The Iowa Travel Analysis Model iTRAM

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ABSTRACT

This presentation discusses the evolution of the Iowa Department of Transportation (Iowa DOT) statewide model, the key purposes for using a statewide model, and future uses of the model.

Key words: Iowa Department of Transportation—statewide model—travel
The Iowa Travel Analysis Model

I-TRAM

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Overview of Today’s Presentation

• Review the evolution of the Iowa DOT statewide model
• Discuss the key purposes of the Iowa STM
• Outline the findings of the architecture step
• Get a briefing on the status of the model components
  
  Iowa TAZ, Iowa Network, Buffer (National) Zones, SE Data, FAF2 (Trucks)

• Review Planned Uses of the Statewide Model
• Look at Validation Statistics
iTRAM Timeline

• Architecture Completed April 2007
• Trip Generation from 2001 National Household Travel Survey – Summer 2008
• Network Transformation (from Iowa GIMS) – Fall 2008
• Calibration Work – Winter 2009
• Validation July 2009
Phases I and II Work Flow

- Phase I developed the Iowa Statewide Model Framework for Phase II
  - Think “blueprint”
- Phase II is building the Iowa Statewide Model
PHASE I

Model Education

Needs Assessment

TIER I
A. Frame Passenger Car Model
B. Frame Truck (Commercial Veh.) Model

TIER II
A. Frame Statewide Rail Freight Model
B. Frame Commodity Freight Flow Model

Model Architecture

PHASE II

Model Development

TIER I
A. Build Passenger Car Model
B. Build Truck (Commercial Veh.) Model

TIER II
A. Build Statewide Rail Freight Model
B. Build Commodity Freight Flow Model

Mescher
Statewide Model Education

Model Education: Two Directions

First - the WSA Team familiarized stakeholders with statewide models & their capabilities.

Second - the stakeholders made the WSA Team aware of what each member needed from the statewide model.
Phase II Work Flow

Two parts of Phase II:

Part 1 – Construction of Iowa STM using the Architecture “blueprint” (began October 15, 2007)

Part 2 – Commodity Flow Model Component (TBD)
Iowa DOT wanted **ownership of the STM** –

The Iowa DOT designed the “workshop” cooperative approach to address schedule, resources, and ownership issues.

Various working sessions were held where the DOT and Consultant team worked side-by-side.
Why have a Statewide Model?

- Traffic forecasts affect every aspect of the Iowa DOT’s core business activities
  - Planning & finance, programming, design, construction & maintenance

- A useful cost-effective tool
  - System, corridor, project level data for evaluating needs & alternatives
  - Reliable & timely forecasts
  - Consistent methodology
Why have a Statewide Model? (cont.)

• To determine when and where existing and future capacity deficiencies will occur

• To aid in policy decisions

• To assist in making investment decisions (projects)
Iowa DOT Agreed that a STM is an Important Tool

- Assembled a team of internal and external transportation specialists
- Established a technical steering team – the EPSC – Executive Planning Steering Committee, which includes MPO representatives
- Set up a cooperative hands-on workshop program for TAZ, network, and centroid tasks with both DOT and consultant members
- Launched the effort formally in October 2007
Concept Level
Architecture Decisions

• Phased Development of Freight Component
• Three step model
• Trip generation – cross classified by household size and income
• National + Iowa network and trips
• Trip distribution – gravity model
• Truck sub-model
• Interface with MPO Models
Figure 2: Model Architecture Process Flow
Iowa DOT wanted **Replicability** –
The STM will use TransCAD GISDK macro language in a Graphical User Interface (GUI)
Iowa DOT wanted to **develop a comprehensive statewide socioeconomic forecast** –

The STM uses forecasts from REMI and Woods & Poole with MPO allocation percentages to jump start statewide control totals.
Detailed Level
Architecture Decisions

Iowa DOT wanted network congruence with the Iowa Road database - GIMS (Geographic Information Management System)

The Iowa DOT is reviewing the GIMS for connectivity, and assignability prior to formal network development

Unique ID (“match field” will be retained in the GIMS and the Iowa STM highway network
iTRAM Network
Iowa DOT wanted 2,000+ Iowa STM TAZs –

The STM is in a “TAZ-allocation” phase using 186,000 Census blocks to form the Iowa STM zones
Iowa DOT wanted a “telescoping” size buffer or national zone system – The STM is reviewing potential zone systems outside of Iowa.
Iowa DOT wanted **MPO input and R & D Assistance throughout the STM development and deployment** -

The ESPC includes MPO and RPA leaders and modelers from all parts of Iowa.
The assistance of the CTRE (Center for Transportation Research and Education) at Iowa State has been essential.
Iowa GIS resources online have been essential.
DOT staff versed in agricultural traffic movements, waterways (Mississippi & Missouri Rivers), ethanol facilities and other have been essential.
Iowa DOT wanted **the most recent national and state data** –

The new Freight Analysis Framework (FAF2) freight data will be used for national truck flow information to/from and through Iowa.
FAF2 Districts
Iowa Truck Flows

Estimated Iowa Daily Truck Traffic
Source: FHWA

Iowa Total Domestic Truck Flows
Source: FHWA
Air Passenger Model

Graph showing time (in minutes) on the x-axis and the cumulative percentage on the y-axis. The x-axis is divided into intervals from 0 to 10, 11 to 20, etc., up to 171 to 180. The y-axis ranges from 0 to 100.

Histogram bars represent the number of airport trips in each time interval. A line graph shows the cumulative percentage of trips over time.
### Model Calibration (24 hr – ADT)

- By Functional Class and Area Type
- By Volume Groups
- Major Route’s Statistics
- Truck Model
- No Standards Exist for Statewide Model Validation
- 68,000 Count Locations Used
### By Volume Groups

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<tr>
<th>Selection</th>
<th>Observations</th>
<th>RMSE</th>
<th>% RMSE</th>
<th>Sum of Counts</th>
<th>Sum of Flows</th>
<th>% Flows / Counts</th>
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### By Functional Class and Area Type

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<thead>
<tr>
<th>Selection</th>
<th>Observation</th>
<th>RMSE</th>
<th>% RMSE</th>
<th>Sums of Counts</th>
<th>Sums of Flows</th>
<th>% Flow / Counts</th>
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Questions?