



MULTI-MODAL **FREIGHT DATA**

Sources and Applications



Data-Driven Planning and Decision Making

The Florida Department of Transportation (FDOT) has a long history of collecting and utilizing transportation data for its planning and asset management activities. Whether it is the annual collection of traffic counts or the statewide purchase of commodity and mobile device data, FDOT has made data and its derived findings the foundation of decision making.

FDOT Freight and Multimodal Data Program

Vision:

Identify, coordinate and establish efficiencies of Department's freight and modal data and technology for programs, studies, plans, models and databases.

Mission:

Promoting Florida's freight business intelligence and economic competitiveness through collaborative development of multimodal freight data resources, used to sustain Florida's strategic freight investments.

Multimodal Freight Data Inventory and Management

Recently, FDOT completed a comprehensive inventory and evaluation of freight data sources to better understand what sources are available, their unique qualities, and how each can be used in daily practice.

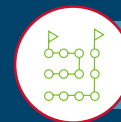
www.fdot.gov/planning/statistics/freight/



DATA INVENTORY MATRIX



DATA SOURCE PROFILES



DATA ROADMAP



CLEARINGHOUSE OPTIONS

Florida Model Task Force Freight Committee

In 2014, the Task Force established a Freight Modeling Committee to guide the application of the Statewide freight model, facilitate the enhancement of freight movement simulation, and support research to improve freight data and modeling applications.

For more information,
about the
Florida Transportation Modeling,
visit:

www.fsutmsonline.net

Multimodal Freight Movement in Florida



AVIATION

20 Commercial Service Airports ¹
2.7M Tons of Air Cargo ³
\$246.3B Air Cargo Value ⁴
2 Spaceports ²



MARITIME

3.5M TEUs cross the dock of Florida's Ports ⁵
15 Public Seaports ⁷
\$86.2B Seaport Cargo Value ⁵
103M Tons of Cargo ⁵



RAIL

15 Freight Railroads ¹
2,743 Miles of Mainline Track ⁶
3,690 Public At-Grade Rail Crossings ⁶
\$43.9B Rail Cargo Value ^{4,7}
117.1M Tons of Cargo ⁷



HIGHWAY

5.4B Combination Truck Miles ⁸
82.9% Combination Truck Travel Time Reliability ^{8,9}
\$700B Truck Freight Value ^{4,10}
4,239 Centerline Miles of Florida's SIS ⁶
685M Combination Truck Tonnage ⁸

SOURCES THROUGHOUT BOOKLET:

1 - FMTP/ FreightMovesFlorida.com

2 - FDOT Spaceport Handbook

3 - BTS T100

4 - Freight Analysis Framework 4 (FAF4)

