Texas on the Move: Emerging Issues and Advances in Accessible Transportation

Texas A&M Transportation Institute

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Texas A&M Transportation Institute

Who We Are

- *Transit Mobility Program* at Texas A&M Transportation Institute (TTI)
  - Provide research and technology transfer expertise in public transit and other forms of shared mobility.
  - Focus on best and emerging practices and technologies and building professional capacity within transportation organizations to continually improve their planning, operations, and management.
- Michael J. Walk
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  Associate Transportation Researcher

Objective

- ✓ Learn about emerging ideas and technologies for improved accessibility in transportation, with a particular focus on public transit.
- ✓ Learn about TTI's recent and current research to improve and better understand transportation accessibility.

Agenda

- Technological Advances for Accessible Transportation
- Transportation Services Advancing Accessibility
- Questions and Discussion

Tripping with Technology: Recent Technological Advances for Accessible Transportation

Some Gadgets, Apps, and Advances to Improve Your Trips

ATTRI

- *Accessible Transportation Technology Research Initiative*
- A USDOT program to “develop and implement transformative applications to improve mobility options for all travelers, particularly those with disabilities.”
- Focus Areas
  - Wayfinding and Navigation
  - Pre-Trip Concierge & Virtualization
  - Safe Intersection Crossing
  - Robotics and Automation
- Focused on helping travelers through the COMPLETE TRIP

ACCESSIBLE TRANSPORTATION TECHNOLOGIES RESEARCH INITIATIVE

(Source: https://www.its.dot.gov/research_areas/attri/pdf/ATTRI_BAA_AwardsAnnouncement_092617.pdf)

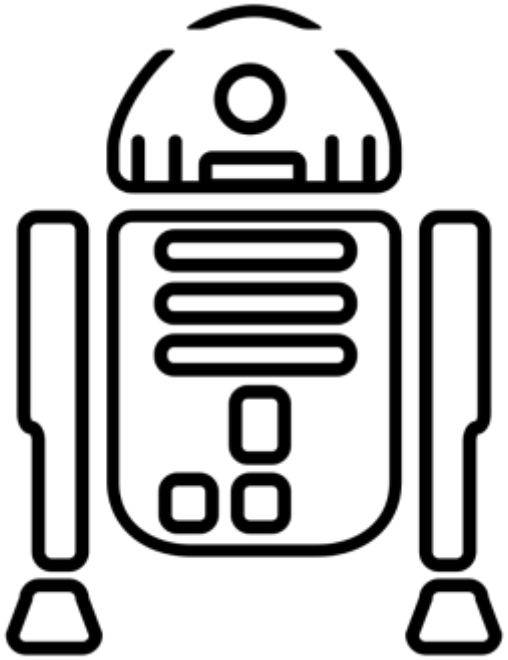
Some ATTRI Currently Funded Projects

- Smart Cane and Assistive Navigation
  Wayfinding solution for those with low vision – integrated with a smart phone application.
- TRX Systems
  Smart wayfinding and navigation system – focused on real-time location and situational awareness (previous work on indoor navigation).
- Pathways Solutions
  Wayfinding and routing tool for wheelchair users and people with visual impairments.
- Carnegie Mellon University
  Increase safety of intersection crossings by connecting smartphones to traffic signals.

(Source: https://www.its.dot.gov/research_areas/attri/pdf/ATTRI_BAA_AwardsAnnouncement_092617.pdf)

ATTRI Robotics and Automation Project

– Develop seamless transportation assistance from cloud-based autonomy and shared robots in and around transportation hubs.



(Source: http://search.naric.com/research/pd/redesign_record.cfm?search=1&type=advanced&display=detailed&all=aaron&exact=&any=&omit=&fld1=PN&txt1=&op1=AND&fld2=PN&txt2=&op2=AND&fld3=PN&txt3=&op3=AND&fld4=PN&txt4=&funding_status=all&criteria=&state=&start_month=&start_year=&project_type=&funding_priority=&rec=3602)

Examples of Other Tools and Apps

- Viamigo: trip concierge and coaching for people with cognitive disabilities
- General Wayfinding
  - BlindWays: Crowdsourced bus stop location app (Boston)
  - Google Maps, Apple Maps, etc.
  - Sendero Group
- Wayfindr
  - Developing open standard for accessible and inclusive audio-based navigation

