



Sustainability
of
Connected
Vehicles

Martin Stone, Ph.D., AICP
General Manager
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EGIS: MARTIN STONE, Ph.D., AICP – 35+ YEARS IN TRANSPORTATION

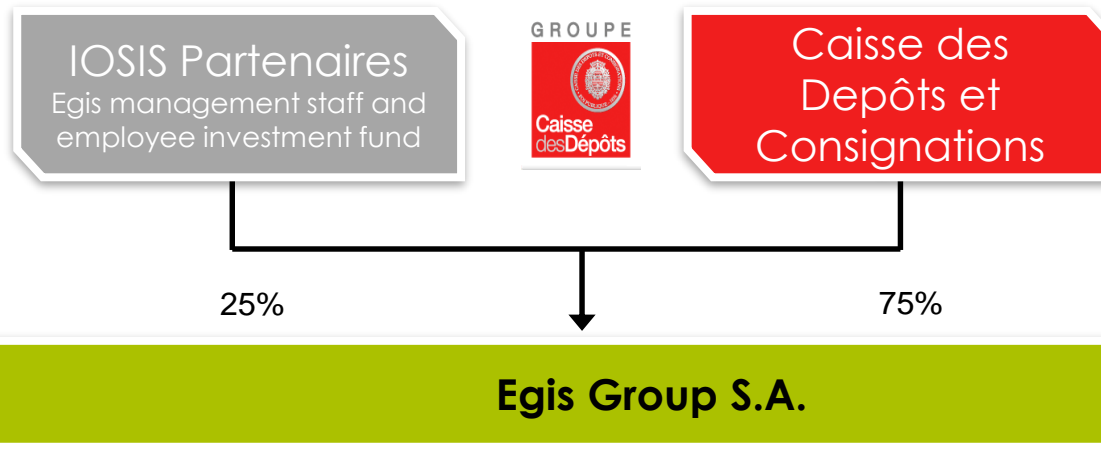
- ❖ MA in Urban Planning and Ph.D. in Public Administration
- ❖ 15 year as Tampa Hillsborough Expressway Authority Planning Director
- ❖ Planned & managed all THEA's ETC systems & ITS controls
- ❖ Planned & developed THEA's Reversible Express Lanes
- ❖ Planned & implemented 1st ORT lanes in the State of Florida
- ❖ Planned & implemented 1st AET System Conversion in Florida
- ❖ Consultant to Florida Turnpike Enterprise & Multiple FDOT Districts
- ❖ 1st Chairman of the IBTTA Interoperability Committee to develop the plan for toll interoperability in North America



Martin Stone
Egis Projects USA)
General Manager



EGIS: GLOBAL RESOURCES WITH A LOCAL FOCUS



- Staff: 138,000
- AAA/AA+ Rating
- Assets: >\$300 Billion

- ❖ Leading Worldwide Transportation Infrastructure Company
- ❖ 12,000 Employees in Over 100 Countries
- ❖ 40 Motorway & Toll Operations Projects
- ❖ >2.6 Million ETC Subscribers
- ❖ >2 Million Daily Transactions with >\$2 Billion Annual Tolls
- ❖ >1,200 Miles of Multi-Lane ETC & Traditional Toll Systems
- ❖ 1/3 are Long-Term Concessions with P3 Investments
- ❖ 7 Airport Operations Subsidiaries with 13 Airport Platforms



EGIS: GLOBAL RESOURCES WITH A LOCAL FOCUS

World Leader in P3 Multi-Modal Operations



❖ **EASYTRIP**

- Independent Multi-Modal Service Provider
- France, Greece, Ireland, Netherlands and Philippines

❖ **TransPass**

- 60 Ferry Routes
- Rail Bookings

❖ **National and Regional Toll Interoperability**

- Ireland, Greece, Canada and the US

CONNECTED VEHICLE

Autonomous Vehicles

- ❖ Vehicles that operate in some fashion (some or all of the driving actions) independent of the human driver

Connected Vehicles

- ❖ Vehicle-to-Vehicle (V2V): Vehicles that operate in some fashion due to communications or sensory input from other vehicles
- ❖ Vehicle-to-Infrastructure (V2I): Vehicles that operate in some fashion due to input from the highway, bridge or tunnel on which they are traveling – and also includes communication from the vehicle to the infrastructure – that may be relayed to other travelers

(or combinations of the above)

