JOINT FLORIDA
Model Task Force & Transportation
Data and Analytics Workshop

FDOT D4 PARK-AND-RIDE (PNR) DEMAND ESTIMATION

Transit Committee
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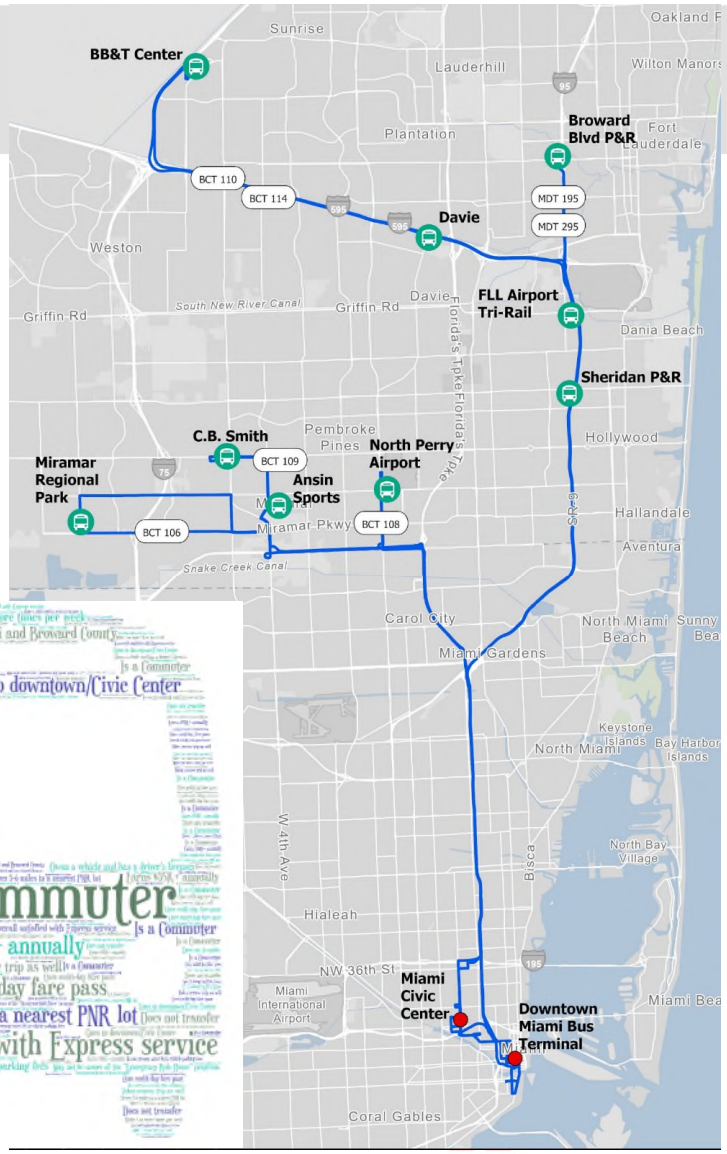
Background

- Location: FDOT Districts 4 and 6
- **Inter-County express buses** operate in I-95 Express and I-75 Express lanes
  - Currently originate from PNR lots in Broward and end in Miami-Dade
- Relatively new but growing market
- Capture different market segment than the fixed route bus services



Planning Context

- Growing focus on proactive planning as the Express Lanes network grows
  - Support implementation of D4 PNR Master Plan
  - Assist in re-design / evolution of Express services
  - Prioritize and develop new PNR lots

- **Goal**: Provide efficient, streamlined and consistent PNR planning services and agency coordination

PNR/Express Planning Activities

RECENT AND ONGOING

Key FDOT Resources/Tools

PNR Lot/Express Service Planning Questions → Where? How big? Impacts? Best service options?

