
TPO
Miami-Dade Transportation
Planning Organization
IMPACT OF FUTURE TECHNOLOGY
IN THE 2045 LRTP

- The evolution of modern technology is changing the world faster than ever.
- This *technology revolution* will accelerate over the next several years, and the transformations are, in many ways, unfathomable.
- “Disruptive” changes to everyday life are just beginning.


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What is in the Report

Table 1: Literature Review Results (continued)

CATEGORY	SUB-CATEGORY	TOPIC	SOURCE
A. AV/CAV	A.9 Air	35. The Future of Air Cargo: How to Adapt	http://www.citylab.com/work/2014/10/a-complete-guide-to-the-future-of-us-freight-movement/381012/ http://www.inboundlogistics.com/cms/article/air-cargos-future-ready-for-anything/ http://aircargoworld.com/airfreight-has-bright-future-despite-technology-lag/ http://www.wsj.com/articles/are-drones-the-future-of-air-freight-1436468089 http://www.orionsystems.com/ http://www.orionsystems.com/solutions/fleet-solutions/
A. AV/CAV	A.10 Railroads	36. Think beyond the rails: Leading in 2025	http://www-935.ibm.com/industries/traveltransportation/think-beyond-the-rails.html http://www.progressiverailroading.com/ http://www.progressiverailroading.com/rail_industry_trends/article/Drones-mobility-and-more-Supplier-perspectives-on-next-level-rail-technology--49386
B. Smart Cities		37. Why Santa Monica Is a Smart City Trailblazer	http://www.ioti.com/smart-cities/why-santa-monica-smart-city-trailblazer
B. Smart Cities		38. Surveying Innovations Across City Systems— "Becoming Smart"	http://datasmart.ash.harvard.edu/news/article/the-urban-internet-of-things-727
B. Smart Cities		39. Surveying Innovations Across City Systems—Some Challenges	http://datasmart.ash.harvard.edu/news/article/the-urban-internet-of-things-727
C. TDM (Travel Demand Modeling)		40. "Using an Activity-Based Model to Explore Possible Impacts of Automated Vehicles"	https://www.google.com/webhp?sourceid=chrome-instant&ion=1&espv=2&ie=UTF-8#q=29.+Using+an+Activity-Based+Model+to+Explore+Possible+Impacts+of+Automated+Vehicles%E2%80%9D
C. TDM (Travel Demand Modeling)		41. "Modeling Autonomous Vehicles"	http://www.fsutmsonline.net/images/uploads/mtf-files/Modeling_Autonomous_Vehicles_by_Jerry_Graham_and_Dan_Macmurphy.pdf
C. TDM (Travel Demand Modeling)		42. "Effects of Next-Generation Vehicles on Travel Demand and Highway Capacity"	www.fehrandpeers.com/fpthink/nextgenerationvehicles/
D. Maglev/ Hyperloop		43. Hyperloop	http://www.usatoday.com/story/tech/news/2016/05/09/la-sf-30-min-hyperloop-wars/84137224/ http://www.usatoday.com/story/tech/news/2016/06/25/hyperloop-may-be-transportation-leap-too-far/86284444/
D. Maglev/ Hyperloop		44. Maglev in Other Countries	http://usa.chinadaily.com.cn/epaper/2014-02/19/content_17291903.htm http://www.koreatimes.co.kr/www/news/nation/2016/02/116_197061.html http://www.digitaltrends.com/cool-tech/hyperloop-india/#ixzz4HVgrAtku
D. Maglev/ Hyperloop		45. Dallas to Houston High Speed Rail	http://www.yourhoustonnews.com/pasadena/news/multi-billion-dollar-bullet-train-connection-houston-to-dallas-expected/article_df2448e8-30a3-11e6-91e3-837610fb3cb6.html

Miami-Dade County MPO Technology Literature Summary Sheet

Topic: #28 The future of freight: More shipping, fewer emissions?

