Transit Pre-Planning & Data Collection for Multi-Modal Corridor Studies

presented to
Model Task Force

presented by
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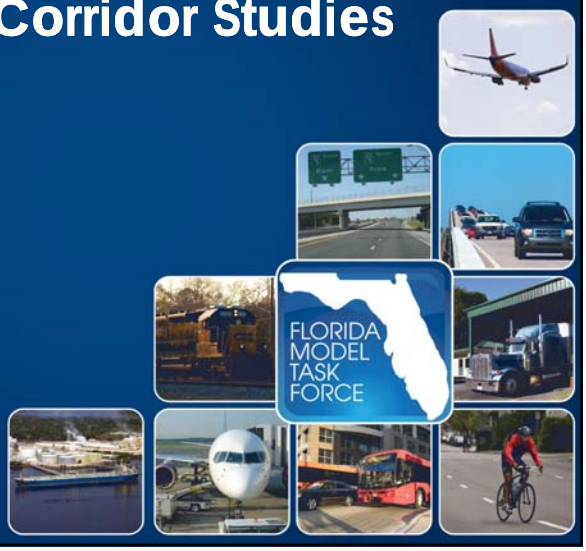


The Problem

- Multi-modal corridor studies typically suffer from lack of corridor-level transit data that is
  - Up-to-date,
  - Sufficiently detailed, or
  - Of sufficient quality for corridor analysis
- Pre-planning for these types of studies is generally limited to the collection readily-available, system-/region-wide travel data

The Consequence


- Multi-modal corridor studies that use their resources inefficiently and suffer from high schedule-delay risk
  - Data collection: limited windows of opportunity (Jan-Apr/Sep-Nov), data processing time
  - Technical tools: regional models and TBEST are not sufficiently prepared for corridor analysis or may not be most appropriate for some corridors
  - Tight schedule because downstream funds are programmed in next FY (1-2 month delay → 1 fiscal year delay)

Objectives


- Identify issues in advance to inform project scope development
- Move data collection and model development outside of the project
  - Better control of costs/delivery of the data and models
  - Reduce study distractions from the data/model work
  - Keep focus on the study analysis and consensus efforts
- Faster delivery of projects to NEPA/design phases
- Reducing PM stress and extending life expectancy ☺

A Comparison of Approaches


	Traditional	With Pre-Planning & Data Collection
Available corridor transit data	Aggregate boarding/alighting counts (by stop?), sometimes outdated	Stop-to-stop movements with travel details
Knowledge of corridor issues, ridership patterns	Anecdotal, general	Detailed understanding
Technical tools available	Regional travel model, TBEST	Enhanced regional travel model, simplified models
Applicability of technical tools	Regional model assumed to be applicable and "good to go" for corridor analysis	Developed/Enhanced with corridor in mind
Corridor analysis scope of work	Generic	Tailored to corridor needs and transportation problems
Percentage of budget devoted to data collection	Significant	Minimal
Schedule delay risk	High	Low

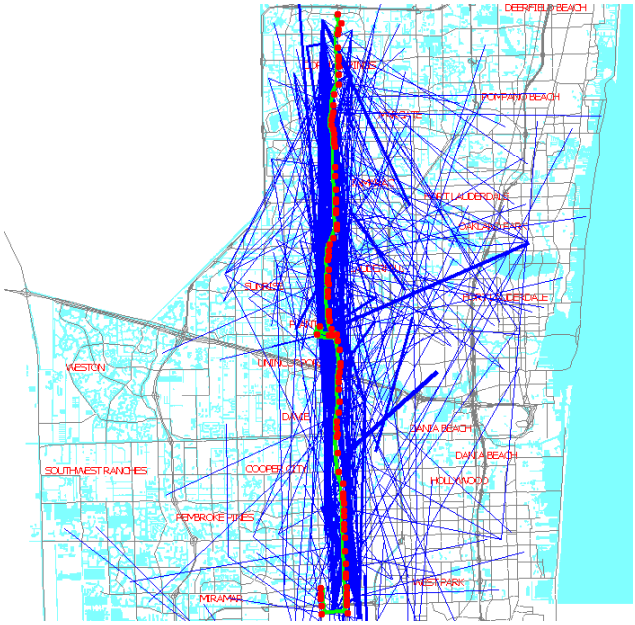
Pre-Planning & Data Collection Tasks


- Data collection
  - All readily-available data
  - Collect route-specific transit data
- Pre-planning
  - Assess regional travel model's applicability and usefulness for corridor study
  - Fully analyze all transit and travel data
  - Develop preliminary Case for the Project
  - Enhance regional travel model or develop simplified model

Route-Specific Transit Data Collection


- Two surveys conducted simultaneously
  - Boarding-to-alighting (B2A) survey
    - Captures boarding and alighting stops for each rider
    - Card distributed to rider, and returned to surveyor when rider alights
    - 40-55% sample rate (4-5x standard transit O/D survey)
  - Simplified main survey, asking questions oriented to route:
    - Origin and destination
    - Up- and down-stream transfers
    - Trip purpose
    - Others as necessary
    - ~20% sample rates (2x standard transit O/D survey)
- Main survey data linked to B2A data → route-specific rider database
  - Easily converted into trip table

