

FLORIDA AUTOMATED VEHICLES INITIATIVE

Transforming Transportation in Our Connected World



2018 FSITE Winter
Workshop
FEBRUARY 9, 2018

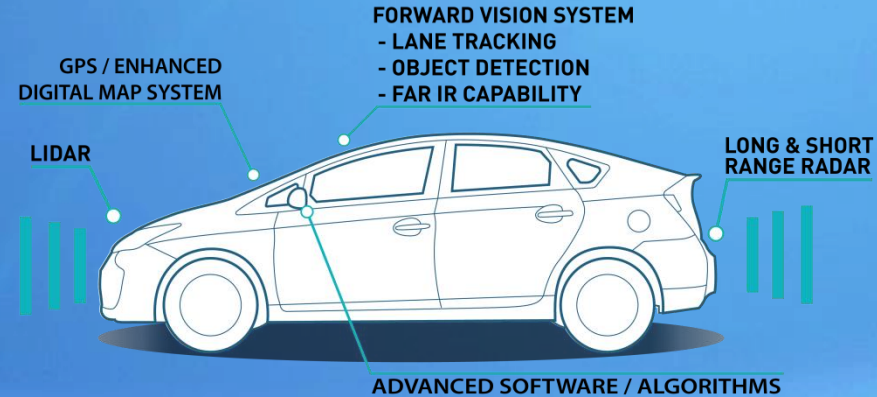
FLORIDA DEPARTMENT OF
TRANSPORTATION



AUTONOMOUS VEHICLES

Levels of Automation (as defined by NHTSA)

- **0 – No Automation**, but advanced collision warnings, blind spot monitoring, etc.
- **1 – Function Specific**, such as adaptive cruise control or active lane centering (but not at same time)
- **2 – Combined Function**, such as adaptive cruise control and active lane centering working at same time (must still be actively engaged in operation of vehicle)