Category: A. AV/CAV SUBCATEGORY A.6 Freight

Author(s)/Sponsoring Agency: Nate Berg, *Green Biz*

Date: January 16, 2016

Source: https://www.greenbiz.com/article/future-freight-more-shipping-less-emissions
http://www.europarl.europa.eu/RegData/etudes/STUD/2015/569964/IPOL_STU(2015)569964_EN.pdf
http://www.worldshipping.org/about-the-industry/how-liner-shipping-works
http://www.worldshipping.org/about-the-industry/how-liner-shipping-works/the-step-by-step-process
https://www3.epa.gov/otaq/oceanvessels.htm

Abstract: Much of what we consume embarks on a seaborne journey from another part of the world. Ships handle roughly 90 percent of global trade, nearly 11 billion tons of goods per year. Maritime vessels and ports are only a part of the picture. Airlines, railroads, trucks, warehouses, refrigerators, delivery people — the international system of goods movement -- is integral to the way we live. It also is a huge source of opportunity to reduce humans' environmental footprint. International aviation and maritime transport are constantly growing despite considerable efficiency improvements. In 2012, both sectors together accounted for about 3% to 4% of global emissions (PDF) A recent report (PDF) from the European Parliament estimated that number could rise as high as 17 percent by 2050 due to growth of global transport demand and if the shipping industry does not keep pace with other economic sectors in addressing emissions.

Efficiency gains and developments in automation may have the biggest influence on how the environmental footprint of the global system of goods movement evolves in the coming years. Maritime ports are getting more automated. Ships essentially can plug into the ports where they dock, tapping into local power instead of idling their huge engines and burning hundreds of tons of fuel to sit still. Automated cranes can quickly unload and reload ships to reduce their time in port. And the same systems can quickly move those thousands of containers onto the trucks and trains that carry them to distant locations.

The issue of getting to/from the port is another dominant conversation in goods-movement. Companies, such as FedEx, are investing in hybrid or all-electric delivery vehicles. Amazon is investigating delivery by battery-powered drones, which could reduce the reliance on traditional vehicles and their emissions. As the economic efficiency of shipping increases on sea and land, there will be more factories in more locations, with the parts and raw materials moving between them at lower cost and with more energy efficiency than today.

Potential for Pilot Project[1]
Near-term[2]: Ports and their "last-mile" infrastructure, like at the Port of Miami, must be modernized in order to match new and improved shipping processes.
Mid-term[3]: Once ports are modernized to handle these new and improved shipping processes, the industry will need to prepare to accommodate continued improvements in shipping technology.
Long-term[4]: Same as above.
Cost to Implement
Near-term: Port upgrades cost millions if not billions of dollars
Mid-term: Same as above
Long-term: Same as above
Cost Implications
Near-tern: It is expected that reduction in future costs will help make-up for initial spending
Mid-term: Same as above
Long-term: Long-term cost reductions will have far reaching impacts throughout the entire global economy.

1: Considered an on-the ground application; 2:2020-2025; 3: 2026-2035; 4:2036-2045

Table 2: Preliminary Evaluation of Technologies (continued)

CATEGORY	SUBCATEGORY	TOPIC	Possible in Pilot Program	Possible in 2045 LRTP		
				2020-2025	2026-2035	2036-2045
B. Smart Cities		37. Why Santa Monica Is a Smart City Trailblazer				
B. Smart Cities		38. Surveying Innovations Across City Systems— "Becoming Smart"				
B. Smart Cities		39. Surveying Innovations Across City Systems—Some Challenges				
C. TDM (Travel Demand Modeling)		40. "Using an Activity-Based Model to Explore Possible Impacts of Automated Vehicles"				
C. TDM (Travel Demand Modeling)		41. "Modeling Autonomous Vehicles"				
C. TDM (Travel Demand Modeling)		42. "Effects of Next-Generation Vehicles on Travel Demand and Highway Capacity"				
D. Maglev/Hyperloop		43. Hyperloop				
D. Maglev/Hyperloop		44. Maglev in Other Countries				
D. Maglev/Hyperloop		45. Dallas to Houston High Speed Rail				
D. Maglev/Hyperloop		46. Maglev in U.S.				
D. Maglev/Hyperloop		47. Fast Trains Outside the U.S.				
E. BRT (Bus Rapid Transit)		48. US 36 Bus Rapid Transit, CO				

