

Understanding the Transportation Models and Asking the Right Questions

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Surface Transportation Policy Partnership

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Overview

- Models in transportation planning
- Demystifying “models”
- Modeling scales
- Modeling foundations
- Model omissions
- Uncertainty
- Using models correctly

Models in Transportation Planning

State and Region

- Statewide Departments of Transportation
 - Statewide Planning
- Urban Area Metropolitan Planning Organizations (MPOs)
 - Land Use/Transportation Scenario Analysis
 - Long-Range Regional Transportation Plan
 - Short-Term Transportation Improvement Program (TIP)
 - Air Quality Conformity Analysis

Models in Transportation Planning Corridor

- Corridor Analysis/Environmental Impact Analysis (EIS)
 - Major road projects
 - Major transit projects including New Starts projects

Models in Transportation Planning Site or Project

- State Departments of Transportation
 - Small area projects on state roadways (e.g. intersection or safety improvements)
- Municipalities
 - Local transportation projects
- Developers with municipal/State DOT review
 - Site plans
 - Traffic impact studies

Demystifying “Models”

We All Use Models

- Example: Choosing a driving route during peak congestion
 - Visualize available routes
 - Draw on experience of past conditions on these routes
 - Estimate travel times on different routes
 - Consider risk of errors
 - Make choice

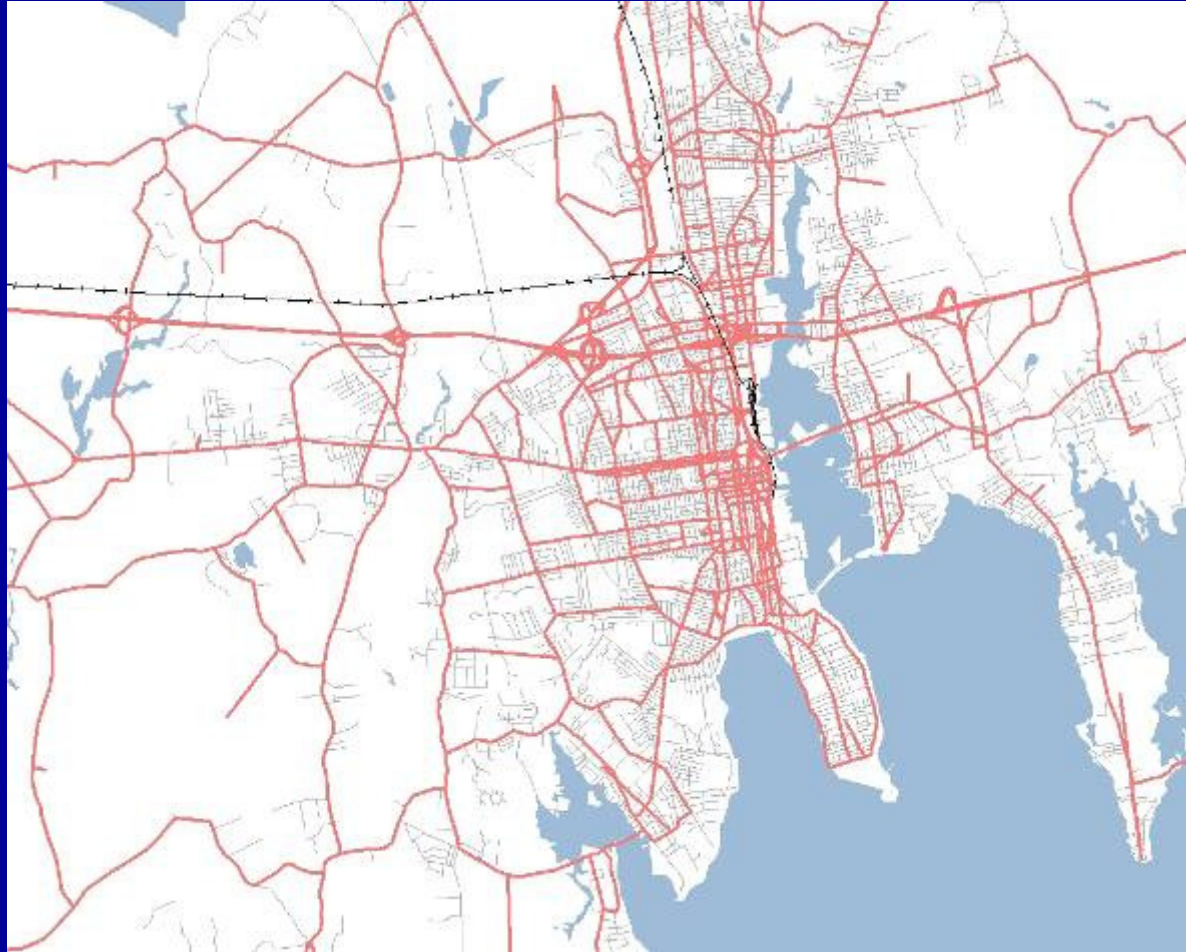
“Mental Models” and Computer Models Complement Each Other

