Travel Demand Modeling And Analytics

Connetics Transportation Group

Traffic

- Traffic Operations and Signal Retiming
- Safety Reviews
- Traffic Forecasting and Simulation
- Traffic Impact Studies
- Interchange Access Request

Modeling

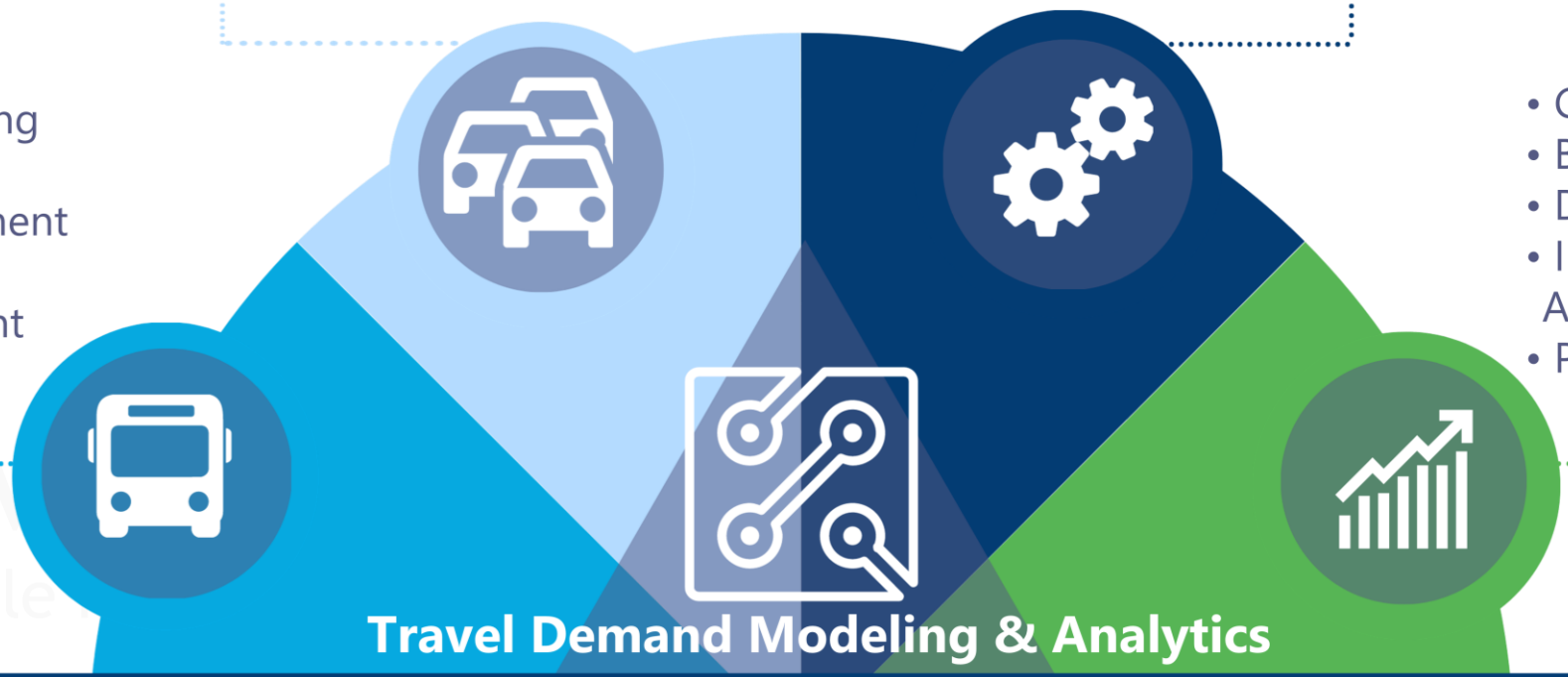
- Model Development
- Model Application
- Forecasting Accuracy Analysis
- Model Enhancement

Transit

- Ridership Forecasting
- Market Analysis
- FTA Capital Investment Grants
- STOPS Development

Analytics

- Census and Survey Data
- Big Data Analysis
- Dashboard / Visualization
- Interactive Web Applications
- Performance Measures



Travel Demand Modeling & Analytics

Meet the Travel Modeling and Forecasting Key Staff

With support from 7 knowledgeable travel modeling and analytics staff members.

