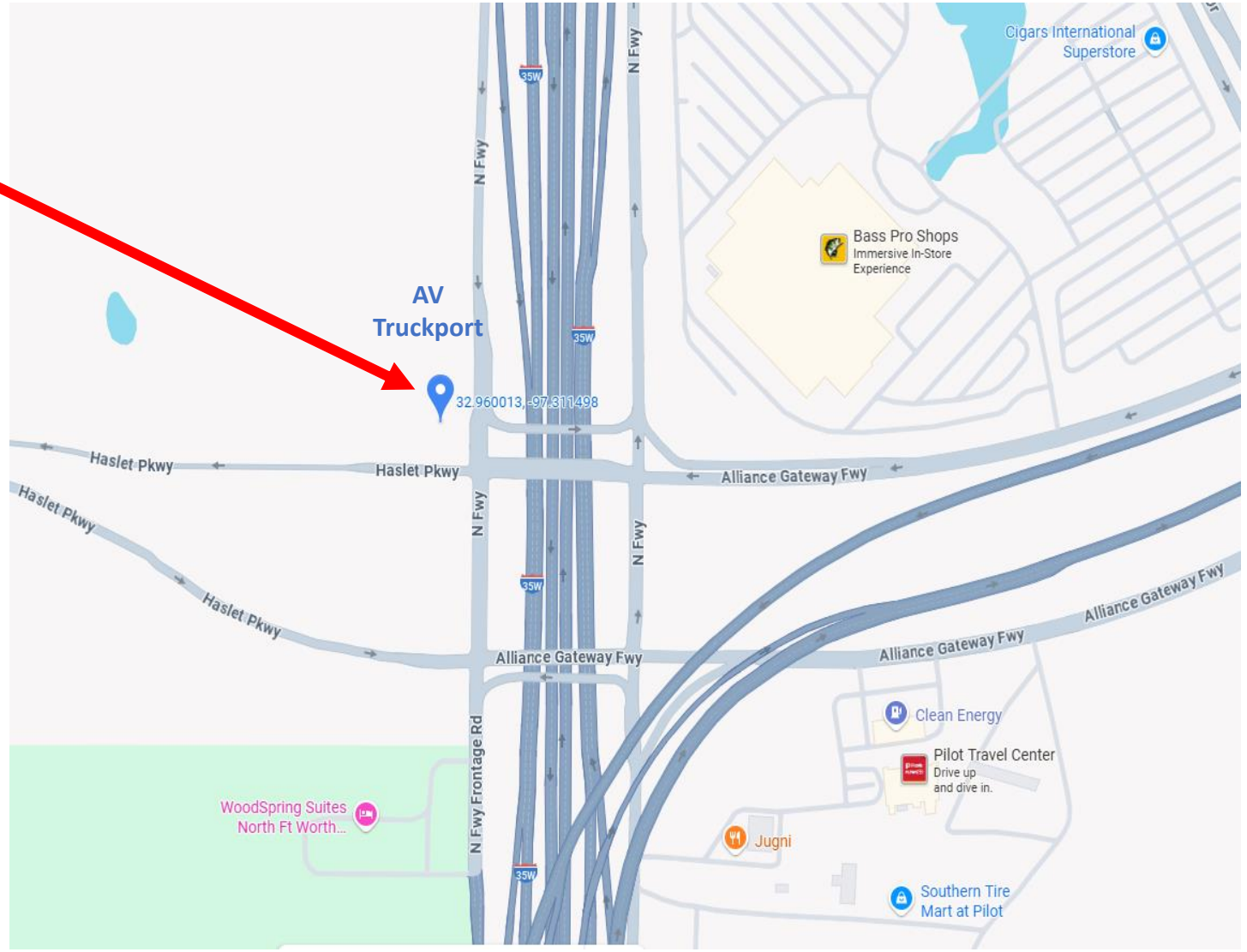
Ongoing AV Projects

IH 35W AV Truckport

Project Overview:
Fort Worth-led initiative exploring truckport facilities integrated with Autonomous vehicles and freight technology.

Current Activities:
- Coordinating with the FAA to establish a payment plan for the site.
- Partnering with Texas A&M to evaluate revenue-generating and trucker-supportive land uses.

Status:
Project initiation has been delayed by one year to June 2026.



Ongoing AV Projects

Richardson Connected Vehicle Corridor

Project Overview:
The City of Richardson is developing a Connected and Automated Vehicle (CAV) corridor to enhance intersection safety and provide automated shuttle services linking residents to key destinations like transit, City Hall, and the Innovation Quarter.

Key Components:
- Establishment of a CAV technology district for safer intersections and optimized AV operations
- Automated vehicle shuttles connecting neighborhoods with local destinations

Status:
- Funding is being shifted from construction to engineering due to higher-than-expected consultant costs.
- A TxDOT AFA amendment is in progress to start design and contracting.

Ongoing AV Projects

DART AV Enhancements

Project Overview:
Two-part project led by DART to modernize passenger experience and operational safety.

Components:

- Real-Time Passenger Displays: Will replace outdated static signage on buses with live-update displays, providing up-to-the-minute route info, service alerts, and event messaging.

- Precision Docking Technology: Helps buses align more precisely at tight curbs or crowded stops (e.g., Airport terminals), enhancing safety and boarding efficiency.

Status:

- Amendment in progress to formally update project scope.
- **Project completion:** Both components targeted for completion by June 2026.

Q&A / Contact

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