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/

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
- 2.7M Tons of Air Cargo
- $246.3B Air Cargo Value
- 2 Spaceports

**MARITIME**
- 3.5M TEUs cross the dock of Florida’s Ports
- 15 Public Seaports
- $86.2B Seaport Cargo Value
- 103M Tons of Cargo

**RAIL**
- 15 Freight Railroads
- 2,743 Miles of Mainline Track
- 3,690 Public At-Grade Rail Crossings
- $43.9B Rail Cargo Value
- 117.1M Tons of Cargo

**HIGHWAY**
- 5.4B Combination Truck Miles
- 82.9% Combination Truck Travel Time Reliability
- $700B Truck Freight Value
- 4,239 Centerline Miles of Florida’s SIS
- 685M Combination Truck Tonnage

**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 the 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 Speed**

**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)

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**Freight Travel Time Reliability on Freeways During Peak Period**

- **Average Speed**
  - $\leq 40$ mph
  - 40 mph - 50 mph
  - 50 mph - 60 mph
  - 60 mph - 65 mph
  - 65 mph - 75 mph

**October 2016**
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?

<table>
<thead>
<tr>
<th><strong>COST OF ACQUISITION</strong></th>
<th><strong>GEOGRAPHIC COVERAGE</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>The Freight Analysis Framework is freely available and can be downloaded from the FHWA website</td>
<td>TRANSEARCH contains full coverage of Florida flows but does not contain comprehensive information for other states</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>COMMODITY COVERAGE</strong></th>
<th><strong>ANALYSIS OPTIONS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Both datasets include most of the same commodities although TRANSEARCH also represents secondary traffic and empty truck trips.</td>
<td>The Freight Analysis Framework does not provide availability of units or rail assignments which are included as TRANSEARCH analysis options</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>USAGE RESTRICTIONS</strong></th>
<th><strong>DATASET SIZE</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>The Freight Analysis Framework is unrestricted. TRANSEARCH users must adhere to restrictions of use defined in licensing agreement</td>
<td>The TRANSEARCH dataset, which is six (6) times larger than FAF, may require longer processing times</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>GEOGRAPHIC RESOLUTION</strong></th>
<th><strong>FLOW REPRESENTATION</strong></th>
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<tbody>
<tr>
<td>In the State of Florida, TRANSEARCH is divided at the county level (67 zones) while FAF data only contains five (5) zones.</td>
<td>TRANSEARCH categorizes secondary truck trips and contains empty truck trip estimates</td>
</tr>
</tbody>
</table>

### 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 state.

141.2 M Tons 56.2 M Tons 508.9 M Tons

What is moving? Top Commodities by Volume and Value

<table>
<thead>
<tr>
<th>COMMODITY GROUP BY VOLUME</th>
<th>COMMODITY GROUP BY VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondary Traffic (Warehoused Goods)</td>
<td>2. Transportation Equipment</td>
</tr>
<tr>
<td>Petroleum Or Coal Products</td>
<td>3. Petroleum or Coal Products</td>
</tr>
<tr>
<td>Food or Kindred Products</td>
<td>4. Electrical Equipment</td>
</tr>
<tr>
<td>Clay, Concrete, Glass or Stone</td>
<td>5. Food or Kindred Products</td>
</tr>
<tr>
<td>Farm Products</td>
<td>6. Machinery</td>
</tr>
<tr>
<td>Chemicals or Allied Products</td>
<td>7. Chemicals or Allied Products</td>
</tr>
<tr>
<td>Coal</td>
<td>8. Misc Mixed Shipments</td>
</tr>
<tr>
<td>Lumber or Wood Products</td>
<td>9. Farm Products</td>
</tr>
<tr>
<td>Waste or Scrap Materials</td>
<td>10. Misc Manufacturing Products</td>
</tr>
</tbody>
</table>

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

How is Freight moving?

Modal Choice by Volume

70%  17%  12%  <1%

Who are we trading with?

Top 5 State Trading Partners by Value

**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)

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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 Nation."
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

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.

2016 Survey
USA, Canada, Mexico
3,285 Respondents
65% Commercial Drivers

Top Ten Industry Issues by Respondent

<table>
<thead>
<tr>
<th>COMMERCIAL DRIVERS</th>
<th>MOTOR CARRIERS</th>
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</thead>
<tbody>
<tr>
<td>Electronic Logging Device (ELD) Mandate</td>
<td>Driver Shortage</td>
</tr>
<tr>
<td>Hours of Service (HOS)</td>
<td>Electronic Logging Device (ELD) Mandate</td>
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<tr>
<td>Truck Parking</td>
<td>Cumulative Economic Impacts of Trucking Regulations on the Industry</td>
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<td>Compliance, Safety, Accountability (CSA)</td>
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</tr>
<tr>
<td>Sleep Apnea Rulemaking</td>
<td>Transportation Infrastructure/Congestion/Funding</td>
</tr>
<tr>
<td>FMCSA Mission</td>
<td>Federal Preemption of State Regulation of Interstate Trucking (also known as F4A)</td>
</tr>
<tr>
<td>Driver Health and Wellness</td>
<td>Driver Distraction</td>
</tr>
</tbody>
</table>

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
- Increasing Fuel Costs
- Modal Shifts
- Airport Bottlenecks
- Funding
- Regulatory Security
- Seaport Bottlenecks
- Network Capacity
- Modal Hub Connectivity
- System Modernization
- Grade Separation at Crossings
- Quiet Zone Implications
**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.
For more information on FDOT’s freight program, visit: http://freightmovesflorida.com

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