

UF

I-STREET Testbed: Progress and Challenges

A Collaboration of UF, Florida Department of Transportation (FDOT), and the City of Gainesville

Clark Letter, Ph.D.
I-STREET Testbed Manager
Research Assistant Professor
University of Florida Department of Civil Engineering

November 28th, 2018

UF | University of Florida
Transportation Institute



Overview

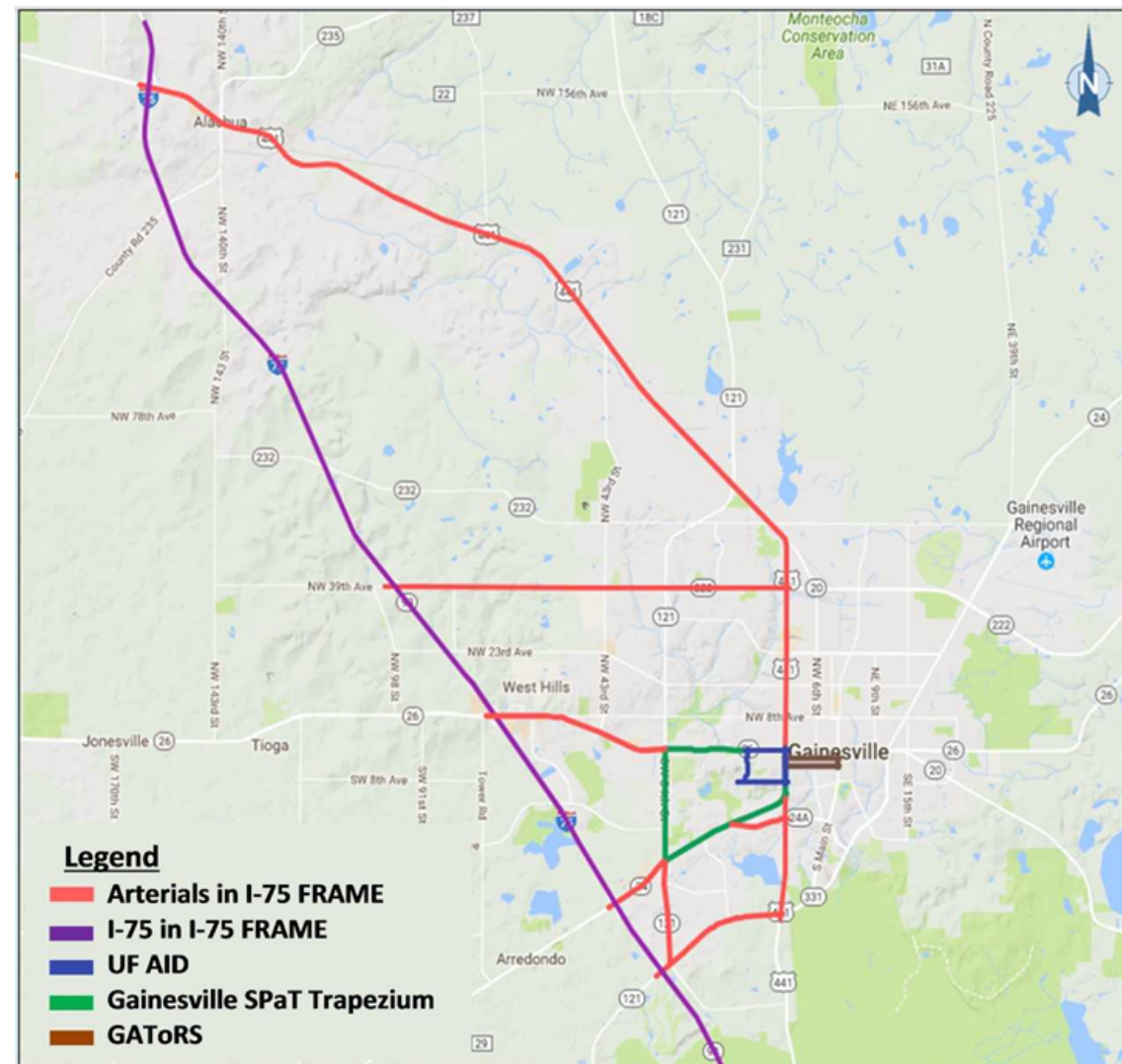
UF, FDOT, CoG partnership
Strong relevant research groups at UF
Aligns well with UF strategic plan for campus

FDOT-Funded Project (completed Sept. 2017):
Develop a plan for an advanced transportation
technologies testbed at UF/CoG






I-STREET Infrastructure Projects

- FRAME - 150 RSUs along I-75 and around the city, plus vehicle instrumentation
- UF AID- 13 signalized intersections and 7 mid-block crossings
- Gainesville Trapezium (45 RSUs around the UF campus)
- Gainesville Mobility Autobus