CONNECTED VEHICLE PILOT DEPLOYMENTS

USDOT Funded CV Pilot Project Contracts

Office of the Assistant Secretary for Research and Technology

- ❖ New York City, NY
- ❖ Tampa, FL
- ❖ State of Wyoming

CV Pilot Deployments

- ❖ Opportunity to put CV technology in the field
- ❖ Identify the planning & investment required to deliver CV technology
- ❖ Define approaches to performance measurement

Ultimate Goal

- ❖ Lower the barriers to deployment (includes financial sustainability)

CONNECTED VEHICLE PILOT DEPLOYMENTS

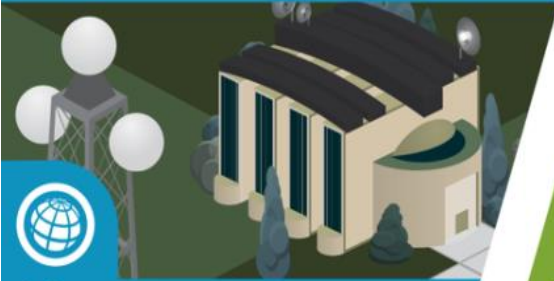
SPUR EARLY DEPLOYMENTS



Wirelessly Connected Vehicles



Mobile Devices



Infrastructure

MEASURE BENEFITS



Safety

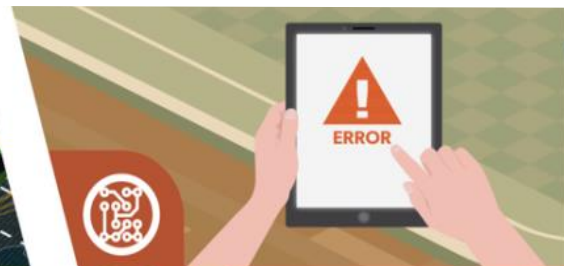


Mobility



Environment

RESOLVE ISSUES



Technical



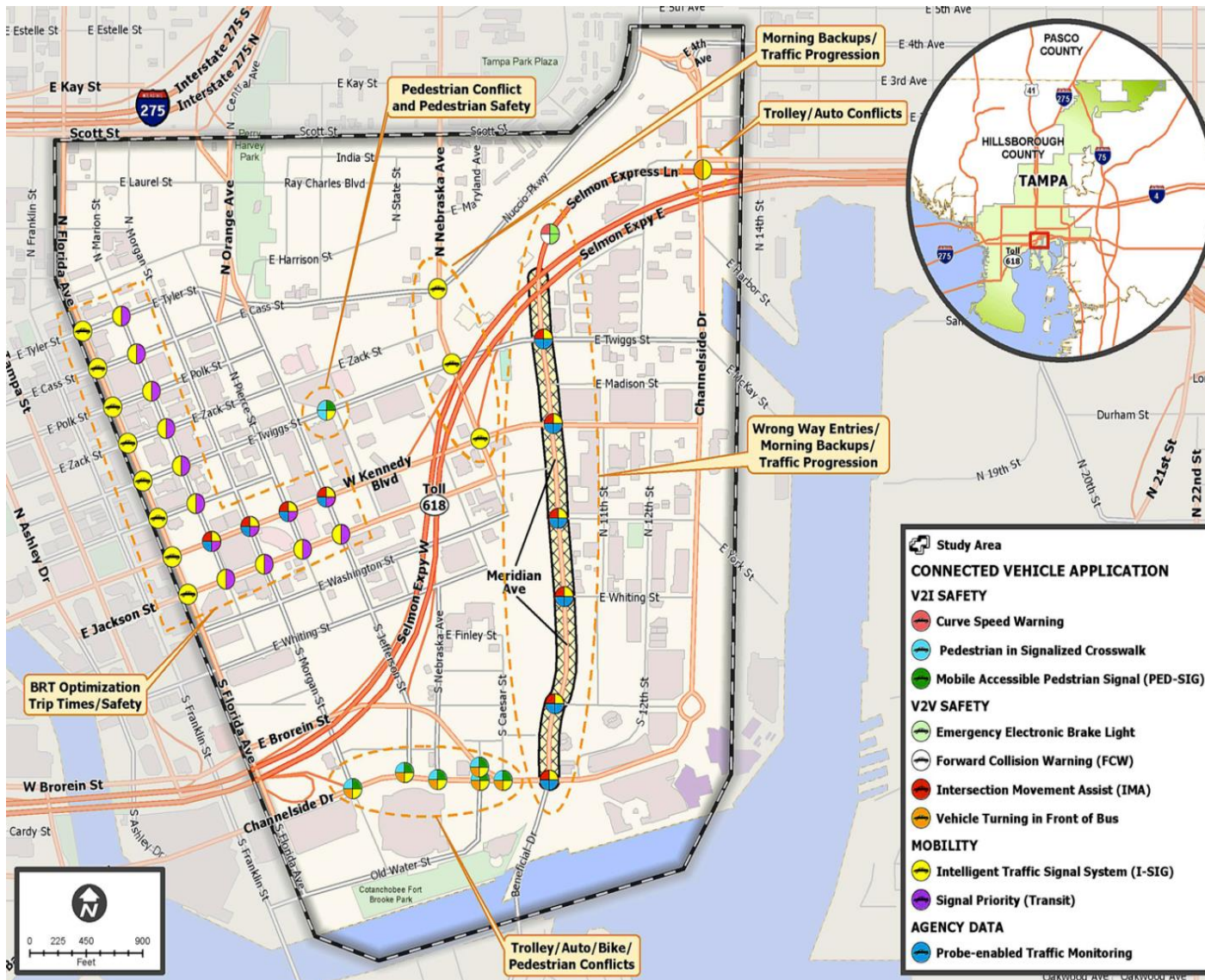
Institutional



Financial

Courtesy: USDOT

CONNECTED VEHICLE PILOT DEPLOYMENTS – TAMPA, FLORIDA



Pilot Project

Phase I: Organization, Vision and Planning

Phase II: Design, Procurement, Public Relations and Deployment

Phase III: Operations and Maintenance

Courtesy: THEA

CONNECTED VEHICLE PILOT DEPLOYMENTS – TAMPA, FLORIDA



Selmon Reversible Express Lanes (REL)

