Cemre Kavvasoglu
Product Management Director, NA

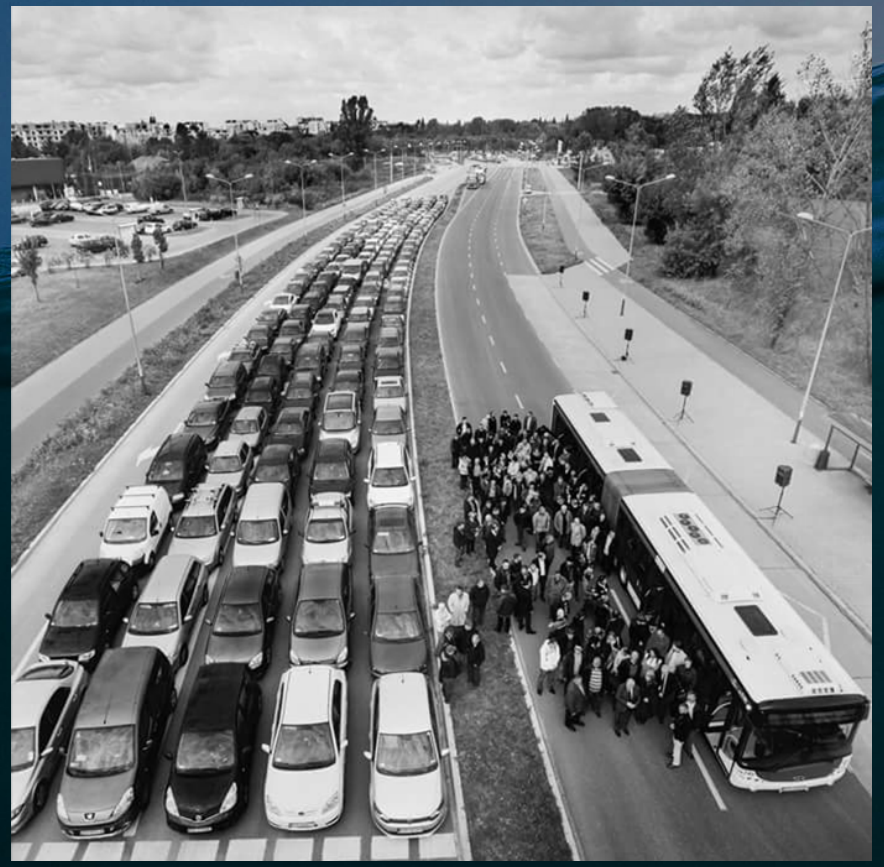
problem

Elon Musk
@elonmusk

Defeating traffic is the ultimate boss battle. Even the most powerful humans in the world cannot defeat traffic.

9:06 AM · Mar 6, 2022 · Twitter for iPhone

Congestion



Carbon Emissions

CATA reduces MSU and Lansing bus routes due to driver shortage as classes resume

Mark Johnson
Lansing State Journal

Published 5:07 p.m. ET Jan. 28, 2022 | **Updated 5:27 p.m. ET Jan. 30, 2022**

A passenger gets off a bus at the MSU-CATA Transportation Center on Wednesday, March 18, 2020, on the Michigan State University campus in East Lansing. *Nick King/Lansing State Journal*

Driver Shortage

ADASTEC

solution

Automated Public Transportation is the ultimate shared mobility

- ADASTEC flowride.ai
  - L4 Automation
  - Factory Fitted
  - Energy Efficient
  - High Capacity

ADASTEC

feasibility

Reduce Energy Costs

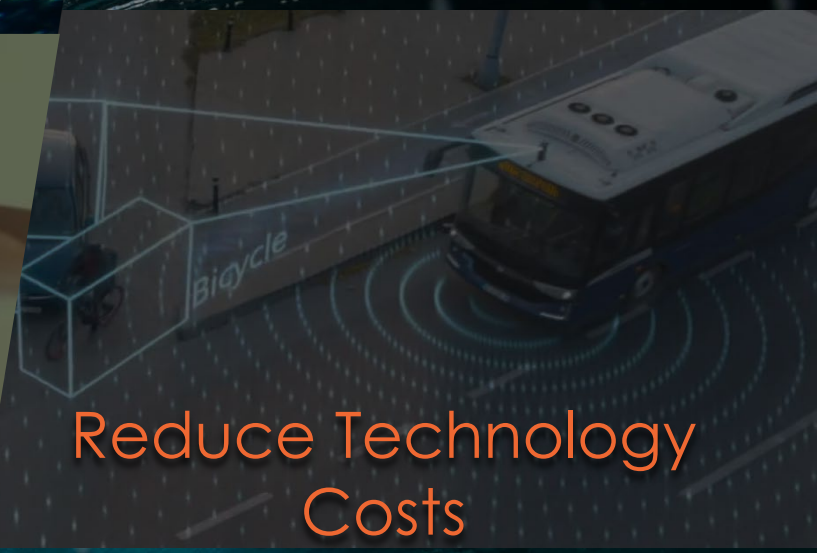
EVs reduce the cost of energy

AV optimizes energy usage ~8%

Reduce Labor Costs

AVs reduce the cost of labor

- Not enough drivers
- Labor costs : ~ 3.5 drivers per bus
- $250K – $300K per year per bus

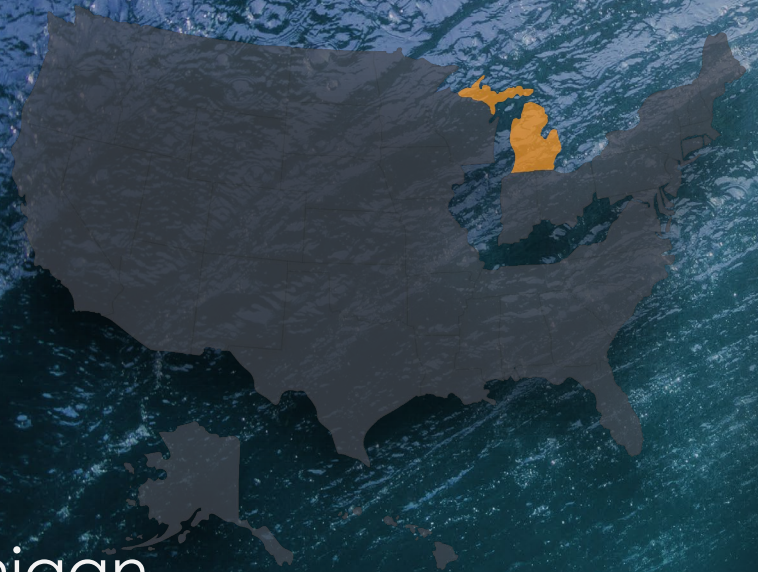


Reduce Technology Costs

Sensor/Software costs are acceptable compared to the cost of an EV Bus

ADASTEC

US deployment



Michigan
USA

ADASTEC

deployments

Stavanger
NORWAY

Châteauroux
FRANCE

Bucharest
ROMANIA

Ankara
TURKEY

ADASTEC

first

First Automated Bus Deployment both in the US and EU

Michigan State University - Autonomous Bus Pilot

ADASTEC CORP
East Lansing, Michigan

Operation Status: **Active Route**
Activity: **AV Testing**
Vehicle: **Bus, KARSAN AUTONOMOUS ATAK ELECTRIC**
Number of Vehicles (approx.): **1**
Learn More About This Vehicle

Road: **Public University**
Safety Driver: **In-Vehicle Safety Operator**
Use: **Public**
AV Technology by: **ADASTEC Corp.**
Vehicle Manufacturer: **KARSAN OTOMOTIV SANAYII**

Forbes

reduce emissions and improve people's travel opportunities especially in urban areas. Self-driving buses can make it financially sustainable to create new bus lines with shorter routes to and from transit hubs.

A first in Europe

The test is a collaboration between transport companies Vy and Kolumbus using AI and sensor technology from Adastec and monitoring technology from Norwegian startup Applied Autonomy.

Public transit users in Stavanger, Norway, will soon get the opportunity to experience self-driving ... [+] GETTY

ADASTEC

only

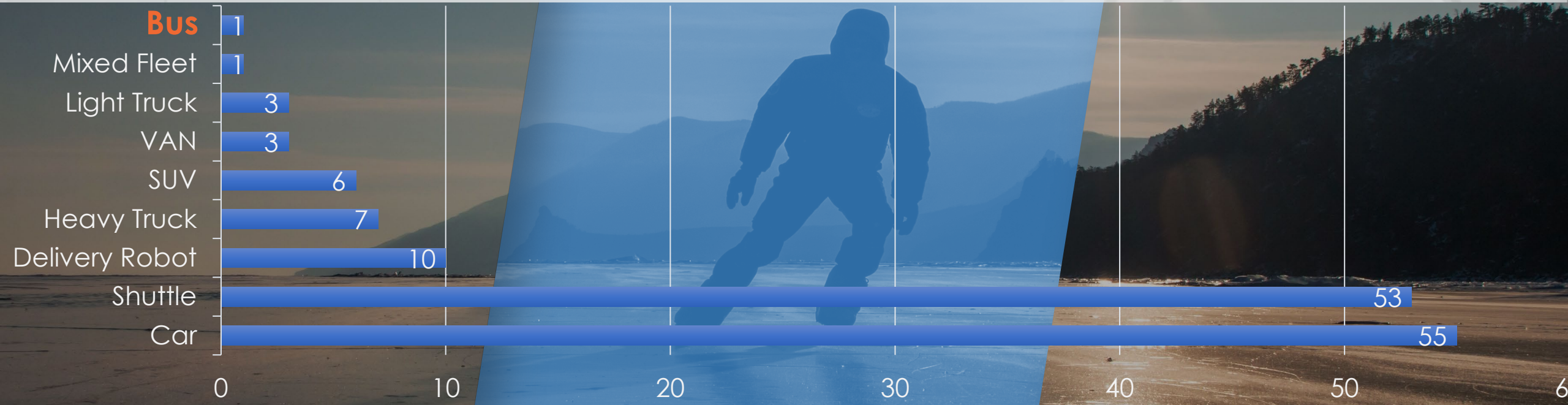
NHTSA

National Highway Traffic Safety Administraton

Ratings Recalls Risky Driving Road Safety Equipment

AV TEST Initiative

Automated Vehicle Transparency and Engagement for Safe Testing Initiative



ADASTEC

global recognition

transdev
the mobility company

DEPARTMENT Autonomous Vehicle
REGION Headquarter

Contact Smal Jean-Christophe

Issy les Moulineaux, 31 March 2023

Subject: RFI - ATS approved vendor List

Karsan / Adastec / HCI Groupe

Cagdas Adiyeke / Atalay Taşkoparan / Nicolas Dagaud

Karsan, Mavi Cd. No:13, 16140, Bursa, Turkey.
Adastec, Dudullu OSB, DES 2. Cad 8/108, Umraniye 34776 Istanbul, Turkey.
HCI, ZA du Haut Coin 8 rue de l'Industrie, 44140 Aigrefeuille-sur-Maine, France

Dear M. Adiyeke, M. Taşkoparan and M. Dagaud,

We would like to thank you for the quality of your answers to Transdev's Autonomous Transport Systems RFI.

Through this RFI, we have evaluated the following main categories:

- Autonomous driving system,
- AV platform,
- Supervision system,
- System deployment and operations.

