



SHRP2 C10A: Jacksonville

Partnership to Develop an Integrated Advanced Travel Demand Model and a Fine-grained Time-sensitive Network

presented to
Florida Model Task Force

presented by
Stephen Lawe
Resource Systems Group, Inc.

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Florida Model Task Force Meeting
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C10A Team

PROJECT TEAM

- Resource Systems Group (lead)
- AECOM
- Mark Bradley
- Dr. John Bowman
- Dr. Ram Pendyala, ASU
- Dr. Chandra Bhat, University of Texas
- Dr. S. Travis Waller, University of Texas
- Dr. Mohammed Hadi, Florida International University

KEY AGENCY PARTNERS

- Florida Department of Transportation
- North Florida Transportation Planning Organization














C10 Project Objectives

Integrate temporally and spatially sensitive travel demand and supply models to increase policy sensitivity of transportation forecasting system.

- DaySim - Activity Based Demand Models
 - Operate at parcel level
 - Forecast in 30 minute time slices
 - Allocate down to closest minute
- DTA/Microsimulator Supply Models
 - Operate at sub-TAZ level (activity locations)
 - LOS feedback at 5–15 minute level
 - Allocate second-by-second



C10 Model Policy Sensitivity

- Variable road pricing
- Ramp metering
- ITS strategies—customer information on road conditions, travel time, incidents, etc.
- Reversible lanes
- Policies affecting the time of travel demand flexible work schedules, HOV lanes and HOT lanes.
- Work and shop-at-home policies
- Bottleneck improvements (reduction in lane width to add a lane, geometric improvements to ramps, etc.)
- Mode shifts





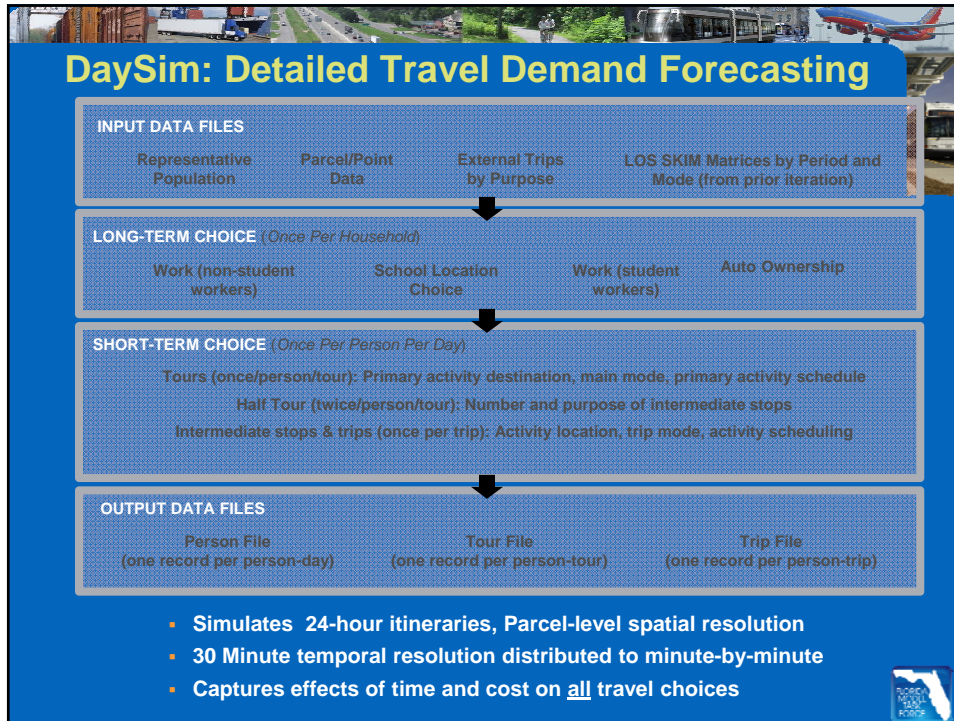
Practical Model Development Strategy

- **Focus on Model Capabilities**
 - Support of Regional Planning
 - Pricing Sensitivity
 - Transit Sensitivity
 - Air Quality Sensitivity (integration with MOVES)
- **Focus on Transferability & Model Adoption Transition**
 - Flexible to support multiple DTA tools
 - Flexible to run without DTA or with DTA as a post-process
 - Research transferability of model structure & parameters
 - Fully describe data requirements & model usage
 - Training and Outreach on Model Implementation & Results