Dave Schmitt, AICP

Director
25+ years

Ashu Kumar

Project Manager
17 years

Hui Zhao, P.E.

Traffic Forecasting Lead
10 years

Sujith Rapolu, P.E.

Modelling Lead
10 years

Kyeongsu Kim

Lead Data Scientist
15 years

Li Jin, P.E.

Growth Management & Performance Measures Lead
10+ years

CTG Connetics Transportation Group

Selected Projects

1. Central Florida Regional Planning Model 7
2. NCDOT General TPD Limited Services Contract
3. St. Paul Gold Line BRT CIG Project Development
4. I-95 Treasure Coast Master Plan (Traffic Forecast)
5. NCHRP 934 Forecasting Accuracy
6. VDOT Traffic Tools Development

Central Florida Regional Planning Model 7

PM Peak Volume-over-Count Ratio by Facility Type

PM Peak Volume-over-Count Ratio by Facility Type

Facility Type	No. of Links	Volume	Count	Volume/Count*	Acceptable	Preferable
Freeway	125	1,408,672	834,717	1.69	+/- 7%	+/- 6%
Divided Arterial	3,167	13,166,931	9,825,748	1.34	+/- 15%	+/- 10%
Undivided Arterial	1,505	2,946,972	2,209,833	1.33	+/- 15%	+/- 10%
Collector	4,388	3,453,446	3,336,664	1.03	+/- 25%	+/- 20%
External Station Connector	4	4,179	4,238	0.99	+/- 1%	+/- 1%
One-way/Frontage	107	383,659	317,173	1.21	+/- 25%	+/- 20%
Ramps	804	1,311,294	1,136,274	1.15	+/- 25%	+/- 20%
Toll Road-Freeway	245	1,540,875	1,677,314	0.92	+/- 7%	+/- 6%
Toll Road-Arterial	2	4,156	3,728	1.11	+/- 15%	+/- 15%
Region	10,347	24,220,184	19,345,689	1.25	+/- 16%	+/- 12%

Green = Preferable; Blue = Acceptable; Red = Out of Range

Summary of the Result from Travel Corridor Analysis

Period	Acceptable Percentage*	Acceptable Standard	Preferable Percentage*	Preferable Standard
AM	88% of links are within 20%	80% of links are within 20%	63% of links are within 10%	50% of links are within 10%
MD	82% of links are within 20%	80% of links are within 20%	52% of links are within 10%	50% of links are within 10%
PM	82% of links are within 20%	80% of links are within 20%	53% of links are within 10%	50% of links are within 10%
NT	99% of links are within 20%	80% of links are within 20%	95% of links are within 10%	50% of links are within 10%

- GIS-based roadway network
  [Editing in GIS **converted to Cube and outputs to GIS**]
- Scripted from "**the ground up**" to improve readability & understandability
- Modules updated using the most recent NHTS, ACS, Census, AirSage and other data
- QC tools
- Regional STOPS model used for transit model (**streamlined model runs**)
- Validated to both volumes and travel times

NCDOT General TPD Limited Services Contract

- NCDOT selected CTG to provide Travel Demand Modeling services
  - ✓ Tasks to enhance, update, and maintain the statewide transportation and multiple individual MPO models
  - ✓ Models to reflect the 2020 based year using the new Census data and potentially next-gen NHTS data
- Relevant Travel Demand Modeling tasks include:
  - ✓ Conduct Survey
  - ✓ Survey Analysis
  - ✓ Socio-Economic Data Preparation
  - ✓ Model Application
  - ✓ GISDK Coding
  - ✓ Training
  - ✓ Solve Technical Issues
  - ✓ Specific AD-Tasks

- NCDOT selected CTG to provide Traffic Forecasting services
  - ✓ Expected to produce traffic reliable forecasts that meet fixed project schedules
- Relevant Traffic Forecasting tasks are as follows:
  - ✓ Traffic Data Collection
  - ✓ Facility and Land use data collection
  - ✓ DOT count station/big data analysis
  - ✓ Developing multiple traffic forecasting projects
  - ✓ Providing documentation.
  - ✓ Providing innovative ideas and best practices for traffic forecasting