Gainesville Mobility Autobus

Points of Interest

-  RTS Garage for AV Storage
-  RTS Facility
-  105 SW 3rd St Garage

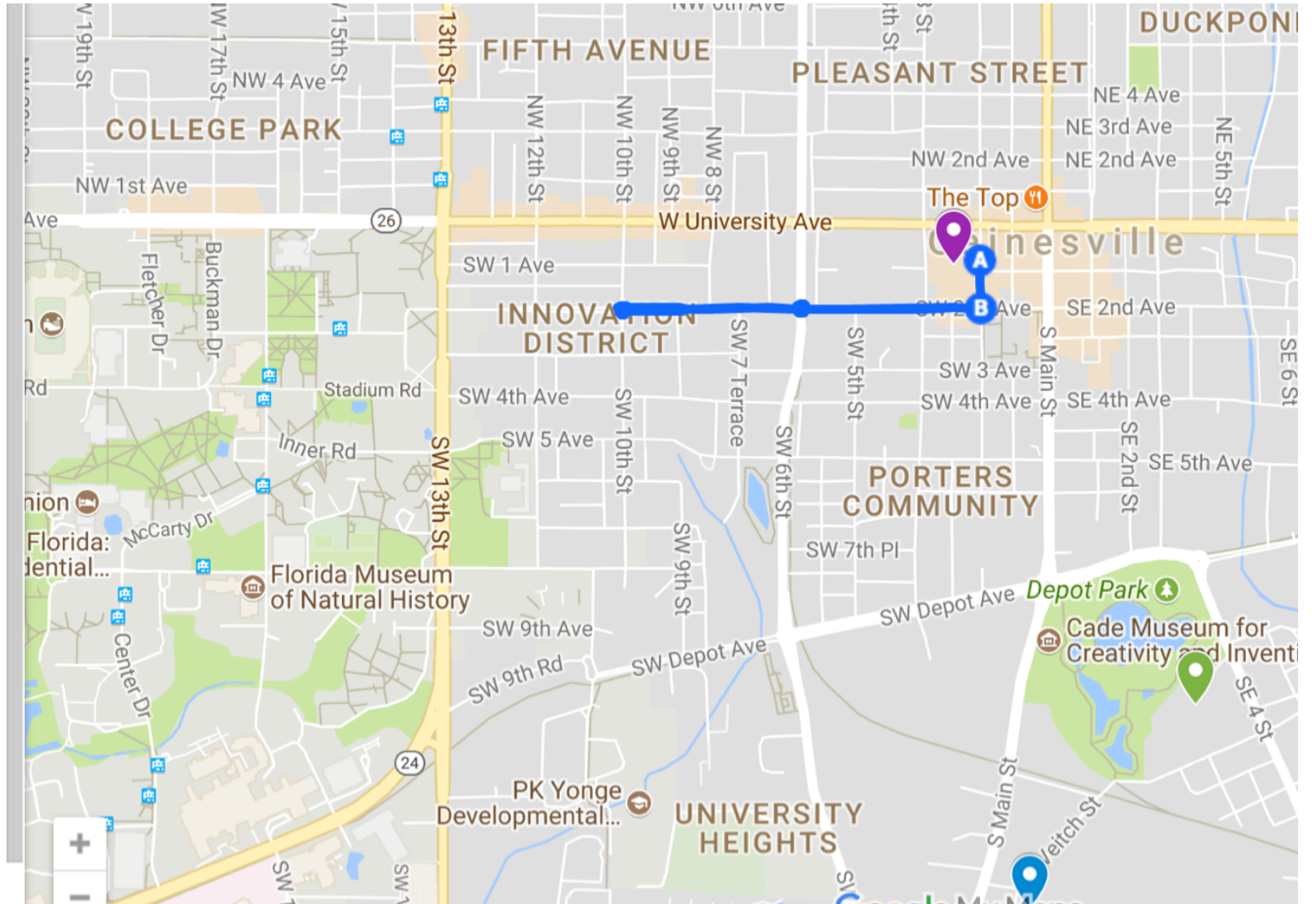
Demo Route + Phase 1

-  14-40 SW 2nd St, Gainesville, FL 32601, ...
-  198 SW 2nd St, Gainesville, FL 32601, USA

Phase 2 (V2I)

Phase 3 Route

GATorS Service Area



Gainesville Mobility Autobus





Points of Interest

-  RTS Garage for AV Storage
-  RTS Facility
-  105 SW 3rd St Garage





Demo Route + Phase 1

-  14-40 SW 2nd St, Gainesville, FL 32601, ...
-  198 SW 2nd St, Gainesville, FL 32601, USA

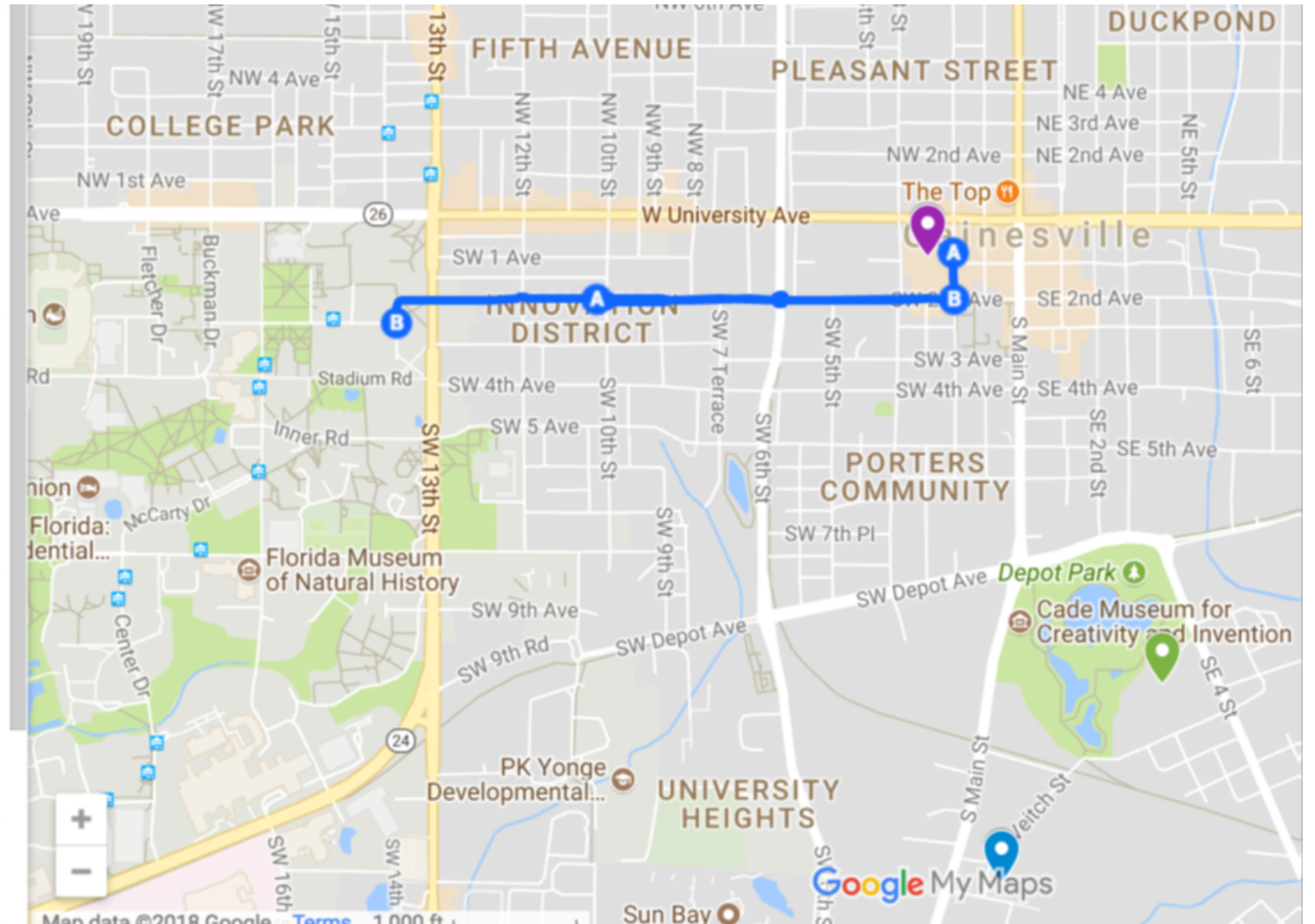


Phase 2 (V2I)

-  1026 SW 2nd Ave, Gainesville, FL 32601, ...
-  1404 Union Rd, Gainesville, FL 32601, USA






