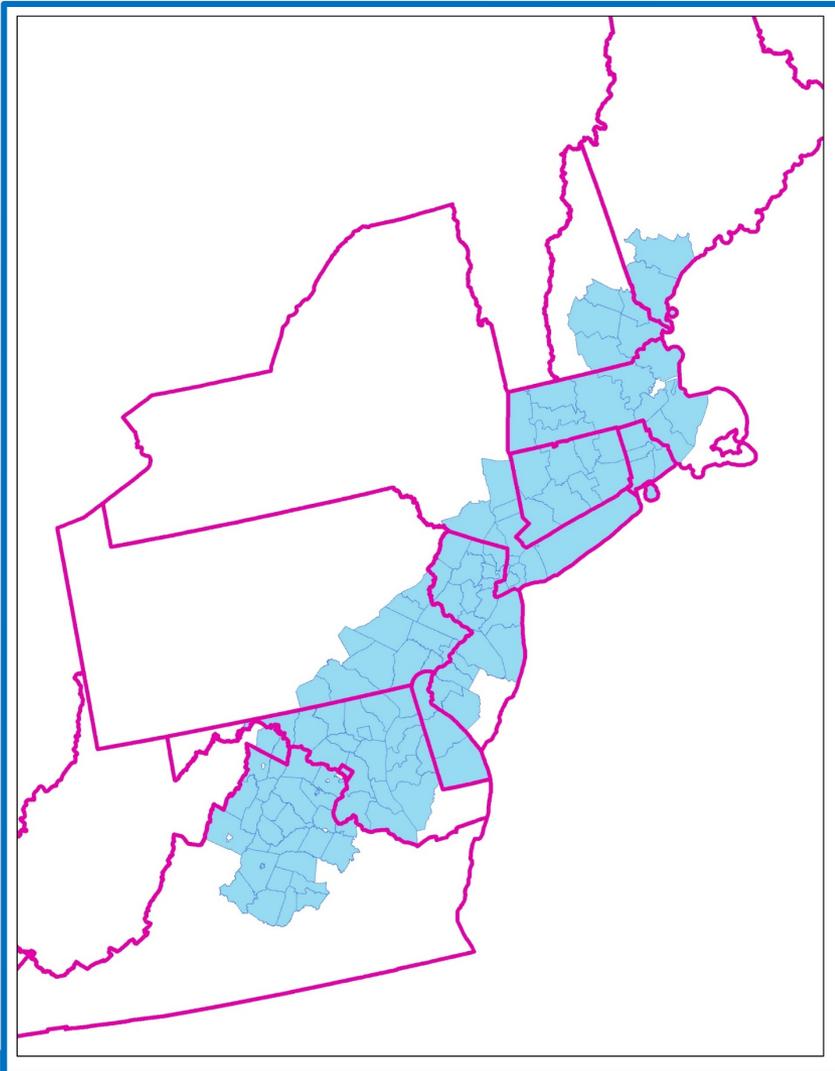# A NORTHEAST MEGAREGION TRAVEL DEMAND & INVESTMENT MODEL:
PROJECT OVERVIEW & MODEL DESIGN

University Transportation Center for

Cooperative Mobility for Competitive Megaregions (CM2)

The Context

A Critical but Fragmented Transportation Planning Landscape

o   13 States

o   39 Metros

o   130 Counties

o   50 million residents (15% of US total in 2016)

o   25 million jobs (14% of US total)

o   38 MPOs (most with their own planning and travel demand models)

Today's Four Questions

1. Is this capability (multi-state and megaregional-scale travel demand & investment modeling) likely to be useful? To whom? For what purposes?

2. How might its design, features and operations be made more useful?

3. What types of investments, scenarios and interventions should it be designed to test or simulate?

4. How can we best share the technology and applications with your agency?

This Morning's Agenda

- **The Northeast Megaregion Travel Demand & Investment Model: Purpose & Scope**

- **3 Component Pieces**

- **Results & Feedback**
  1. TAZ & Roadway Network Systems
  2. Consistent Multi-modal Transit Networks
  3. Modeling Inter-metropolitan Trips
  4. Intra-metropolitan Trips: Trip Generation Results and Issues
  5. Intra-metropolitan Trips: Trip Distribution Models and Issues
  6. Modeling Multi-modal Freight Flows within and from/to the NEMR

- **Additional Issues & Questions**
  - Trip Assignment: Mix intra-regional and mega-regional passenger & freight trips on highways?
  - Importance of modeling second-order economic and real estate development impacts?