(Sources: http://www.afb.org/info/living-with-vision-loss/using-technology/smartphone-gps-navigation-for-people-with-visual-impairments/built-in-smartphone-mapping-apps-from-google-and-apple/1235; http://www.senderogroup.com/products/GPS/allgps.html; http://www.perkinselearning.org/technology/posts/blindways-crowdsourced-bus-stop-location-app; https://www.wayfindr.net/)

Examples of Other Tools and Apps

- Transit Assistance
  - Wi-Fi Access Points on buses and on stops to alert users of arriving buses and when to depart (Santa Cruz)
  - BlindSquare: Navigation app – testing use of Bluetooth beacons in Wellington, New Zealand
  - Aware: Bluetooth beacon positioning and navigation at transit hub (New York)
  - Interactive transit assistant: notified bus driver that a person with a disability is waiting at the stop
- Apps do not overcome problems in the built environment
  - Broken or missing sidewalks
  - Obstacles
  - No curb ramps

(Sources: https://escholarship.org/uc/item/0x5980c8; http://www.blindsquare.com/about/ and https://youtu.be/VgbyrBWsnno; http://www.sensible-innovations.com/; doi: 10.3390/ijerph110504560)

What About Pedestrian Pathways?

- OpenSidewalks
  - Project led by Taskar Center for Accessible Technology
  - Incorporate pedestrian pathway data into OpenStreetMap
- AccessMap
  - Accessible pathway routing tool (Seattle, WA)
- PathVu
  - Funded by ATTRI
  - Developing tools to inventory pedestrian infrastructure and condition (Pilot in Pittsburgh)

(Sources: http://accessmap.io; http://www.pathvu.com; and https://www.opensidewalks.com/)

Beyond Smartphones

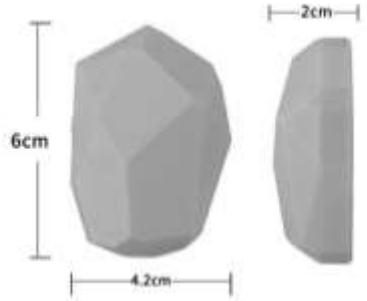
- Smart shoes: EasyJet, Lechal
  - Can vibrate to help you know which way to turn
- Smart watches
  - Keep your phone in your pocket
  - Vibrations and notifications
- Bone-conduction headphones
  - Hear your phone without losing audible situational awareness

Current TTI Projects

Houston METRO Bluetooth Beacon Project

Capital Metro (Austin) Comprehensive Wayfinding for All

Houston METRO



- 2016 Proof-of-Concept Pilot Project
  - Bluetooth beacons installed at bus stops
  - Accessible smartphone app
  - Provide distance to desired bus stop and real-time bus arrival info
- What's Happening Now?
  - METRO continuing development of app
  - METRO working to pilot on 12 routes, 2,400 bus stops
  - Planning to roll out beacons to all 9,000 bus stops by end of 2018

Capital Metro (Austin) Grant Application

A Partnership Between
Texas A&M Transportation Institute
&
METRO

- Grant application to TCRP IDEA Program
  (Transit Cooperative Research Program, Ideas Deserving Exploratory Analysis)
- Comprehensive Wayfinding For All (CWall)
  - Integrated transit and pedestrian trip planning for entire trip
  - Travel to and locate bus stop along *accessible* pathways
  - Receive real-time bus arrival notifications and “get off” notifications
  - Open-source, using open data
  - Will be developed and tested with the assistance of people who are visually impaired and who have mobility limitations
- Status: Waiting for grant decision

TNC Perceptions

- Web survey: https://goo.gl/JSBbtE
- How individuals who are blind or visually impaired
  - perceive TNCs relative to other travel modes
  - Utilize TNCs for safe mobility
- Survey is RECENTLY OPEN!

Paratransit Feeder Service Pilot – Houston METRO

Connecting Customers to Fixed-Route Service

Project Overview

- Conducted a peer review of feeder-service practices including pricing, policies, and measurements of operating costs
- Helped METRO determine the structure of service for the pilot and projected potential cost savings impacts of feeder service for METROLift
- Analyzed the results of the pilot to determine the locations of feeder trips and estimated operational costs per trip

METROLift and METRO Fixed Route

METROLift provides curb-to-curb and door-to-door services within the required ¾-mile area around fixed routes as well as beyond the required area

- Feeder service program designed to take advantage of METRO's accessible fixed-route facilities and fleet
- Making connections to the fixed-route system from places in METRO's service area that do not have strong fixed-route service or sidewalk accessibility

Feeder Service Pilot Design

Pilot allowed customers to *choose* to schedule feeder service trips (self-selection) rather assigning certain trips/customers as mandatory feeder service.