The level of information provided, the existing functionalities and our confidence in the development of future functionalities described in your answers have been considered in the evaluation process.

After reviewing your answers and conducted interviews, Transdev has approved Karsan and Adastec for all 4 categories.

Clément AUBOURG
Head of Autonomous Vehicles
KEOLIS group
clement.aubourg@keolis.com
+33 6 09 31 56 19

Paris, Wednesday October 26th

Reference letter: Keolis and Adastec, a win-win partnership to deploy full size autonomous buses

To whom it may concern,

As head of Autonomous Vehicles for the Keolis group, in charge of the team of experts in Paris (France) and to support all Keolis subsidiaries worldwide on these AV related topics, I do confirm that Keolis has started discussions with Adastec in December 2020 in anticipation of the first vehicle presentation retroffited by Adastec, the Karsan E-ATAK autonomous 8 meter bus.

Keolis AV team and Adastec, in charge of developing the AD stack of the Karsan e-Atak autonomous, have quickly validated a common interest on the autonomous buses operations. Both companies want to move forward in terms of autonomous mobility, and by combining both expertises, the Keolis group and Adastec have a win-win partnership.

Keolis has welcomed the Adastec team on its dedicated AV test site in Châteauroux (France) in 2021 to deploy and test the Karsan buses made autonomous by Adastec. During 2 phases, testing 2 different releases of their software, the Keolis AV team had the chance to evaluate the bus on its test bed in different weather conditions in order to validate the Adastec technology prior to any deployment in open road.

As a result, Keolis remains positive on this promising technology and recommends Adastec as an autonomous vehicle technology provider.

Clément AUBOURG

ADASTEC

projects

- Contract/Deployment stage
  - Israel
  - Australia – TfNSW Funded
  - Germany – Hannover Albus project – 3 Buses
  - Istanbul Technical University
  - VY – Norway, Finland, Sweden
  - University at Buffalo

ADASTEC

product

Operating Conditions

- Full Autonomous in the route
- Day/Night working capability
- Operation in Rain/Hazy/Snow
- Controllable Max Speed (25 ml/h)
- No Safety Driver on route (2024)

Routes

- Predetermined
- Pre-mapped
- Simulated
- Mixed traffic conditions
- Multiple Stops

flowride.ai

Supporting wide range of
Operating Design Domains

ADASTEC

Automated Driving

- Bus stop handling
- Intersection handling
- Traffic lights
- Crosswalk handling
- Precise localization
- Traffic participants handling

Central Control

- Operation Management
- Mission Management
- Communication
- Data sharing

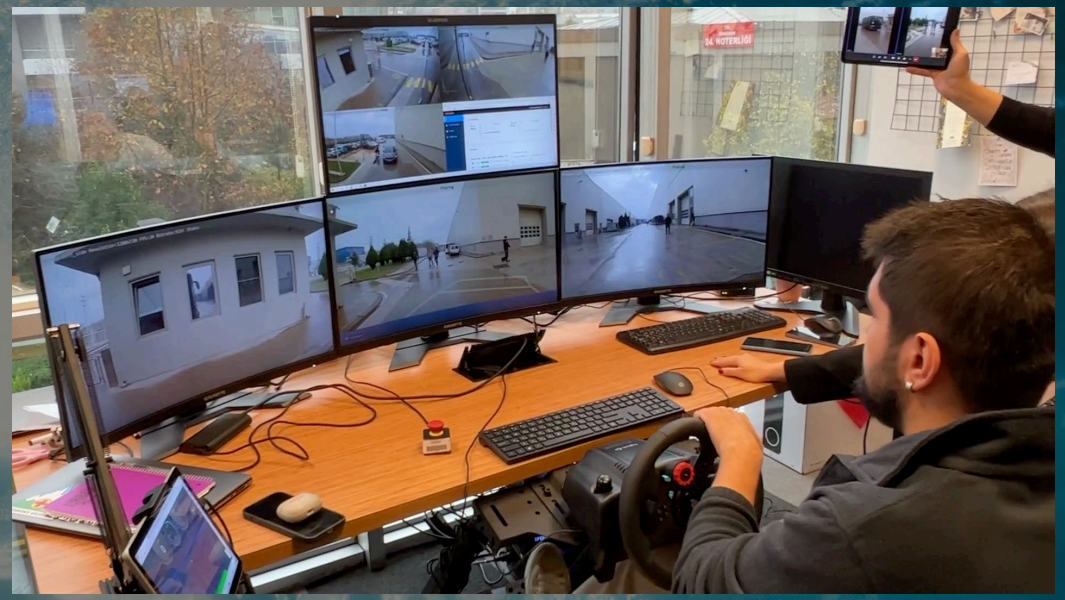
more

Remote Operation

- Remote Driving
- Remote Supervision
- Needed for removal of the safety driver

Platooning

- Virtual articulation
- Capacity optimization
- Bus Stop Handling



ADASTEC

thank you

Get In Touch:

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Ann Arbor MI 48104
USA

www.ADASTEC.com
cemre@ADASTEC.com
+1 (989) 501-4010

ADASTEC

Building public transit for the future

Via’s autonomous mobility solutions.

Meghan Grela, Autonomous Mobility Lead
Florida Automated Vehicles Summit
September 2023

Via Overview

TransitTech for all.

Whether you're a public transit organization, a private transportation operator, or a major corporation, Via's platform provides tailored solutions to meet your needs.


Cities


Transit authorities


Transit operators


Paratransit operators


School Districts & Departments of Education


Universities


Corporations


Healthcare providers & payers


Drivers


Riders

What does Via do?

Via’s solutions.

Microtransit/
On Demand
Public Transit

Paratransit

School Transportation

Autonomous
Mobility

Corporate/
University Shuttles

How does Via do it?

Plan

See how people move in your community, identify what's missing, and design new outcomes.

- Remix On-Demand Planning
- Remix Streets
- Remix Scheduling
- Remix Explore
- Consulting + Service Design
- ViaViewer

Operate

Bring your plans to life with an integrated suite of tools for operators, drivers, and riders.

- Via Operations Center
- Driver App
- Rider App
- Fleet Management
- Driver Management
- Driver/Rider Support

Optimize

Use data to assess impact, and move your vision forward.

- Reporting + Analytics
- Rider Growth
- Community Engagement

Partners

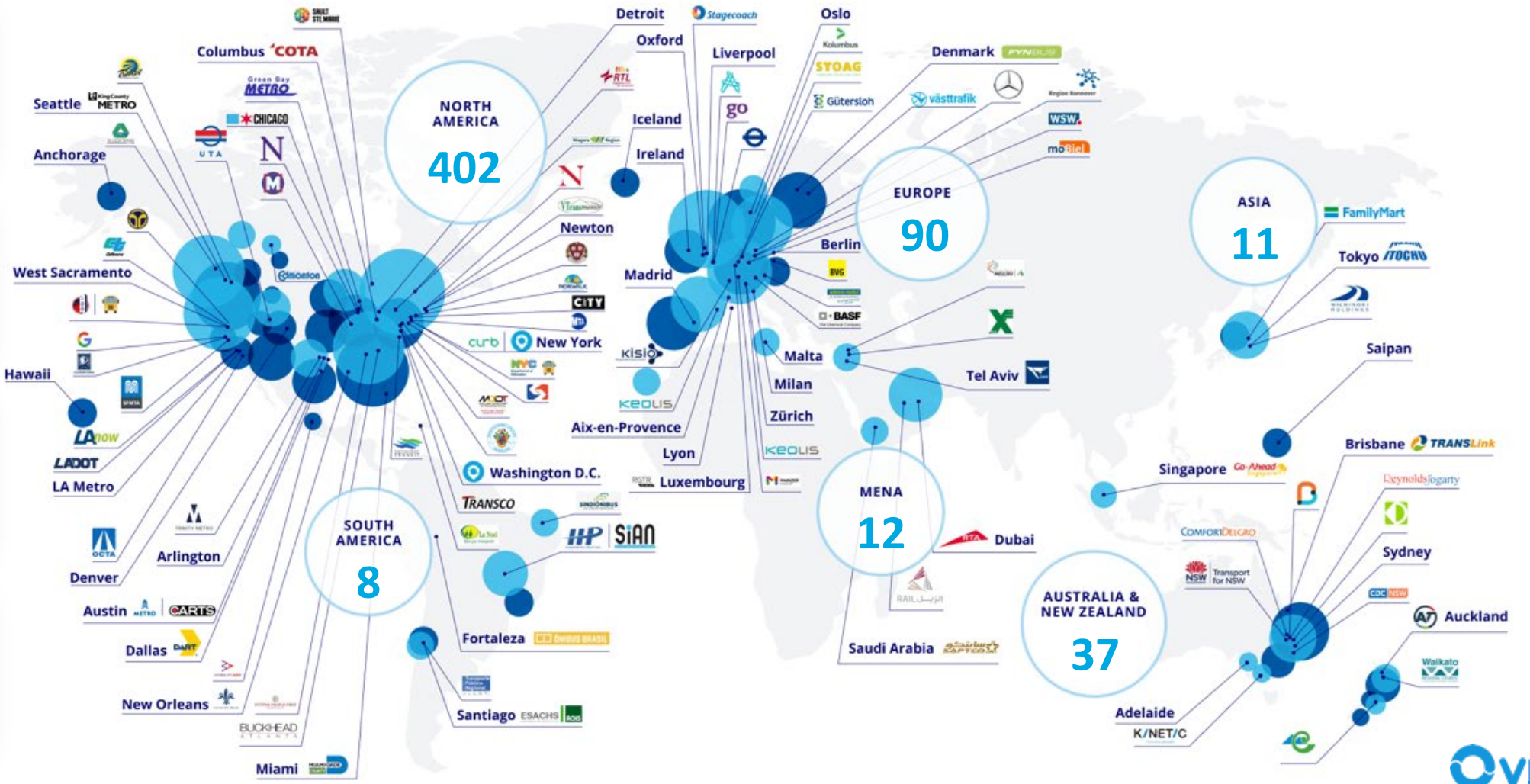
Via is the world's leading provider of advanced public mobility solutions.

600+
Partnerships

40
Countries

500
Engineers

100M
Rides



Partners

…Including in Florida.

Introduced a new microtransit service that allows riders to view **multi-modal trip proposals** (microtransit + fixed-route) in a single app.

12 min
average wait time

35 trips
per peak hour

Replaced underperforming fixed-routes with microtransit, and powering the paratransit service to improve OTP and PPH.

4x
reduction in avg. wait time

700+
rides per day

Replaced a legacy dial-a-ride program with a microtransit service that **allows riders to book pre-scheduled + on-demand trips.**

2x
reduction in avg. wait time

50%
of riders take on-demand trips

Replaced a legacy dial-in demand response program with a new microtransit service that has **improved ridership and operator bandwidth.**

80%
of riders book through app

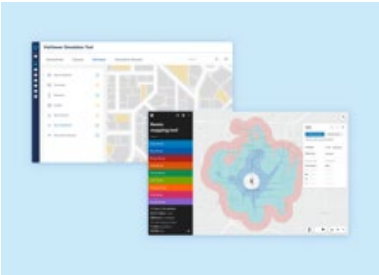
2x
growth in ridership in first month

Via Autonomous Mobility Overview

Via enables AVs to provide useful transit services.