5 - Florida Ports Council 5-Year Mission Plan

6 - 2015 Florida Trends and Conditions Report

7 - USDOT Rail Waybill Data, 2015

8 - FDOT Traffic Characteristics Inventory

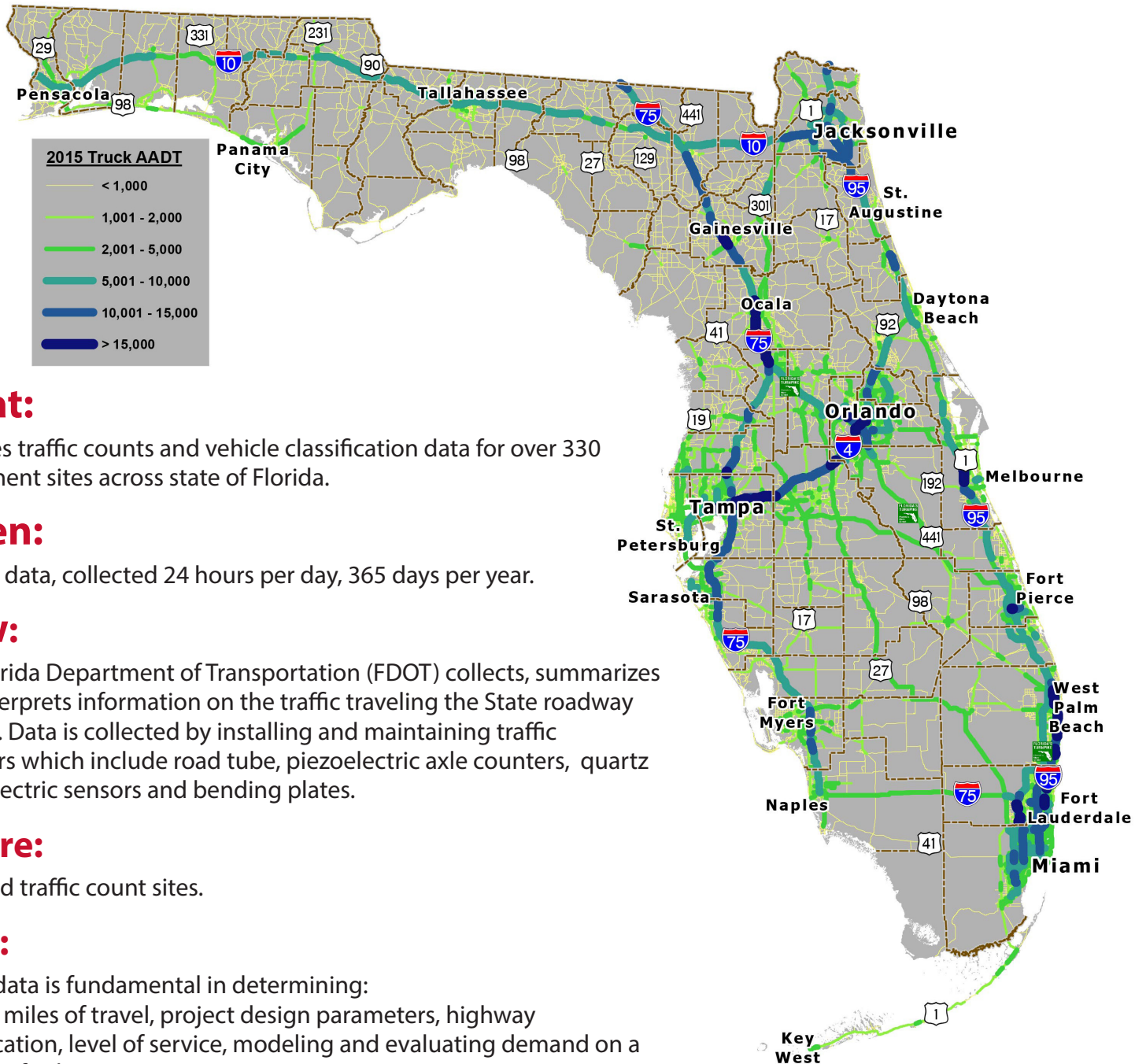
9 - HERE Data

10 - FDOT Weigh-In-Motion Data

11 - TRANSEARCH

12 - NPMRDS

Traffic Characteristics Inventory



What:

Includes traffic counts and vehicle classification data for over 330 permanent sites across state of Florida.

When:

Annual data, collected 24 hours per day, 365 days per year.

How:

The Florida Department of Transportation (FDOT) collects, summarizes and interprets information on the traffic traveling the State roadway system. Data is collected by installing and maintaining traffic counters which include road tube, piezoelectric axle counters, quartz piezoelectric sensors and bending plates.

Where:

Selected traffic count sites.

Why:

Traffic data is fundamental in determining: vehicle miles of travel, project design parameters, highway classification, level of service, modeling and evaluating demand on a highway facility.

Developer:

Florida Department of Transportation (FDOT)