- Mental Models
 - Can be simplistic or complex
 - Need to examine assumptions & test against data
- Computer Models
 - Even when complex, may be incomplete
 - Need to examine assumptions & test against data
- Testing mental models and computer models against each other & data and refining both makes us smarter and gives us smarter tools

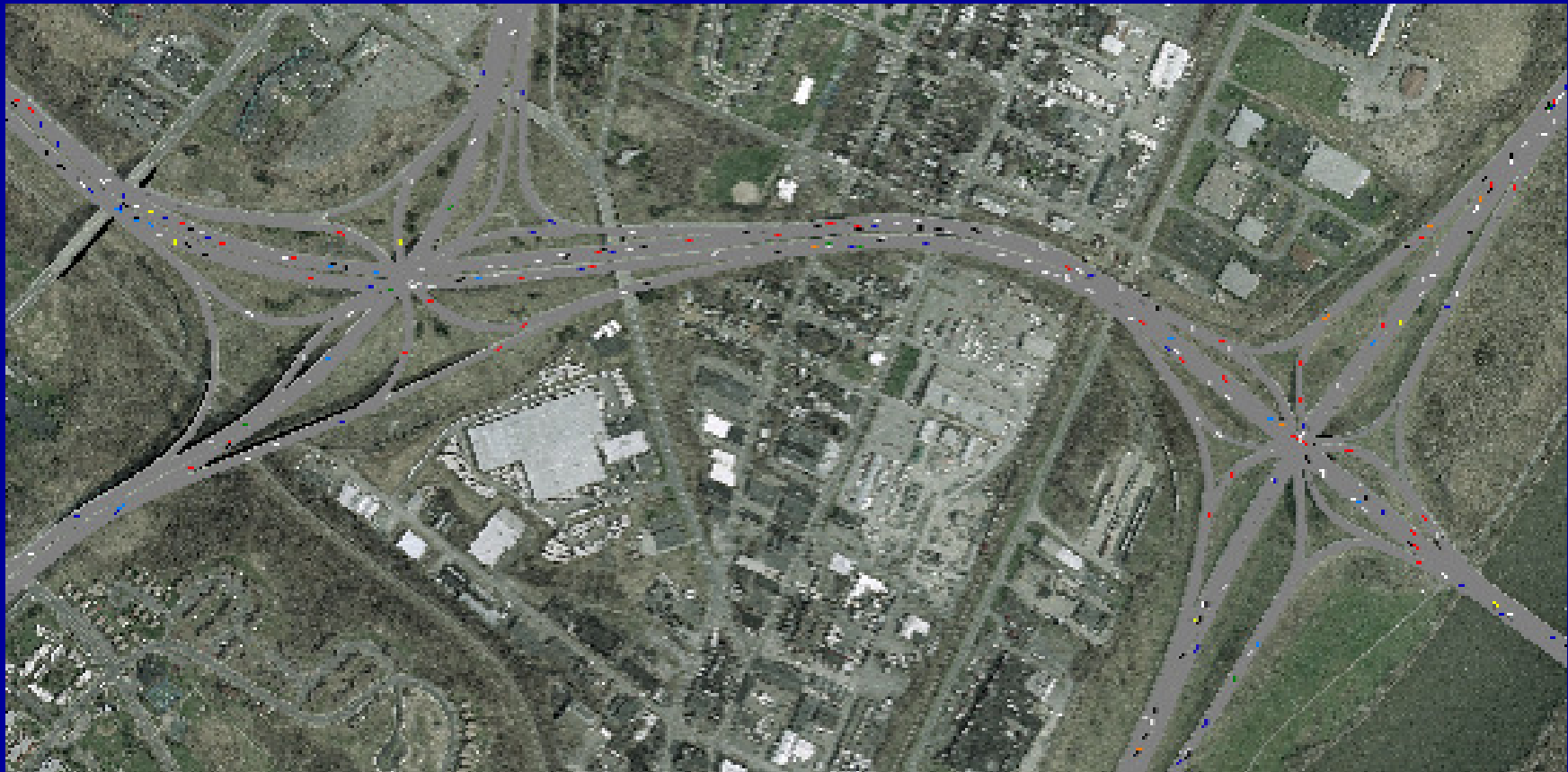
Modeling Scales

- Regional: Metropolitan area or statewide models predict larger patterns of growth and traffic distribution
- Corridor: Used to evaluate a major freeway, arterial or transit line
- Site or Project: Used to evaluate traffic from a proposed development or to evaluate local investments