Avoid Crashes due to Excessive Queues from Exit Ramp to Travel Lane



Warn Approaching Vehicles of Queue Backup in Curve



Reduce Queue Backup on Curve and Improve Signal Timing Progression

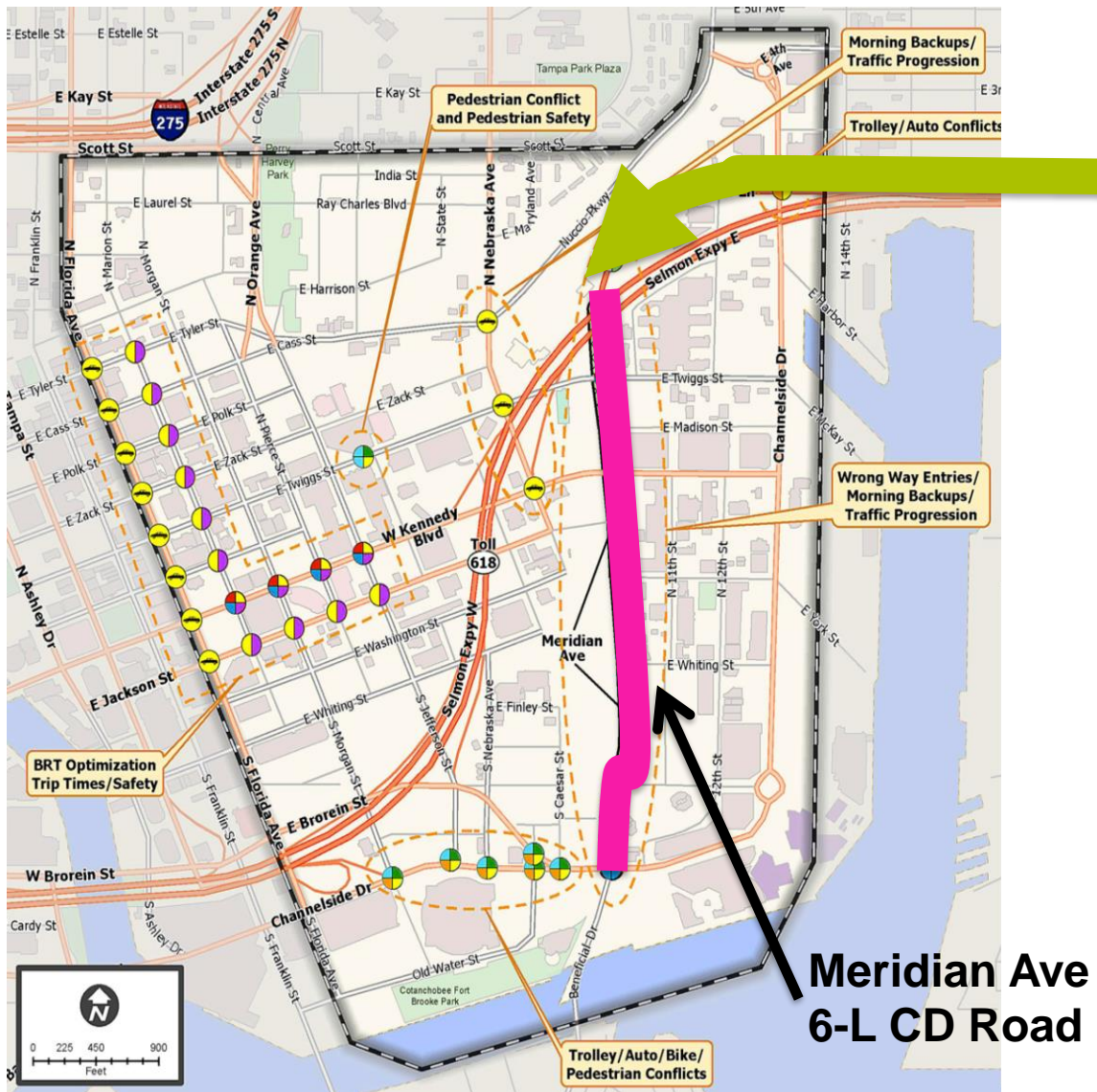


- Performance Measures**
- Congestion Impact
 - Incident Rates