18,000⁺

Portable Traffic Monitoring Sites

330⁺

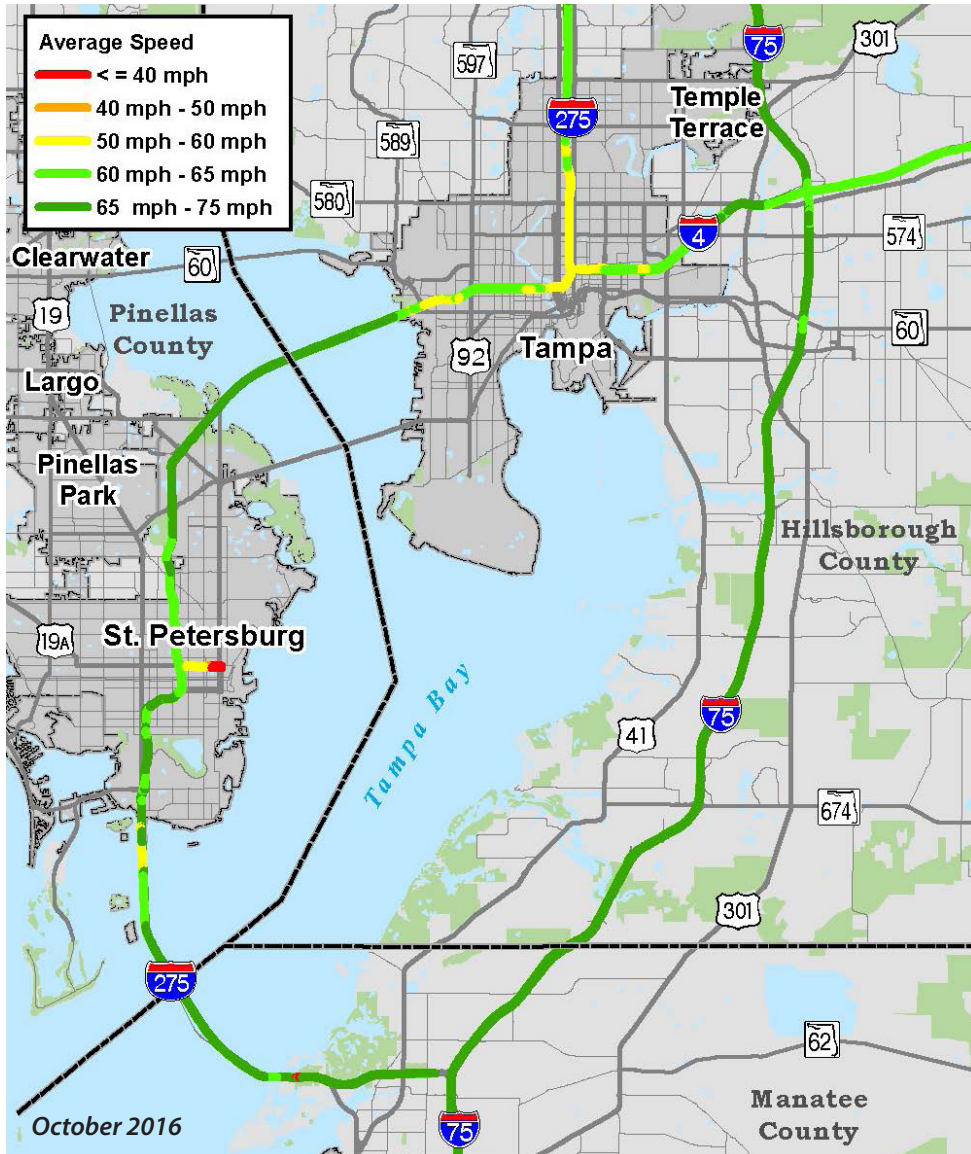
Telemetered Traffic Monitoring Sites

33

Weigh-in-Motion Locations

Pathing & Routing

A Snapshot of Average Daily Travel Speed¹²



National Performance Management Research Data Set (NPMRDS)

What:

Travel time data for autos and trucks

When:

Daily speed data in 5 minute increments, updated annually

How:

Real-time probe data from a variety of sources including mobile devices, connected autos, portable navigation devices, commercial fleet and sensors

Where:

National Highway System (NHS) at state and regional resolution

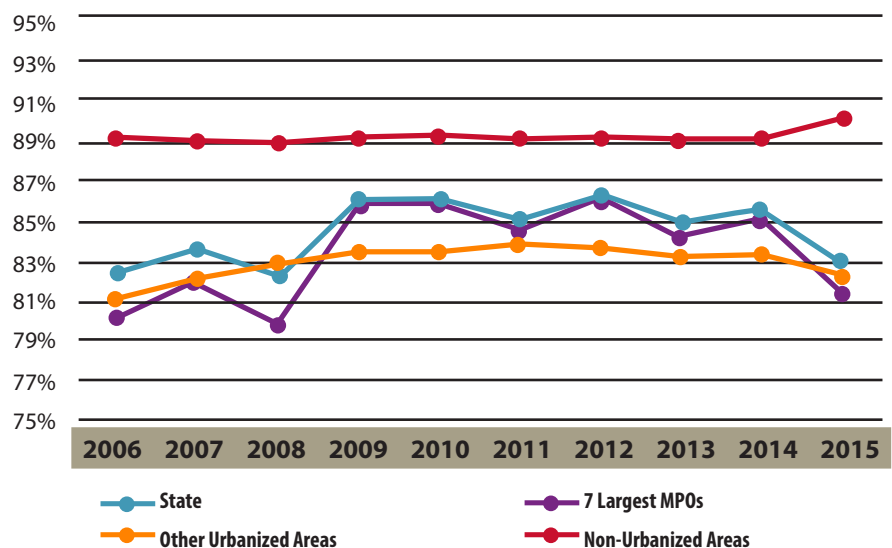
Why:

Reporting of performance measures
Analysis for congestion management
Capital and maintenance investments

Developer:

US Department of Transportation (USDOT) /
Federal Highway Administration (FHWA)

Freight Travel Time Reliability on Freeways During Peak Period⁹



Commodity Flow Datasets

The **Freight Analysis Framework (FAF)** and **TRANSEARCH** commodity flow datasets are used to help answer questions regarding freight movements. This includes the amount of freight produced or consumed, the origin-destination patterns, and modes used. Both datasets have practical use in transportation planning, each with distinct advantages and disadvantages.

HOW DO THEY COMPARE?



COST OF ACQUISITION

The **Freight Analysis Framework** is freely available and can be downloaded from the FHWA website

COMMODITY COVERAGE

Both datasets include most of the same commodities although **TRANSEARCH** also represents secondary traffic and empty truck trips.

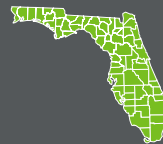


USAGE RESTRICTIONS

The **Freight Analysis Framework** is unrestricted. **TRANSEARCH** users must adhere to restrictions of use defined in licensing agreement

GEOGRAPHIC RESOLUTION

In the State of Florida, **TRANSEARCH** is divided at the county level (67 zones) while **FAF** data only contains five (5) zones.



GEOGRAPHIC COVERAGE

TRANSEARCH contains full coverage of Florida flows but does not contain comprehensive information for other states

ANALYSIS OPTIONS

The **Freight Analysis Framework** does not provide availability of units or rail assignments which are included as **TRANSEARCH** analysis options



DATASET SIZE

The **TRANSEARCH** dataset, which is six (6) times larger than **FAF**, may require longer processing times

FLOW REPRESENTATION

TRANSEARCH categorizes secondary truck trips and contains empty truck trip estimates



KEY SIMILARITIES

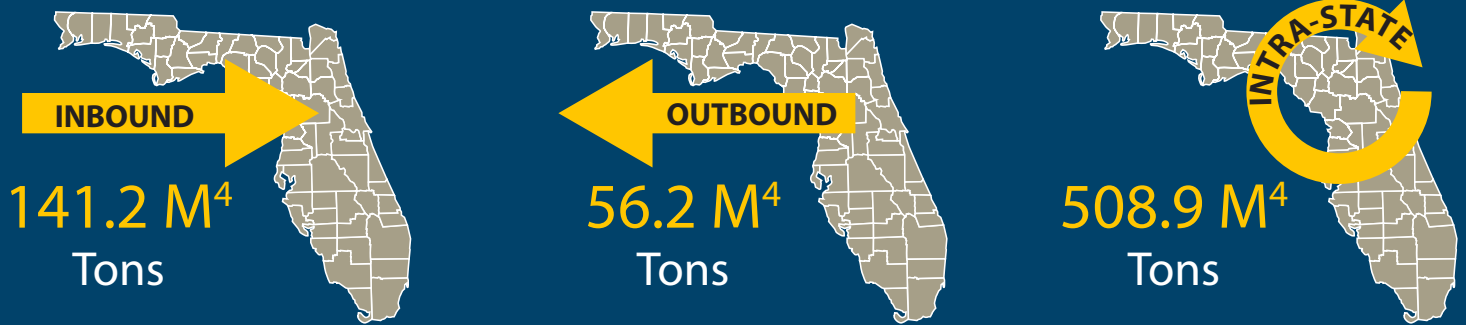
- They include most of the same commodities
- They use many of the same input data sources
- They present historical, not “real time” data
- Projected national and global economic trends are used
- Both datasets are large but manageable
- Both contain thorough documentation

COMMON LIMITATIONS

- They rely on data samples, which may lack information for certain industries, geographic areas, or commodities
- They use modeling processes in which uncertainty is inherent
- Assumptions and judgment are intrinsic to the estimation process, introducing additional uncertainty

How much freight?

In 2012, over 700 million tons of freight moved in, out, and within the state⁴



What is moving? Top Commodities by Volume and Value¹¹

COMMODITY GROUP BY VOLUME

Non-Metallic Minerals

1

Secondary Traffic (Warehoused Goods)

2

Petroleum Or Coal Products

3

Food or Kindred Products

4

Clay, Concrete, Glass or Stone

5

Farm Products

6

Chemicals or Allied Products

7

Coal

8

Lumber or Wood Products

9

Waste or Scrap Materials

10

The top 10 commodities make up over 88% of total tonnage.