- FDOT State Guide Demand Estimation Methods
  - Planning level – likely appropriate for initial screening
  - Not appropriate if competing lots or lots with capacity constraints

- South Florida Technical Tools
  - Inter-County PNR market < 2% of current transit trips → regional models (STOPS/SERPM) provide limited information
  - No easy way to handle planned express buses crossing TCRPM/SERPM model boundaries

Identified Technical Issues

- PNR planning efforts used “one-off” methods with little consistency with past efforts
- No existing tool has solid understanding of changes to demand…
  - When lot sites are moved
  - When transit services are modified
  - If nearby PNR lots offer different transit options or amenities

→ Challenging to develop reliable PNR program and transit service plans

Technical Approach

Tiered Approach

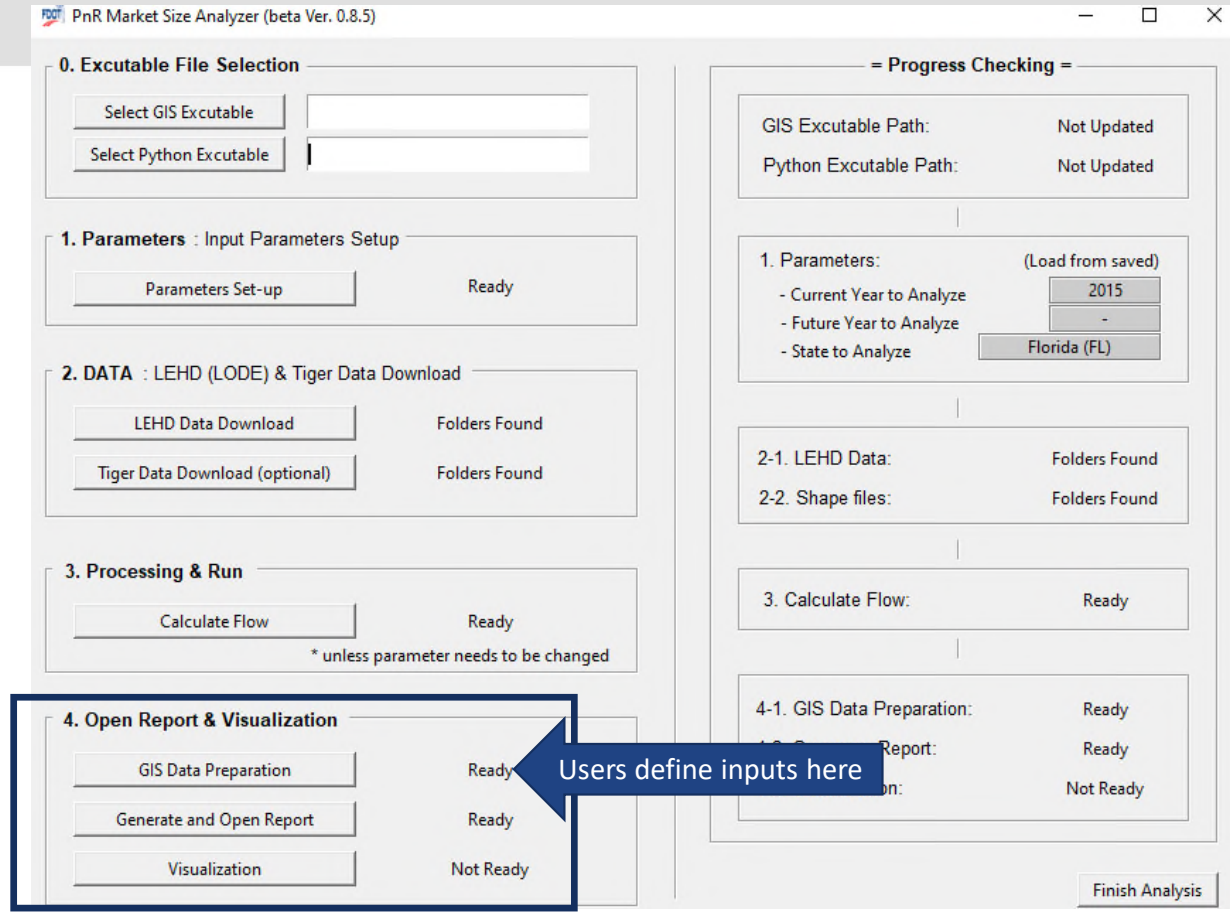
- Level 1 (Planning Level) Screening
  - Use "D4 PNR Market Size Analyzer"
  - Rely on Journey to Work data from LEHD / ACS
  - Assess market size from selected origin(s) to selected destination(s)
  - **Screen out several alternatives to a handful of alternatives**

- Level 2 (Project Development Level) Screening
  - Use "D4 PNR Demand Model" and the on-board survey
  - Detailed investigation for ridership and lot size estimates
  - Trip- and Network-based demand modeling
  - **Screen out handful of alternatives to 2-3 alternatives** for operational analysis