 - Travel Time and Reliability of Travel Time
 - Emission and Fuel Consumption

FCW: Forward Collision Warning | EEBL: Emergency Electronic Brake Lights

Courtesy: THEA

CONNECTED VEHICLE PILOT DEPLOYMENTS – TAMPA, FLORIDA



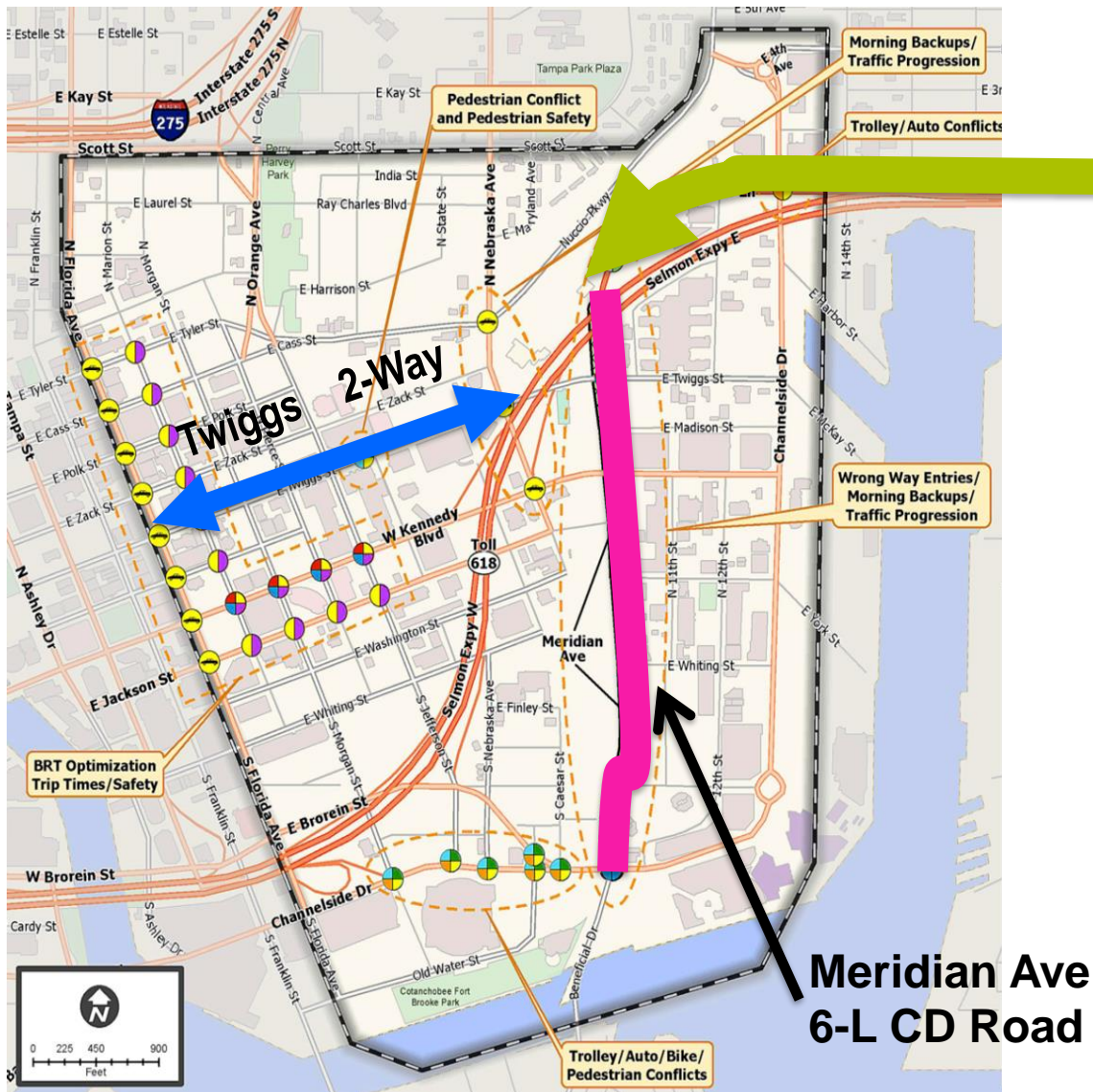
Selmon Reversible Express Lanes (REL)