ELEMENTS OF THE LRTP
THE PERIOD 2036–2045

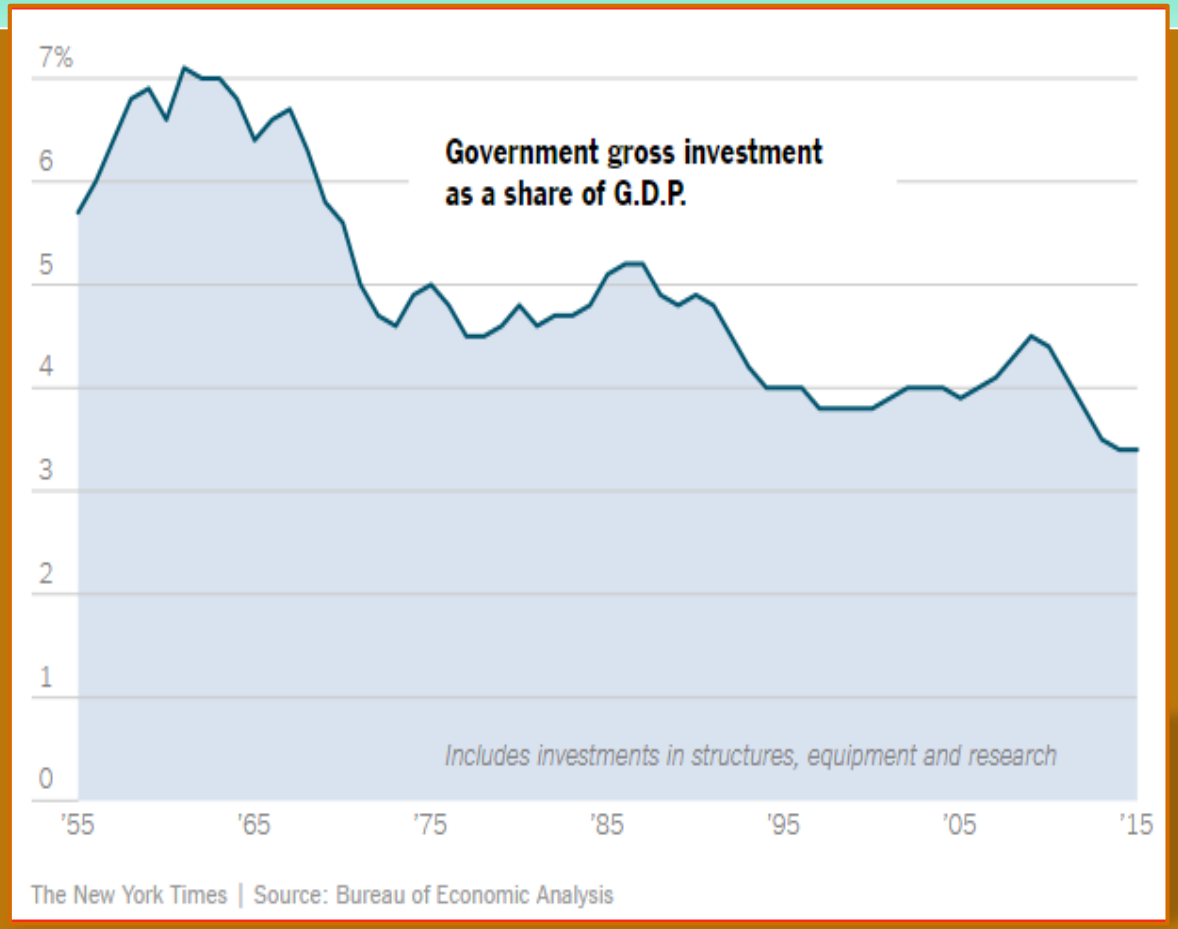
Travel Modeling Approach

- ❑ Define market penetration by year
- ❑ Identify lanes on restricted facilities
  - ✓Speed, capacity, etc.
- ❑ Represent in network increased safety/higher reliability, narrower lanes(?)
- ❑ Update land use files based on changes in speeds/delays

ELEMENTS OF THE LRTP

THE PERIOD 2036–2045

Funding: Federal



Outlook: Something has to give.