Phase 3 Route





Gainesville Mobility Autobus



✓ **Points of Interest**

-  RTS Garage for AV Storage
-  RTS Facility
-  105 SW 3rd St Garage



✓ **Demo Route + Phase 1**

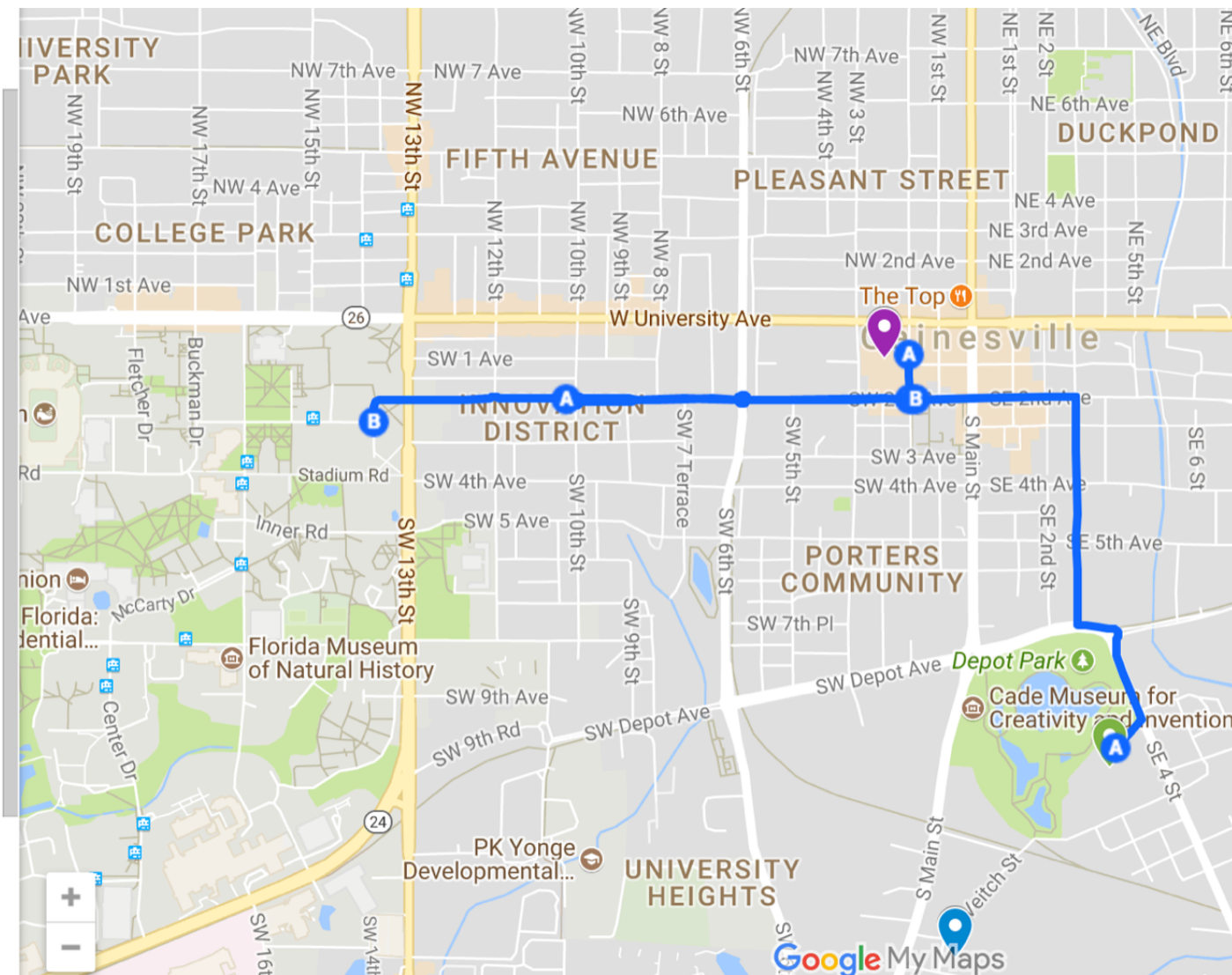
-  14-40 SW 2nd St, Gainesville, FL 32601, ...
-  198 SW 2nd St, Gainesville, FL 32601, USA

✓ **Phase 2 (V2I)**

-  1026 SW 2nd Ave, Gainesville, FL 32601,...
-  1404 Union Rd, Gainesville, FL 32601, USA

✓ **Phase 3 Route**

-  RTS Garage for AV Storage
-  151 SW 2nd Ave, Gainesville, FL 32601, ...



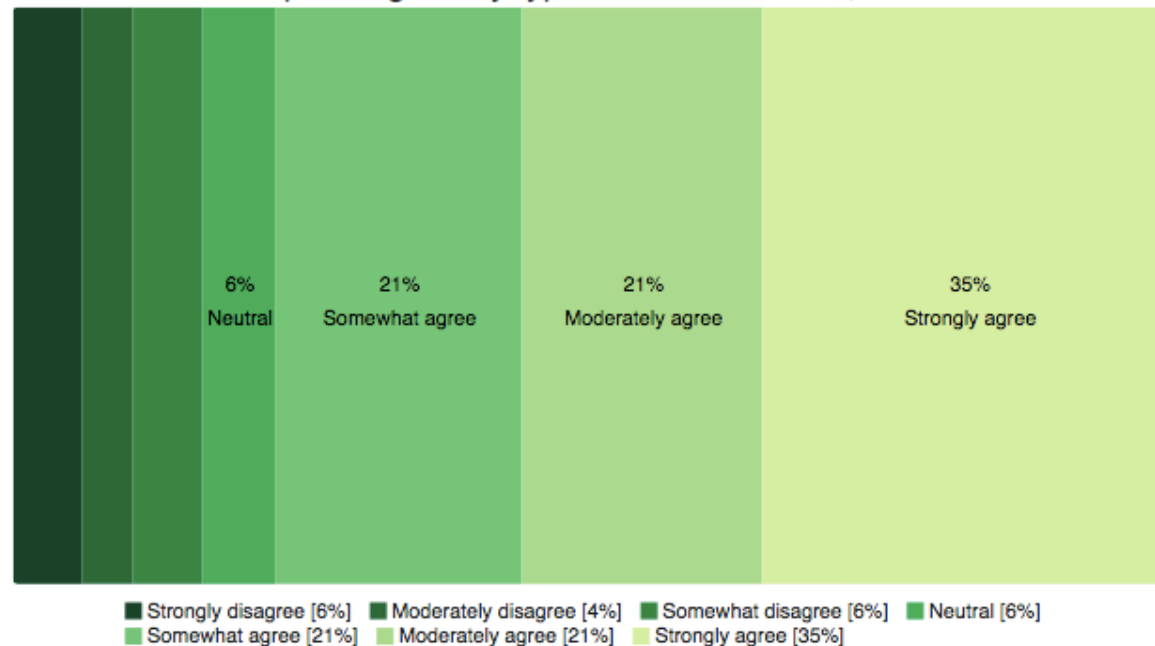
Gainesville Mobility Autobus



AV Shuttle Evaluation – Before Study

- Only 1/3 of surveyed were aware of Autobus
- 77% agree that they would use the Autobus on a typical commute
- Overall Survey:
 - Many Neutral/Somewhat responses
 - Moderate confidence in the Autobus, especially as a rider/driver