<p>Improve Safety at the Entry/Exit Point</p> <p>Intersection Movement Assist (IMA)</p>	<p>Effectively Detect Wrong Way Entries to the REL</p> <p>Probe Enabled Traffic Monitoring</p>	<p>Signal Control at Express Lane Entries</p> <p>Intelligent Traffic Signal System (I-SIG)</p>
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- Performance Measures**
- Congestion Impact
 - Reversible Express Lane (REL) Operation
 - Travel Time and Reliability of Travel Time
 - Wrong Way Incidents
 - Warnings Issued

Courtesy: THEA

CONNECTED VEHICLE PILOT DEPLOYMENTS – TAMPA, FLORIDA



Selmon Reversible Express Lanes (REL)

Avoid Potential Vehicle Conflicts

Improve Signal Timing for Special Events

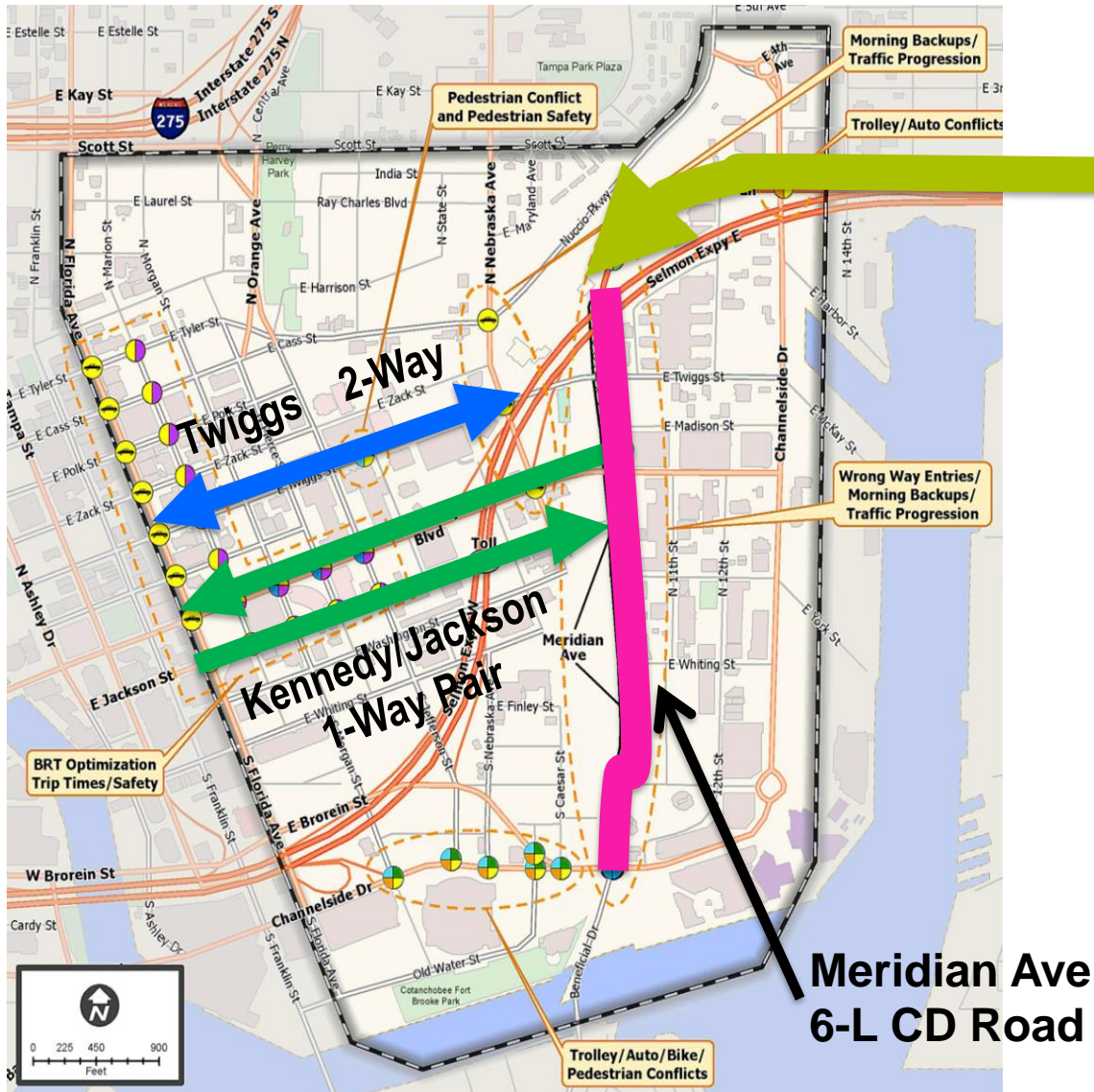
Vehicle Turning Right in Front of Bus Warning