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ELEMENTS OF THE LRTP

THE PERIOD 2036–2045

Funding: Local

Table 3: Quick Reference to 2016 Fuel Taxes

LEVEL/TAX	AMOUNT	USE
Federal		
Fuel Excise Tax	Gasohol = 18.4¢/gal Gasoline = 18.4¢/gal Diesel = 24.4¢/gal	2.86¢ for mass transit 0.1¢ for leaking tanks Remainder for roads and bridges
State (Distributed to DOT)***		
Fuel Sales Tax	All fuels = 13.3 ¢/gal	At least 15.0% of DOT receipts** dedicated for public transportation. Remainder for any legitimate state transportation purpose.
SCETS* Tax	Gas/Gasohol = 6.1¢ – 7.4¢/gal Diesel = 7.4¢/gal	Net receipts must be spent in the district where generated.
State (Distributed to Local Governments)***		
Constitutional Fuel Tax	All fuels = 2¢/gal	Acquisition, construction, and maintenance of roads
County Fuel Tax	All fuels = 1¢/gal	Any legitimate county transportation purpose
Municipal Fuel Tax	All fuels = 1¢/gal	Any legitimate municipal transportation purpose
Local***		
Ninth-cent Fuel Tax	Gas/Gasohol = 0¢ – 1¢/gal Diesel = 1¢/gal	Any legitimate county or municipal transportation purpose
Local Option Fuel Tax	Gas/Gasohol = 5¢–11¢/gal Diesel = 6¢/gal	Local transportation; small counties may also use funds for other infrastructure needs.

Outlook: Flexible w/ Local Option Funding Mechanisms

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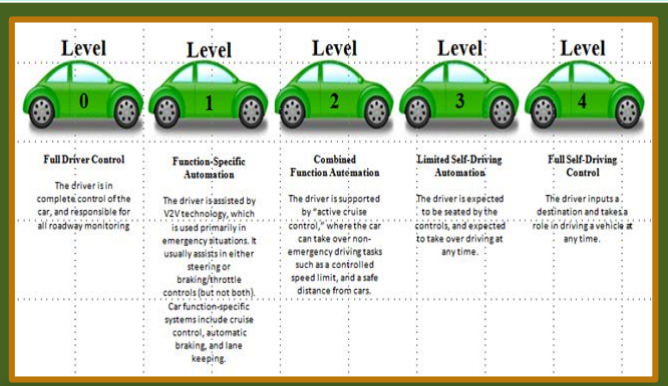
ELEMENTS OF THE LRTP

THE PERIOD 2036–2045

Autonomous Vehicles

Cars



Transit

Commodity Transport

Emergency Equip.

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THE PERIOD 2036–2045

Autonomous Cars

Market Penetration

Table 4: Predictions of Availability of AV Cars

COMPANY	DRIVERLESS VEHICLE PREDICTION
Baidu	by 2019
BMW	by 2021
Delphi	by 2019
Ford	by 2021
GM	by 2020
NuTonomy	by 2020
Tesla	by 2018
Toyota	in 2020
Uber	Entire fleet by 2030
Volkswagen	by 2019

Source: http://www.driverless-future.com/?page_id=384

Table 5: Period in which AVs Will Reach Certain % of All Vehicles Purchased in U.S.