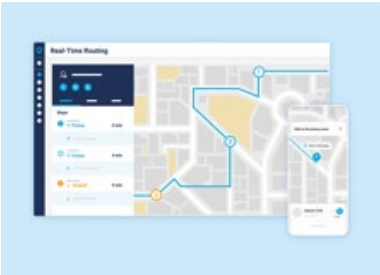
	Useful	Sustainable	Inclusive
Traditional Approaches AVs are deployed as fixed, inconvenient public transit *or* as private taxis 	AVs do not solve for transit needs & are inconvenient for riders.	Simply replacing vehicles with AVs does not address sustainability goals.	Leading AV tech has been deployed with limited reach.
Via's Approach AVs are **shared, on-demand & dynamically routed, integrated** with public transit networks. 	AVs **fill gaps in current transportation** coverage. AVs made available where they are **capable, safe, and serve a purpose**.	Shared AVs **reduce traffic, congestion, pollution & parking land use**. On-demand & dynamically routed shared AVs **maximize vehicle utilization** while bringing in riders into public transit.	Cutting-edge, costly AV tech is **democratized to broader public**. Data drawn from large rider base matures AV tech and innovates public transit through **diverse**, **real-life use cases**.

Via’s turnkey solution — everything you need to smartly design & deploy your autonomous transit service.



Service Design Tools.

Data-driven service planning and performance optimization, including phased/ mixed AV & conventional vehicle services.

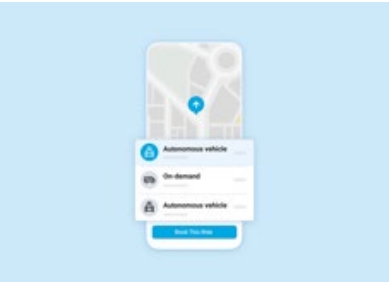


Microtransit Software Suite.

User-friendly technology designed for accessibility & customization; fleet management technology for on-demand, dynamic booking & routing.

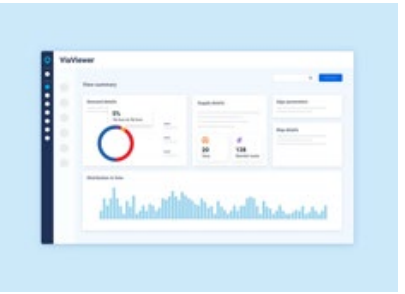
Custom-Branded Fleet.

Ability to deploy both AVs & conventional vehicles best suited to transit need (including WAV) & custom-branded to service.



Community Engagement.

Marketing, community engagement & customer-facing tools to enable an educational, safe & comfortable AV rider experience.

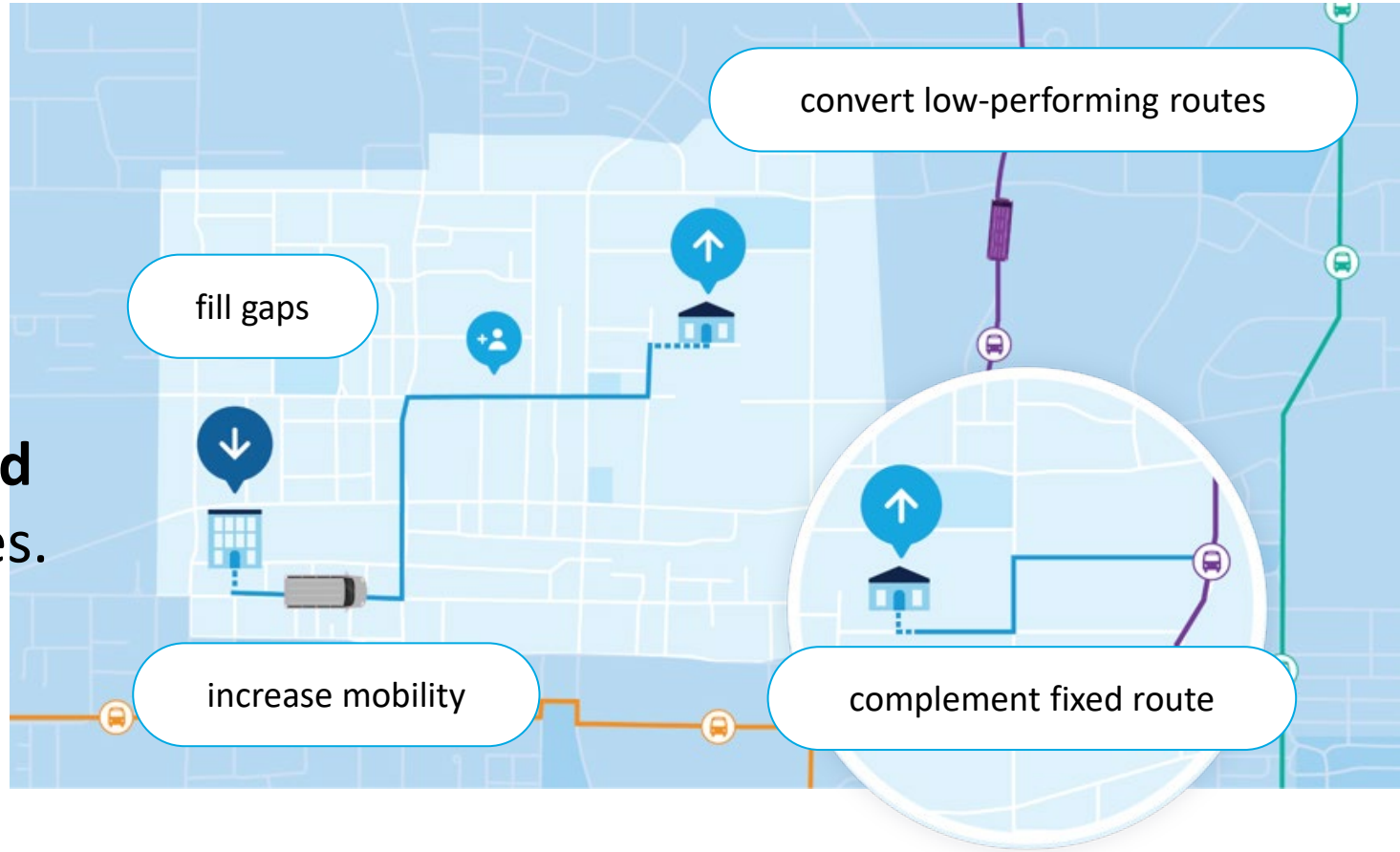


Operations & Optimization.

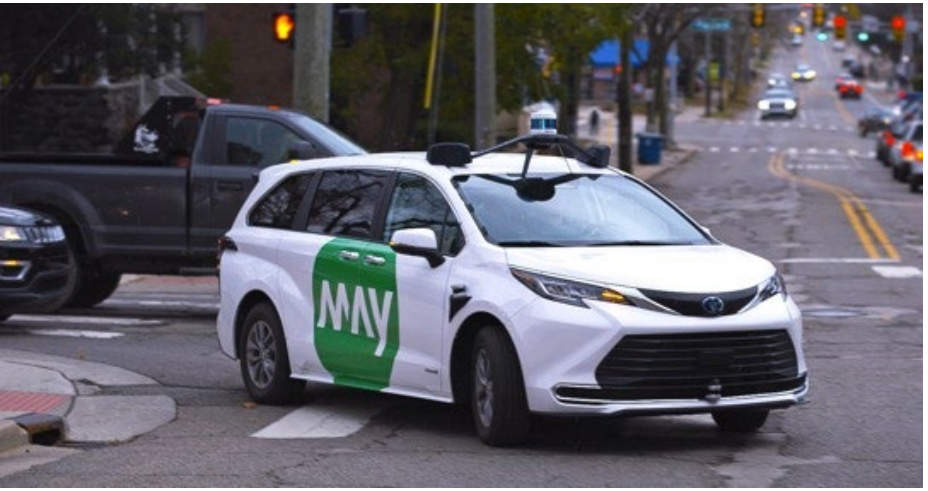
Launch planning & day-to-day operations management with dedicated Via success manager & streamlined reporting tools.

How to use microtransit.

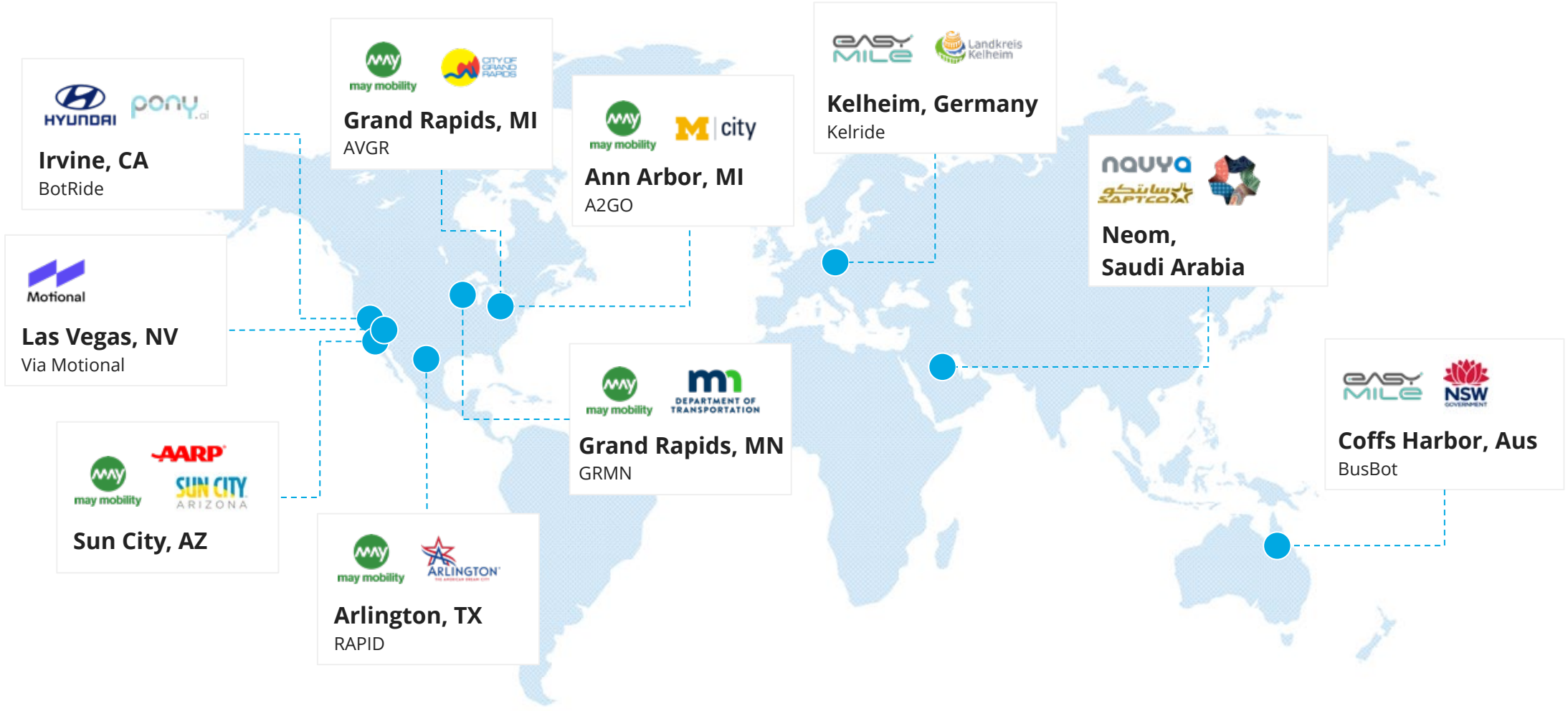
1. **Fill gaps** where the fixed-route network is limited.
2. **Complement** fixed-route with first and last-mile solutions.
3. **Convert underperforming fixed routes** into on-demand services.
4. **Increase mobility** for seniors or disabled riders.