- **Work plan & Timeline**

The NEMRTD & I Model: Purpose & Scope

1. **Facilitate Better Planning:** To be able to better model passenger travel *AND* freight flows across state and MPO borders:

   - <u>Forecasting</u>: To be able to consistently model the effects of differential population and job growth and change on travel behavior and traffic volumes.
   - <u>Simulation</u>: To be able to robustly simulate the travel implications of major facility and service investments (new modes technologies and systems, improved LOS and capacity investments, expanded link and node capacities).

2. **Create Additional Knowledge**: To develop a consistent mega-regional or multi-metropolitan understanding of travel behavior patterns and preferences across the NEMR.

3. **Build Joint Capacity**: To develop and share robust datasets and modeling procedures that are consistent and accurate across the different MPOS and agencies in the NEMR.

4. **Improve Single- & Multi-agency Decision-making:** To develop procedures that facilitate more robust and transparent investment decisions.

Alternative Scenarios: Looking to the Future

- **What Types of Forecasts?**
  - Aggregation of current state-produced population and employment projections?
  - Growing infill employment and population shares
  - Growth of suburban distribution centers

- **What Type of Investments?**
  - Mega-regional high-speed rail
  - Center city to airport HSR service
  - Truck only roadways and lanes
  - Port distribution corridors
  - New commuter rail links and tunnels
  - New airport facilities

- **What Types of New Technologies?**
  - Facilities for autonomous shared vehicles (ASV)
  - Hyperloop systems
  - Online retail & home delivery at 50% of retail market share

3 Component Pieces

1. ONE **Inter-metropolitan multi-modal travel demand model** for modeling passenger trips greater than 50 miles considering automobile, rail, *(bus?)* and air travel modes. *Based on National Household Travel Survey (NHTS) data.*

2. FOUR **Intra-metropolitan travel demand models** (Boston-Providence-Worcester, Greater New York City, Greater Philadelphia, Baltimore-Washington-Richmond) for modeling passenger trips greater than 5 miles (?) considering automobile, bus, subway and light rail, and commuter rail modes. *Developed using a 4-step modeling procedures in Trans CAD.*

3. ONE **National scale freight travel model** for modeling truck, rail, and air freight flows in and out of major metropolitan areas in the Northeast Megaregion. *Based on FHWA's Freight Analysis Framework (FAF) flow data.*

MODELING MILESTONES & PROGRESS

Inter-metropolitan Travel Analysis and Modeling

1	Review and summarize NHTS data for NEMR	Done
2	Build inter-metropolitan highway, bus, and passenger rail networks	In process
3	Develop inter-metropolitan trip generation models	In process
4	Develop inter-metropolitan trip distribution model	No
5	Develop inter-metropolitan mode split model and compare to NHTS results	No
6	Identify days and times for inter-metropolitan route assignment	No
7	Assign inter-metropolitan trips to region-serving highway, rail, transit, and air routes	No

4 Intra-metropolitan Travel Models (Boston, NYC, Philly, DC)

1	Create NEMR TAZ system	Done
2	Trip generation analysis in TransCAD (regression & TG rates)	Done
3	Build NEMR Highway network	Done
4	Trip distribution analysis in TransCAD (Gravity model based on skim trees times & dista	Done
5	Build local transit networks	In process
6	Local mode choice analysis	No
7	Assign local trips to region-serving highway, rail, and transit routes	No

Freight Modeling

1	Modify FAF4 zone system for NEMR	Done
2	Generate freight flow O-D & mode tabulations by commodity	In process
3	Model freight trip generation & distribution by commodity	No
4	Develop mode split and routing models	No
5	Freight route/time/vehicle assignment	No