Level 1 Screening: D4 PNR Market Size Analyzer

- Stand alone application and user interface

- Purposes
  1. Provide the commute market size to key destinations from selected origin locations
  2. Convert **LEHD O/D data** to TAZ-level trip table and forecasts it for the horizon year → Feeds directly into Level 2 screening PNR Model



For General Users

Level 1 Screening: Sample Output Summary

User Defined Origin(s)

User Defined Destination(s)

Commute Market Size Summary Report - Number of LEHD Trips from Selected Origin to Selected Destination

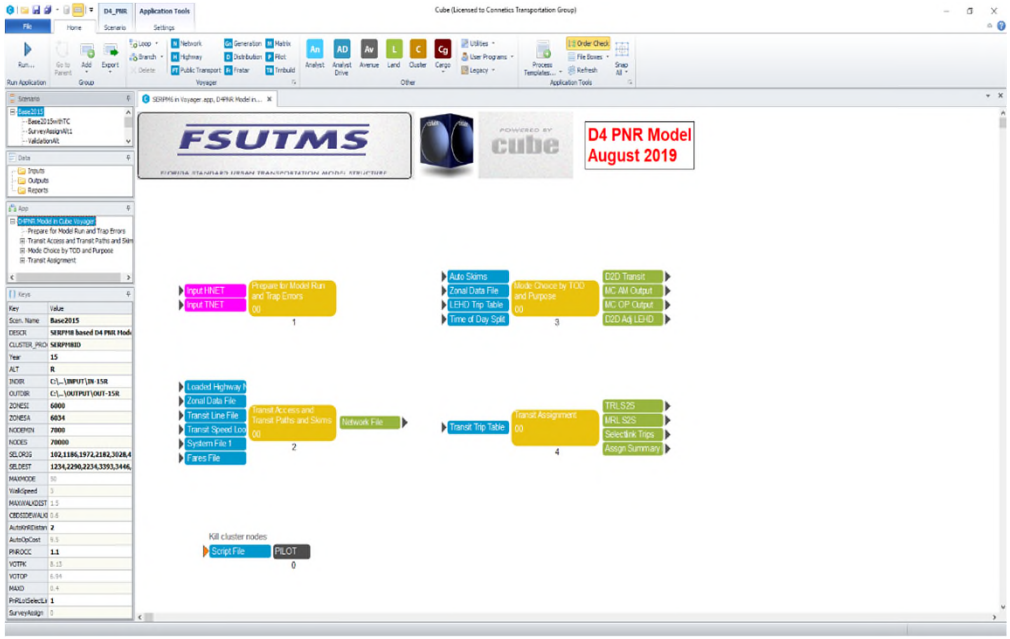
Origin Selection			Destination Selection					
Origin Type	Origin #	Origin	Destination Type	Destination #	Destination	2015 LEHD	2045 Forecast	% Growth
UserOrigin	1001+1002	Boynton	UserDestn	1	Miami CBD	834	1,187	42.34%
UserOrigin	1001+1002	Boynton	UserDestn	2	Overtown	155	239	54.22%
UserOrigin	1001+1002	Boynton	UserDestn	3	Civic Center	235	384	63.03%
UserOrigin	1001+1002	Boynton	UserDestn	4	Brickell	562	618	10.02%
UserOrigin	1001+1002	Boynton	UserDestn	5	MIA	554	695	25.51%
UserOrigin	1001+1002	Boynton	UserDestn	6	Miami Beach	532	595	11.80%
UserOrigin	1001+1002	Boynton	UserDestn	7	Fort Laud CBD	752	930	23.70%
UserOrigin	1001+1002	Boynton	UserDestn	8	Plantation	483	605	25.33%
UserOrigin	1001+1002	Boynton	UserDestn	9	Cypress Creek	852	1,116	31.01%
UserOrigin	1002	Boynton	UserDestn	10	Boca	558	951	70.00%
UserOrigin	1002	Boynton	UserDestn	11	FIU	1,897	2,746	45.00%
UserOrigin	1002	Boynton	UserDestn	12	Yamota	3,497	4,222	21.00%

Move to Level 2 screening if alternative looks viable...