- **3 – Limited Self-Driving**, Driver is not expected to monitor vehicle movements for limited time in limited situations (driver operates vehicle during part(s) of trip)
- **4 – Full Self-Driving**, No human operator expected to control safety-critical functions of the vehicle



Safety critical functions of the vehicle (steering/throttle) are affected without direct driver input

CONNECTED VEHICLES

Applications

- Safety Critical Warnings
- Mobility Enhancements
- Environmental Benefits
- 55+ specific applications/uses defined by USDOT

Data Gathering/ Information Exchange

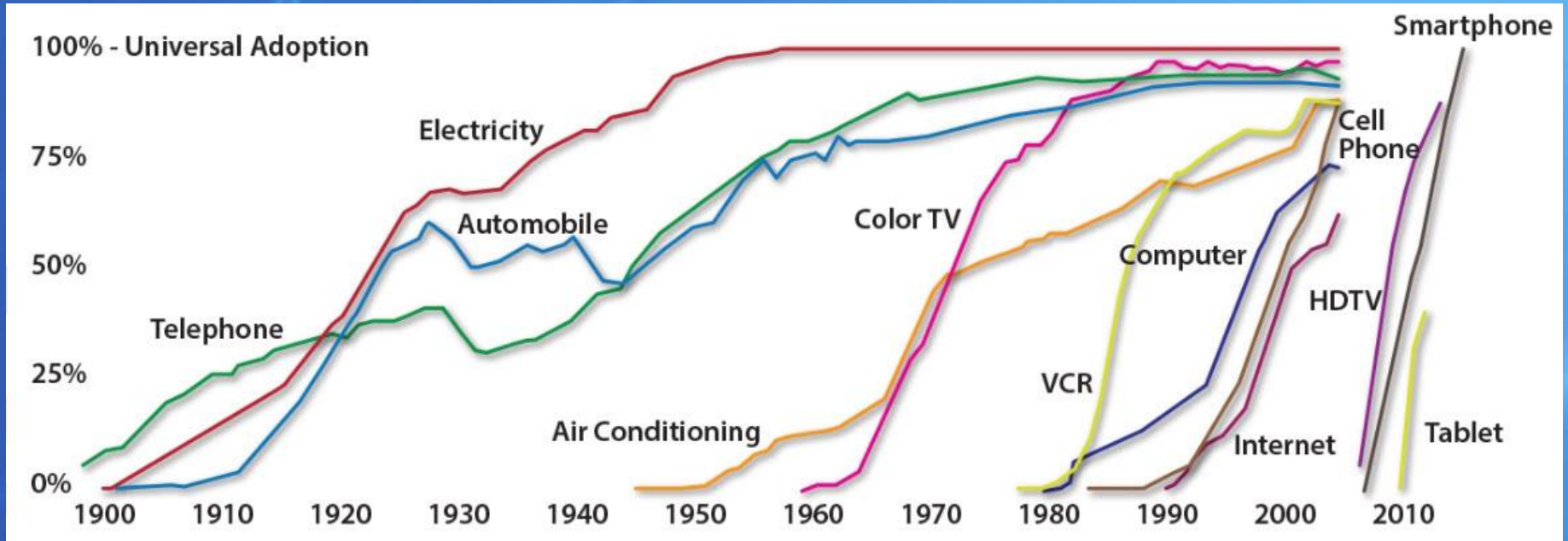
- Vehicle-to-Infrastructure (V2I)
- Vehicle-to-Vehicle (V2V)
- Vehicle-to-Bike/Ped/Other (V2X)