COMMODITY GROUP BY VALUE

Secondary Traffic (Warehoused Goods)

Transportation Equipment

Petroleum or Coal Products

Electrical Equipment

Food or Kindred Products

Machinery

Chemicals or Allied Products

Misc Mixed Shipments

Farm Products

Misc Manufacturing Products

The top 10 commodities make up over 77% of total value.

How is Freight moving?

Modal Choice by Volume¹¹



Who are we trading with?

Top 5 State Trading Partners by Value⁴

INBOUND

1. Georgia
2. California
3. Texas
4. Illinois
5. Alabama

OUTBOUND

1. Georgia
2. Texas
3. California
4. North Carolina
5. New York

Florida Freight Facilities

What:

Includes major freight generators, attractions, and distribution centers.

When:

Updated Annually.

How:

Utilizing multiple data sources including but not limited to Department of Revenue, Google maps and FDOT data resources.

Where:

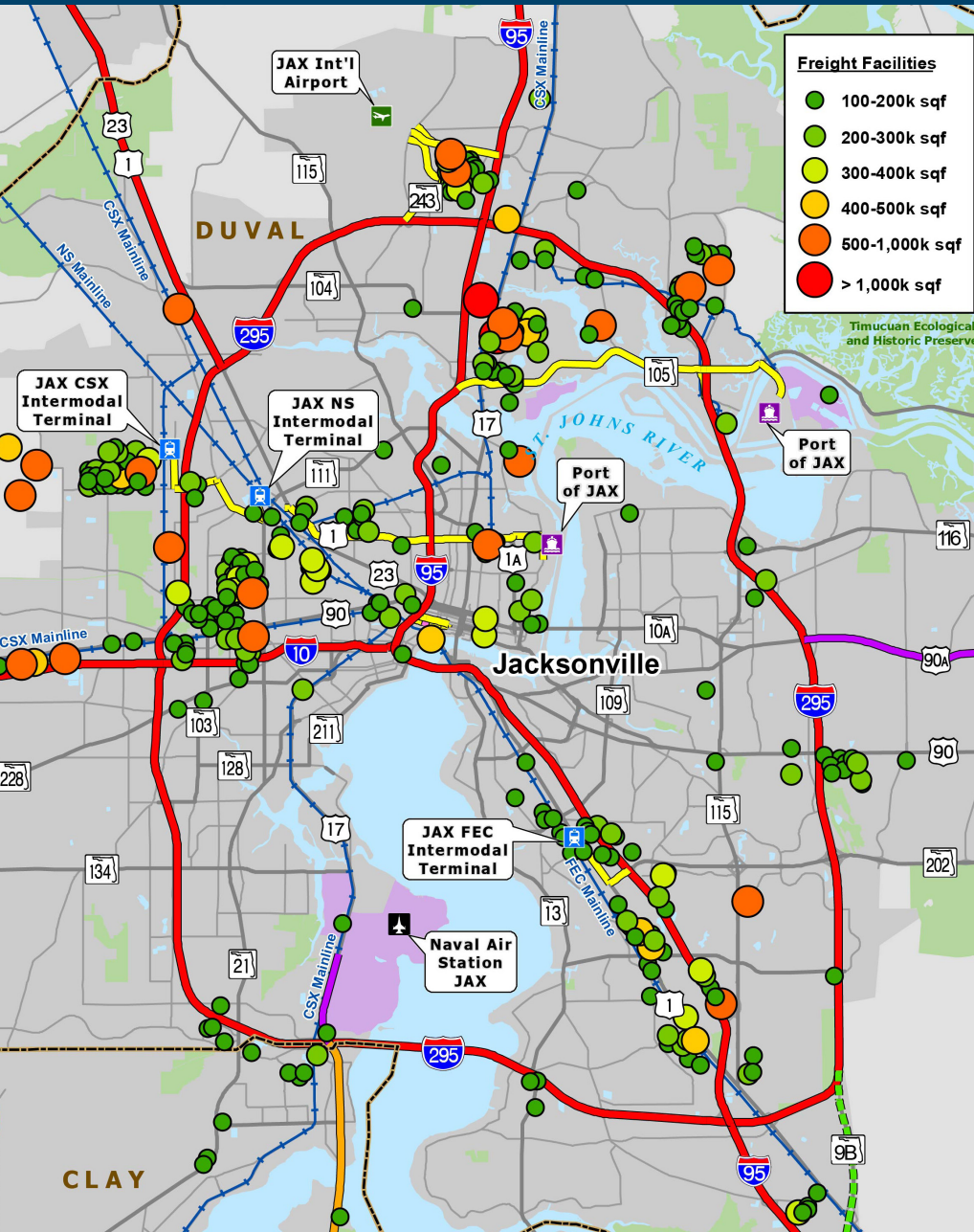
All 67 Counties in the State of Florida.