Level 2 Screening: D4 PNR Demand Model

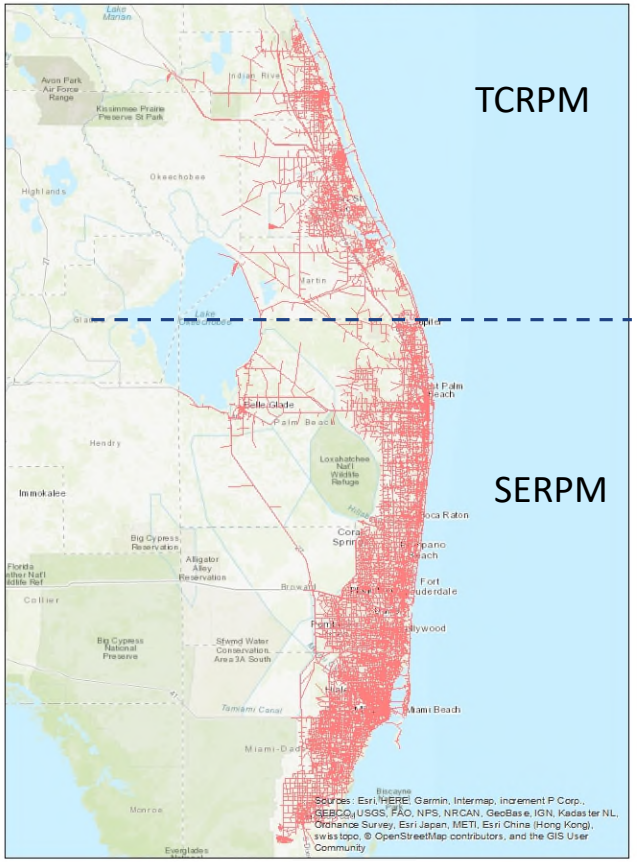
- "Transit PNR-Only" Model in Cube Voyager → 1-step model
- Covers six counties (Miami-Dade, Broward, Palm Beach, Martin, St. Lucie and Indian River)
- Base year 2015
- Each scenario runs in ~1 hour

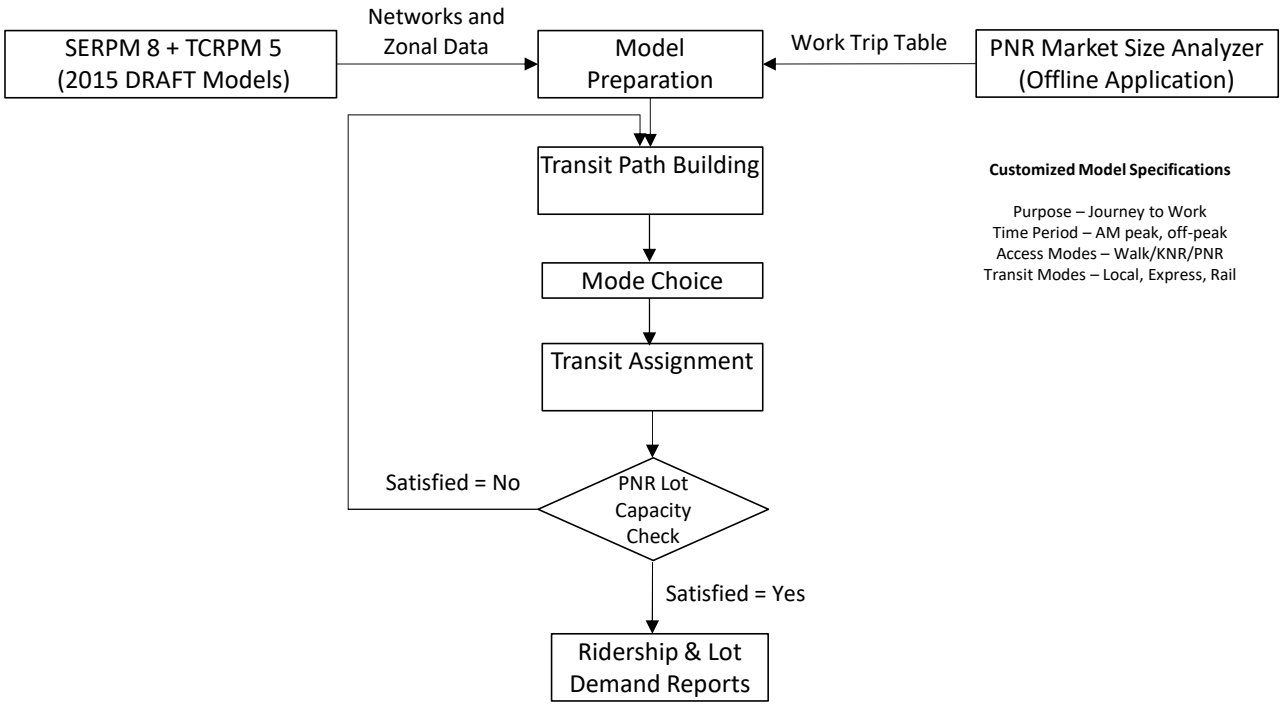
- Purposes
  1. Ridership impacts on Express bus services
  2. PNR lot size determination



