TEXAS AUTOMATED VEHICLE PROVING GROUNDS PARTNERSHIP

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CAV Leadership in Texas

Texas Technology Task Force

Texas Innovation Alliance

Texas AV Proving Ground Partnership
USDOT AV Proving Grounds

- USDOT seeking to:
  - Create national network of proving grounds
  - Encourage new levels of public safety
  - Establish Community of Practice on testing and demonstration of best practices
  - Accelerate the pace of safe deployment

- January 2017, USDOT designated 10 sites
Texas AV Testing Needs

- Automated vehicles are here – and more are coming!
- How do the public agencies plan for:
  - AVs to help with safety and mobility needs
  - What is needed to safely accommodate AVs
  - Safe introduction of AVs into mixed traffic
Texas Proving Ground Partnership

PG – Proving Ground
TB – Urban Test Bed Site
FR – Freight Test Bed Site
Other AV Proving Ground Sites

USDOT selected 10 sites out of 60+ proposals
Proving Ground Partners

- Texas A&M, University of Texas, and Southwest Research Institute
- All are conducting AV research
- All have controlled proving grounds on their campuses
TTI/Texas A&M

- RELLIS Campus Proving Grounds
  • 2,000 acre campus
- Truck Platooning
- AV roadway infrastructure needs and V2I
- FAA UAV Center of Excellence
- Expertise in vehicle controls, robotics, cybersecurity, UAVs
UT-Austin / CTR

- Proving Grounds: Streets and parking lots; J.J. Pickle Campus
- Highway, intersection, rural road safety
- V2X sensing/communication
- Vehicle and non-motorized user interactions
- Expertise in travel behavior, GPS and wireless sensing, cybersecurity, policy and regulation
Southwest Research Institute

- 1,200 acre on- and off-road testing facilities
- Over 20 fully automated vehicle platforms developed (from golf carts to class 8 trucks) for government and commercial clients
- Deploying CAV since 2008
- Specialties include: localization, perception, cybersecurity, connected automation, UAVs
Strengths of Texas AV Partnership

- Proving Grounds open for business
  - On-road and off-road environments
- Match research expertise and proving grounds to testing needs
- Partnerships are in place for pilots/demos
- Diverse set of urban test sites
  - High-speed freeway/managed lanes
  - Arterial streets with transit
  - Low Speed Urban
  - Campus environments
  - Border crossings
Urban Test Site Partners

- City of Austin,
- Central Texas Regional Mobility Authority,
- Capital METRO, Capital Area MPO,
- City of Bryan,
- City of College Station,
- Brazos Valley Council of Governments,
- City of Corpus Christi
- Corpus Christi MPO,
- Houston METRO,
- City of Houston,
- Harris County,
- Port of Houston,
- Houston-Galveston Area Council,
- Texas Medical Center,
- University of Houston,

- City of Arlington,
- City of Dallas,
- City of Fort Worth,
- City of Grand Prairie,
- North Central Texas Council of Govts,
- Tarrant County,
- Denton County Transit Authority,
- University of Texas at Arlington,
- City of San Antonio,
- VIA Transit,
- Alamo Area MPO,
- Joint Base San Antonio,
- City of El Paso,
- County of El Paso,
- Camino Real Regional Mobility Authority,
- El Paso MPO,
- Texas Department of Transportation
- Riverside Drive
  - Connects to CBD
  - Low-speed arterial
  - Transit/ped/bike
- Austin-Bergstrom Airport
Dallas-Fort Worth-Arlington

- I-30 Freeway / managed lanes between Dallas and Fort Worth
- Arlington arterials connecting to I-30
- UT Arlington Campus
Houston

Potential tests include:

- Safety: autonomous braking
- Capacity: bus platooning
- First/last mile Connection: automated shuttle

Texas Medical Center
- 1,345 acres
- 106,000 employees
- 50,000 students
- METRO bus and

METRO HOV Lanes
- METRO owned and operated
- 100 miles HOV/HOT
  - I-45
  - US 59 North
  - I-45 South
  - US 59 South
  - US 290

Energy Corridor
- Third largest employment center
- 91,000 employees
- Multimodal options

Universities
- University of Houston
- Rice University
- Texas Southern University
San Antonio

- Fredericksburg Road
  - Arterial street
  - Bus Rapid Transit Route
El Paso

- AV technologies for freight and passenger border crossings
- Model for other border crossings in Texas and U.S.
Next Steps

▪ USDOT
  - Meetings with the 10 National Proving Grounds
  - Assist national guidance
    - Define testing needs
    - testing guidance
    - best practices
    - safety procedures

▪ Texas
  - Private companies and public agencies can engage Texas Partnership on testing needs
Upcoming Events

- AVS 2017 - Presentation & Poster Session
  - San Francisco, CA, July 11-13\textsuperscript{th}
- Data Code-a-thon
  - Austin, TX, July 18-19\textsuperscript{th}
- 2\textsuperscript{nd} Texas Innovation Alliance Summit
  - Houston, TX, October, 2017
For More Information

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- Chandra Bhat, University of Texas, bhat@mail.utexas.edu
- Michael Brown, Southwest Research Institute, Michael.brown@swri.org
The “one-stop shop” for testing connected and autonomous vehicles
Iain Forbes
The goal – a self sustaining CAV ecosystem

- Attracts global industry players
- Attracts world class talent
- Supports and attracts adjacent business
- Stimulates cross-sector activity & transfer
- Produces world class business & technical innovation
- Attracts funding