Safety critical functions of the vehicle (steering/throttle)
not affected (operator is in control at all times)

Enhanced Situational Awareness



TECHNOLOGY ADOPTION RATE



RECENT HEADLINES

Volkswagen expects first self driving cars on the market by 2019

GM: Autonomous cars could be deployed by 2020 or sooner

BMW to launch autonomous iNext in 2021

First autonomous Toyota to be available in 2020

NVIDIA to introduce level-4 enabling system by 2018

Ford CEO announces fully autonomous vehicles for mobility service by 2021

Audi to introduce a self-driving car by 2020

NuTonomy to provide self driving taxi service in Singapore by 2018, expand to 10 cities around the world by 2020

Delphi and MobilEye to provide off the shelf driving system by 2019

Uber fleet to be driverless by 2030.

INITIATIVES ACROSS THE U.S.



POTENTIAL EFFECTS OF AV ON URBAN PLANNING

Parking Space Size

- Reduced width (doors don't need to open)
- Varied sizes to fit specific vehicle types

Parking Lot Location

- No spaces within 300' of building entrances?
- On-street parking repurposed
- Passenger drop off/pick up lanes at building entrance (similar to airport design)
- Remote lots to make better use of urban land

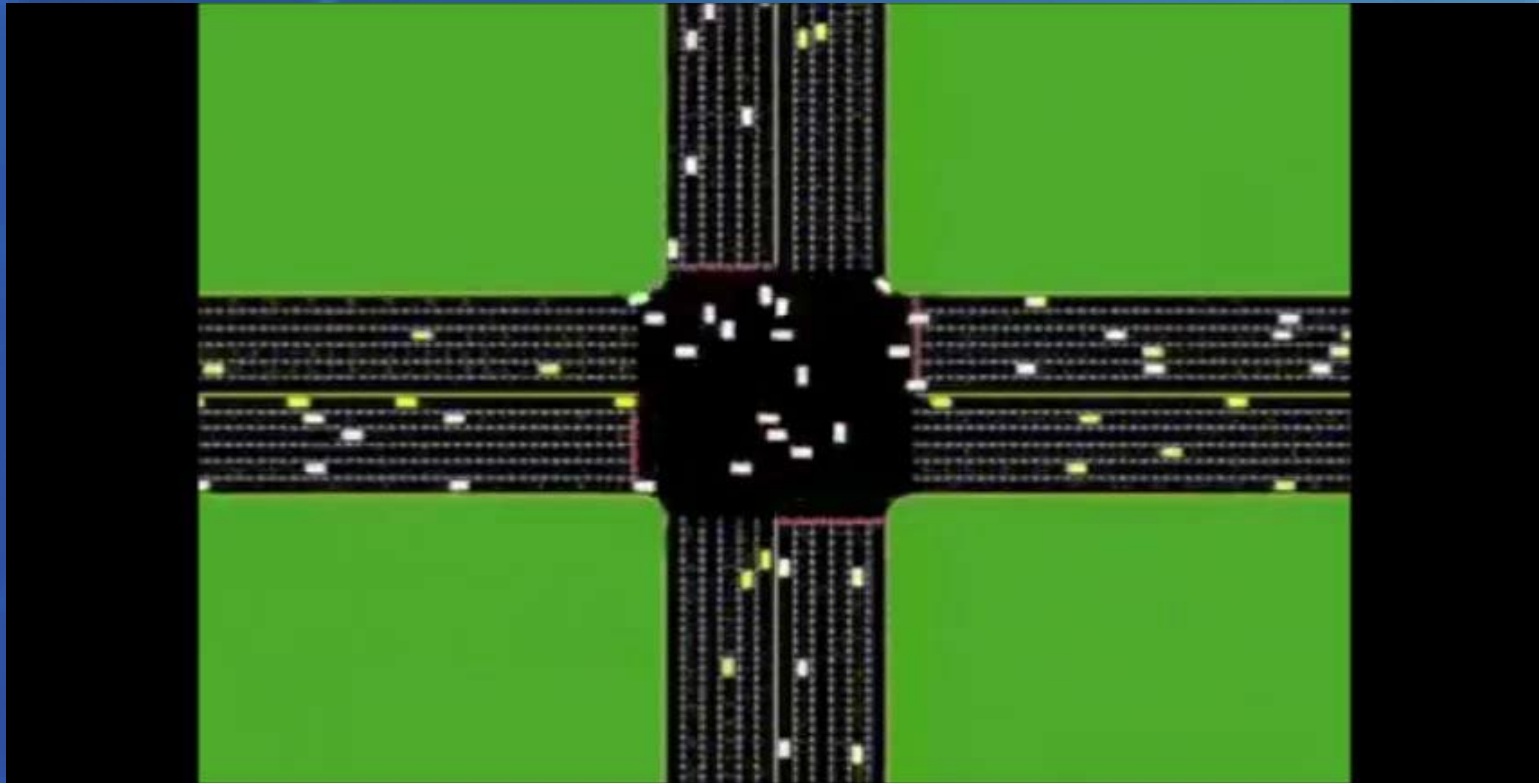
Development Patterns

- Higher density requirements may be more attainable
- Driveway placement and design
- Building setbacks
- Greater focus on bike/ped improvements

