



# How Will ARC Make the Transition from its 4-Step Trip-Based Model to Activity-Based Modeling?

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Presented by:

Guy Rousseau  
Modeling Manager  
Atlanta Regional Commission  
[grousseau@atlantaregional.com](mailto:grousseau@atlantaregional.com)



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# CT-RAMP Coordinated Travel – Regional Activity-Based Modeling Platform

- **Long-term** choice models estimated & implemented:
  - Auto ownership
  - Work destination choice
  - School destination choice
- **Short-term** models estimated & being implemented:
  - Selection of DAP (daily activity patterns)
  - Generation of tours
  - Destination choice for non-mandatory tours
  - TOD (Time-of-day) choice
  - Intermediate stop location choice
  - Tour / trip mode choice

# 2008 ARC ABM Work Program

- **Implement Short-term models:**
  - Utility Expression Calculator spreadsheets
  - Logit model specification
  - Data input then read and interpreted by Java to run model
- **Develop supporting Java classes (“jar files”):**
  - Provide ‘plumbing’ to handle data structures
  - Monte Carlo simulation
  - Situational variables (previous choices made)
  - Program flow
  - Heuristics required for overall model system



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# 2008 ABM Implementation

- **Coordinated DAP** (daily activity patterns) for all households members choice model
- **Fully joint travel/activity choice** model (generation and participation sub-models)
- **Tour destination choice** model for all non-work travel
- **Tour mode choice** model for all non-work travel
- **Tour TOD** (time-of-day) choice model for all travel
- **Stop-frequency** choice model for all tour types
- **Stop-location** choice model for all tour types
- **Trip departure** choice model for all tour types, trip purposes, and trip placement in the tour chain
- **Parking choice model** for auto trips to CBD

# Application Model Shell & Distributed Processing

- Stream-line application procedure:
  - Implement model feedback
  - Transit & highway network skimming
  - Distributed application programming for system-level model calibration
- Develop application model shell:
  - Population synthesizer
  - Core models
  - Auxiliary models (trucks, externals, special generators)
  - Network assignment & skimming procedures for highway and transit modes

# 2009: Calibration & Validation

- Develop structural calibration targets from:
  - 2001 household travel survey
  - Traffic counts
  - 2000 CTPP tables
  - Transit ridership data
- Perform model-by-model calibration runs
- Compare to targets (estimated VS observed)
- Adjust parameters through programmatic and manual procedures
- **Have ABM up and running by end of 2009, but on a dual/parallel track with trip-based model, via a staged and gradual transition**



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# ARC ABM Link to Transims????

<b>TRANSIMS</b>	<b>Correspondence</b>	<b>ARC ABM</b>
Population Synthesizer	≡	Population Synthesizer
Activity Generator	?	Core Demand Models
Router	±	Conventional SUE or DTA
Traffic Microsimulator	±	Any Traffic Microsimulator
Feedback to Activity Generator through rules	?	Feedback to Core Models through LOS