- Scheduling feeder service trips would be completely voluntary for customers
- Feeder trips would be fare free on both the METROLift and METRO fixed route portions
- Feeder trips could be scheduled on the same day when capacity is available

How the Paratransit Feeder Service Works

(Source: Houston METRO)

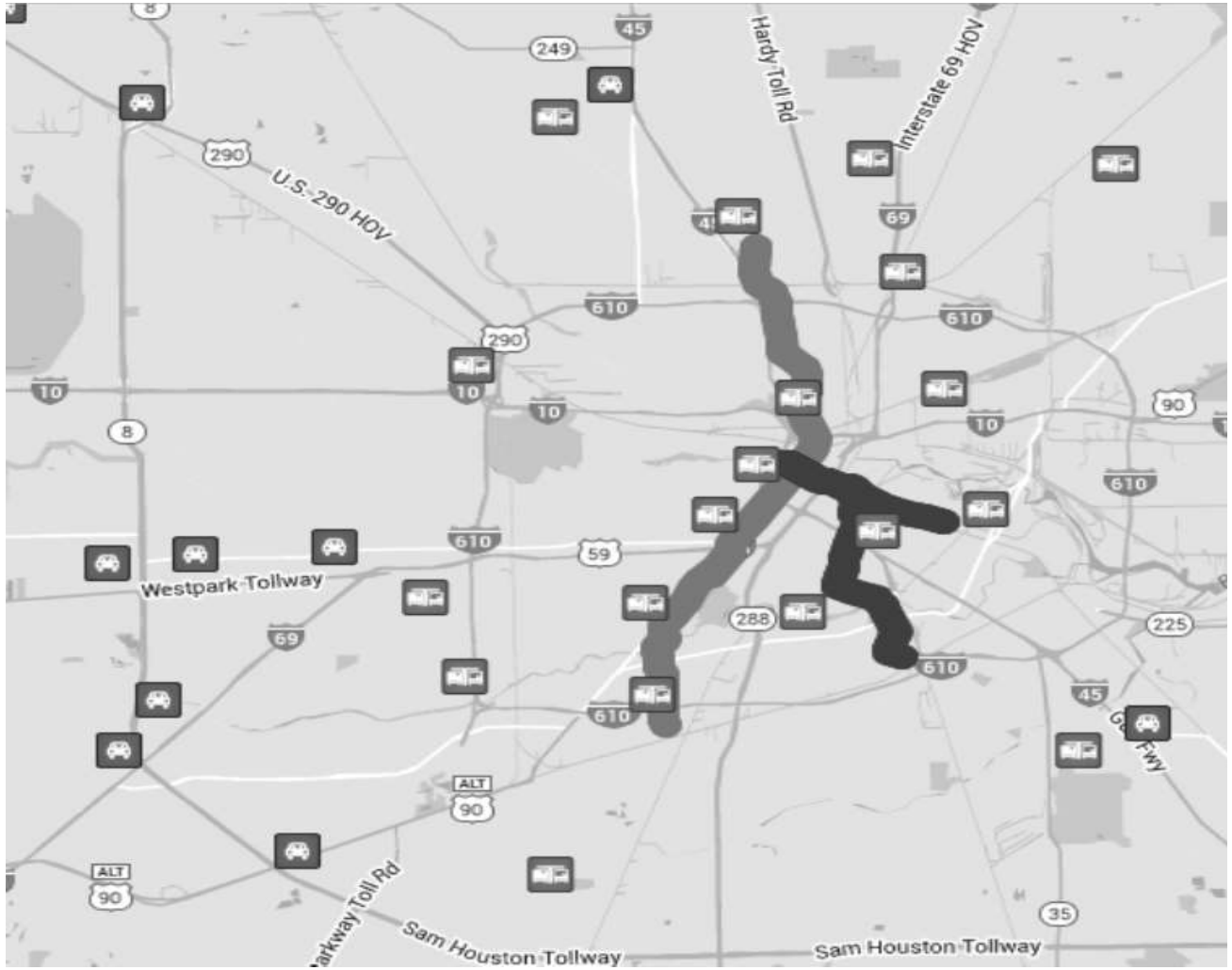
Fixed-Route Facilities

METRO determined that fixed-route stations/facilities, totaling 79 possible transfer locations, would be the best fit for connecting customers to fixed-route service using feeder service.

