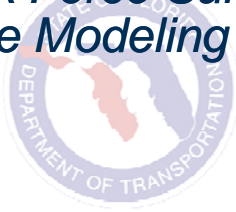



*Model Task Force Summary of
Express Lane Modeling Work Plan*



Steve Ruegg
Parsons Brinckerhoff




Toll Modeling History

- Toll Facilities Model
 - Fixed Tolls
 - Toll Plaza operations
 - Multi-server queuing
 - Assignment-based
 - Time value of cost
- Ramp-to-Ramp Tolling
 - Implemented in TranPlan and Voyager
 - Accommodates Turnpike toll structure

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FSUTMS Model Updates

- Greater market stratification, including income
- Destination-Choice Distribution
- Expanded mode choice nesting structure
- Time of day stratification
- Feedback mechanism involving distribution, mode choice and assignment

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Toll Modeling Performance Goals


- Flexible – able to accommodate most or all “flavors” of managed and express lanes within a unified approach
- Behaviorally Sensitive – Includes variables that are important to selection and use of a managed lane
- Policy Sensitive – Has the ability to test different Managed Lane Policies (e.g., tolls, hours of operation, eligibility)
- Easy to use – Model implementation compatible with FSUTMS and a “reasonable” runtime
- Understandable and transparent – No “black boxes”

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|  <h2 style="text-align: center;">Concept Plan</h2> | | | |
|---|--|--|--|
| | Phase I | Phase II | Phase III |
| Type | Assignment-Based Integrated Toll Choice | Mode Choice + Assignment | Discrete Choice |
| Model Type | Trip-Based, Static | Trip-Based, Static | AB and DTA |
| Features | Dynamic toll Estimation, Willingness to pay Curve, Toll Policy | Feedback of toll LOS skims to mode choice. Sensitive to multi-modal shifts | Incorporates detailed HHLD characteristics for toll choice |
| Uses | L RTP & Corridor Planning | Multi-modal corridor evaluation | Policy Sensitivity Testing, and TP Planning |
| Data Requirements | SP/RP survey for WTP curve or logit estimation | SP+RP survey to estimation & calibrate MC parameters | HIS supportive of AB models |
| Availability | Summer, 2012 | 2013 | 2014-2015 |

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|  <h2 style="text-align: center;">Phase I Design</h2> | |
|---|---|
| <ul style="list-style-type: none"> ▪ No Prior assumptions about toll – accommodates time of day tolling ▪ Includes a willingness to pay curve – based on toll cost per marginal time savings ▪ Flexibility: <ul style="list-style-type: none"> • Multiple class assignments, subject to different WTP curves • Multiple toll policy curves • User-specified toll segment and access/egress design ▪ Toll Choice integrated with assignment, a heuristic formulation is used to balance toll demand and toll price | <p>6 Managed-Lane Modeling Practice Workshop</p> |

Phase I Model Application

- Used for planning level feasibility and broad alternative selection and sensitivity testing
- Not by itself suitable for multi-modal demand assessment
- Requires time of day stratification
- Requires data on traveler response to price/time savings
- Requires assumption on toll pricing strategy

Toll Model: Willingness to Pay

| Cost/Hour Saved To Use Toll Facility (dollars/hr) | Percent Willing to Pay Toll |
|---|-----------------------------|
| \$0 | 95% |
| \$5 | 45% |
| \$10 | 25% |
| \$15 | 15% |
| \$20 | 10% |
| \$25 | 8% |
| \$30 | 6% |
| \$35 | 5% |
| \$40 | 4% |
| \$45 | 3% |
| \$50 | 2% |

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Phase II Design

- Utilization of Toll Choice in Mode Choice allows for multi-modal sensitivity
- Wide range of Level of service and demographic variables possible
- Allows purpose-specific toll choice estimation
- Through feedback and Phase I model times and costs, may achieve stable results

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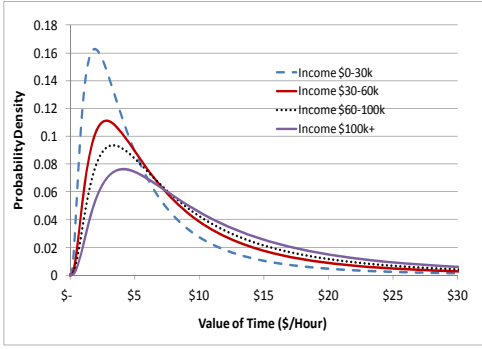
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    SharedRide --> SharedRideNonHOVNonToll[Non HOV Non Toll]
    SharedRide --> SharedRideNonHOVToll[Non HOV Toll]
    SharedRide --> SharedRideHOVNonToll[HOV Non Toll]
    SharedRide --> SharedRideHOVToll[HOV Toll]
    
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Phase II application

- Multi-modal Corridor Analysis – Planning level
- LRTP development
- May be used with mode choice only, or in combination with integrated choice/assignment model
- Calibration requires data on trip mode choice sensitivities with respect to time, cost, income and by demographic markets