Blue Polygons = Parking



POTENTIAL EFFECTS ON INTERSECTIONS



POTENTIAL EFFECTS ON LAND DESIGN



Bicycle/Pedestrian and Vehicle balance

Source: FSU through a research project funded by FDOT



POTENTIAL EFFECTS ON LAND DESIGN



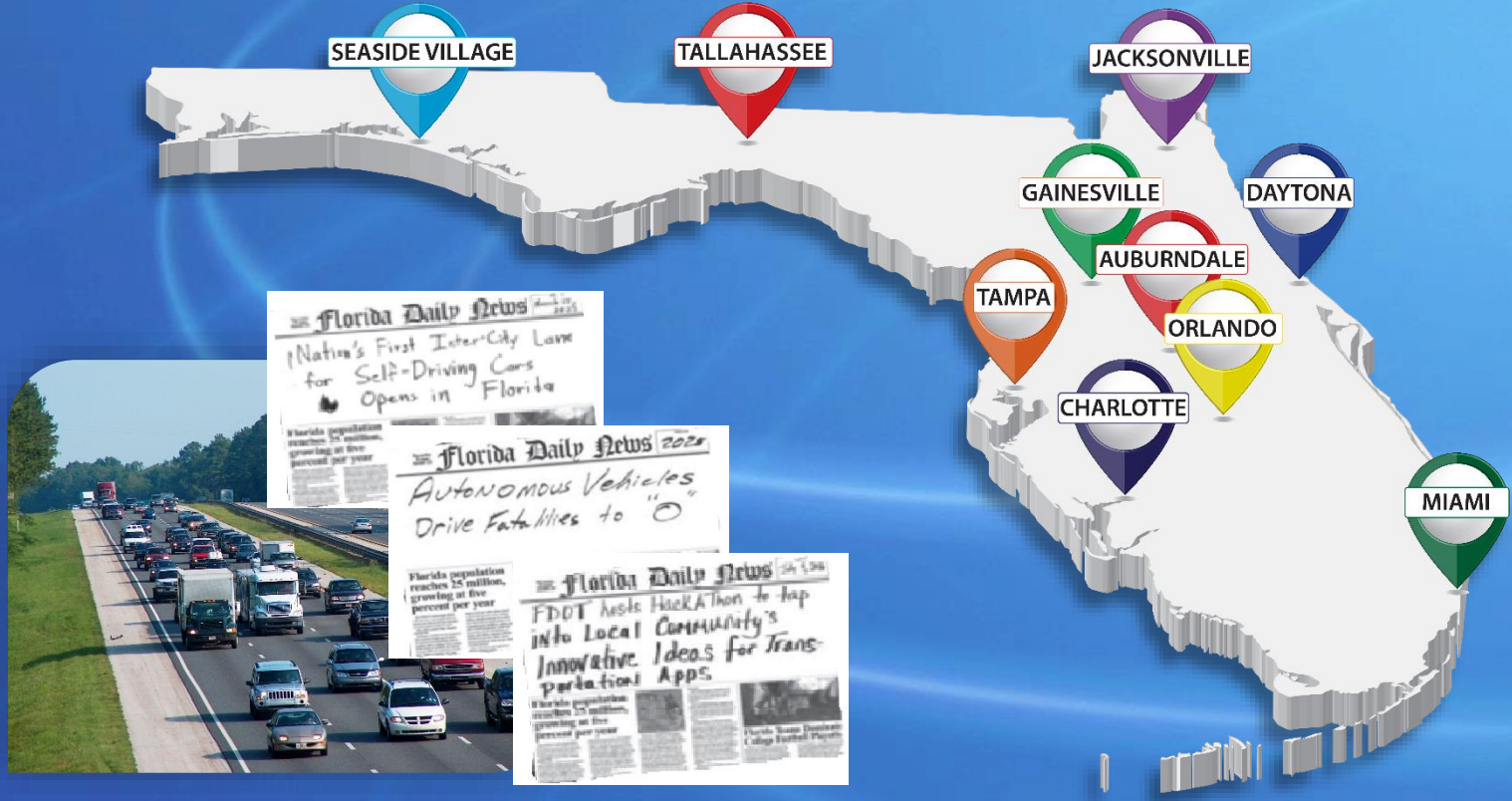
Source: FSU through a research project funded by FDOT