Intelligent Traffic Signal System (I-SIG)

- Performance Measures**
- Transit/ Auto Conflicts
 - Travel Time and Reliability of Travel Time
 - Incident Rates
 - Streetcar Headway / On-Schedule Performance

Courtesy: THEA

CONNECTED VEHICLE PILOT DEPLOYMENTS – TAMPA, FLORIDA



Selmon Reversible Express Lanes (REL)

Effectively Monitor Peak Queuing and Congestion

Improve Traffic Progression



Probe Enabled Traffic Monitoring



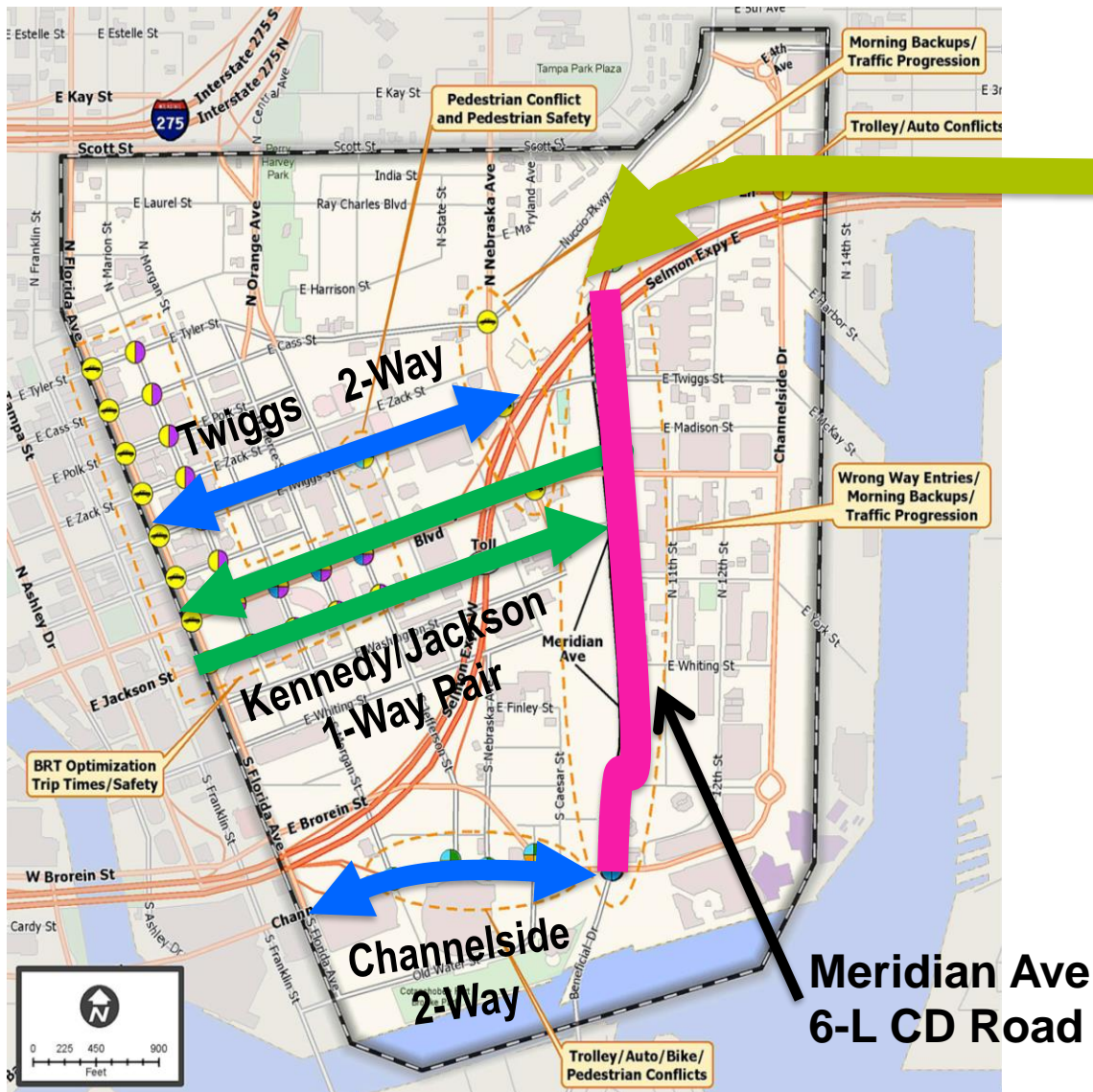
Intelligent Traffic Signal System (I-SIG)