PERIOD	CONSULTANT	MPO SAC
2020–2025	NA	NA
2026–2035	25%	25%
2036–2045	50%	50%
> 2045	75%	75%

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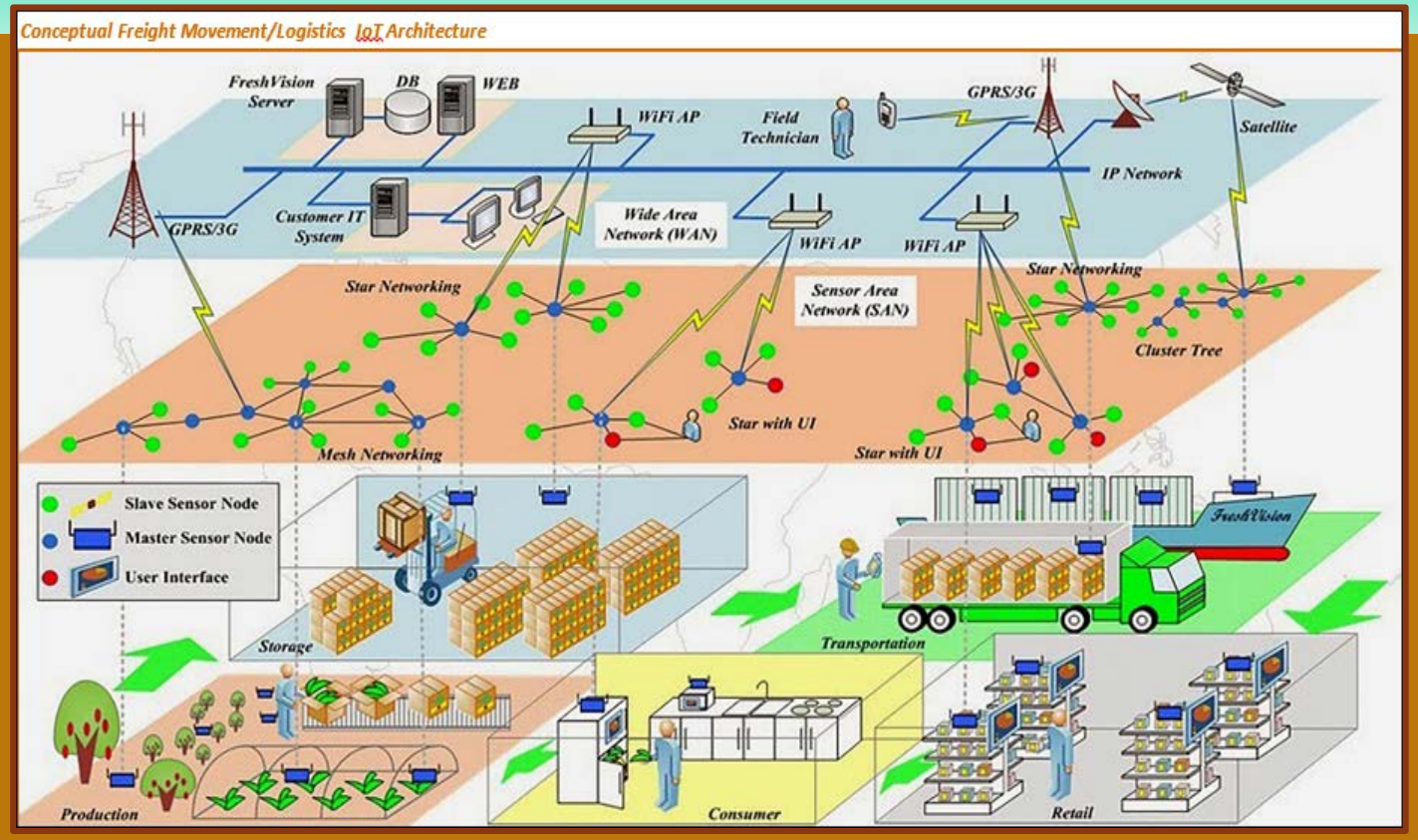
THE PERIOD 2036–2045

Logistics/Freight Movement: Marine, Rail, and Air



Outlook: Virtually Unlimited Potential

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ELEMENTS OF THE LRTP

THE PERIOD 2036–2045

Smart Cities – The Internet of Things (IoT)

Includes:

- Utilities/Energy
- Buildings
- Manufacturing
- Environmental Conditions
- Water
- Waste
- Wellness/Healthcare
- Retailing
- Banking

And more……..the world as we know it will not be the same!!