FUTURE QUESTIONS

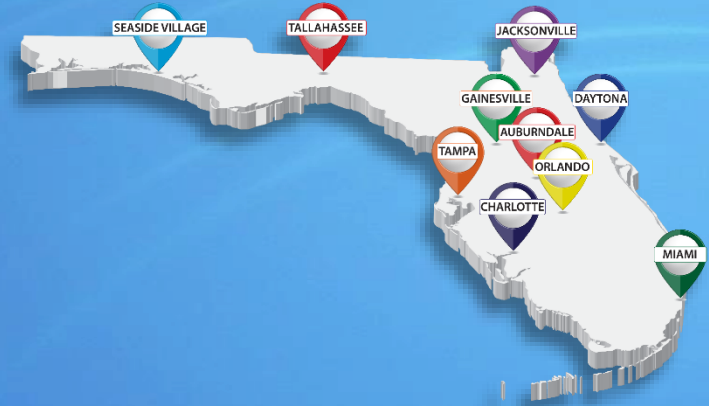
- Should parking garages have flat levels so they can be converted into apartments or stores in the future?
- In high cost residential areas, will automated vehicle “closets” help supply micro-apartments and does that create a need for “closet” storage and distribution centers?
- When will be the first suburban residential community designed with no garages in the home?
- Will the new “garage” actually be a covered walkway from the front door to the street?
 - “Bus stop” at every home?
 - Do local zoning ordinances need to change?
 - No change because not many can fit cars in garages today anyways

INITIATIVES ACROSS THE STATE



Industry Trends

Automated
Connected
Electric
Shared



AUTOMATED



Gene J. Puskar/Associated Press

AUTOMATED - TAMPA AUTONOMOUS SHUTTLE

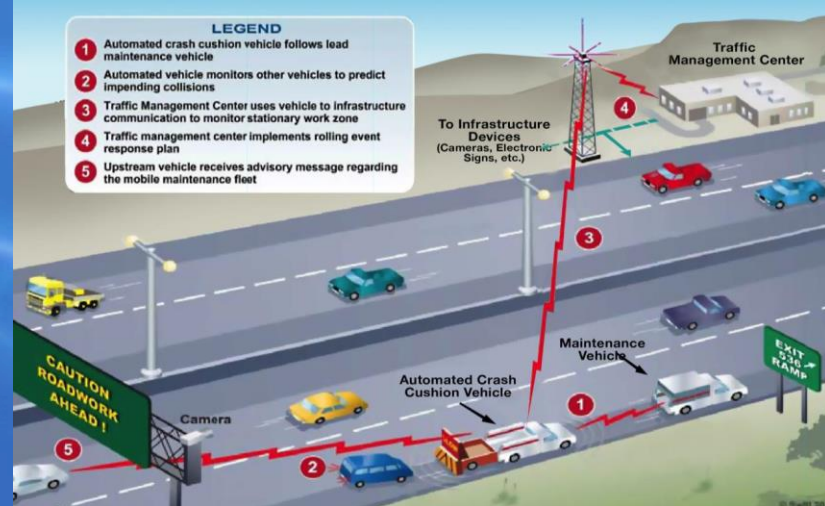


AUTOMATED - WALTON COUNTY 30 A AUTONOMOUS SHUTTLE

SEASIDE VILLAGE



CONNECTED

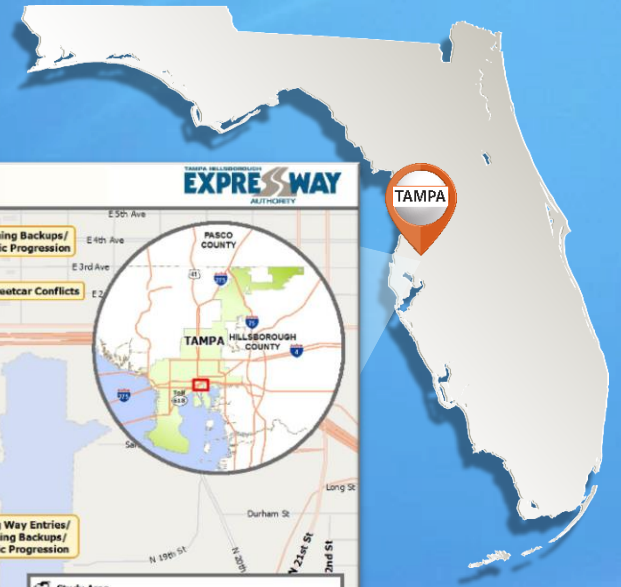


CONNECTED - TALLAHASSEE SIGNAL PHASE AND TIMING (SPaT)