St. Paul Gold Line BRT CIG Project Development

Developed region's first STOPS model for CIG application

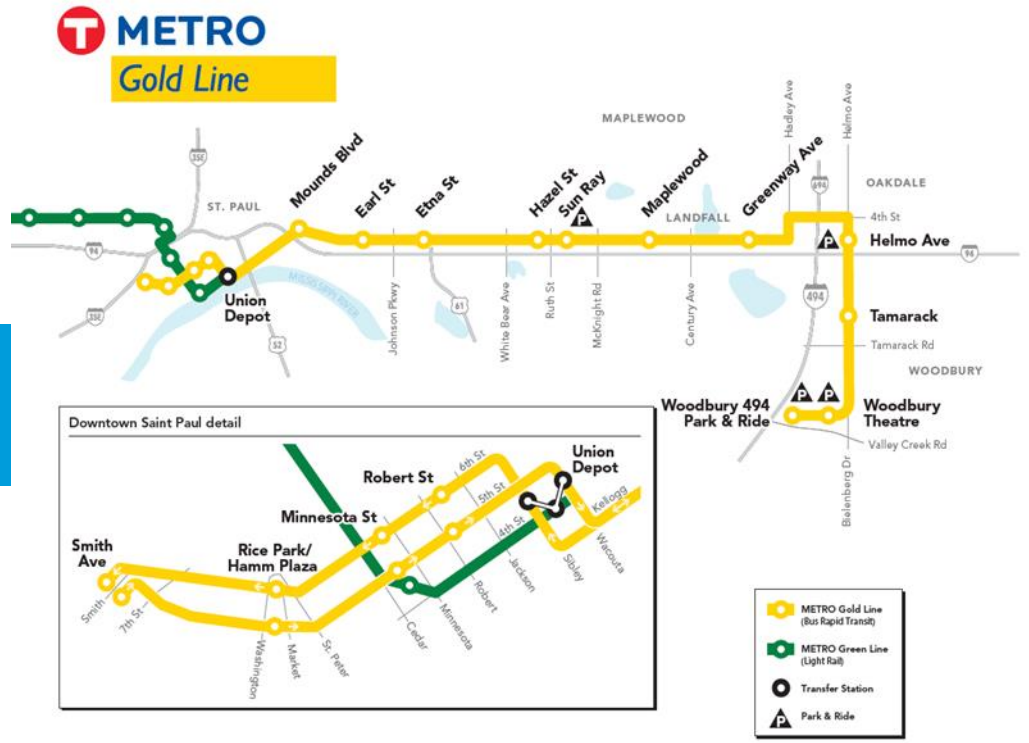
Led ridership forecasting efforts

Led ridership discussions with FTA

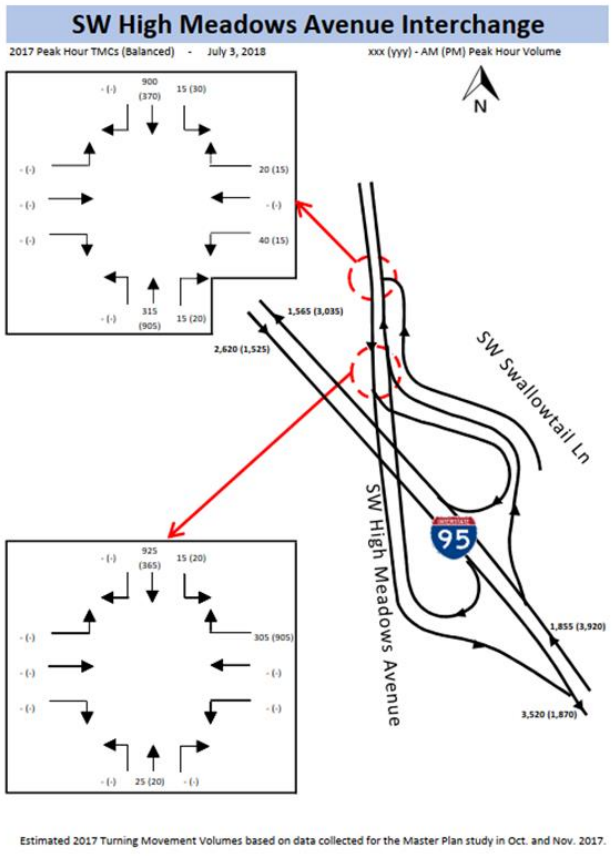
"I would call the model used a state-of-the practice STOPS incremental application." – FTA Staff