Regional Models: Simplified Road Networks



Corridor Models: More Detailed Operations

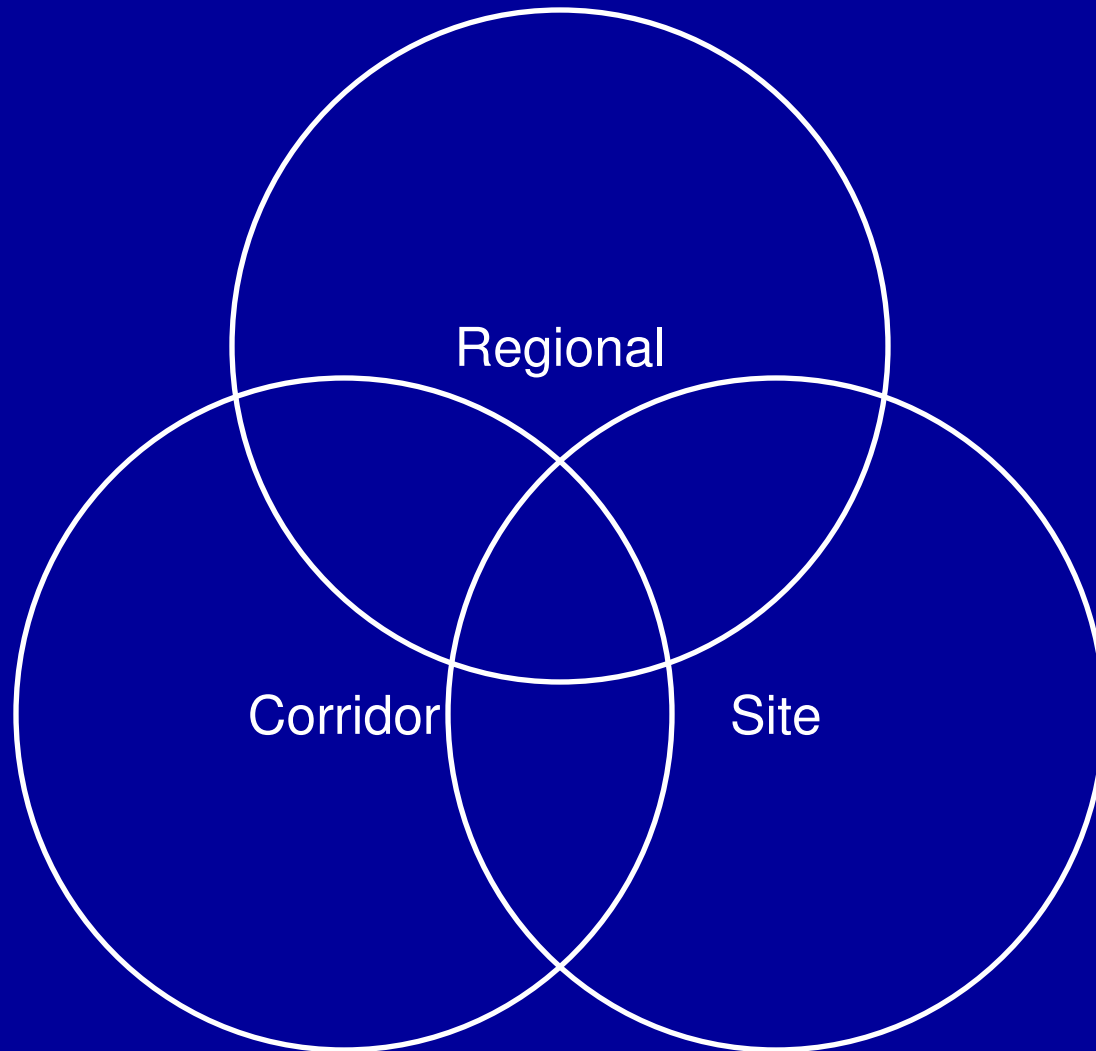


Site or Project Models

Small Area Traffic Estimates



Some Analyses Combine Modeling Tools at Different Levels



Modeling Foundations

- Codified procedures
- Professional norms
- Assumptions

Codified Procedures

- Regional
 - Transportation Research Board publications
 - Air quality conformity guidance
 - Federal Transit Administration *New Starts* requirements
- Corridor
 - *Highway Capacity Manual*
- Site or Project
 - *Trip Generation*
 - *Parking Generation*
 - *Highway Capacity Manual*
 - *Local standards for traffic impact analyses*

Professional Norms

- All three scales
 - Commercial software
 - Body of past practice

Underlying Assumptions

- Travel behavior will be the same in the future as in the past
- Future land use is independent of future transportation service levels
- Models predict future precisely (and therefore also accurately)

Models Are Incomplete – Example: Responses to New Roadway

- Route changes
- Destination changes
- Travel mode changes
- Time of day shifts
- Make or not make trip
- Land use changes
- Changes in attitudes and social norms