CONNECTED - TAMPA

THEA CV PILOT PROJECT

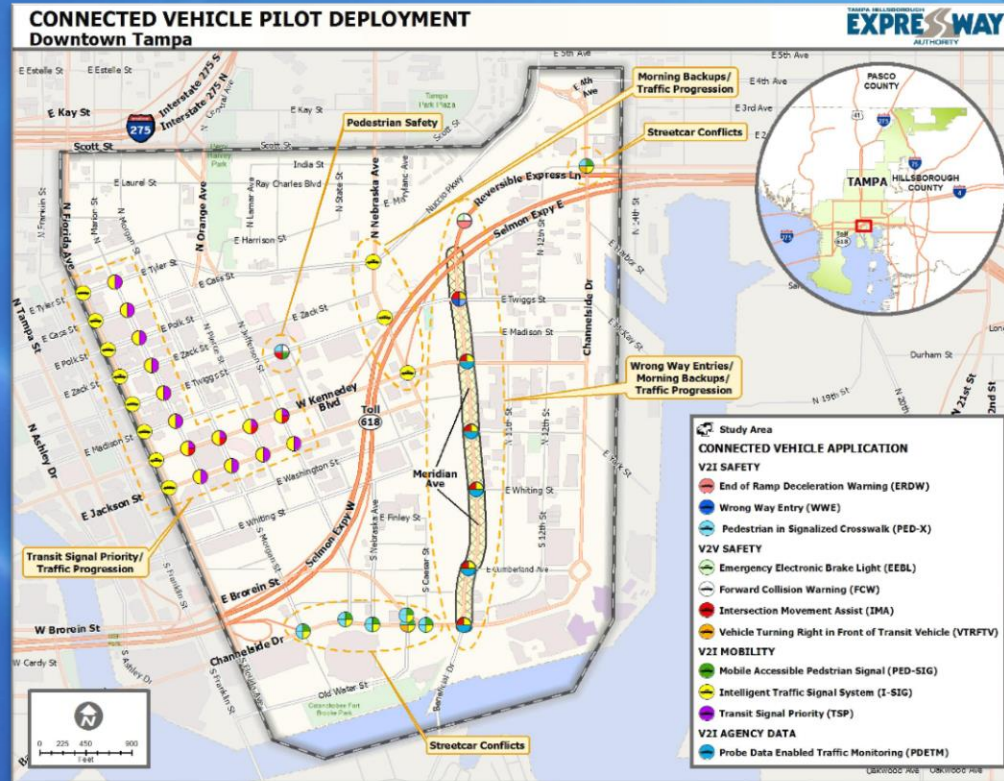


CURVE SPEED
WARNING

PEDESTRIAN
SIGNALIZED
CROSSWALK WARNING

FORWARD COLLISION
WARNING

INTERSECTION
MOVEMENT ASSIST



CONNECTED - I-75 FLORIDA'S REGIONAL MOBILITY ELEMENTS (FRAME)

I-75 CORRIDOR
BETWEEN
GAINESVILLE
AND OCALA HAS
SIGNIFICANT
CONGESTION
AND SAFETY
CHALLENGES



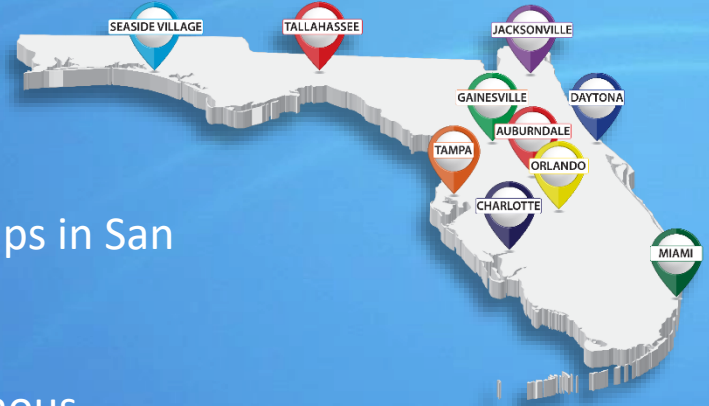
ELECTRIC

- Bloomberg forecasts electric vehicles will account for more than half of all new light-duty vehicles by 2040
- Volvo will stop developing internal combustion only engines in 2019
- France made pledge to phase out all gasoline and diesel engines by 2040.