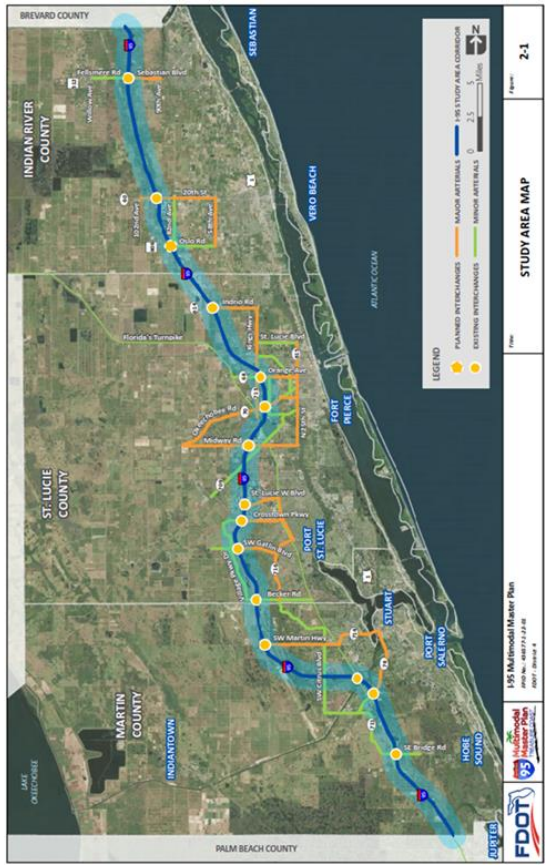
CIG New Starts application support

Applied region's ABM for traffic projections



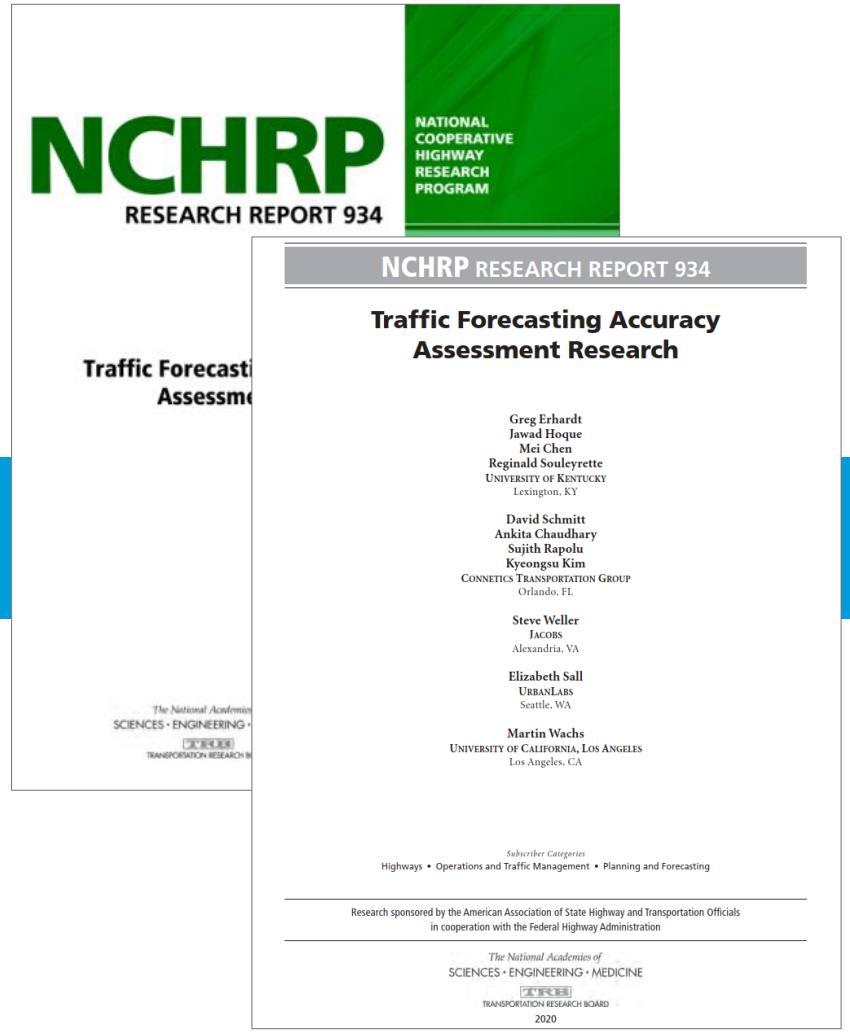
I-95 Treasure Coast Master Plan (Traffic Forecast)