Common Practice

(last step only of “4-step” model)

- Route changes
- Destination changes
- Travel mode changes
- Time of day shifts
- Make of not make trip
- Land use form changes
- Changes in attitudes and social norms

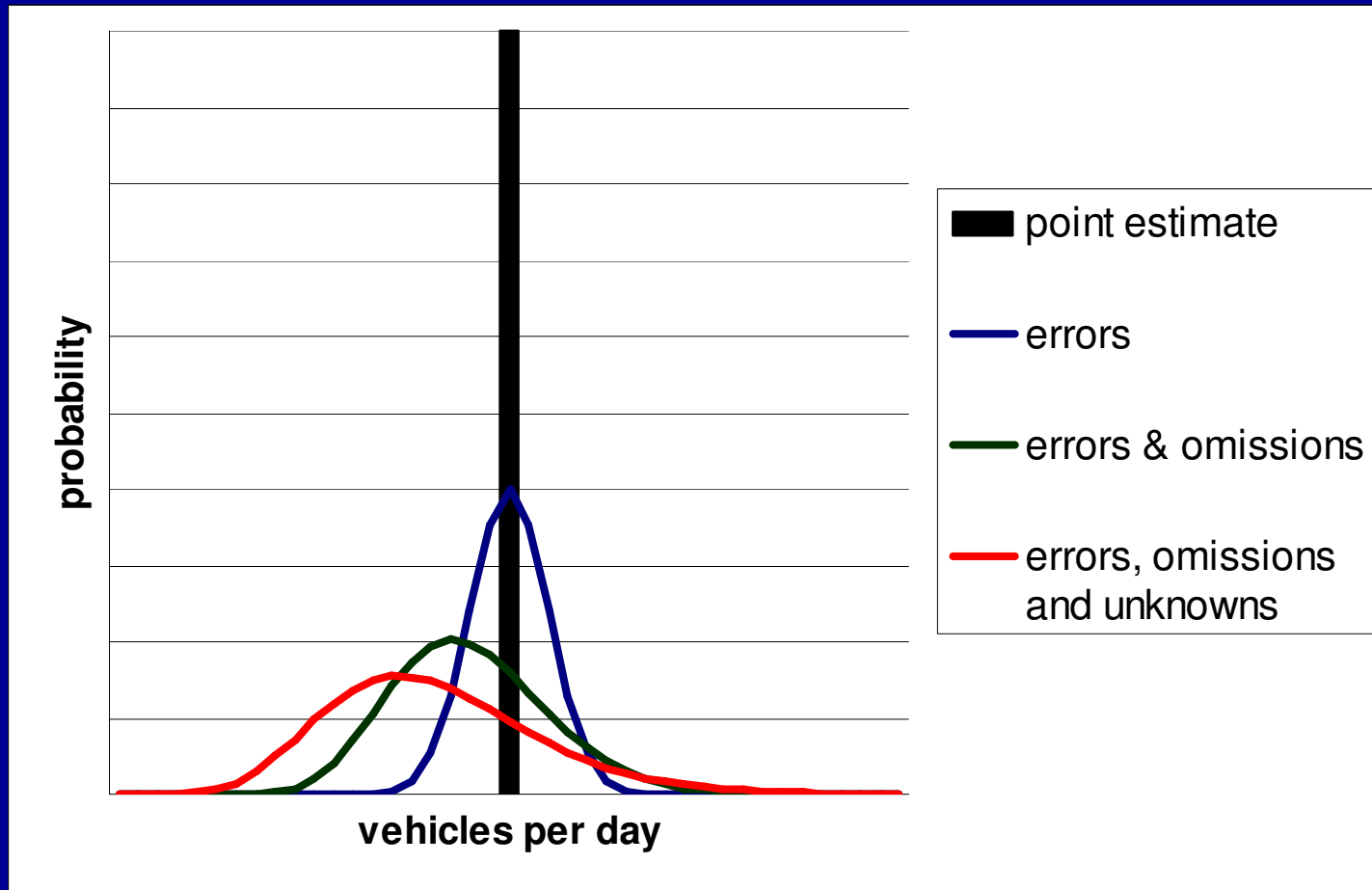
Minimally Acceptable Practice (feedback through “4-step” model)

- Route changes
- Destination changes
- Travel mode changes
- Time of day shifts
- Make or not make trip
- Land use form changes
- Changes in attitudes and social norms

Unknowns

- General level of economic activity
- Energy pricing
- Greenhouse gas regulation
- Technological change
- Social change, e.g. much more widespread telecommuting

Uncertainty from Model Errors, Model Omissions, and Unknowns



Using Models Correctly

- Make the models as smart as possible – including using new models
- Use scenarios to explore uncertainty and unknowns
- Modeling has seat at table but facilitates discussion rather than ending it