BCT Route #2/#102 Transit Rider Desire Map

Preliminary Case for the Project


- Succinct, collective summary of project information (≤5-7 pages)
- Initial draft completed by MMSC Team (≤3 pages)
  - Project identification and setting
  - Current (base year) conditions
  - Near-term and horizon-year changes
  - Enumeration of corridor transportation problems
- Remaining sections to be completed by project team during corridor study (≤3-4 pages)
  - Purpose of the Project
  - Merits of the Low-Cost Alternative and Locally-Preferred Alternative (LPA)
  - Uncertainties: Ridership
  - Summary

Simplified Model


- Three main ingredients
  1. Route-specific transit data,
  2. Auto skims, and
  3. Auto/transit networks from regional travel model
- Incremental logit mode choice model (pivot-point)
  - Suggested in *TCRP Report 118: BRT Practitioner's Guide*
  - Auto and all transit travel modes
  - Peak and off-peak time periods
  - HBW, HBO and NHB trip purposes
  - Zero-car households and households with car
- Development time/cost: 1 month and ~$30,000 (for BCT's highest-ridership route; ~25 miles in length)
- 15% of regional model running time (6x faster)

Simplified Model: Calibration Results (1)


Route 18 and 441 Breeze Daily Activity Analysis		Route 18			
Corridor Segment		Average Weekday Activity ([Ons+Offs]/2)			
From	To	Observed	Estimated	Difference	Estimated/ Observed
Golden Glades	County Line Rd	1,801	1,482	(319)	0.82
County Line Rd	Hollywood Blvd	1,935	1,967	32	1.02
Hollywood Blvd	Griffin Rd	1,690	2,028	338	1.20
Griffin Rd	Davie Blvd	579	827	248	1.43
Davie Blvd	NW 12th St	2,701	2,699	(2)	1.00
NW 12th St	Commercial Blvd	3,556	3,332	(224)	0.94
Commercial Blvd	Atlantic Blvd	2,072	2,193	121	1.06
Atlantic Blvd	Sample Rd	1,565	1,669	104	1.07
Sample Rd	Sandlefoot Blvd	419	590	171	1.41
Total		16,318	16,786	468	1.03

*Activity is defined as (Boardings + Alightings)/2

*Observed boardings obtained from 2012 Route 18 and 441 Breeze boardings/alightings survey

Very good results, even at sub-route level…

Simplified Model: Calibration Results (2)


Route 18 and 441 Breeze Transfer Analysis		Route 18			
Route No.	Description	2012 Observed Transfer Boardings	% of 2012 Observed Transfer Boardings	Estimated Transfer Boardings	% of Estimated Transfer Boardings
92	Palmetto Park Rd Local Bus	162	2%	75	1%
91	Glades Rd Local Bus	151	2%	153	2%
72	Oakland Park Blvd Local Bus	1,315	13%	1,099	12%
36	Sunrise Blvd Local Bus	1,088	11%	1,267	14%
7	Pines Blvd Local Bus	714	7%	464	5%
34	Sample Rd Local Bus	697	7%	446	5%
28	Miramar Pkwy Local Bus	681	7%	932	10%
55	Commercial Blvd Local Bus	630	6%	632	7%
22	Broward Blvd Local Bus	539	5%	608	7%
81	West Tamarac to BCT	505	5%	148	2%
40	Sistrunk/17 St/A1A	411	4%	255	3%
62	Cypress Creek/McNab Local Bus	409	4%	514	6%
9	Young Circle to BCT	351	4%	621	7%
42	Atlanticd Blvd Local Bus	333	3%	393	4%
83	Copans Rd Local Bus	295	3%	359	4%
77	NW 7th Ave MDT	722	7%	593	7%
22	22nd Ave MDT	475	5%	325	4%
183	Miami Gardens Dr MDT	346	4%	214	2%
Subtotal		9,824	100%	9,098	100%

…and transfer routes!

A Comparison of Approaches: An Actual Example (Route 18)

	Traditional (Regional transit survey)	With Pre-Planning & Data Collection (Corridor-specific transit survey)	Notes
Riders making at least one transfer	49%	67%	More riders transferring than previously thought; different routes and magnitudes
Top 4 transfer routes	22, 72, 34, 36	72, 36, 7, 34	
Percentage of work trips	43%	49%	Relatively similar
Average trip length (overall)	8.33 miles	7.18 miles	Previous estimates over-stated trip lengths (long-trip response bias)
Average trip length (on bus)	6.54 miles	4.93 miles	
Sub-route travel movements	Insufficient information	Detail information; created trip table	Now have better data to inform route planning

Result: Improved, refined understanding of corridor transit travel patterns

Reactions / Summary

- Highly favorable reactions by FTA (!!) and FDOT
- Pre-planning & data collection efforts provide many benefits to transit planners
  - Improved understanding of corridor
  - Focused use of resources
  - Reduced schedule delay in corridor studies