Level 2 Screening: D4 PNR Demand Model Flow Chart

South Florida Six County Highway Network



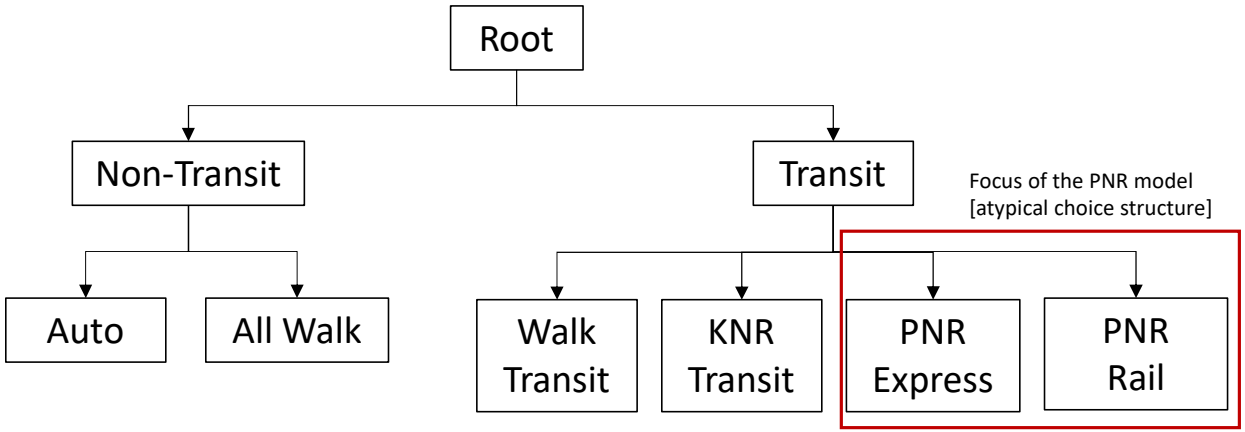


Customized Model Specifications

Purpose – Journey to Work
Time Period – AM peak, off-peak
Access Modes – Walk/KNR/PNR
Transit Modes – Local, Express, Rail

Level 2 Screening: D4 PNR Model Set up

- Takes advantage of targeted on-board surveys
- Borrows structure ideas from STOPS
- Borrows several parameter values from STOPS/SERPM



Structure tested using the 2019 express on-board survey assignments.

Level 2 Screening: Model Calibration and Validation

Calibration Efforts

- Detailed focus on
  - Morning work travel
  - Express bus ridership
  - Access splits by individual lots
  - PNR utilization against model estimates
- Relevant and sufficient focus on
  - Tri-Rail and Metrorail travel
  - Local bus travel
- Less focus on
  - Auto travel
  - Non motorized travel

Validation Tests

- Assignment of on-board survey
- Ridership checks on Express routes that no longer operate
  - Sawgrass to FLL Express
  - Martin County to West Palm Beach Express
- Demand estimation for a planned lot and express bus service options

Conclusions and Next Steps

- Streamlined, sound and consistent PNR/Express alternatives analyses
- Approach and tools are being successfully applied in D4 to…
  - Provide **technical information** for short- and longer-term planning & lot/fleet programming needs
  - Identify total **potential commuter market** to user defined activity center
  - Evaluate existing and new lots (e.g. when would **demand exceed capacity**, need for new lot)
  - Estimate **ridership impacts** of service changes (e.g. lot closures, re-arranged/new service)
- Next steps
  - Continue to "house-train" the approach and the tools as locals consider different types of Express service (locations and plans)
  - Investigate needs for future year networks/models and technologies

THANK YOU!