DaySim Activity Based Modeling



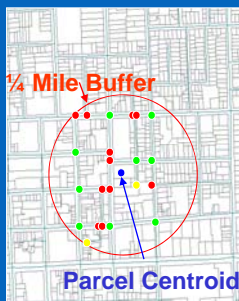


DaySim Required Data

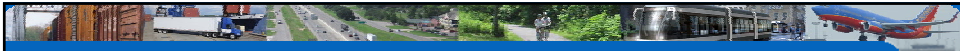
Data Need	Source	Status
Synthetic Population	Census, regional so. economic forecasts, synth pop software	Initial population developed
Housing Units (parcel)	Assessors' GIS	Draft complete
Jobs by sector (parcel)	Commercial databases	Draft complete
School enrollment by grade (parcel)	Florida DOE, FLBOG	Draft complete
Urban form variables (parcel)	"All Streets" GIS network, Parcel-level jobs and housing data	Draft complete
Transit stop access (parcel)	Transit operators' GIS	Complete
Parking supply and costs (parcel)	Parking authorities, business groups	Locations coded, but no cost or capacity
Network impedances	Transportation networks, network software	Seed skims used initially
Travel survey data	NHTS, NE Florida HH survey SP surveys	Assembled

DaySim: Buffer Variables (parcel)

- Urban form / street grid
- Employment by type
- School Enrollment by grade level


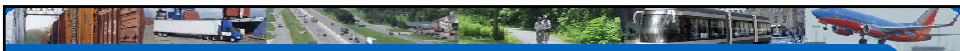


Time-Sensitive Assignment Process




Time Dependent Network Implementation

- Developed TRANSIMS networks in Jacksonville for 3 spatial resolutions
 - Planning network (consistent with current model)
 - All-streets network (includes all regional roadways)
 - Intermediate network (detail between planning and all-streets)
- Coded physical traffic signal locations
- Tagged count data to network(s) for validation purposes
- Developed iterative TRANSIMS assignment process aimed convergence





Network Spatial Resolution



Network Detail

- ★ Activity Locations
- Parcels assigned to AL 1
- Parcels assigned to AL 2
- Parcels assigned to AL 3
- Parcels assigned to AL 4



"All-Streets Level Network"



8 activity locations represented by
15 individual house parcels
(parcels)

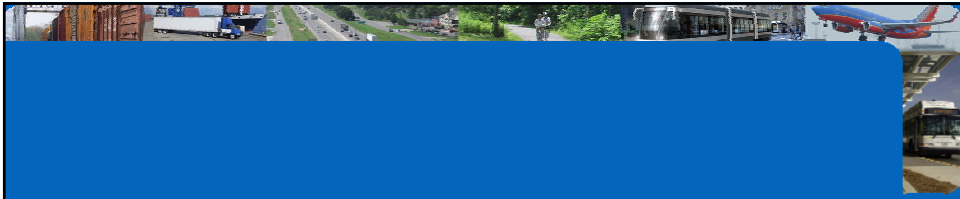
University Blvd
FL region showing




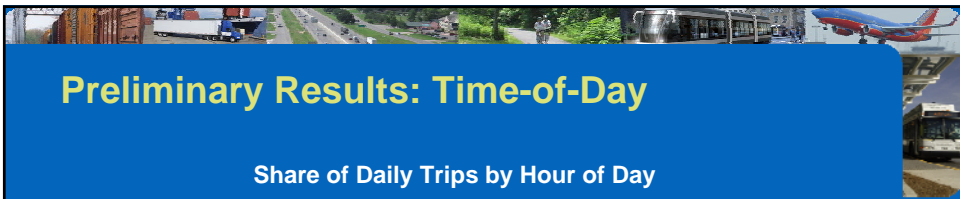
TRANSIMS: Network Simulation

- DTA Considerations:
 - Level of network detail
 - Usage at regional level
 - Convergence methodology
- Disaggregate simulation tracks:
 - Individuals
 - Households
 - Vehicles