We partner with leading AV providers…



…To deploy autonomous microtransit services around the world.



Select Via Case Studies

Case study

RAPID: Arlington, TX

In March 2021, with a $1.7m FTA grant, the City of Arlington integrated on-demand AVs into its existing Via-powered citywide public transit — **the first in the U.S.** Via's **multimodal** technology enables riders to book trips in in AVs or conventional vehicles in the same rider app. In 2022, the City received a $5.5m state grant to expand the service for 2 years.

Use case
University, commuters

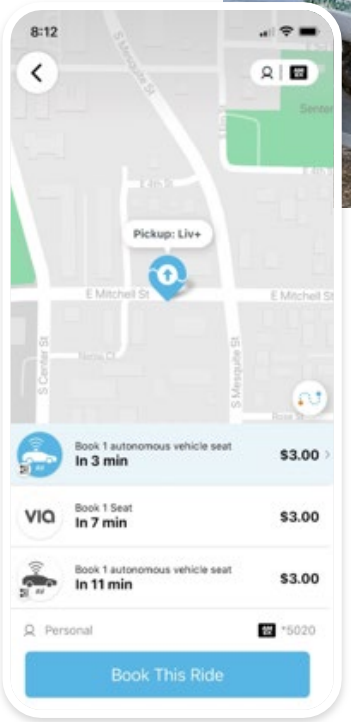
Service Zone
1.25 sq mi, urban

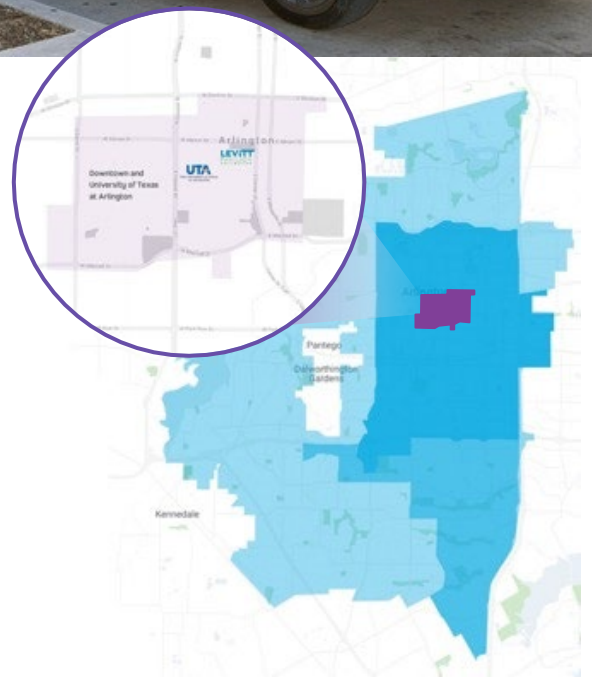
Solution
On-demand, multimodal

Service Hours
Weekdays, 8a-8p

Fleet
5 AVs (1 WAV)
74 vans (14 WAV)

Fare
$3, student discount





38k
autonomous rides provided since launch

70%
of trips are to/from essential destinations

13
average rides per RAPID rider, with 95% likely to ride again

Case study

goMARTI: Grand Rapids, MN

A city of 11k, Grand Rapids lacked public transit on evenings and weekends, critical for its senior and disabled populations. In September 2022, with funding from MnDOT, Via helped launch goMARTI — the **first on-demand ADA autonomous service in rural U.S.** In May 2023, goMARTI was awarded $9.3m in ATTAIN funding to expand & continue the service for 3 years.

Use case
Seniors, disabled riders

Service Zone
5 sq mi, rural

Solution
On-demand

Service Hours
T-F, 2p-10p
Sat, 10a-10p | Sun, 8a-2p

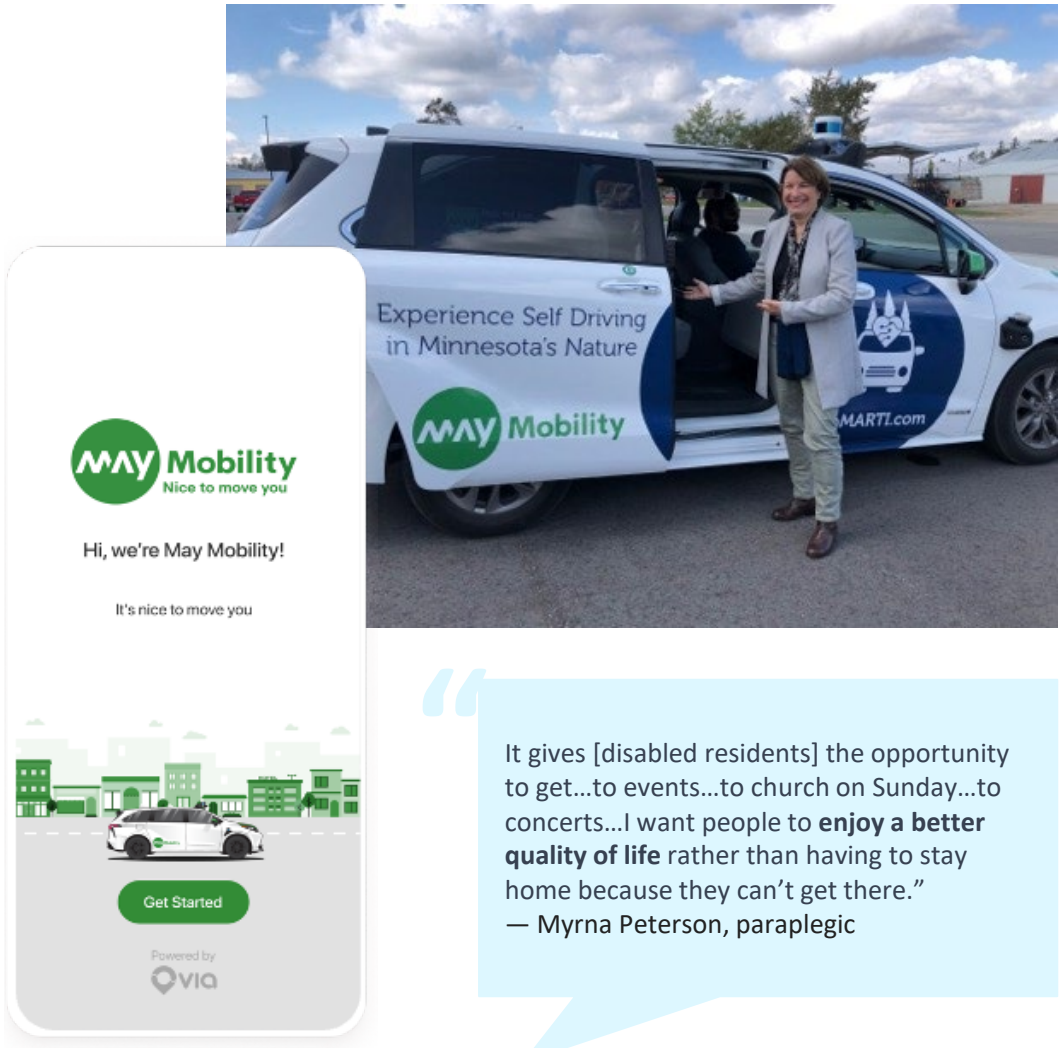
Fleet
5 AVs (3 WAV)

Fare
Free

3.5k
autonomous rides provided since launch

88%
of rides are booked through the mobile rider app

4.9
out of 5 average rider rating



> It gives [disabled residents] the opportunity to get…to events…to church on Sunday…to concerts…I want people to **enjoy a better quality of life** rather than having to stay home because they can't get there."
> — Myrna Peterson, paraplegic

Case study

KelRide: Kelheim, Germany

In September 2021, in partnership with the County of Kelheim and EasyMile, Via launched an autonomous on-demand shuttle service in rural Kelheim. **Integrated with Via's conventional microtransit** service, KEXI enables commuters and tourists to book trips in AVs and regular vehicles to access the city center and make **first-mile-last-mile connections** to local train and bus stations.

Use case
FMLM

Service Zone
1 sq mi, urban

Solution
On-demand, intermodal, multimodal

Service Hours
Weekdays, 10a-4p

Fleet
5 electric AVs
3 vans

Fare
Free

87k
autonomous & conventional rides provided since launch

$10m
federal funding award for 3 years

Thank you.

For more information please contact:

Meghan Grela
meghan.grela@ridewithvia.com

Case study

Valley wAVe: Sun City, AZ

In April 2023, Via, May Mobility, and AARP launched **Arizona's first public on-demand autonomous service** for a 55+ community. Via and May's fifth joint service, Valley wAVe provides free on-demand transit to essential locations, including medical, recreation, and residential points of interest.

Use case
Seniors

Service Zone
3.5 sq mi, suburban

Solution
On-demand

Service Hours
Weekdays, 7a-5p

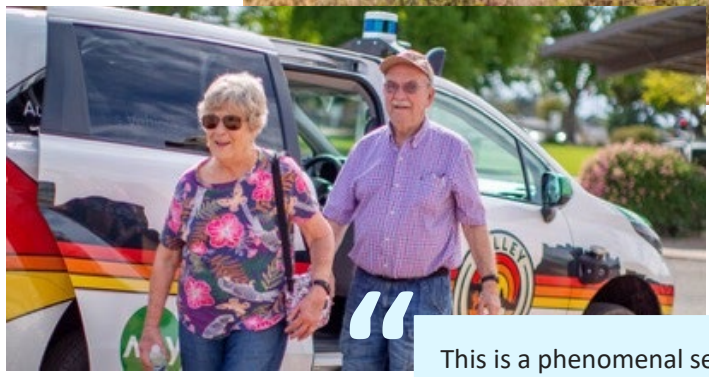
Fleet
2 AVs (1 WAV)

Fare
Free

5
out of 5 average ride rating

65%
of rides are booked through the mobile rider app

100%
of riders surveyed felt very comfortable riding in an AV



"This is a phenomenal service and has been so needed. My mobility has diminished, especially in the last two years. I gave up my car last year. May Mobility's service will **give me more options and freedom**.
— Elizabeth

Case study

BusBot: Coffs Harbor, Australia

In partnership with Transport for New South Wales, local operator, Busways, and AV provider, EasyMile, Via launched its **first on-demand autonomous service**, BusBot. BusBot provided free trips for the 250-member senior community in Coffs Harbour, Australia, facilitating travel for residents, visitors, and family.

Use case
Seniors

Service Zone
Residential community

Solution
On-demand

Service Hours
M-Sat, 6 hr/day

Fleet
1 electric AV (WAV)

Fare
Free

1,500
autonomous rides provided during 6 month pilot

1st
On-demand autonomous service launched by Via

> This has shown that on-demand autonomous shuttles can **answer a number of challenges of last mile mobility.**"
> — Evan Walker, TfNSW

2023 FAV Summit

Transit Automation & Shared Use

Getting more ATN's into the AV discussion…

Kiel Clasing
Business Development Manager
Oceaneering

Three AV Approaches

Similar but different…

What's the difference?