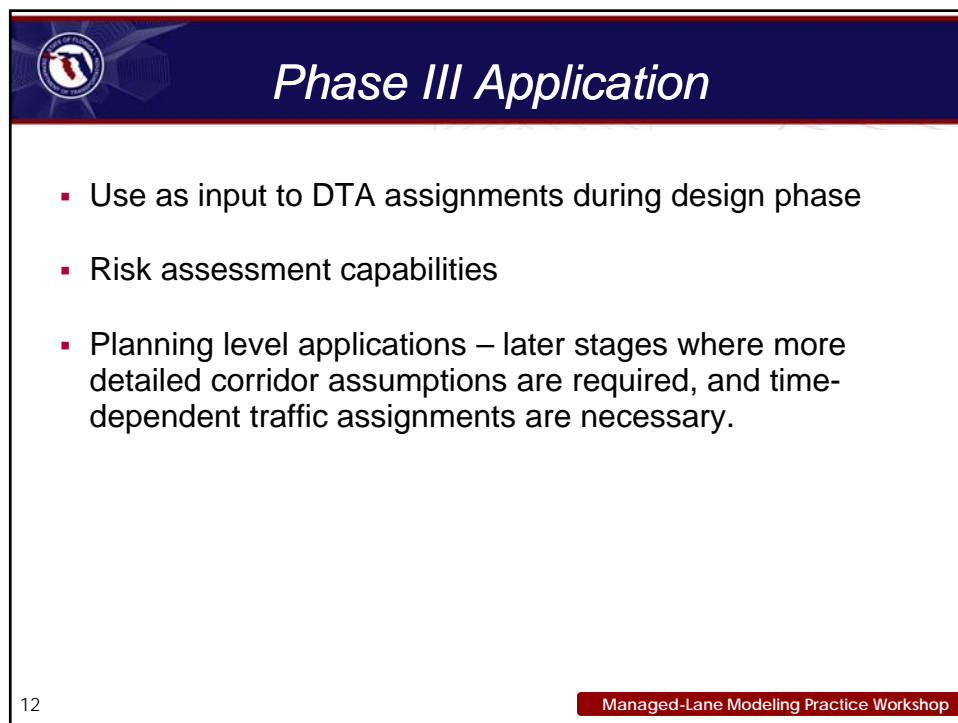
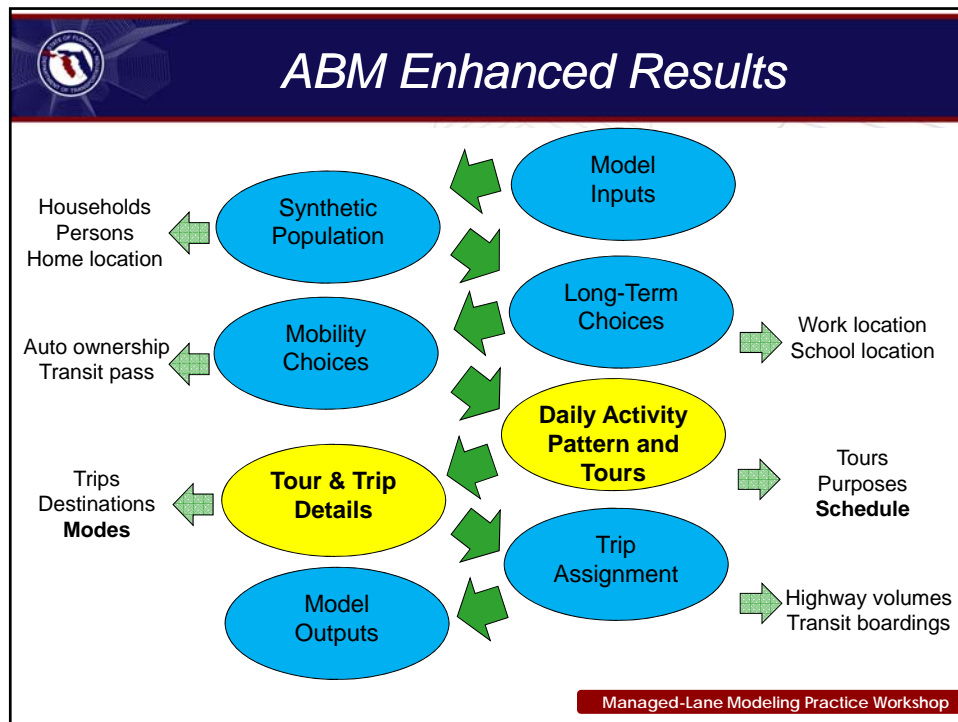
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Phase III Design

- Makes use of inherent Activity-Based Model advantages
- Greater depth of household and individual characteristics
- Time of day choice an outcome of the activity scheduler
- With a dynamic traffic assignment, reliability can be more accurately defined
- More accurate definition of trips based on tour and priority (Mandatory, Discretionary, Maintenance)

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Policy for Managed Lane Tools

- What key model sensitivities and capabilities do we need at each stage of project development and for LRTP?
- What model application guidelines should be established?
- What data are needed to support the development and maintenance of forecasting tools for managed lanes?
- How should these models be coordinated from initial screening through traffic and revenue forecasts to ensure consistency?