Performance Measures

- City Traffic Management Center (TMC) Operation Enhancements
- Transit Agency Scheduling
- Travel Time and Reliability of Travel Time
- Fuel Consumption

Courtesy: THEA

CONNECTED VEHICLE PILOT DEPLOYMENTS – TAMPA, FLORIDA



Selmon Reversible Express Lanes (REL)

Avoid Potential Vehicle Conflicts

Improve Signal Timing for Special Events



Vehicle Turning Right in Front of Bus Warning



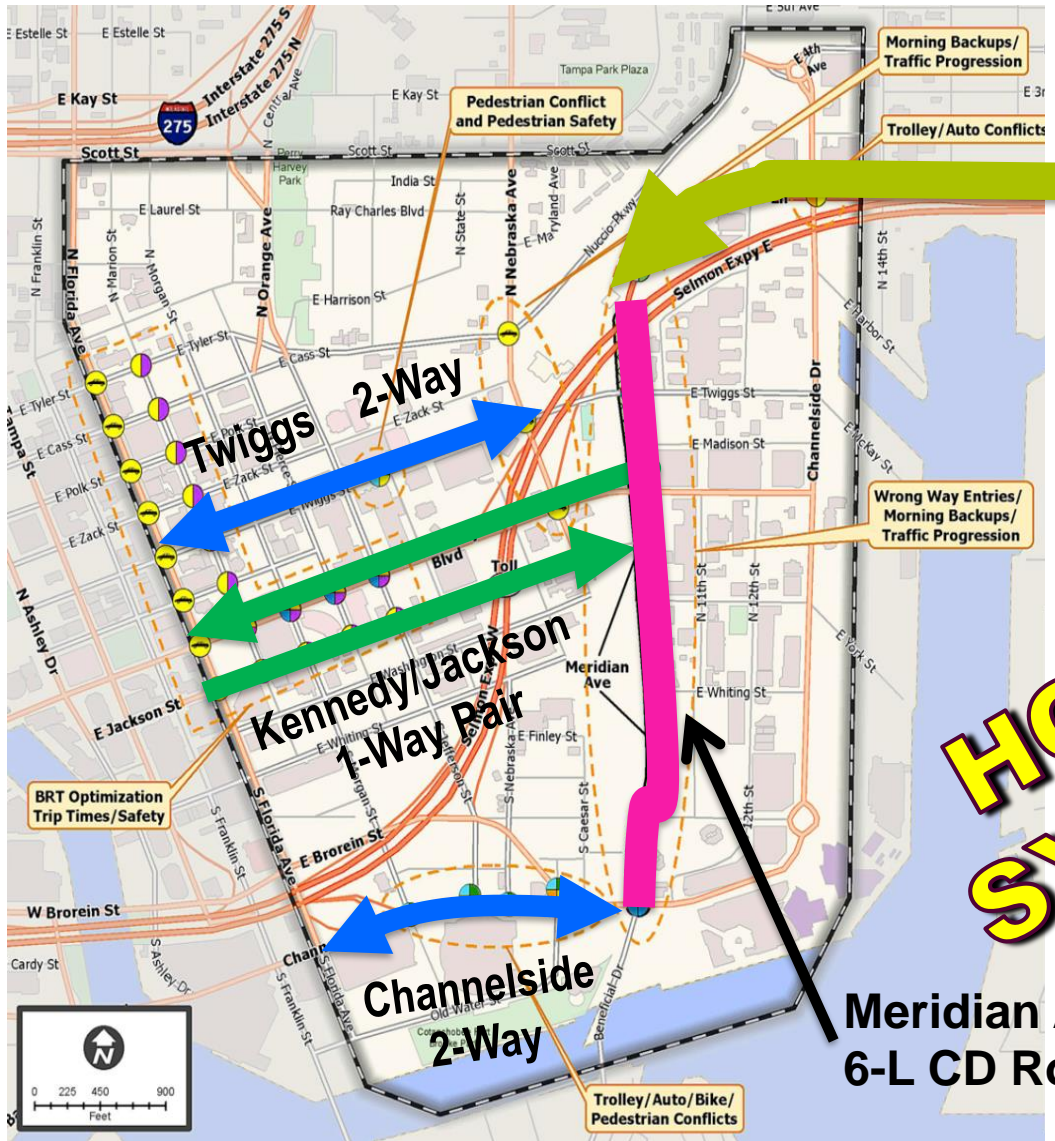
Intelligent Traffic Signal System (I-SIG)