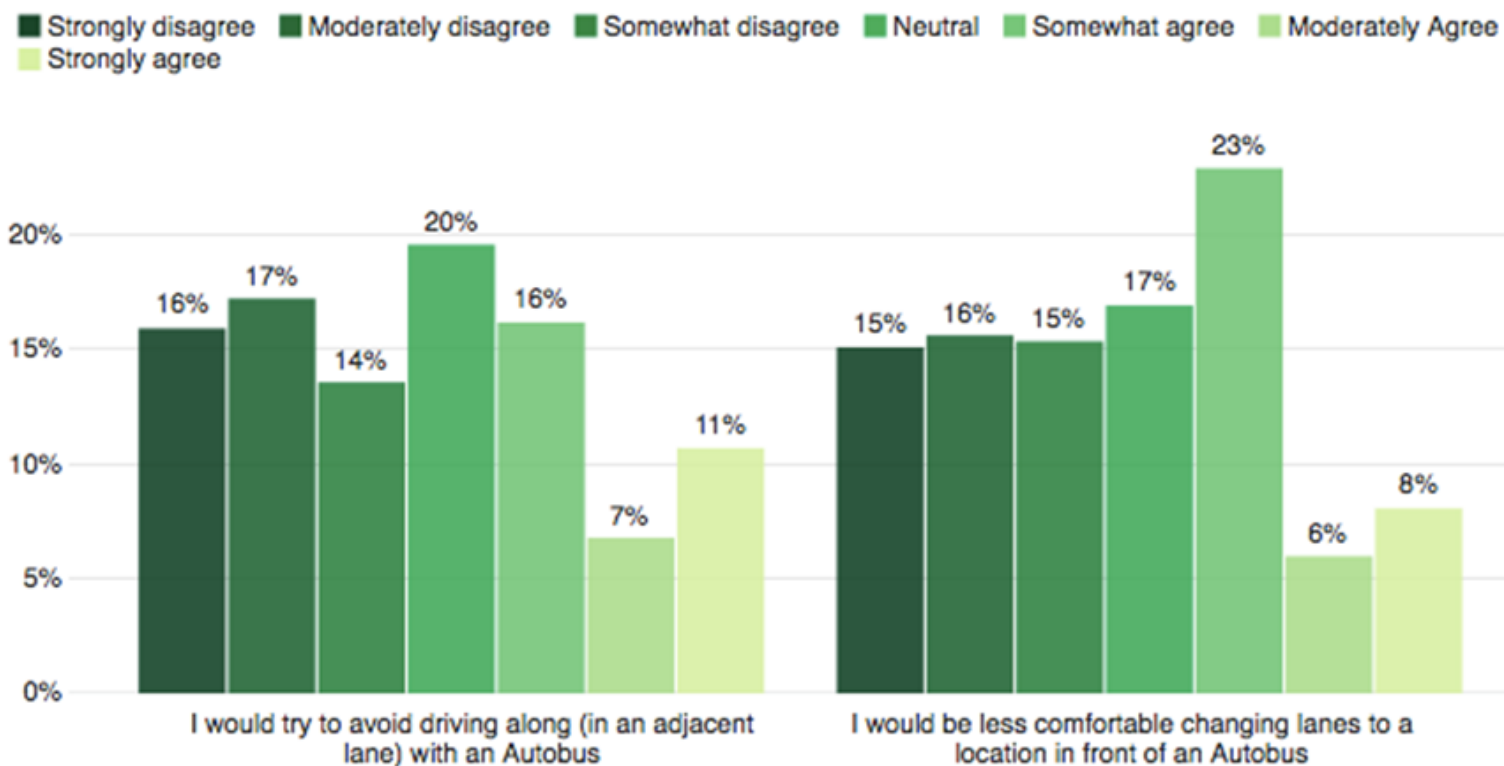
If the Autobus is operating on my typical commute route, I would use it.



Drivers

Drivers are more confident

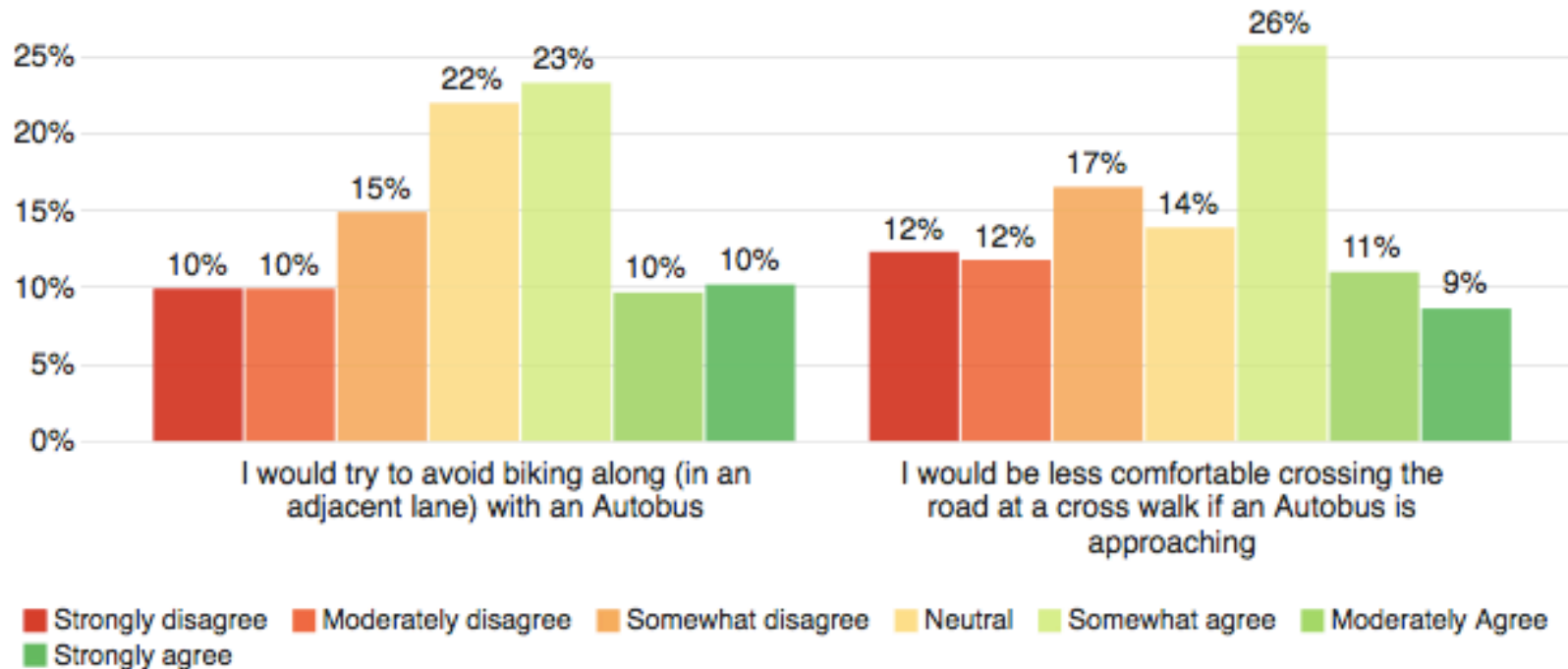
- 34% would avoid driving along the Autobus
- 37% would avoid driving in front on an Autobus