At the time of the pilot METRO operated service at:

- 44 light rail stations
- 21 transit centers
- 27 park & ride stations

(some facilities share multiple services such as a rail station and bus transfer center)



(Source: http://www.ridemetro.org)

Summary

- Reduced trip travel times for feeder service customers on paratransit vehicles
- No additional operational cost for the transit agency
- Cost savings achieved by using existing resources to assist customers in planning feeder trips
- Consistent with goals for feeder service: to be an additional option rather than a requirement, scheduling based on conditional eligibility

On-Demand Ridesharing and Microtransit

New Service Models for Public Transit

First/Last Mile Connections

Alameda-Contra Costa Transit District - Flex Shuttle

- Self-operated on-demand flexible route, temporarily replacing existing low productivity route
- Customers used Flex as a feeder to BART service
- Another Flex shuttle added for a community circulator
- 3rd party contractor DemandTrans Solutions for software
- Customers book trips up to 30 minutes before, then wait about 15 minutes at bus stop
- Website and call center for trip reservations

(Source: https://www.mercurynews.com/wp-content/uploads/2017/03/cct-acflex-0324-01.jpg?w=525)

First/Last Mile Connections

Santa Clara Valley Transportation Authority - FLEX

- Microtransit to improve mobility in identified service areas with unmet demand
- 3rd party contractor RideCell for software
- Defined pickup and dropoff areas with sidewalk decals
- Customers provided directions to the closest pickup location
- Average wait time of 7.5 minutes, maximum wait of 20 minutes*
- Trip requests and fare payment through mobile app

(Source: http://cdn.abclocal.go.com/content/kgo/images/cms/automation/vod/1159761_1280x720.jpg)

*(Source: http://www.enotrans.org/etl-material/uprouted-exploring-microtransit-united-states/)

On-Demand in Texas

City of Arlington and Via

- On-demand rideshare operated by Via
- Designated service zone and connection to Trinity Railway Express station

Capital Metro Pickup

- On-demand microtransit, operated by Capital Metro with Via software
- Designated service zone and connection to MetroRail station

(Source: http://www.arlington-tx.gov/news/wp-content/uploads/sites/2/2017/12/Articles-Via-Rideshare-12-11-17.jpg)

(Source: https://capmetroblog.files.wordpress.com/2017/06/pickup.jpg?w=640)

On-Demand Paratransit

Massachusetts Bay Transportation Authority – The RIDE

- On-demand paratransit pilot with Lyft and Uber
- MBTA subsidizes part of the trip costs at $13
- Customer pays initial $2 of the trip cost, then any cost past the subsidy
- Wheelchair Accessible Vehicles are provide by the company through local agreements
- Trip allocations set for each customer, using tiers to manage demand
- Pilot trips are 55% cheaper for MBTA than a comparable RIDE trip*

*(Source: from MBTA)

On-Demand Paratransit

Washington Metropolitan Area Transit Authority – Abilities Ride

- On-demand trips in Maryland service area provided by two local taxi companies with smartphone apps
- WMATA subsidizes part of the trip costs at $15
- Customer pays initial $5 of the trip cost, then any cost past the subsidy
- Maximum of 4 trips a day
- Accommodation of all mobility devices and service animals
- Background checks and drug testing under Maryland law

SILVER Cab

Emerging Mobility and Accessibility: What is the Future for Accessible Transportation?

Improved Accessibility through Autonomous and Connected Vehicles

Moving Towards Automation

Autonomous vehicles

- Capable of executing some or all tasks without driver input
- "Self-driving"
- Possible vehicle connectivity to communicate with other vehicles/ infrastructure – sharing location, speed, and other information

Complexity

- Coordination between public and private stakeholders
- Integration of service providers and manufacturers
- Uncertain market forces, legal issues

Key Issues

- Availability of information
- Fare payment
- Accessible vehicle design
- Door-to-door assistance
- Separation of paratransit from other service
- Risk-sharing in partnerships
- Fleet ownership
- Parking and land use

(Source: https://www.fix.com/blog/driverless-car-revolution/)

Vehicle Automation Scenarios

	Driver Controlled Connected Automated Vehicles (CAVs)	Vehicle Controlled Fully Automated
Private Vehicle Ownership	Private CAVs	Private Autonomous Vehicles
Shared Vehicle Ownership	Shared CAVs	Shared Autonomous Vehicles

USDOT Comment Period

Issued in January 2018, seeking information and comments on the future for automated vehicles