- Improves mobility for local population
- Connects regions
- Stimulates cross-sector collaboration

- Produces world class customer experiences
- Attracts entrepreneurs
- Attracts global industry players
- Stimulates economic activity
- Develops world class talent
- Stimulates cross-sector collaboration

- Centre for Connected & Autonomous Vehicles
New: funding for CAV testing infrastructure

- In November 2016, Government announced **£100 million for new connected and autonomous vehicle (CAV) testing infrastructure.** (A different fund from the 2015 Intelligent Mobility Fund)
- First £55 million competition closes 19 July

Open regulatory approach

Over £100m for collaborative R&D

£100m for testbed infrastructure

International leadership

Testing

Insurance

Next competition opens soon

A coordinated testing ecosystem
GoMentum Station

Randy Iwasaki
Executive Director
Contra Costa Transportation Authority
June 21, 2017
WHO WE ARE

• The Contra Costa Transportation Authority (CCTA) is a public agency formed by voters in 1988 to manage the county’s transportation sales tax program and to lead transportation planning efforts.

• CCTA is responsible for maintaining and improving the county’s transportation system by planning, funding, and delivering critical transportation infrastructure projects and programs that connect our communities, foster a strong economy, increase sustainability, and safely and efficiently get people where they need to go.
<table>
<thead>
<tr>
<th>WHAT WE DO</th>
<th>BUSES</th>
<th>Invest in a reliable, comfortable and convenient bus network</th>
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<tbody>
<tr>
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<td>LOCAL STREETS</td>
<td>Smooth traffic flow on major roads and invest in improvements such as repairing potholes and road surfaces</td>
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<td></td>
<td>PEDESTRIAN</td>
<td>Make improvements to sidewalks, crosswalks, trails, and paths</td>
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<td>SAFE ROUTES TO SCHOOLS</td>
<td>Focus on programs and projects aimed at bicycle and pedestrian safety for K-12 students</td>
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<td>FERRIES</td>
<td>Expand the Bay Area ferry system by looking to ferries as an alternate commute method between West County and San Francisco</td>
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<td>BICYCLE</td>
<td>Invest in safe routes and infrastructure improvements for bicyclists</td>
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<td></td>
<td>BART</td>
<td>Improve BART service and stations, extend routes and increase parking at stations</td>
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<td>HIGHWAYS</td>
<td>Complete Contra Costa’s highway system, and improve air quality and noise protection along these corridors</td>
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<td>CARPOOL/RIDESHARE</td>
<td>Implement programs to reduce traffic congestion by encouraging carpooling and ridesharing</td>
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<td>PROGRAMS FOR SENIORS AND PEOPLE WITH DISABILITIES</td>
<td>Enhance transit options to improve mobility for seniors and people with disabilities</td>
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Introducing the GoMentum Station Program

Connected Vehicle and Autonomous Vehicle (CV/AV) Program and Test Facility

U.S. Department of Transportation Automated Vehicle Proving Ground
WE ARE GLOBAL

GoMentum Station is an International Entity
Overarching Goals

- ECONOMIC GROWTH & JOB CREATION
- EFFICIENT MOBILITY
- ENHANCED SAFETY
- HEALTHIER ENVIRONMENTS

21ST CENTURY TRANSPORTATION
More than 5,000 acres with 2,100 acres currently available for testing
Over 20 miles of paved roadways including a 7-mile long spine road for high speed testing.
Two 1400-ft. long tunnels ideal for testing guidance, sensors & communications technologies
Freeway underpasses and variable roadway geometrics
Several parking lots for testing by multiple users
The technology that can save 3000 lives per day

The mission of Baidu’s Autonomous Driving Unit (ADU) is to develop vehicles capable of sensing and navigating without human input.

ADU brings together a group of high caliber talent to work on audacious goals – commercializing autonomous driving by 2018 and achieving mass production by 2020.
CONCEPT AND PHASING

Phase 1 (1 to 8 years)
- Oval Test Track
- OEM R&D Facilities
- TRC/Universities
- SAV Manufacturing Factory
- Test Area - U.S. Zone
- Test Area - International Zones
- Urban City Center Area
- Charging Station
- CAV Storage Facilities

Phase 2 (8 to 15 years)

Phase 3 (15 to 25 years)
Shared Autonomous Vehicle Project
PROGRAM PHASING & SCHEDULE

Procurement, Legislative Approval

Phase – I
(GoMentum Station)

Phase – II
(Bishop Ranch)

Phase – III
(Contra Costa County)

2016

SAV Arrival in Contra Costa

2017

Bench Testing, Field Operational Testing and Regulatory Approval

SAV Delivery, Testing in Confined area of Public Road at Bishop Ranch

2018/2019/2020

Commercialization and Deployment In Contra Costa County
PHASE I - SAV Testing Plan
PHASE II - SAV Testing Plan

Phase II (a)
Confined Environment of Bishop Ranch

Bishop Ranch
San Ramon, California
PHASE II - SAV Testing Plan

Phase II (b) Public Roads of Bishop Ranch
Completing Mass Transit via SAV* Shuttles in 2020

* SAV = Shared Autonomous Vehicle
Impacted Industries
How to prepare for the future!
• Education & Outreach
• Planning Process
• Engagement
• Flexibility
• Leverage
• Consistency
• Collaboration
• Partnerships
Thank you!

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