Autonomous Shuttle

ODD	Level 3, Public Roads
Type	Shared Use
Capacity	6-12 passengers (avg. 10)
Speeds	8-15 mph
Driver	Yes
Distances	Less than ~2 miles
PROS	Quick to deploy
CONS	Safety, driver required

Robotaxi/TNC

ODD	Level 3/4, Public Roads
Type	Personal Use
Capacity	2-4 passengers (avg. 2)
Speeds	15-25 mph
Driver	Yes/No
Distances	Less than ~5 miles
PROS	Attractive business case
CONS	Safety, traffic congestion

Automated Transit Network

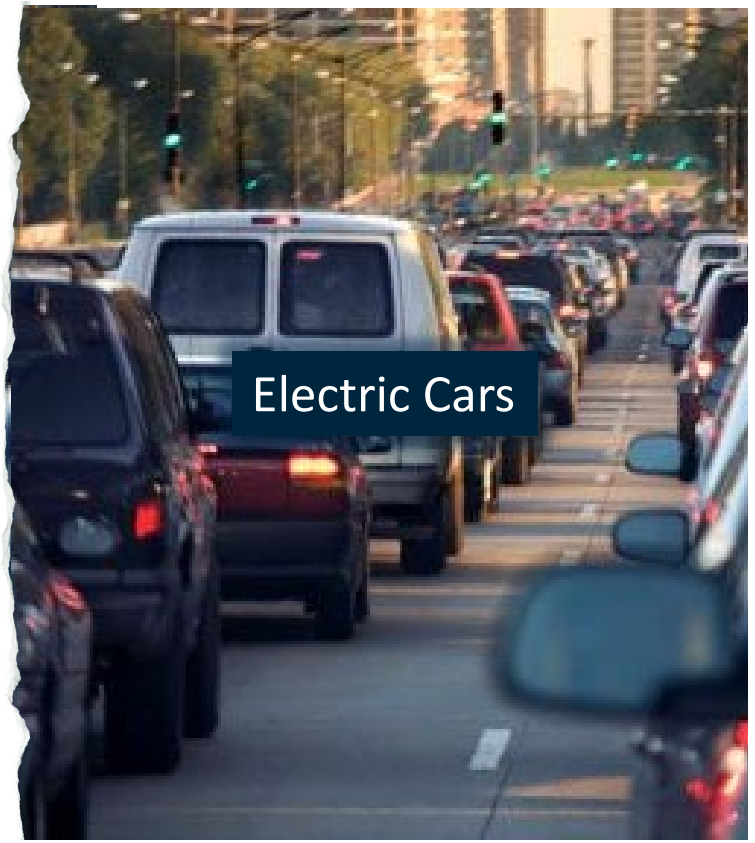
ODD	Level 4, Private Guideways
Type	Personal or Shared Use
Capacity	6-22 passengers (avg. 16)
Speeds	20-40+ mph
Driver	No
Distances	Less than ~3 miles
PROS	High capacity/experience
CONS	Infrastructure investment

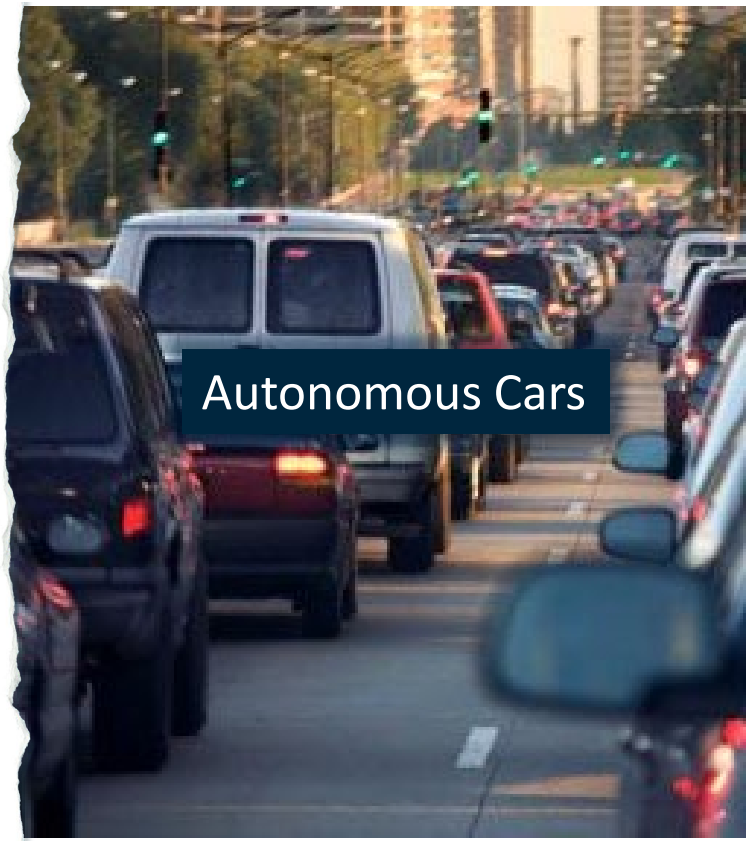
OCEANEERING®

Why not operate on public roads?

Theory of Constraints…

Look Familiar?



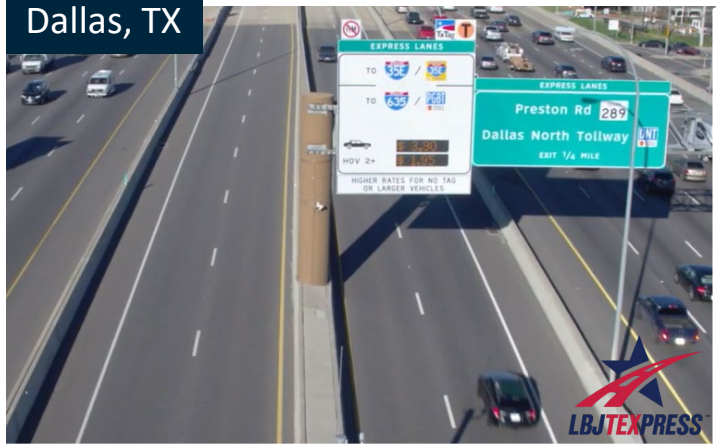


"Automation is good, so long as you know exactly where to put the machine." — **Eliyahu Goldratt**

Independent “Express” Lanes

Improving mobility for all users…

Dallas, TX



Lane County, OR

Hoboken, NJ

Saratoga Springs, NY

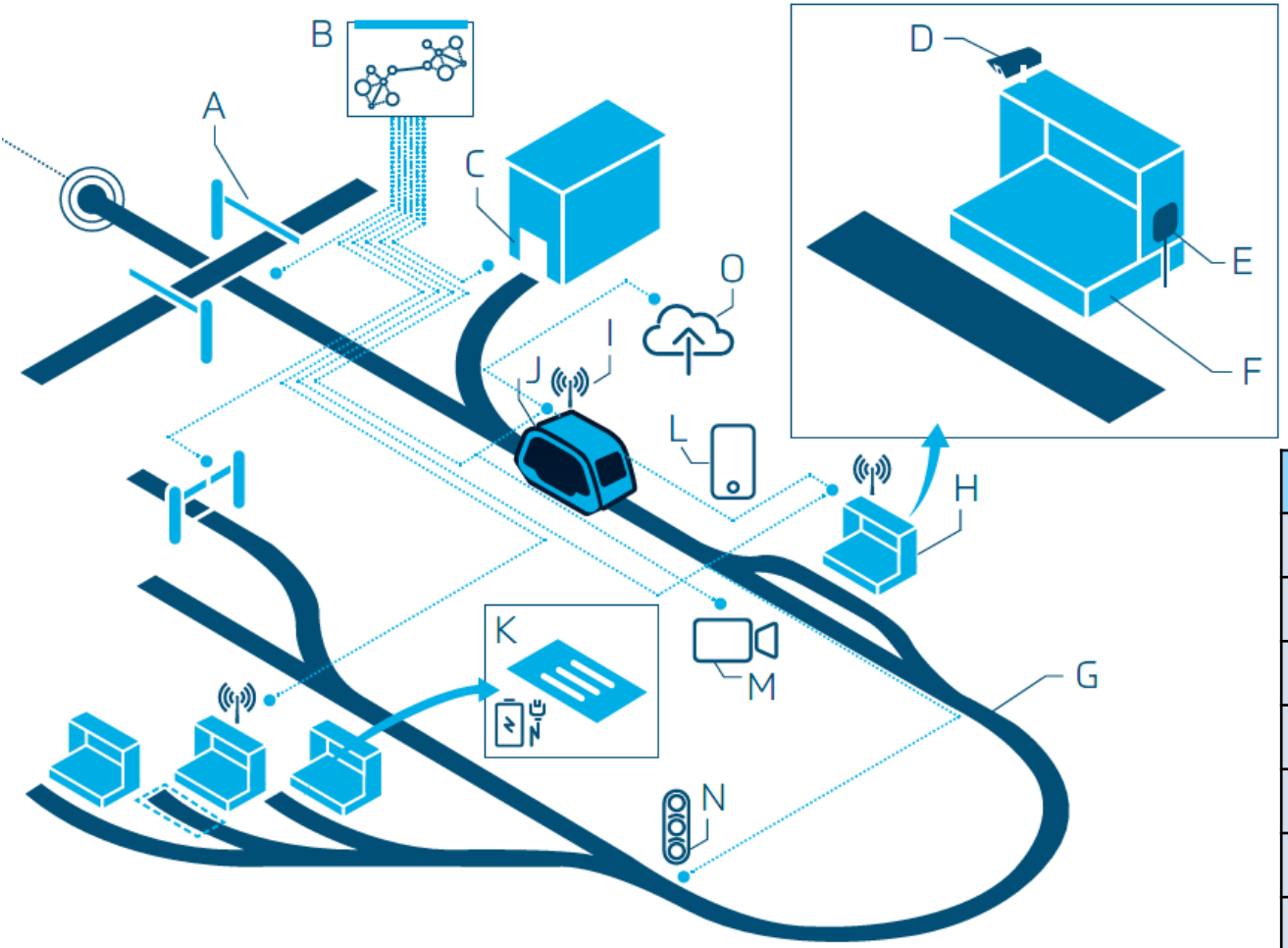
Kansas City, MO

Rotterdam, NL

OCEANEERING®

What's an Automated Transit Network?

ANSI/ASCE/T&DI 21-21 Definitions



Automated People Mover (APM):
"Guided transit mode with fully automated operation, featuring vehicles that operate on guideways with exclusive right-of-way."

Automated Transit Network (ATN):
"Subset of Automated People Mover that has all stations offline, switching that requires no track-based moving parts and train capacity less than 25 passengers."