Why:

Freight Transportation and Land Use Planning, Economic Impact Studies, Zoning Analysis.

Developer

Florida Department of Transportation (FDOT) / Florida Department of Revenue (FDOR)



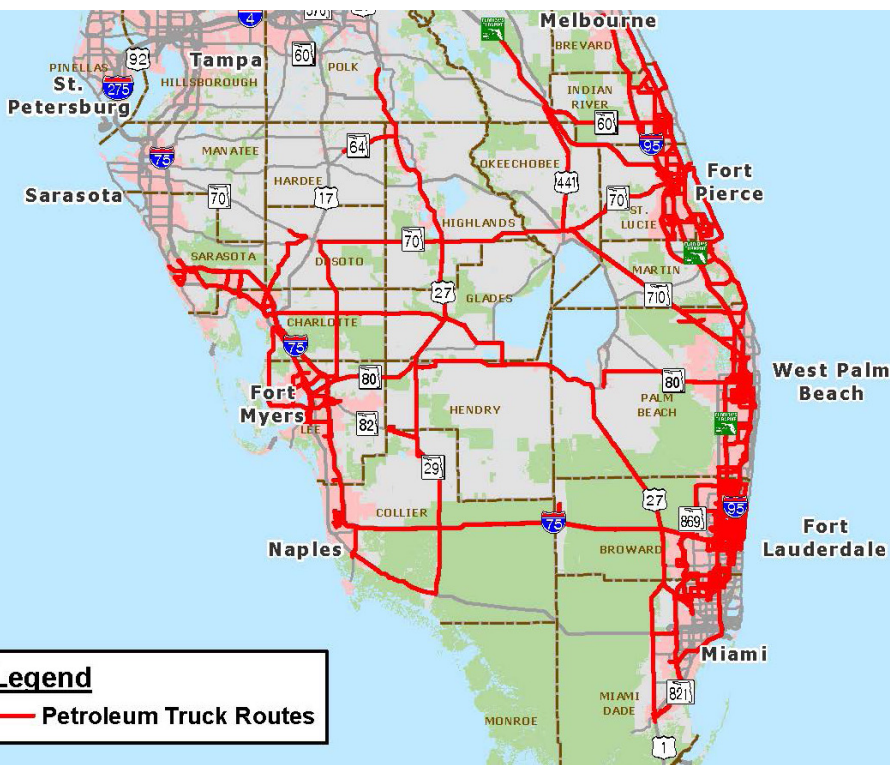
Over **2,000** Freight Facilities over 100,000 Sq. Ft. Inventoried



Comprising of over **531.4 Million** Sq. Ft. throughout the State



Florida is home to the second Largest Foreign Trade Zone network in the Nation¹



Port Everglades Petroleum Commodity Flow Pilot Study (2016)

GPS data was used to identify truck routes to/from Port Everglades moving petroleum commodities. In addition to ATRI data, this Proof of Concept in data collection study used fuel recipient datasets to determine truck routes and trip-chaining.