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Possible Pilot Project

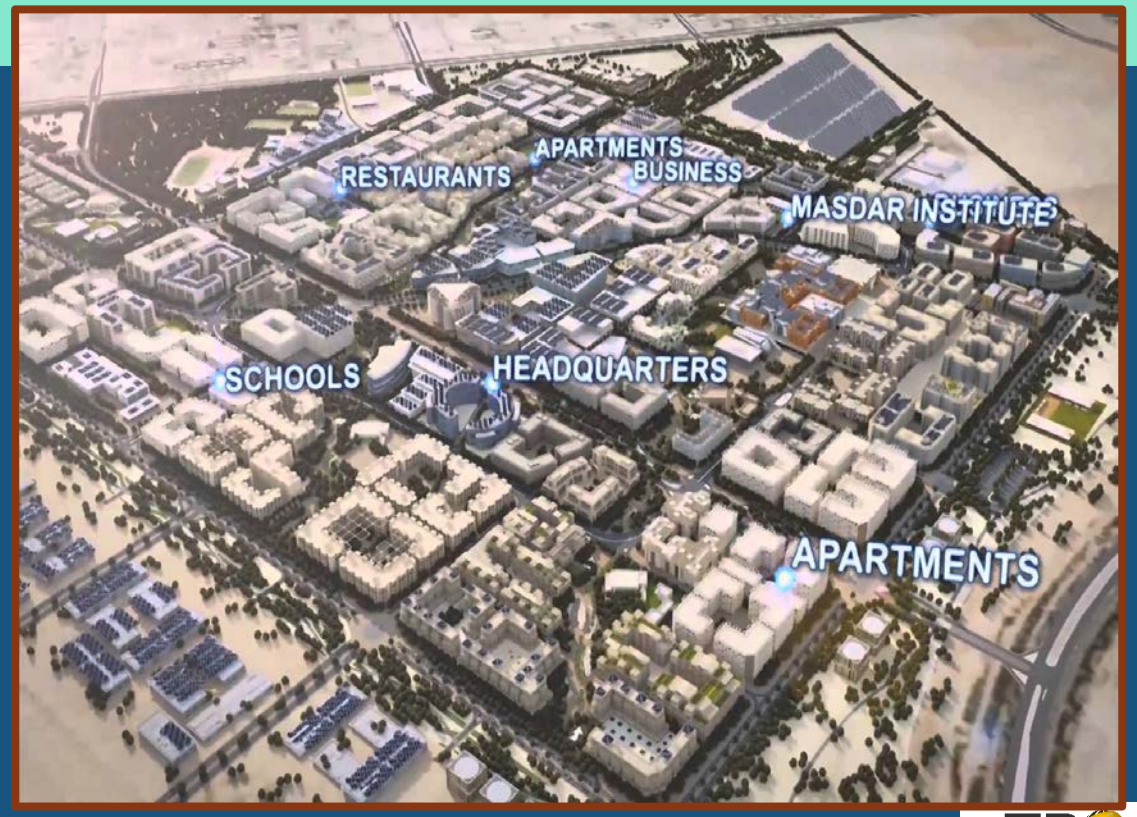
- Planning 2017-2018/2019
- Implementation 2018-2020

Elements of Possible Pilot Project Concept:

1) Conduct in a compact area, i.e., a smaller incorporated area of Miami-Dade County;

2) Do in cooperation with a local university already engaged in technology research; and,

3) Start planning NOW, begin implementation 2018-2020



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Possible Pilot Project

- Planning 2017-2019
- Implementation 2019-2020
- Monitoring & Advancement 2020 and beyond

Within the Pilot Project Area

- Selected Smart homes will be powered by solar energy through roof tiles;
- Healthcare advances will monitor a patients' diagnostic information and recovery progress through mobile devices/app

- Smart buildings will optimize HVAC performance, lighting, and security; and,
- Many shopping deliveries will be done by drones;

- Utilities will install "smart meters" to manage energy use;

- Banking will continue to streamline;
- Travel will not only be by AV shared vehicles and transit, but also by bikes through expanded bike sharing.

- These technologies will be monitored through a "digital dashboard" tracking data at a central location to measure and report on systems performance.