Integrated Components	
A	Traffic Management
B	Fleet Supervisory System
C	Maintenance & Storage Facility
D	Wayside CCTV
E	Vehicle Request Panels
F	Level Load Platform
G	System Alignment/Routes

H	Passenger Station
I	LAN/WiFi Communications
J	Group Rapid Transit Shuttle
K	Automated Fast Charging
L	Trip Planning App
M	Onboard CCTV
N	Signal Integration
O	Data/Cloud Management

ATN Examples

Prior/Current/Future

Service-Proven Technology

Schiphol (1997-2004)

Rivium 1.0 (1999-2001)

Rivium 2.0 (2006-2018)

Masdar City (2010-Current)

Rivium 3.0 (2022-Current)

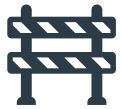
GSP Airport (~2025)

In Development

ATN Solutions

Benefits over mixed traffic operations…

Maximizing Value Add

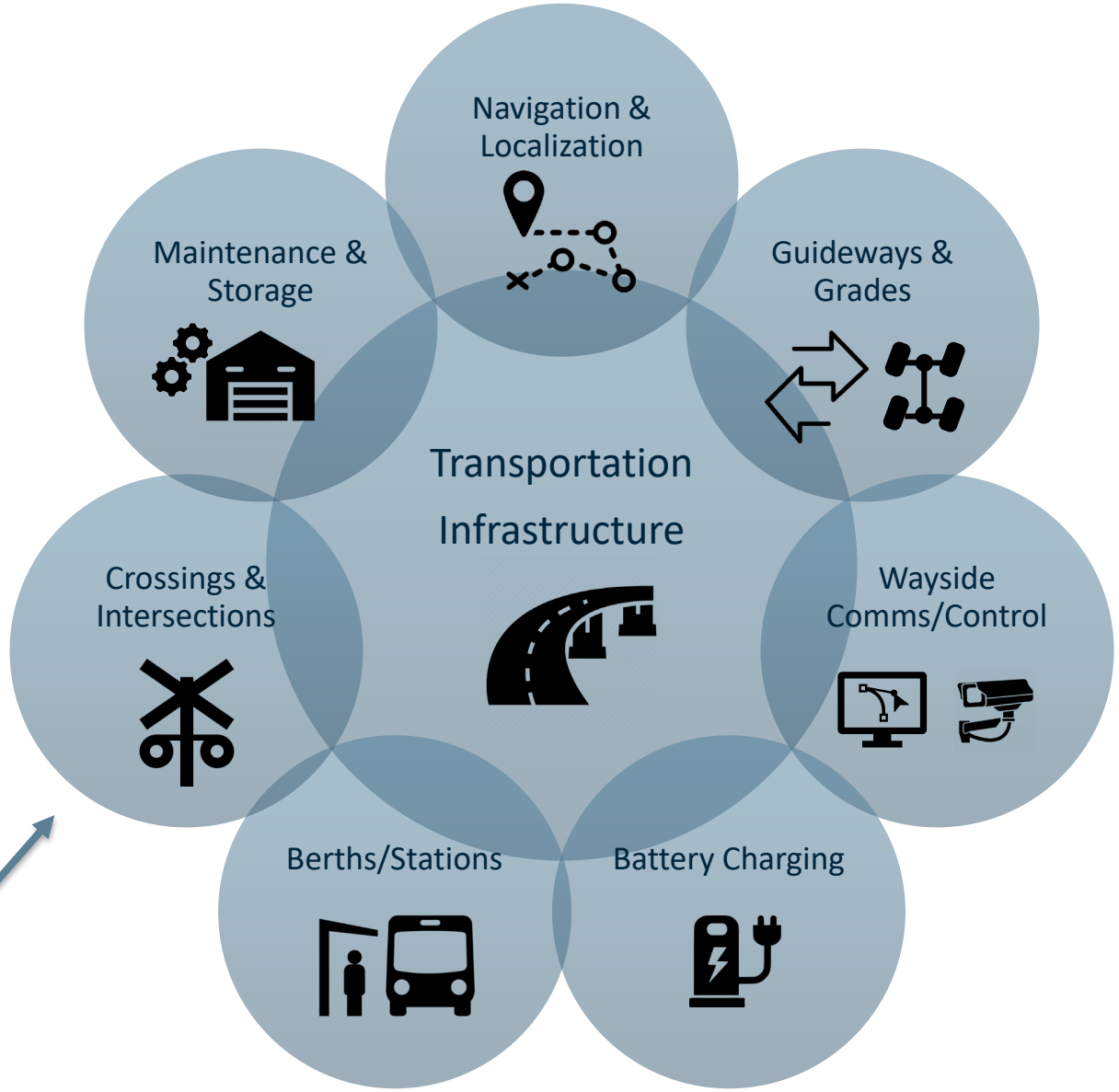
Topic/Issue	Challenges/Motivations	How ATN's can help…
Safety Concerns 	Reckless driving, vulnerable road users, texting and driving, heterogeneous traffic patterns…	Segregate passenger cars from transit, control speeds and intersecting traffic 
Traffic Congestion 	Population growth, density, accidents, construction, TNC's, robotaxis…	Remove vehicles from public roads, increase throughput, reduce travel time 
Passenger Behavior 	Reduction in drivers, labor shortages, travel convenience, costs, availability…	Provide alternative to private cars, improve availability over other modes 
Land Use Challenges 	Right of way shortage, aging infrastructure, demand for curb space…	Narrow, bi-directional travel lanes provide more efficient space utilization 
Sustainability Goals 	Emissions reduction, VMT reduction, green space incentives…	Zero-emissions, reduction in vehicle miles traveled, enables green space development 
Mobility Innovation 	Smart ecosystems, complete streets, mobility hubs, rapid transit zones, managed lanes…	Enhances passenger experience, improves efficiency, increases availability/connectivity 

ATN – Vehicles & Infrastructure

Where rubber meets the road…

- Not all vehicles/systems are created equal
- Lack of universal design standards
- Variability in AHJ requirements
- Various infrastructure design options
- Project delivery approach plays a role

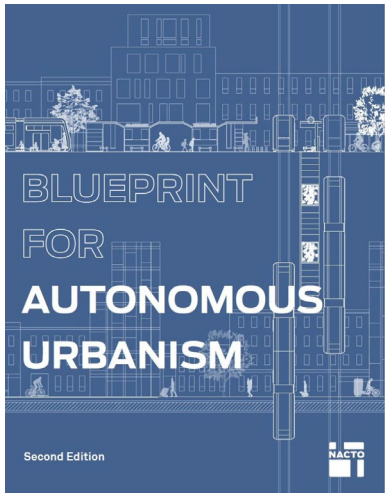
Key factors to consider (High Level)



ATN – Vehicles & Infrastructure

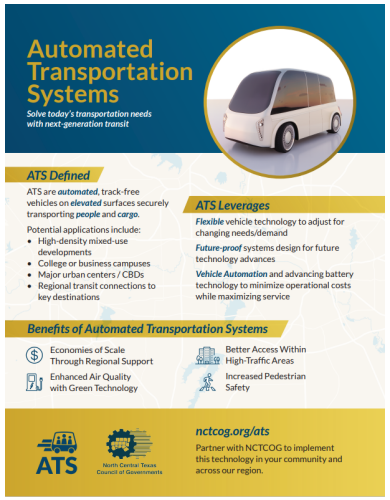
Industry Examples…

Public Sources of Information



Source:
Nacto.org/publication/bau2/

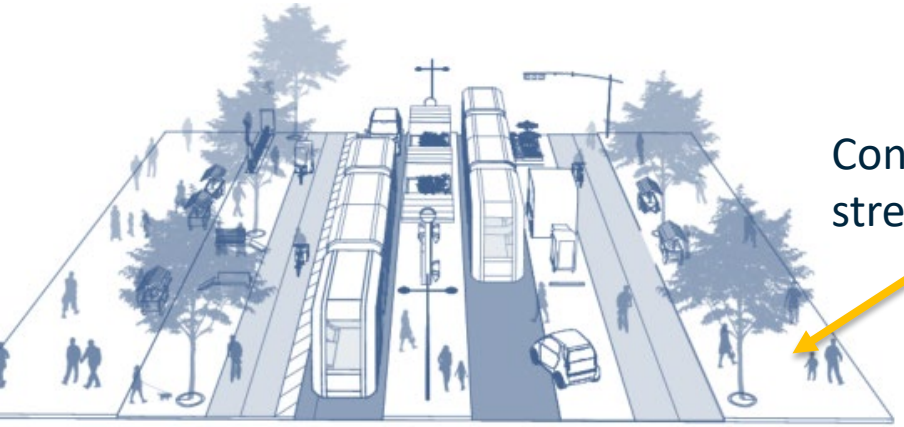
Blueprint for Autonomous Urbanism: Second Edition