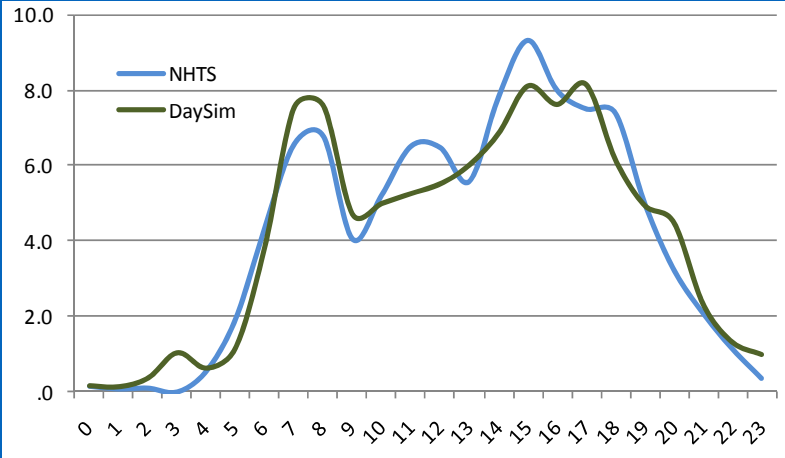


Calibration/Validation





Preliminary Results: Time-of-Day

Share of Daily Trips by Hour of Day

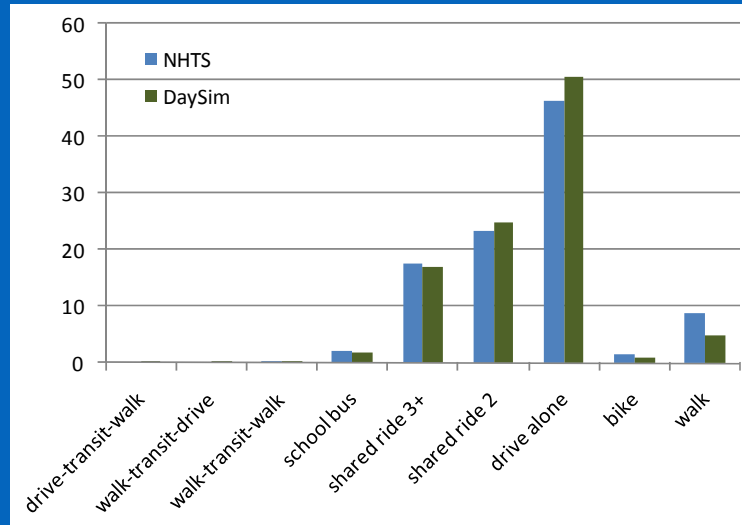


Hour	NHTS	DaySim
0	0.2	0.2
1	0.2	0.2
2	0.2	0.2
3	0.2	0.2
4	0.2	0.2
5	0.2	0.2
6	0.2	0.2
7	0.2	0.2
8	7.0	7.8
9	4.2	4.8
10	4.8	5.0
11	6.5	5.5
12	6.5	5.5
13	5.5	6.0
14	6.5	6.5
15	9.5	8.2
16	7.5	7.8
17	7.5	8.2
18	7.5	7.5
19	5.5	5.0
20	3.5	4.5
21	2.5	2.5
22	1.5	1.5
23	0.5	0.5