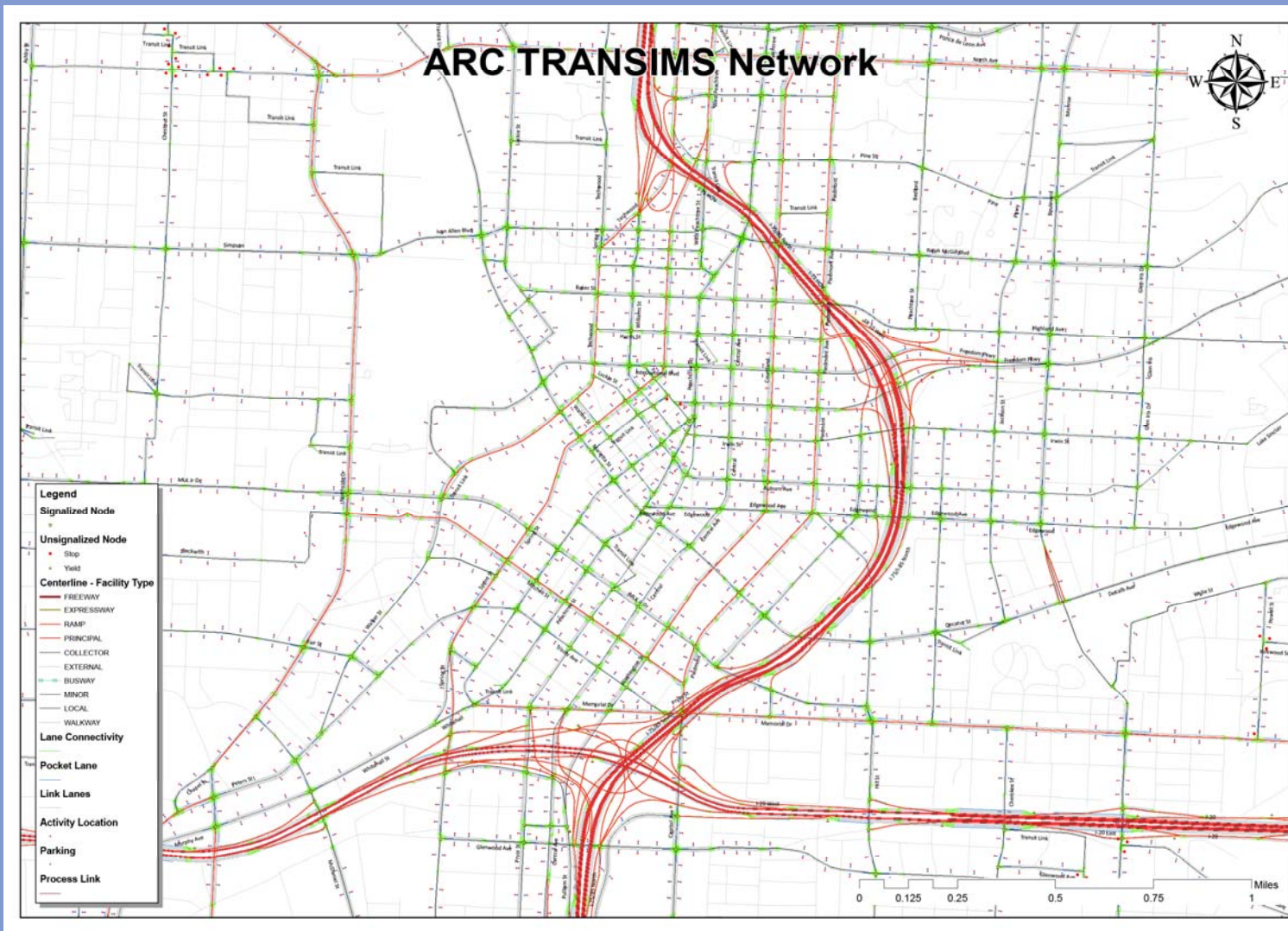
# 3 Ways to use TRANSIMS

- The original “full spirit”:
  - Re-engineer feedback mechanism to account for adjustment of destinations & modes
- Hybrid (Portland METRO):
  - Regeneration of locations
  - Mode preferences
  - TOD congestion feedback
- Truncated:
  - Only **Router** and **Microsimulator**
  - Demand model (AB/4-step/fixed trip table)
  - ABM to produce sliced trip tables suitable for DTA / traffic microsimulation



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# ARC ABM Link to PECAS????

- 2 Types of Linkages:
  - Connection: Feed PECAS land use model estimates of population & employment to ABM
  - Integration: Utilize labor flows from PECAS spatial Input-Output model to determine workplace location choice



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# Workplace Location Choice

- Looking at examples from Ohio and Oregon Statewide Models
- Select employment location for every employed person in a household
- Segmentation by occupation & household type
- Selection probability is a function of labor flows forecasted by PECAS

# Disaggregate Application for a Fully-Integrated Transport & Land Use Model????

- PopSyn would use occupation sector control totals for workers based on needs of industries predicted in the spatial Input-Output PECAS model
- Each worker chooses a workplace TAZ based on the disaggregated probability
- Would allow for full consistency & integration between land use model and ABM, but calibration can be intense



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# Questions/Comments?

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