For more information, contact Min-Tang.Li@dot.state.fl.us

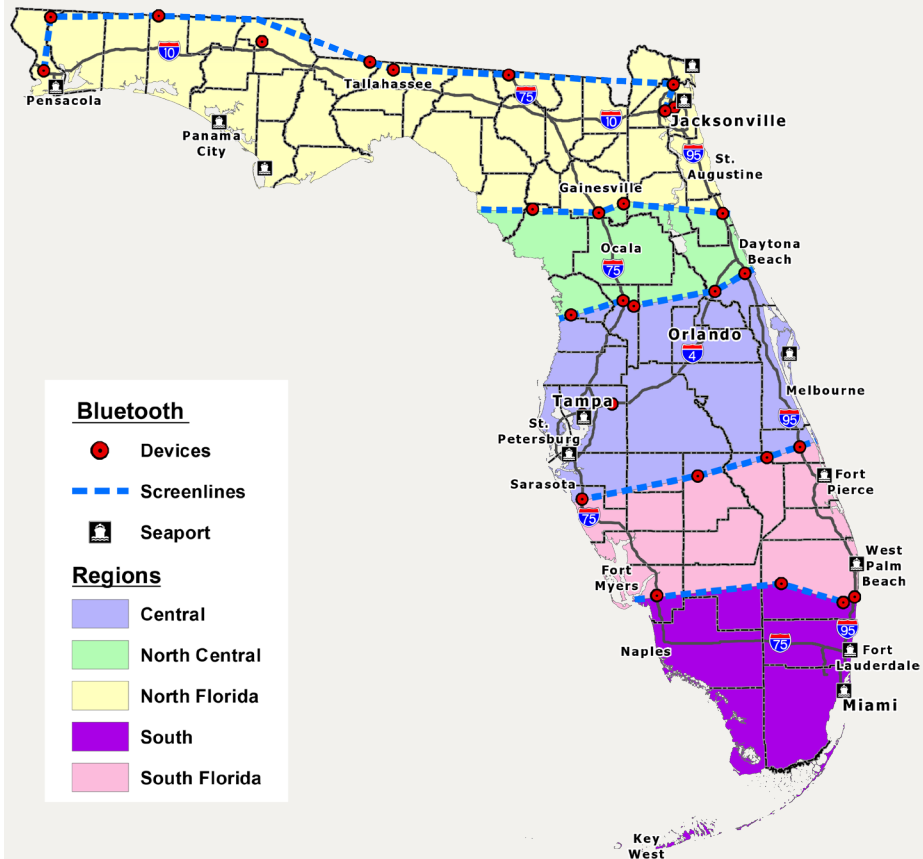
STATS 11,907 Trips 1,320 Trip Chains Made by 92 trucks

Statewide Bluetooth Data Collection (2016)

Deployment to track freight and cruise passenger movements through the state to their destinations. Proof of Concept to test Bluetooth as a reliable means of data collection for transportation planning.

For more information, contact Thomas.Hill@dot.state.fl.us

- 45 Bluetooth Study Reader Sites
- 45 Million Records Captured
- 4 Million Unique Vehicles
- Collected over 45 days



Industry Issues and Concerns

Annual ATRI Survey

Many planners and engineers know the American Transportation Research Institute (ATRI) for their truck probe data and analytics. Although for the past 12 years, ATRI has also conducted an annual survey of commercial vehicle drivers and the motor carriers to identify key issues affecting the industry.



Top Ten Industry Issues by Respondent

COMMERCIAL DRIVERS

- 1 Electronic Logging Device (ELD) Mandate
- 2 Hours of Service (HOS)
- 3 Truck Parking
- 4 Cumulative Economic Impacts of Trucking Regulations on the Industry
- 5 Economy
- 6 Compliance, Safety, Accountability (CSA)
- 7 Driver Retention
- 8 Sleep Apnea Rulemaking
- 9 FMCSA Mission
- 10 Driver Health and Wellness

MOTOR CARRIERS

- 1 Driver Shortage
- 2 Electronic Logging Device (ELD) Mandate
- 3 Cumulative Economic Impacts of Trucking Regulations on the Industry
- 4 Economy
- 5 Hours-of-Service (HOS)
- 6 Driver Retention
- 7 Compliance, Safety, Accountability (CSA)
- 8 Transportation Infrastructure/Congestion/Funding
- 9 Federal Preemption of State Regulation of Interstate Trucking (also known as F4A)
- 10 Driver Distraction

FMTP Key Freight Issues

The Florida Freight Mobility and Trade Plan (FMTP) identified key freight issues by transportation mode.