Performance Measures

- Transit/ Auto Conflicts
- Travel Time and Reliability of Travel Time
- Incident Rates
- Streetcar Headway / On-Schedule Performance

Courtesy: THEA

CONNECTED VEHICLE PILOT DEPLOYMENTS – TAMPA, FLORIDA



Selmon Reversible Express Lanes (REL)

Avoid Potential Vehicle Conflicts

Improvement in Planning for Special Events

HOW DO WE MAKE CV SYSTEMS FINANCIALLY SUSTAINABLE?



Enabling Right Bus Way



Intelligent Traffic Signal System (I-SIG)

Performance Measures

- Avoid Auto Conflicts
- Travel Time and Reliability of Travel Time
- Incident Rates
- Streetcar Headway / On-Schedule Performance

Courtesy: THEA

Transportation Funding

Competitive Public Environment

□ CAPEX

- ❖ **Federal Grants & Contracts** (from fuel taxes & general funds)
- ❖ **State & Local Capital Programs**
 - Fuel and other taxes (sales, real estate, etc.)
 - Tolls (user fees)

Transportation Funding

Competitive Public Environment

□ CAPEX

- ❖ **Federal Grants & Contracts** (from fuel taxes & general funds)
- ❖ **State & Local Capital Programs**
 - Fuel and other taxes (sales, real estate, etc.)
 - Tolls (user fees)

□ OPEX

- ❖ **State and Local Operating & Maintenance Programs**
 - Fuel and other taxes (sales, real estate, etc.)
 - Tolls (user fees)

Transportation Funding

Competitive Public Environment

❑ **Public-Private Partnerships (P3) Offer Commercially Sustainable Solutions**

❖ **Mobility-as-a-Service (MaaS)**

- **Public Agency/Jurisdiction**
 - Investments
 - Subsidies
- **Private Products and Services**
 - Marketing Models
 - Customer Willingness to Pay

P3 Mobility-as-a-Service (MaaS)

- ❖ **Open Framework** (with published interfaces/APIs)
- ❖ **3rd Party Providers** (allow 3rd-party public & private service providers to compete for access to customers)
- ❖ **Competitive Products & Services** (providers differentiate their offerings with prices and value-added services)
- ❖ **Public Oversight**
Example: The public authority could provide the basic CV network & service (safety and operations) and the platform to which 3rd party/independent service providers connect (and pay fees to the public authority)

P3 Mobility-as-a-Service (MaaS)

For Connected Vehicles & Parking

- ❖ CV platform could be an open framework for urban parking
- ❖ Allow public & private parking providers to compete for access to customers through the CV platform (including private spaces)
- ❖ Allows CV drivers to find, reserve, purchase and access parking (with directions) as they approach an urban area
- ❖ 3rd-party providers can offer different quality/price of parking locations, GPS directions, merchant & restaurant discounts, etc.
- ❖ Public authority can receive a piece of the pie to be used for sustaining the CV system (O&M and improvements)

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