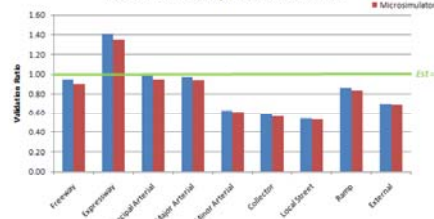
Preliminary Results: Mode Choice

Share of Daily Trips by Travel Mode



Preliminary Results: Assignment Model

DAILY Estimated / Observed Ratios

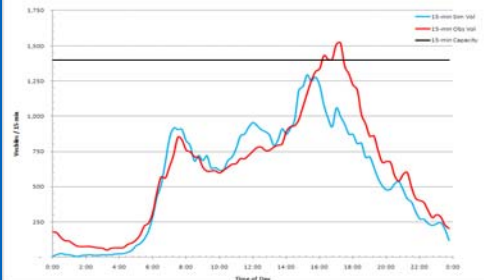


Daily validation

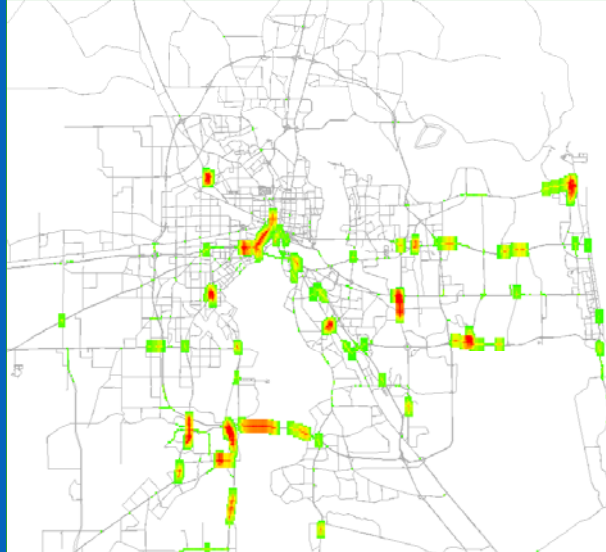
I-295 (Location 220631)

Time of Day validation

15-min Observed and Simulation Volume Distribution

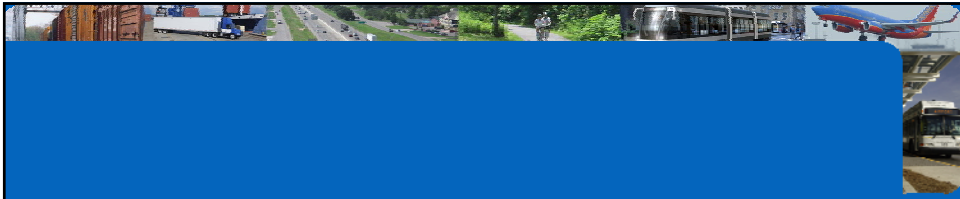


Preliminary Results: Congestion Heat Plot


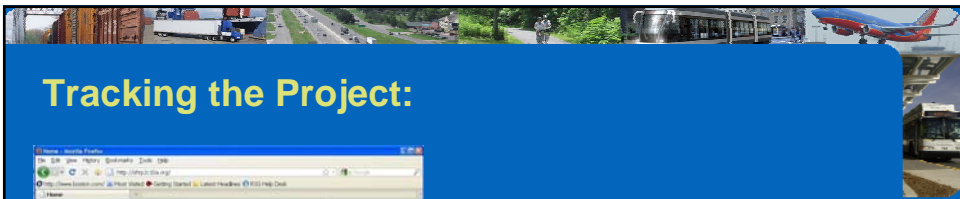


Preliminary Results: Dynamic Simulation







Next Steps


Tracking the Project:



www.shrp2c10a.org



wiki.rsginc.com/display/C10/C10A+Jacksonville





Application to Other Florida Regions

- Proposed Funding by SHRP 2 Extension
 - Jacksonville FSUTMS/DaySim used for planning
 - Tampa FSUTMS/DaySim used for planning
 - Draft FSUTMS/DaySim Framework
 - Flexible integration of DTA (none, partial, full)
 - Documentation, training & workshops
- Considerations for funding
 - Estimation for Jacksonville/Tampa Models (high priority)
 - Polk FSUTMS/DaySim implementation



Contact Information

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