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Current Efforts

Planning, Implementing & Monitoring

Pilot Project Implementation:

- Microtransit and Dynamic On-Demand Responsive Services developed by all stakeholders— MDC, TPO, FDOT, local governments of the pilot project area: TPO SMART Demonstration Projects.
- Cross-Modal Trip Planning. Reservation and Payment: DTPW.
- SMART City Technology Grant: John S. and James L. Knight Foundation for Miami to explore how the Internet of Things (IoT) can be deployed in cities responsibly and equitably.

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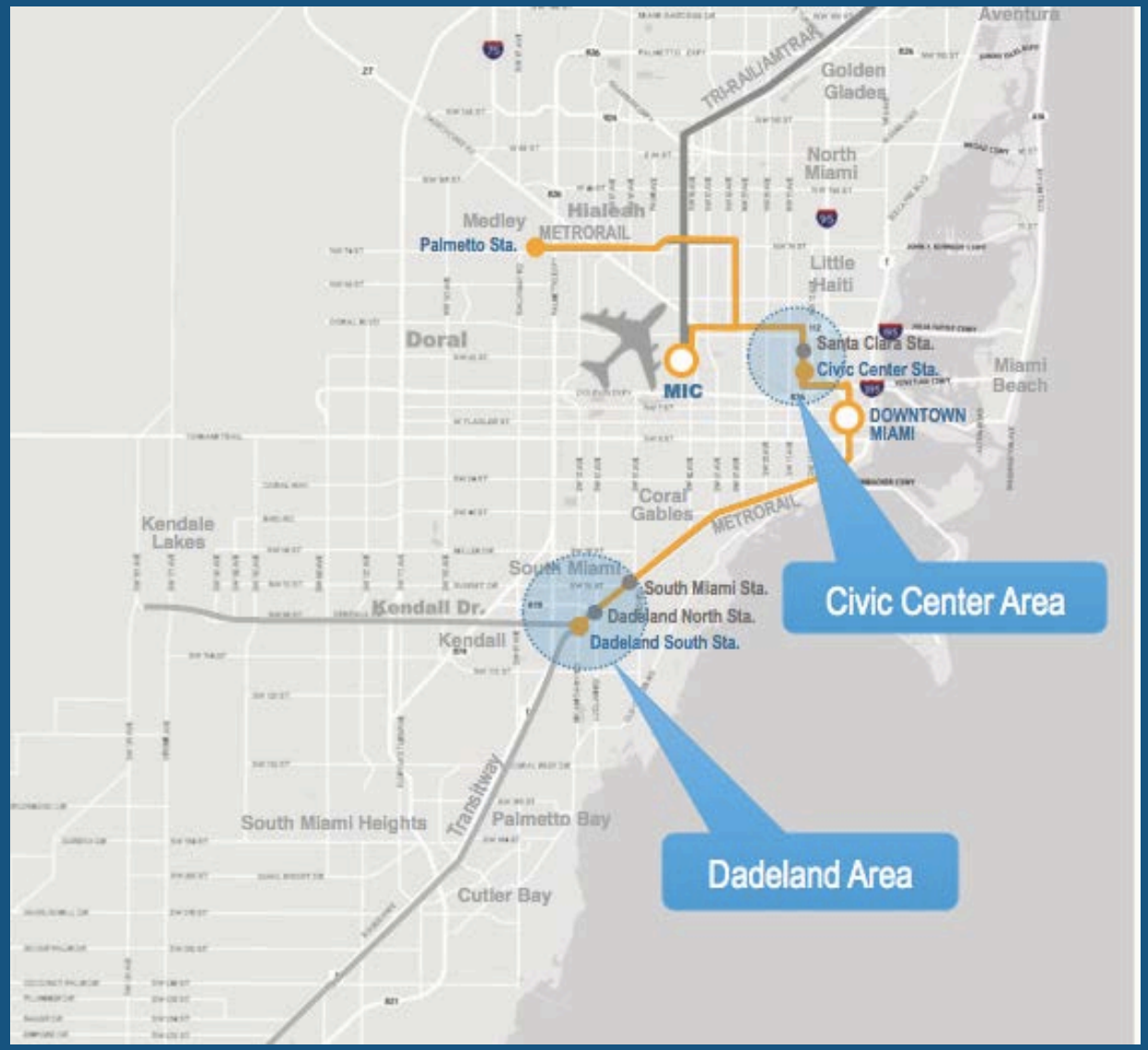
Current Pilot