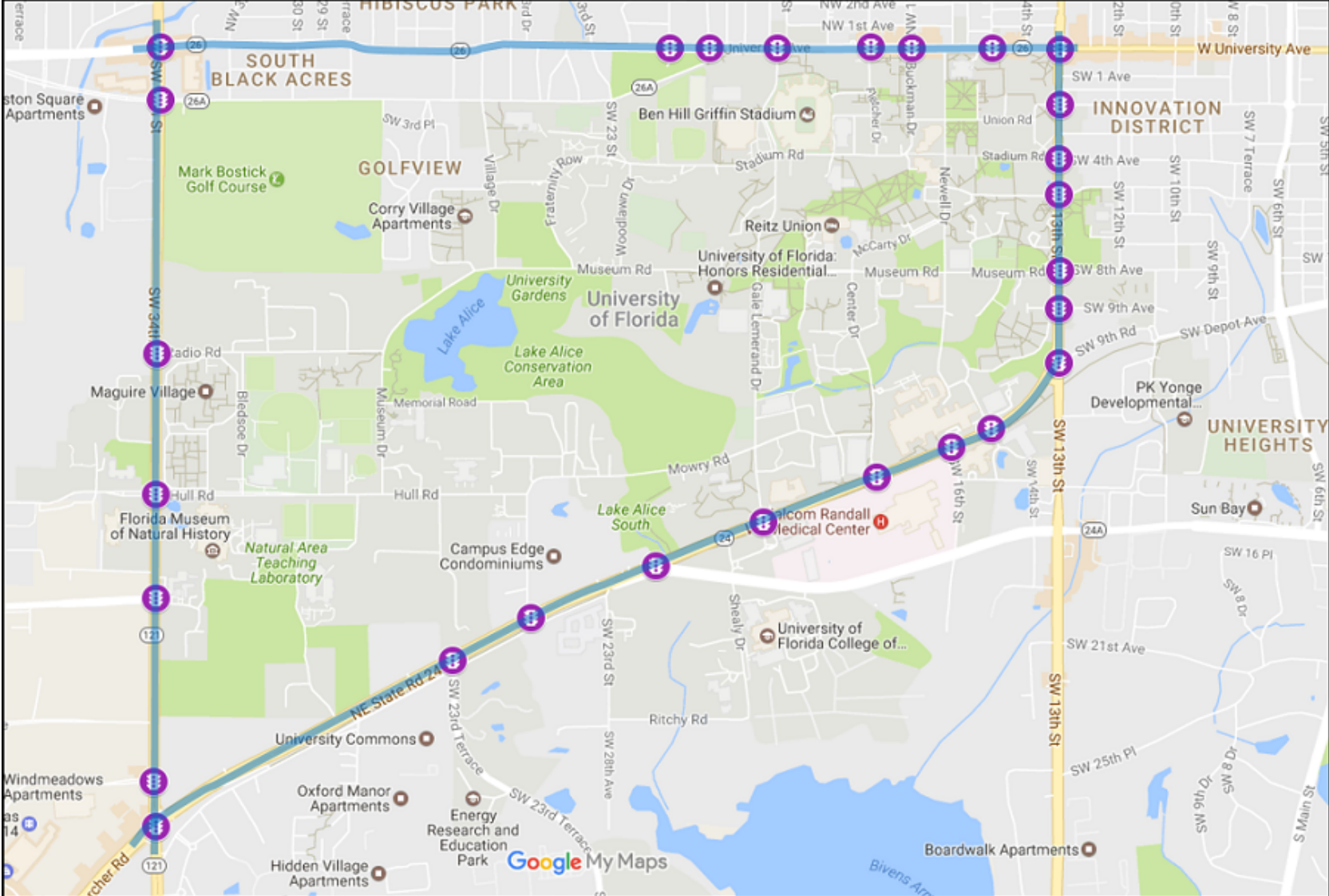
Pedestrians/Cyclists

Cyclists/Pedestrians are less confident

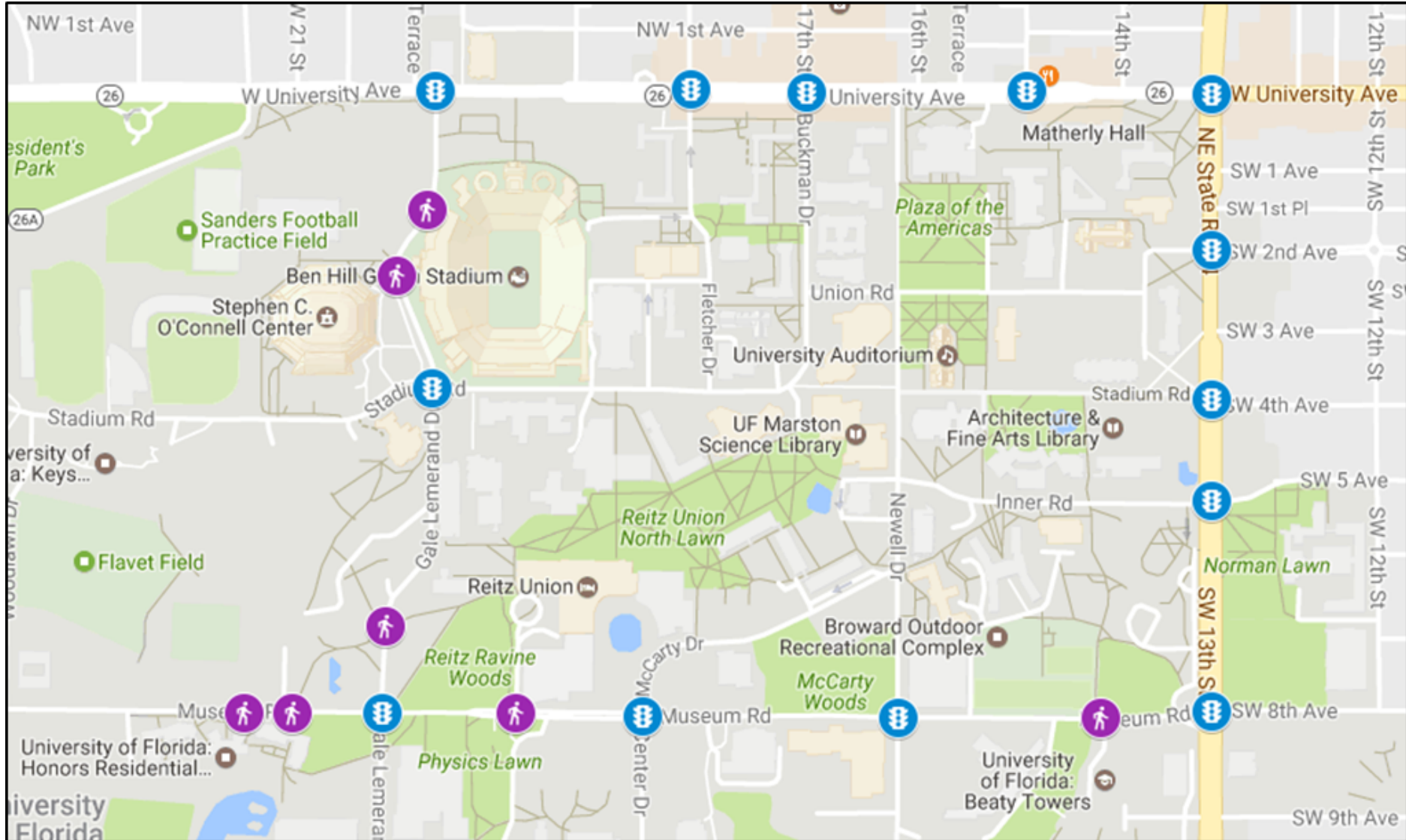
- 43% of cyclists would avoid biking in an adjacent lane to an Autobus;
- 46% of pedestrians/cyclists would feel less comfortable crossing the road at a cross walk if an Autobus is approaching



Gainesville SPaT Trapezium



UF Accelerated Innovation Development

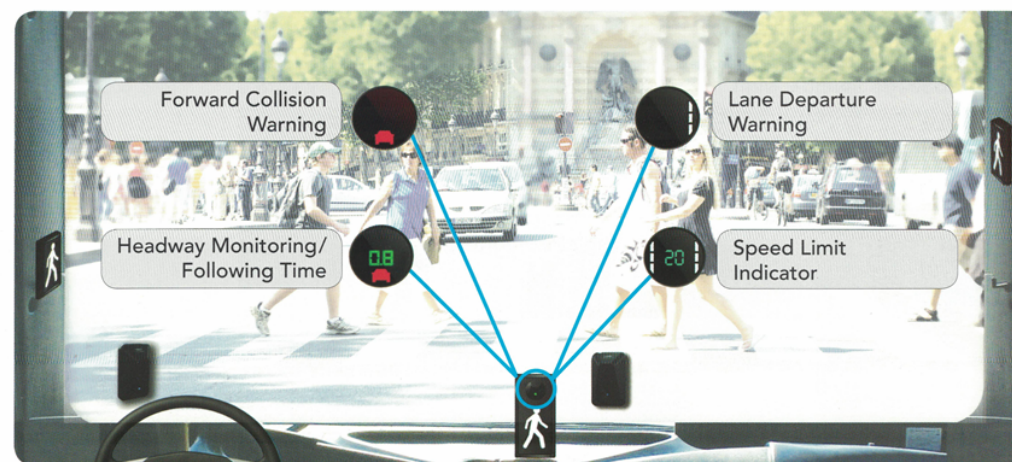


Other I-STREET Projects and Activities (1)