SHARED

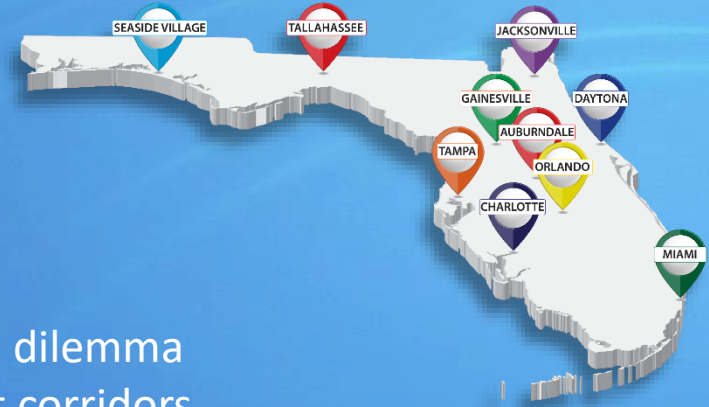
- Uber Pool now makes up over half the Uber trips in San Francisco after only 2 years.
- FDOT study of Implications of Shared Autonomous Vehicles for Fixed Route Transit



SHARED

Findings

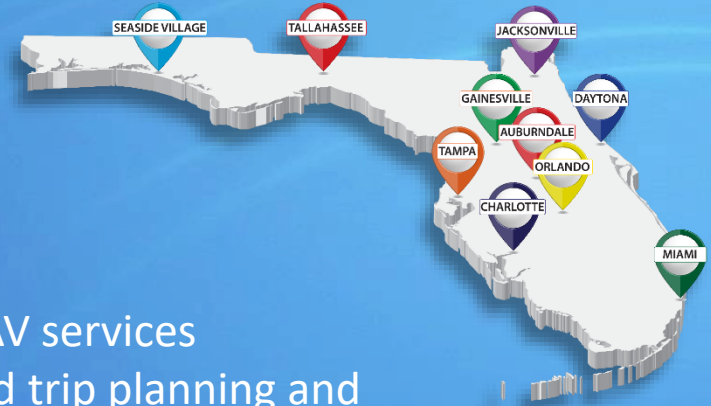
- SAVs may help solve the frequency-coverage dilemma
 - Focus fixed-route transit on the densest corridors
 - Support SAVs at off-peak times in urban areas
 - Support SAVs as suburban feeders
 - Enjoy increased overall agency service effectiveness
- Low-speed SAVs and rising VMT create opportunities
 - Position transit as a high speed, high quality alternative
 - Invest in transit priority features and passenger amenities
 - Enjoy increased stakeholder support



SHARED

Findings

- Today's TNCs will evolve into tomorrow's SAV services
 - Expand TNC partnerships for integrated trip planning and payment
 - Explore taxi/TNC/SAV fare subsidy programs
 - Create need-based subsidies to replace coverage services
- Automation technology will evolve too
 - As SAVs gain capability, urban service approach may expand to suburbs
 - Increasing share of paratransit trips may be served by SAVs
 - Automation may support more frequent service at same cost



SUMMARY

- Autonomous systems components are already in new vehicles
- Connected vehicles can greatly improve the efficiency and safety of our transportation system
- Electric vehicles are growing in market share
- As shared transportation costs become more convenient, there will be greater opportunities to leverage transportation funds
- FDOT is actively engaged in developing projects and planning scenarios for all modes to prepare for these emerging technologies