*Highway Bottlenecks
Limited Truck Parking
Truck Weight Permitting*



*Funding
Regulatory
Security
Seaport Bottlenecks*

*Increasing Fuel Costs
Modal Shifts
Airport Bottlenecks*



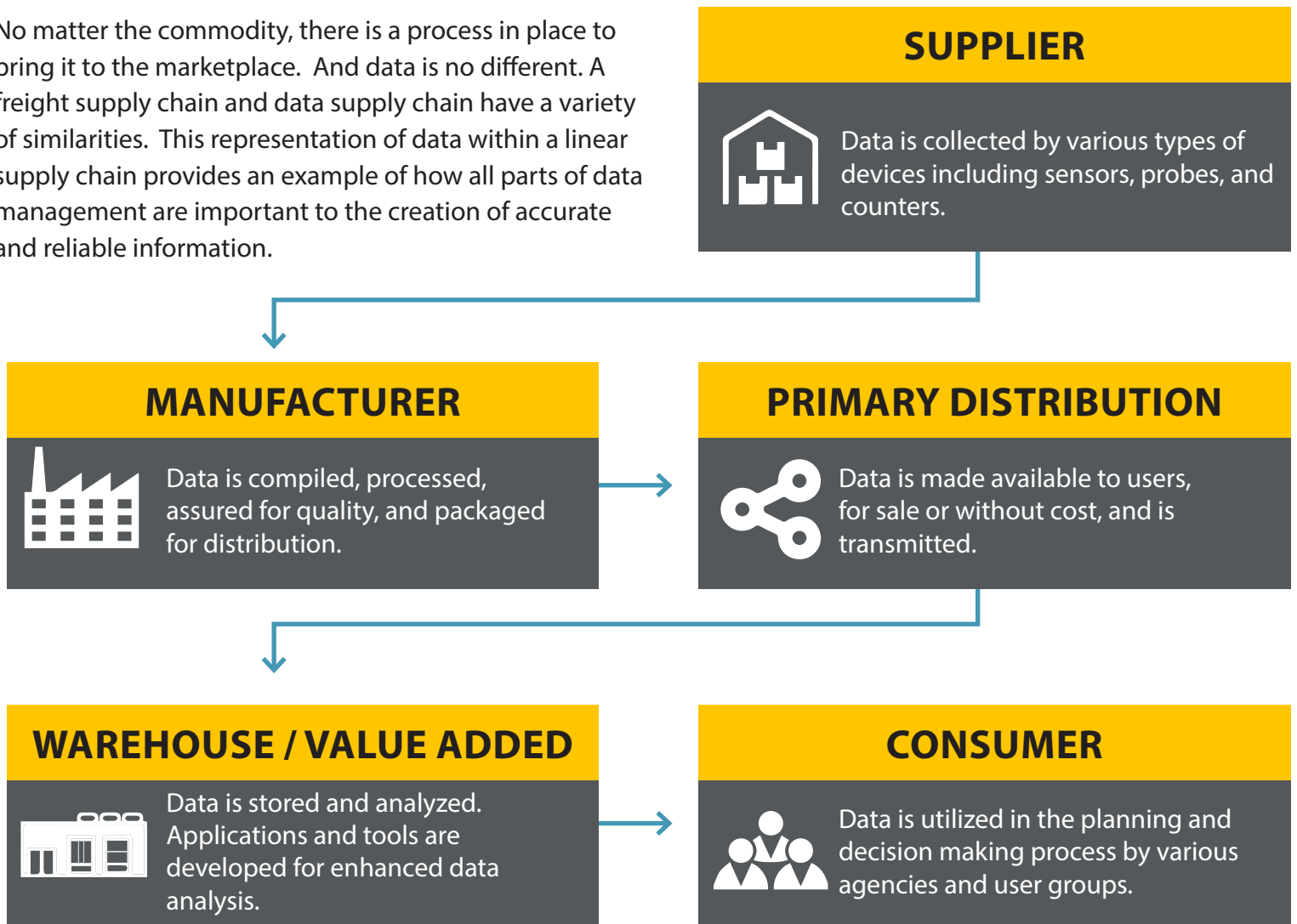
*Network Capacity
Modal Hub Connectivity
System Modernization
Grade Separation at Crossings
Quiet Zone Implications*



Data Distributed

FREIGHT AND DATA SUPPLY CHAIN









No matter the commodity, there is a process in place to bring it to the marketplace. And data is no different. A freight supply chain and data supply chain have a variety of similarities. This representation of data within a linear supply chain provides an example of how all parts of data management are important to the creation of accurate and reliable information.



What's Next for FDOT?

With strategic direction from the Florida Transportation Plan (FTP), FDOT embraces efficiency, innovation, and collaboration across sectors to improve planning through advanced data analytics and performance measurement. This will ensure continued focus on strategic investments and improved customer service.

Legend:

-  Spaceports
-  Airports
-  Passenger Terminals
-  Highways
-  Railways
-  Seaports
-  Freight Terminals
-  Military Facilities



For more information on FDOT's freight program, visit:

<http://freightmovesflorida.com>



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