- Data analytics platform
- Sensor and sensor fusion development
- Bus bike rack sensors and app
- Ped and bike safety applications based on connectivity
- Shield+ for Transit Buses



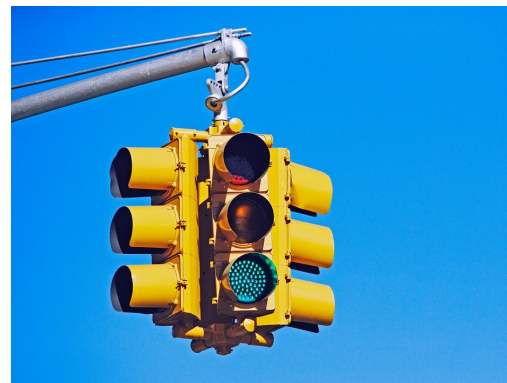
VIEW OF SMART SENSORS AND DRIVER DISPLAYS



The Shield+ System for commercial vehicles includes three (3) display modules that alert the driver, visually and audibly, when the bus is in motion, and a pedestrian and/or cyclist is in one of the danger zones around the bus.

Other I-STREET Projects and Activities (2)

- Intelligent School Zone Beacons
- Simulation of autonomy in the loop
- Evaluation of conflicts and near misses using video
- Villages evaluation
- Radar evaluation



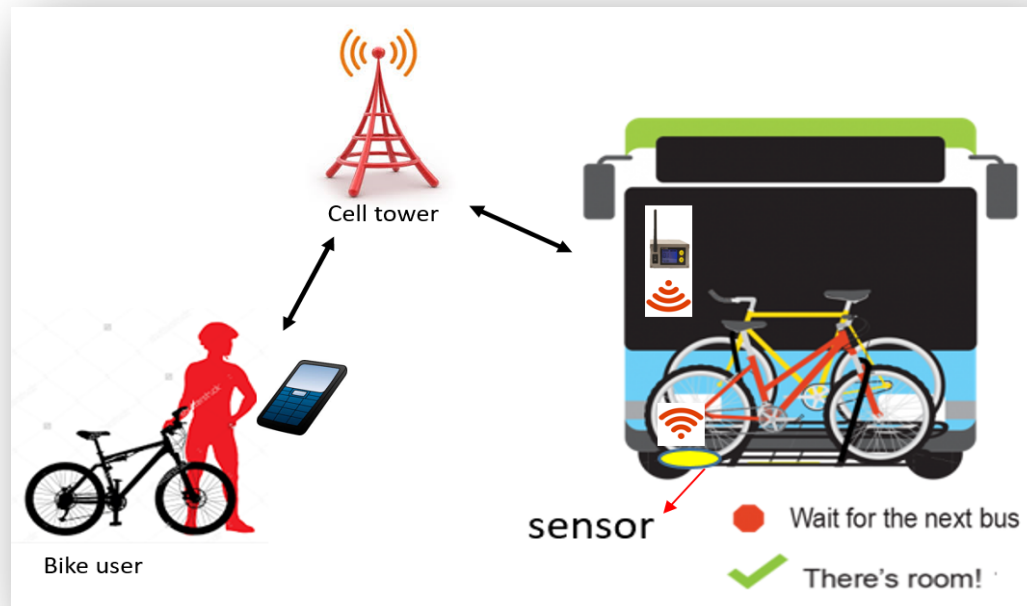
Example: Freeway Operations

Autonomous Vehicles

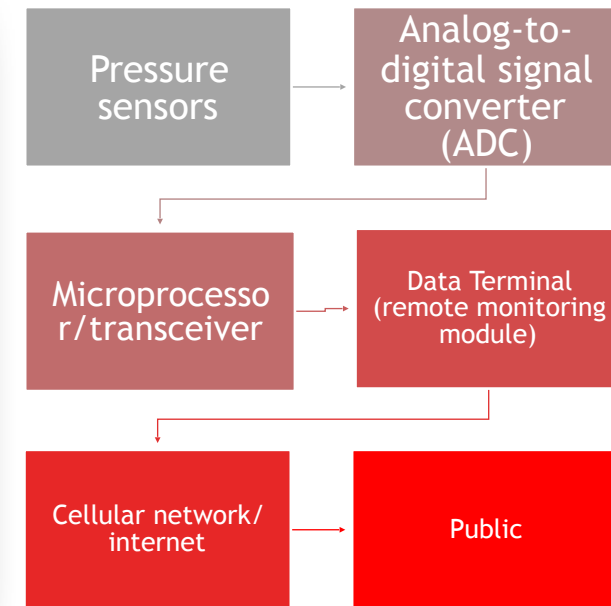
Conventional Vehicles

Bike Rack Sensors

Goal: To develop a smart sensing system of producing real-time bus bicycle rack capacity information.