North Central Texas Council of Governments

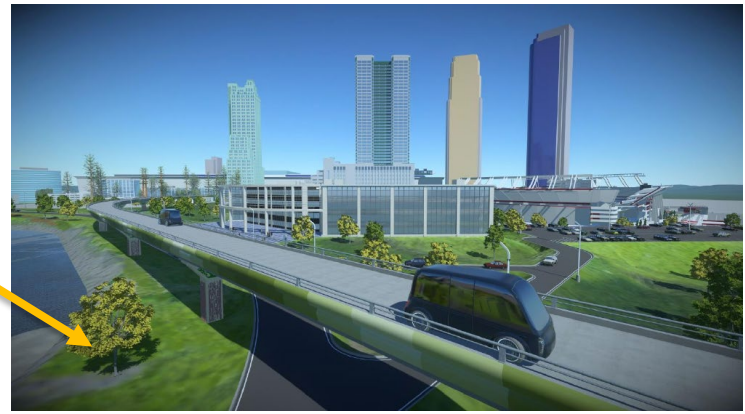
Source:
nctcog.org/getmedia

Automated Transportation Systems Development Study



Content on smart street design

Content on vehicles & infrastructure design



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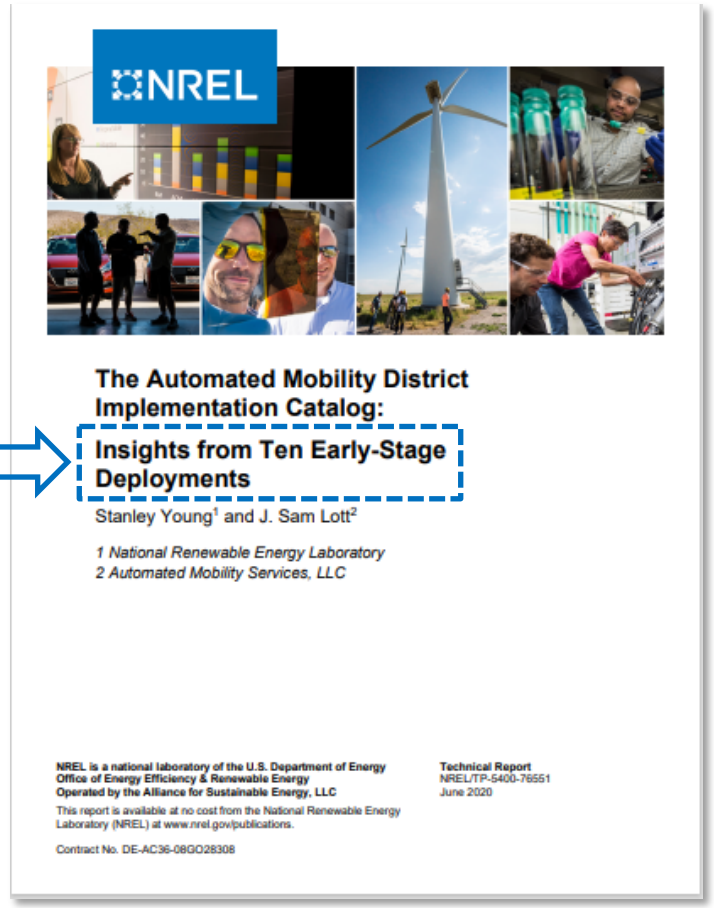
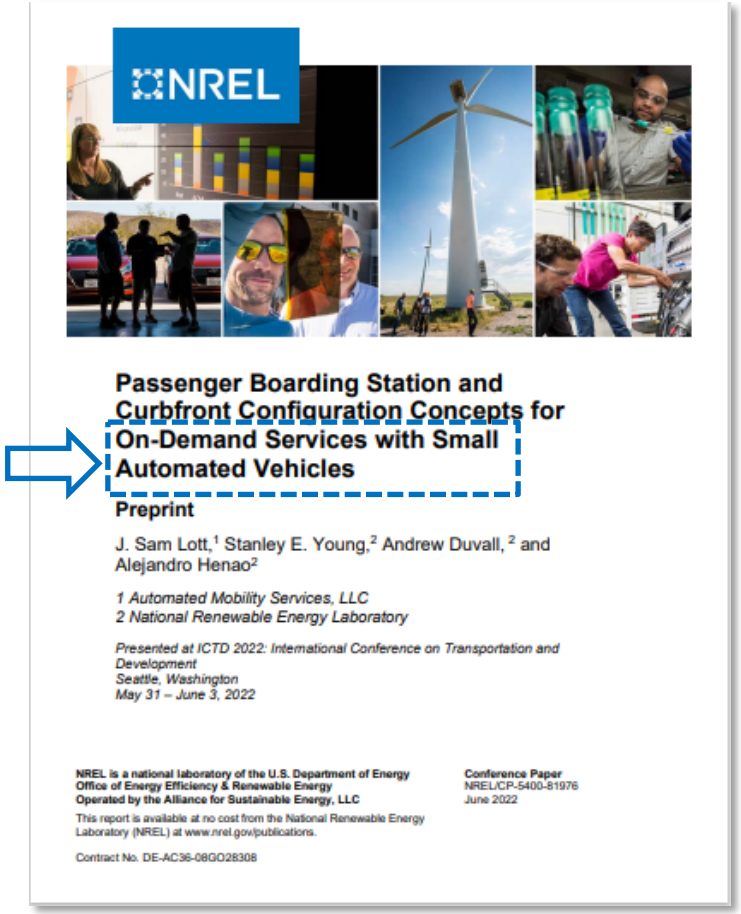
ATN – Vehicles & Infrastructure

More Industry Examples…

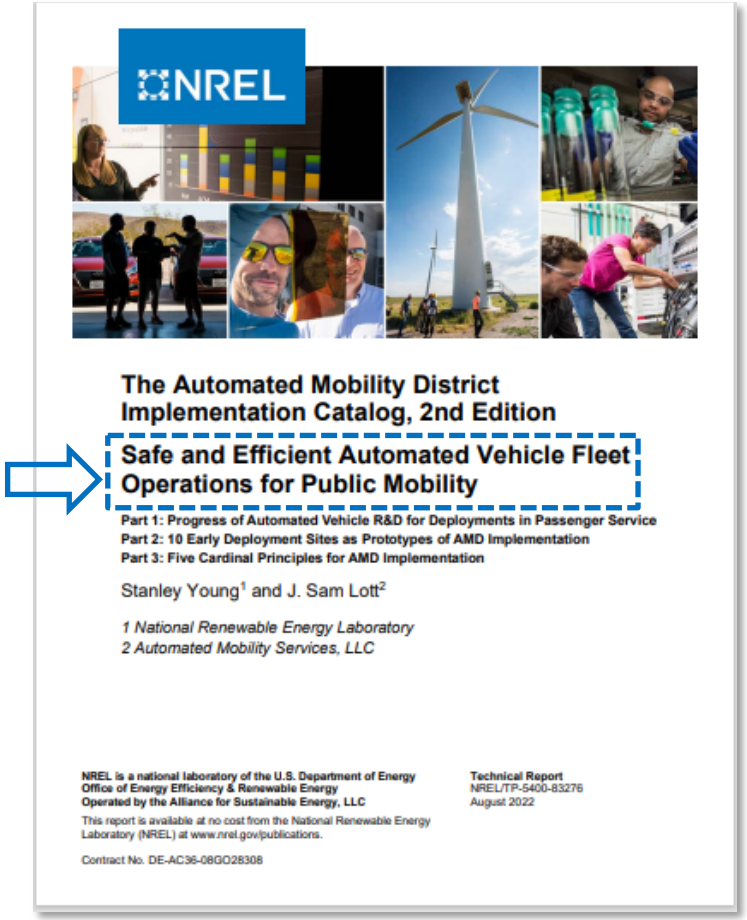
Public Sources of Information



Source:
https://www.nrel.gov/docs/fy20osti/76551.pdf



Source:
https://www.nrel.gov/docs/fy22osti/81976.pdf



Source:
https://www.nrel.gov/docs/fy22osti/83276.pdf

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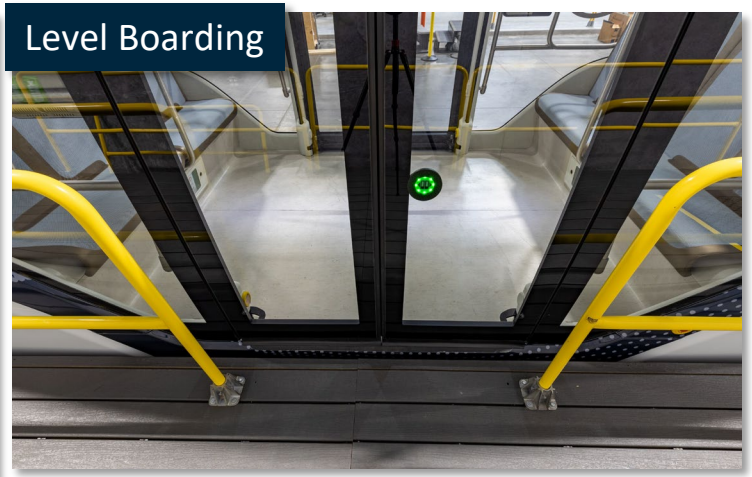
Universal Design Principles

Usable for all people…

Safe, simple & predictable

Smooth Operations

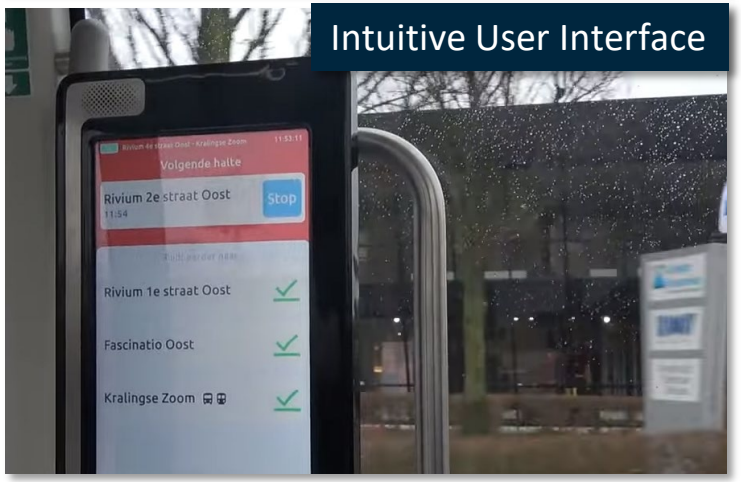
Level Boarding



Flexible use of Space

Hi-Vis Signage

Intuitive User Interface



Easy Wayfinding

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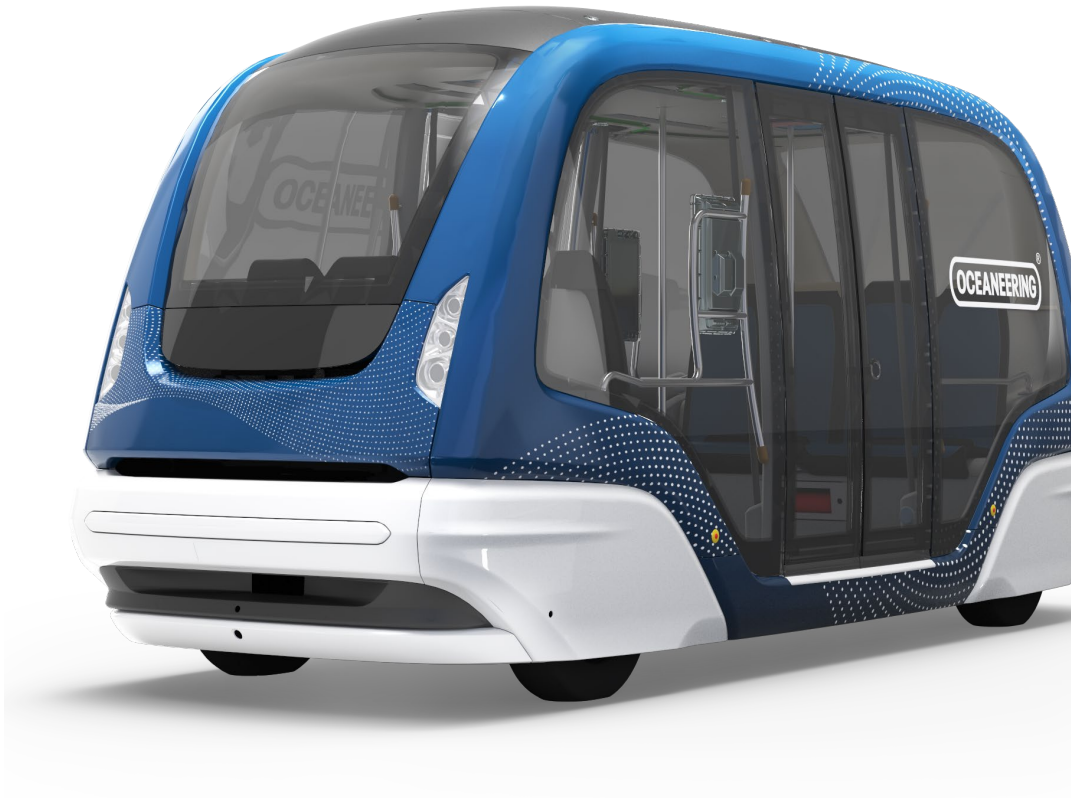
Focusing on User Needs

Versus just pushing tech…

What's important to the passenger?

- Safety
- Accessibility
- Affordability
- Mobility
- Flexibility
- Usability
- Capacity
- Reliability
- Comfortability
- Availability
- Predictability
- Connectivity



Thank you!