Federal Highway Administration

- Request of Information on Integration of ADS into the Highway Transportation System

Federal Transit Administration

- Request for Comments on Automated Transit Buses Research Program & Transit Bus Automation

National Highway Traffic Safety Administration

- Request for Comments on Removing Regulatory Barriers for Automated Vehicles

Autonomous Shuttles in Texas

City of Arlington – Milo shuttles

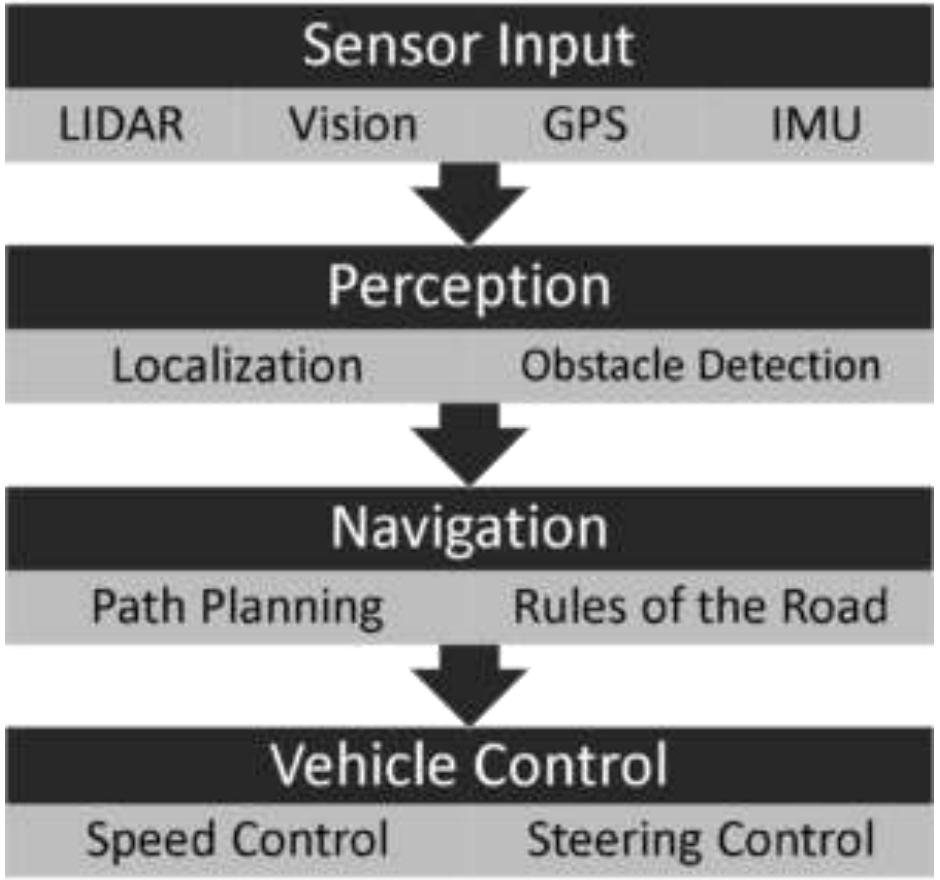
- Pilot vehicles providing service at events in the entertainment district
- Self-driving electric vehicles
- Up to 12 passengers
- 10 to 12 MPH
- Wheelchair accessible
- Transdev technology
- Operator on-board during pilot

(Source: https://arlingtonvoice.com/sites/default/files/reports/2017/Nov/13/milo_easymile-arlington-tx.jpg)

Autonomous Shuttles in Texas

Texas A&M University

- Equipped with sensors for autonomous operation
- Low speed testing at main College Station campus



(Source: https://unmanned.tamu.edu/projects/autonomous-shuttle/)

Texas AV Proving Grounds Partnership

Recognized by USDOT

- Arlington- University of Texas at Arlington
- Austin – City of Austin, Central Texas Regional Mobility Authority, Capital METRO, the Capital Area MPO
- Bryan/College Station – City of Bryan, City of College Station, and Brazos Valley Council of Governments
- Corpus Christi – City of Corpus Christi and the Corpus Christi MPO
- El Paso – City of El Paso, County of El Paso, and Camino Real Regional Mobility Authority, and the El Paso MPO
- Houston – Houston METRO, City of Houston, Harris County, Port of Houston, Houston-Galveston Area Council, Texas Medical Center, University of Houston
- San Antonio – City of San Antonio, VIA Transit, the Alamo Area MPO, Joint Base San Antonio

Questions and Discussion

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