Dynamic On-Demand Responsive Service



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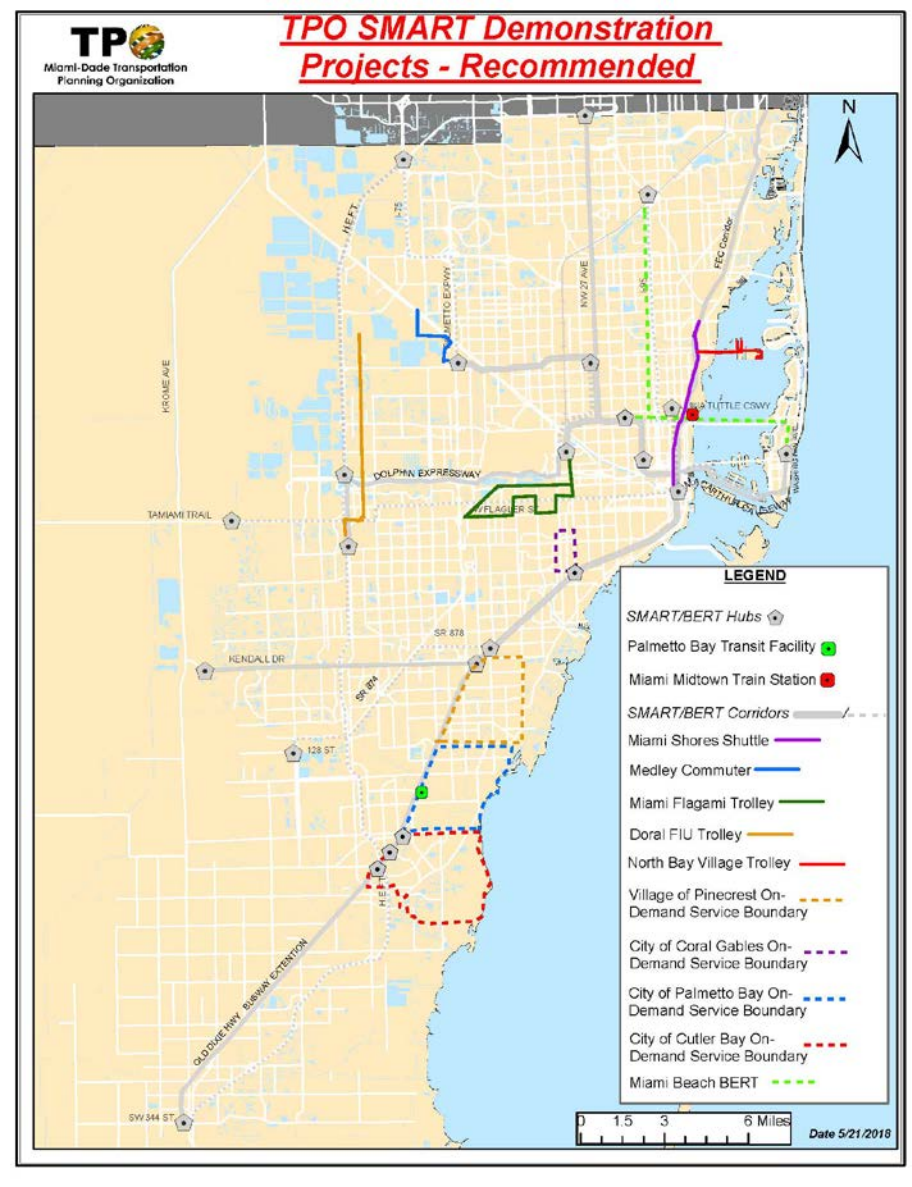
Current Pilot

TPO SMART Demonstration Projects



On-Demand Responsive Services:

- Coral Gables
- Cutler Bay
- Palmetto Bay
- Pinecrest

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CONCLUSION: Miami-Dade County must be at forefront of this Technology Revolution!!!

Thank you!

Questions/Comments?

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