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Connecting What's Needed with What's Next™

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linkedin.com/in/kiel-clasing-0634427

Automated Integrated Multimodal Solutions for Future Transit Systems

Yu Zhang, PhD
Professor, NICR Director

FAV Summit
Sep. 7, 2023

Photo sources:
https://www.nasa.gov/sites/default/files/thumbnails/image/uam-3-4x3-v2-sm.jpg

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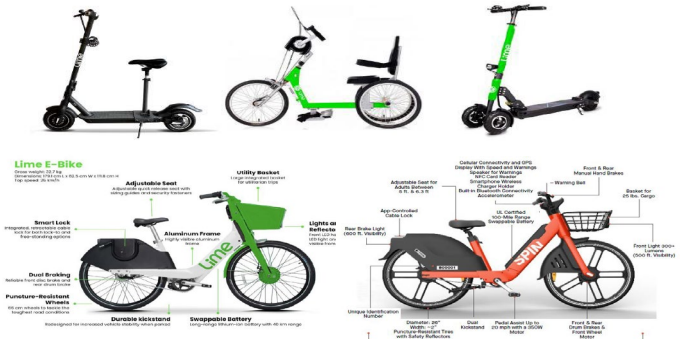
New Mobility

Carsharing

HAIL, EASY TAXI, lyft, Flywheel, OLA, GRABTAXI, Get Taxi, UBER, BLACKLANE LIMOUSINES, shuddle, Getaround, VIA, 99TAXIS, Side·car

Shared Micromobility



Advanced Air Mobility

Ridesourcing

Free floating carsharing operators

Яндекс Драйв, ekar, GreenMobility YOUR CITY CAR, Communauto, GIG car share, mobility car sharing, citybee, enjoy, SHARE NGO, MILES, ZITY, evo CAR SHARE

Car rental companies

UBEEQO, SIXT share, zipcar

Carmakers

FREE2MOVE, wible, SHARE NOW, We share.

Technology vendors

RIDECELL, INVERS, © Berg Insight, MONGEO Connected Technology, OMOOVE, An OCTO company, OTA keys, Wunder Mobility, evulog, astus

Transit Automation

Automated Vehicles



Carsharing & Ridesourcing

- Demand prediction
- Peer-to-peer carsharing
- Ridersourcing behavior and analysis

Shared Automated Vehicles

- Consumer use likelihood & concerns
- Potential impacts on household vehicle ownership
- Impacts on commercial aviation and airport planning, design, and operation

Advanced Air Mobility

- Vertiport siting and network design
- Automated traffic management of advanced air mobility
- Simulation and fleet planning of AAM operations
- Mobility, environmental, and equity impact analysis of AAM

Share-A-Bull Bike Sharing Program at USF

- May 28th, 2019--March 9th, 2020
- 1,049,661 trips
- 3424 trips/day
- Average trip distance 1.14 miles
- Average trip duration 15mins 19 secs

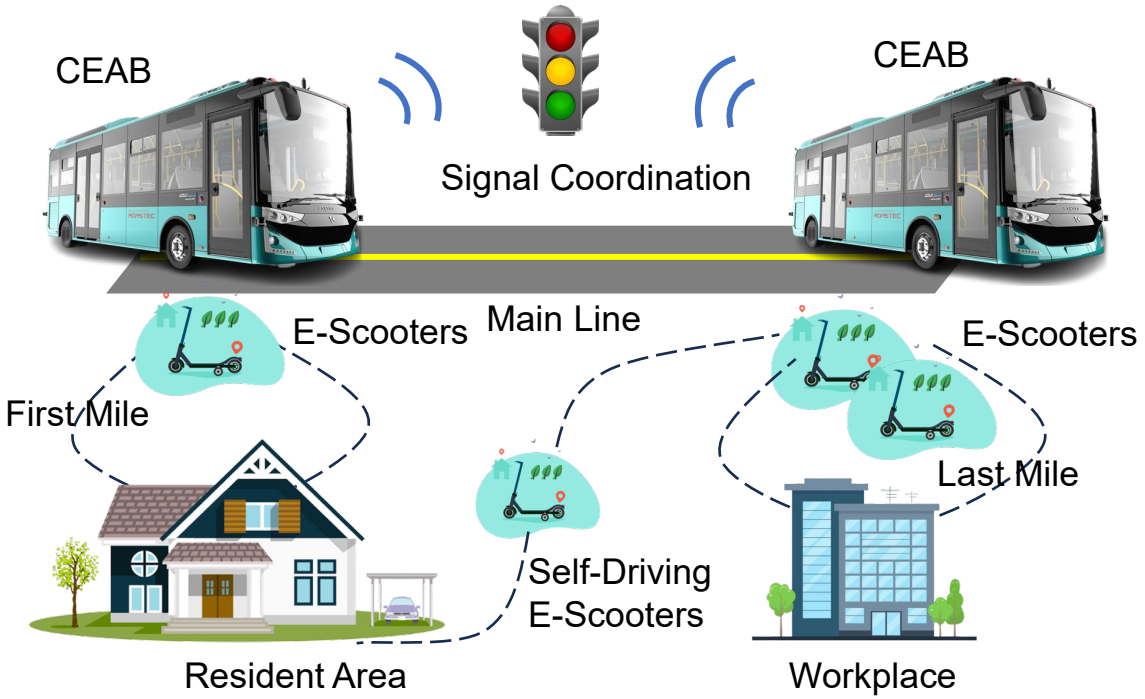
- Oct 1st ,2020 -- Sep 30th , 2021
- 310,217 trips
- 796 trips/day
- Average trip distance 1.25 miles
- Average trip duration 14mins 38 secs

BIRD SPIN Lime JUMP veo Razor

Shared Micromobility

- Rebalancing strategies and optimization
- Usage analysis and mode shifting
- Integration of transit and shared micromobility

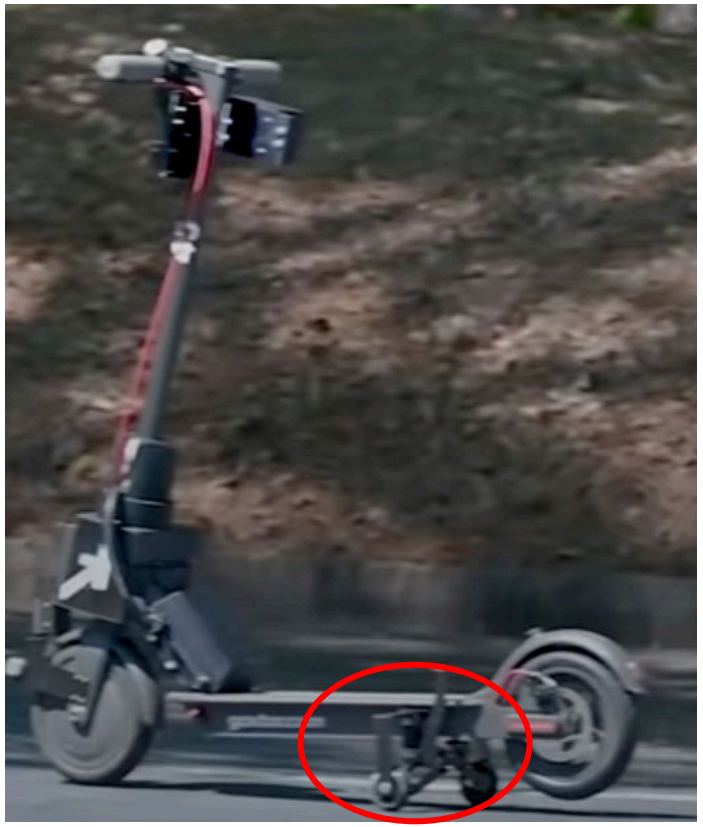
Automated Integrated Multimodal Solutions (AIMS) for Future Transit



Door-to-door transportation service that integrates mainline L4 electric automated buses with first-and-last-mile shared micro-mobility service enhanced by self-driving e-scooters, and system connectivity.

Enhanced Shared Micromobility with Self-Driving E-Scooters

Motor

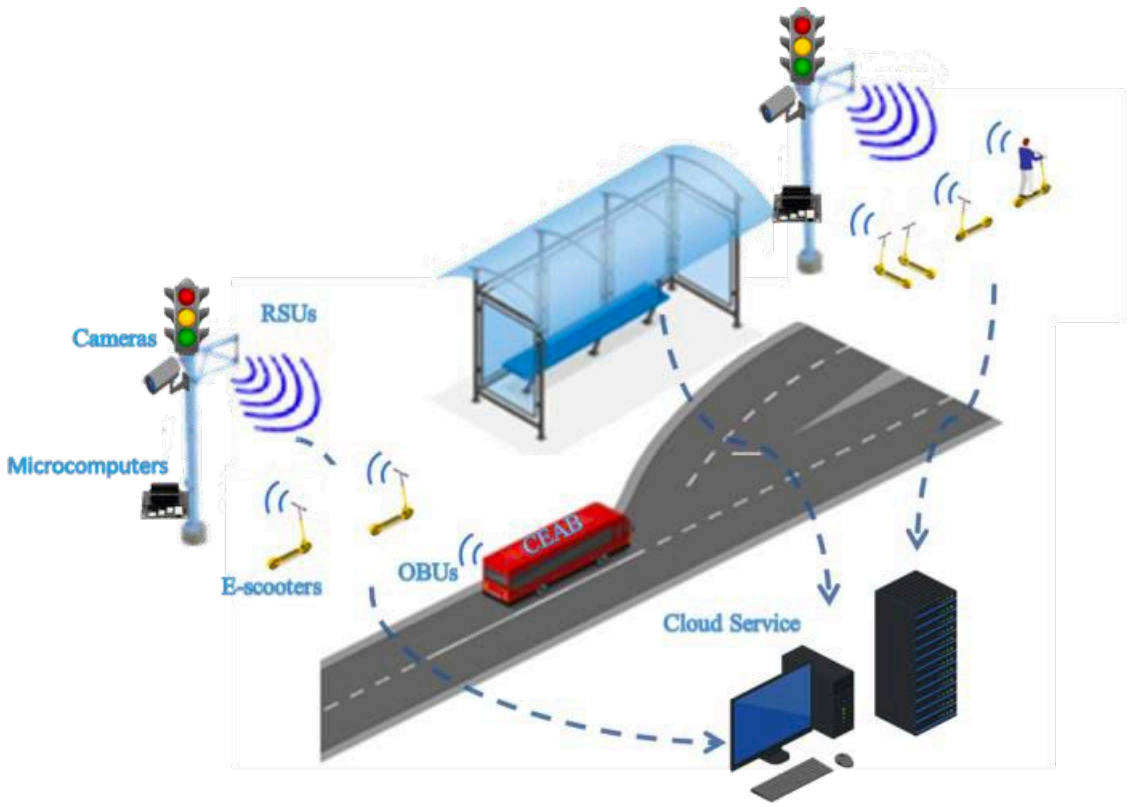


Retractable training wheels

Black box:
camera
turn signals

- Self-rebalancing
- On-demand service

Illustration of AIMS



- **Infrastructure**
  - Connected Vehicles Roadside Units
  - Integrated Traffic Cameras for Navigation
  - Roadside Microcomputers
  - Integrated Trajectory Planning and Control
  - Cloud Connectivity
- **Connected Electric Automated Bus**
  - Level-4 Automated Bus System
  - Vehicle Interface
  - Cooperative Connected Vehicle Onboard Units Installation
- **Self-driving E-scooter**
  - Sensor Suite
  - Trajectory Planning and Control
  - Remote Monitoring and Diagnostics
  - User Interaction Interfaces

Transit Automation and Shared Use

- Modular-vehicle transit service system

https://www.cnn.com/style/article/dubai-autonomous-public-transport/index.html

- Integrated rail and advanced air mobility

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Smart Urban Mobility

http://www.sum-lab.org/

NICR
NATIONAL INSTITUTE FOR CONGESTION REDUCTION

https://nicr.usf.edu/

CUTR
CENTER FOR URBAN TRANSPORTATION RESEARCH

UNIVERSITY of SOUTH FLORIDA
Advanced Air Mobility

https://www.cutr.usf.edu/advancedairmobility/

Thank You!

yuzhang@usf.edu

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