System Network Diagram

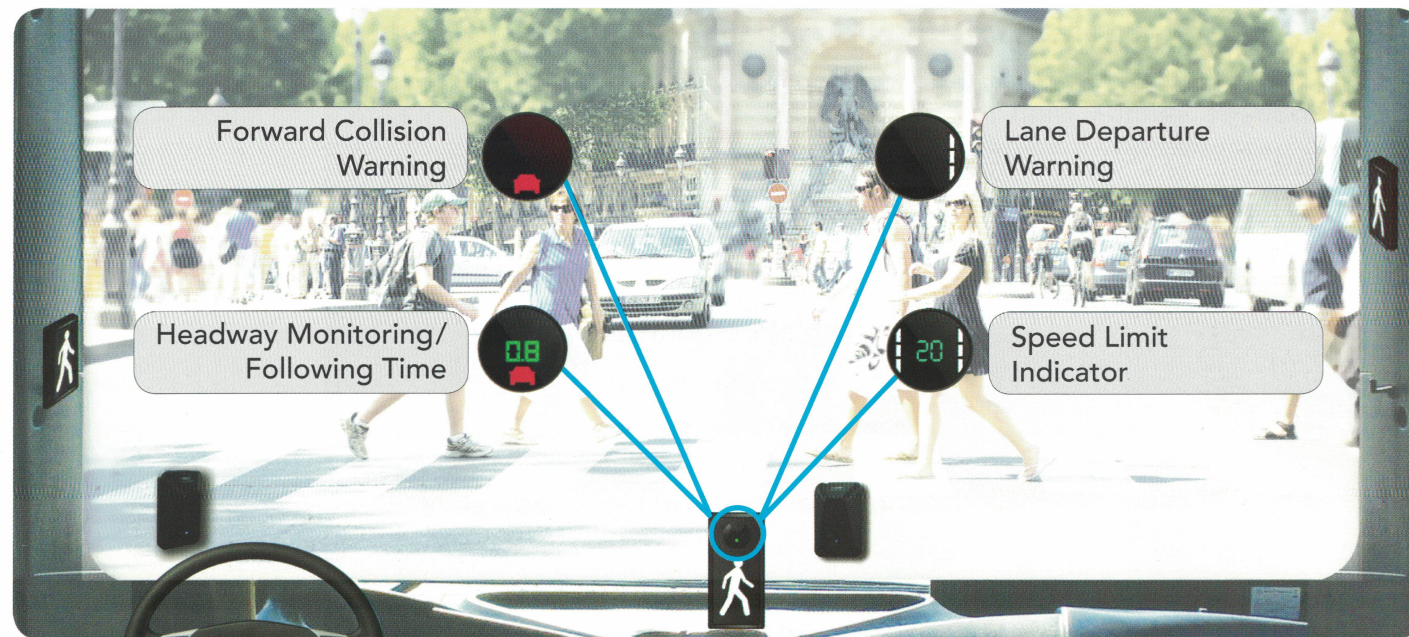


Signal Flow Diagram

ADAS for Transit – Shield+

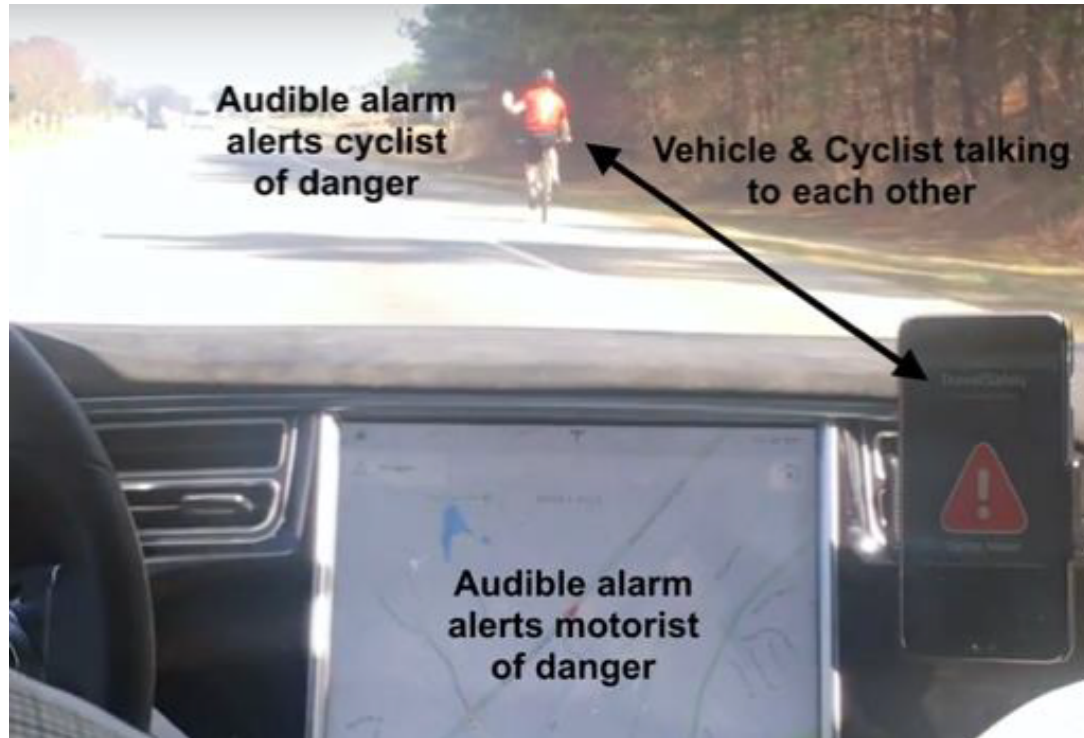
- Working through contract negotiations with Rosco
- MOU between UF and City of Gainesville
- 4 Cameras
- 3 display modules

VIEW OF SMART SENSORS AND DRIVER DISPLAYS

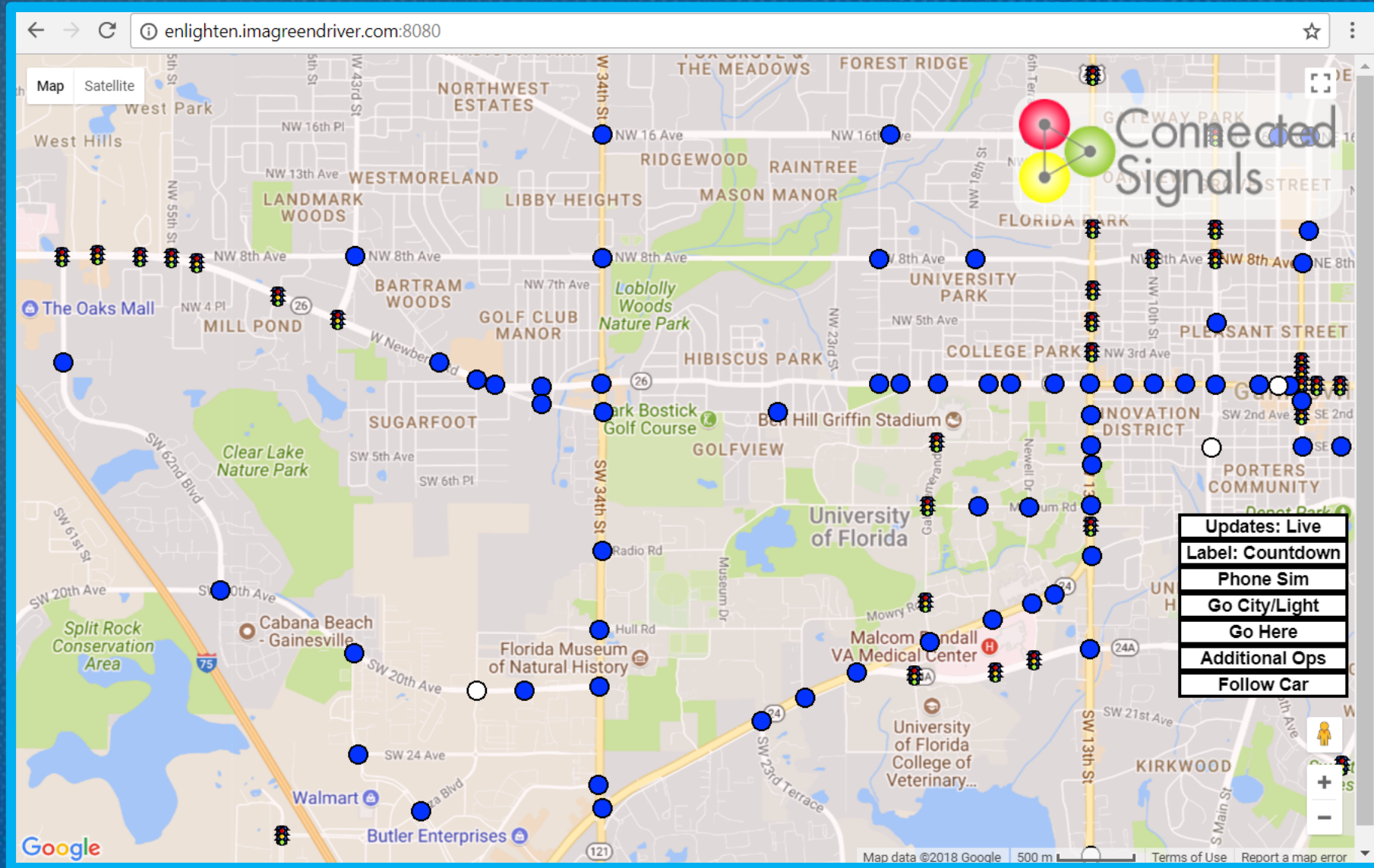


The Shield+ System for commercial vehicles includes three (3) display modules that alert the driver, visually and audibly, when the bus is in motion, and a pedestrian and/or cyclist is in one of the danger zones around the bus.

Evaluation of Intelligent School Zone Beacon and Vehicle-Cyclist Detection and Warning System



City of Gainesville – Connected Signals



City of Gainesville – TTS

psa.traffictechservices.com/Home/Regions

Gainesville

Search ID, at street or on street

0	0	0	0	52
0	0	0	0	28
0	0	0	0	0
0	0	0	0	0
0	0	0	0	1

- Group 1
- Group 2
- Group 3
- Group 4
- Group 5
- Group 6
- Group 7
- Group 11

Legend

Leaflet | © OpenStreetMap

City of Gainesville – Iteris Vantage Live

Secure | https://vantagelive.iteris.com/CL_GAINESVILLE/#

Vantage Live!
Home | Settings | Help

Vehicles - Yesterday

Top 5 Intersections By Volume

Intersection	Volume
Newberry & NW 69th Terr	59,470
Newberry & NW 62nd St	59,239
Newberry & NW 66th St	52,158
Newberry & Oaks Mall	51,394
Newberry & I75 Eastside	40,526

Top 5 Approaches By Volume

Intersection	Dir	Volume
Newberry & I75 E...	EB	28,185
Newberry & NW 6...	WB	28,032
Newberry & NW 6...	EB	27,961
Newberry & NW 6...	WB	26,078
Newberry & NW 6...	EB	25,786

Top 5 Movements By Volume

Intersection	Dir	Move	Volu
Newberry & I75...	EB	T	28,185
Newberry & N...	WB	T	25,786
Newberry & N...	EB	T	25,786
Newberry & N...	EB	T	23,961
Newberry & O...	EB	T	23,961

Mode Share - Yesterday

Top 5 Intersections By Mode Share

Intersection	%	%	%
S Main St and S...	91.4	2	6.6
SW 16th Ave & ...	95	0.6	4.4
S Main St & SW...	96.8	0.5	2.7
Clark Butler Blv...	97.9	0.5	1.6
S Main St & SW...	98.4	0.4	1.2

Bicycles - Yesterday

Top 5 Intersections By Volume

Intersection	Volume
SW 16th Ave & SW 13th St	558
S Main St and SE 2nd Ave	472
Clark Butler Blvd & Plaza...	161
SW 16th Ave & SW 16th St	126
Clark Butler Blvd & Wind...	123

Pedestrians - Yesterday

Top 5 Intersections By Volume

Intersection	Volume
S Main St and SE 2nd Ave	1,530
SW 16th Ave & SW 16th St	1,005
Newberry & NW 69th Terr	731
S Main St & SW 4th Ave	550

System Status

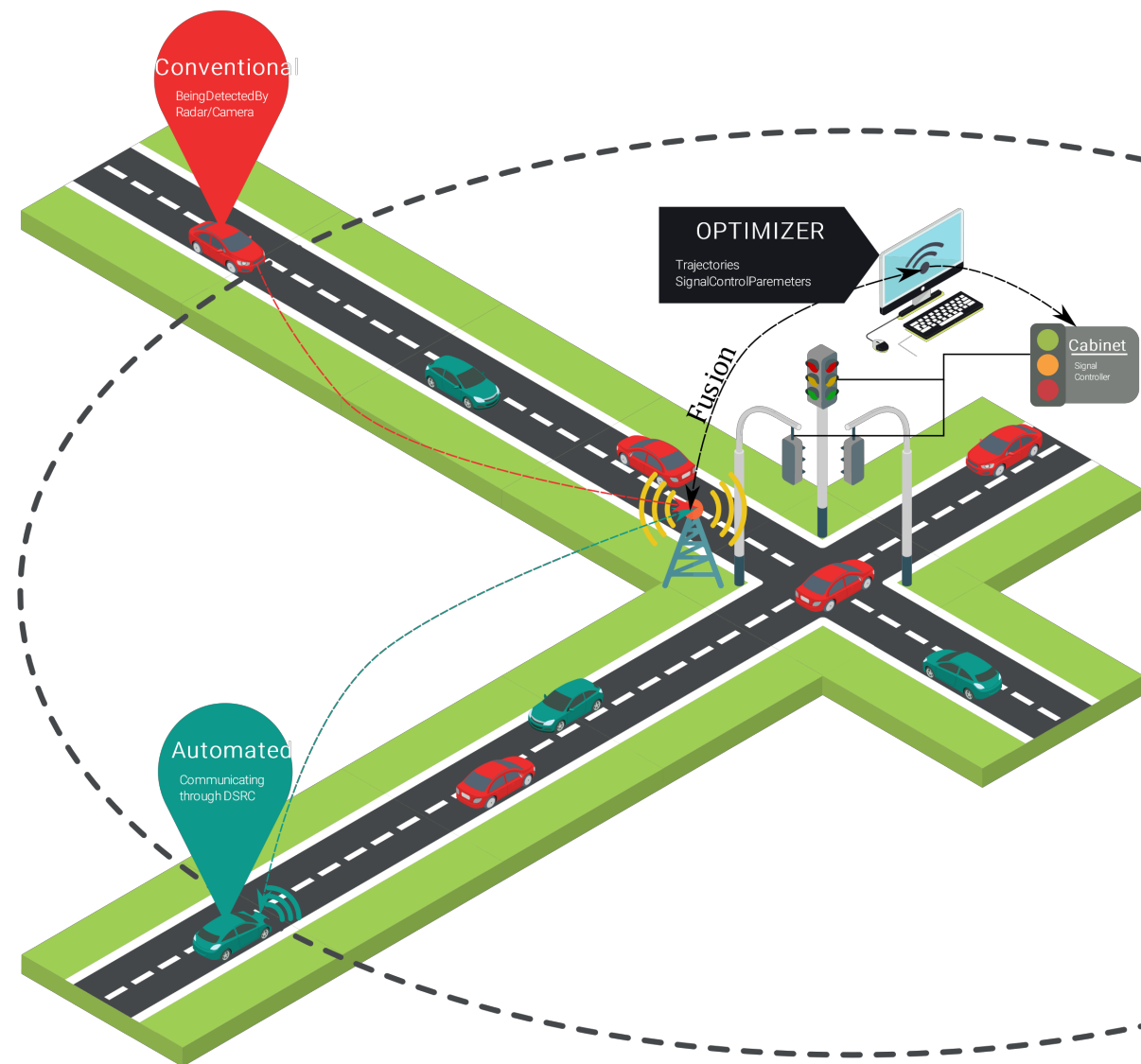
Intersection	Communication	Standard Detection Mode
	Real-time as of 12:40pm	As of Yesterday
Clark Butler Blvd & Plaza Blvd	■	100%
Clark Butler Blvd & Windmeadows Blvd	■	100%
Newberry & I75 Eastside	■	100%
Newberry & NW 62nd St	■	100%

©2018 Iteris, Inc. All rights reserved.

CAV Intersection Operations

Given: the arrival information of automated vehicles and conventional vehicles

Goal: to optimize the average delay by advising automated and connected vehicles and controlling signal phase and timing



Questions?

Clark Letter, Ph.D. | Research Assistant
Professor
University of Florida Transportation Institute
clarklet@ufl.edu

<http://avian.essie.ufl.edu/>

www.transportation.institute.ufl.edu/

<http://www.transportation.institute.ufl.edu/research-2/istreet/>