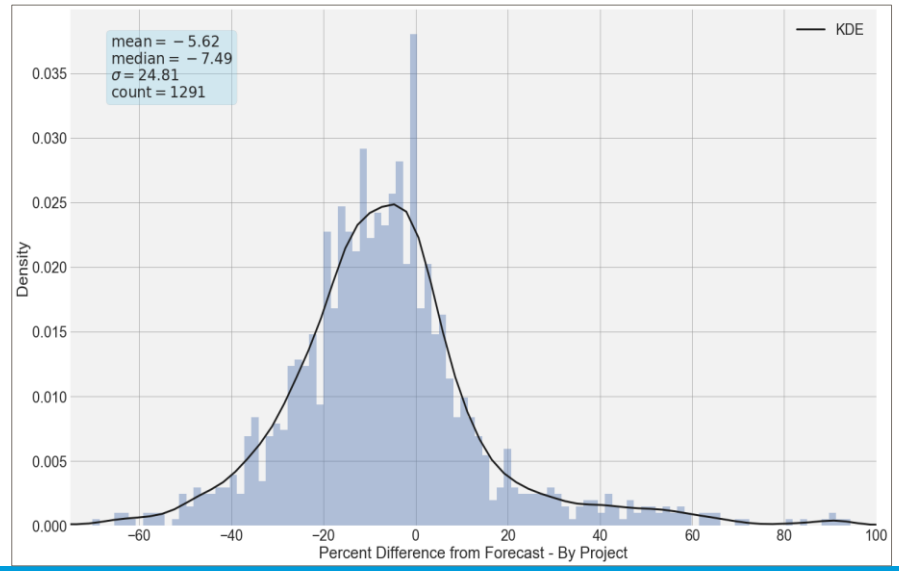


- Successfully developed the interim and design year AADTs and AM/PM peak hour turning movement forecasts for over 72 miles of study roadway with 15 interchanges and 62 intersections, spanning over three counties in 45 days.
- Developed an R program to streamline and automate efforts for turning movement volumes:
  - ✓ Allows users to interact and customize for different projects using an input Excel file

NCHRP 934 Forecasting Accuracy

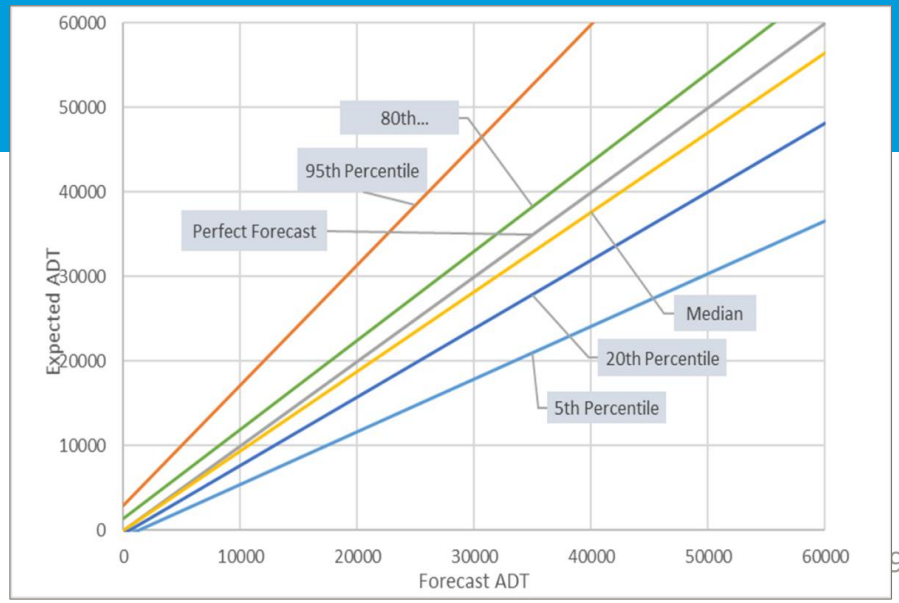


Developed largest known collection of traffic forecasts



Performed "Deep Dive" analysis of accuracy of traffic forecast

Developed several ready-to-use toolkits for practitioners



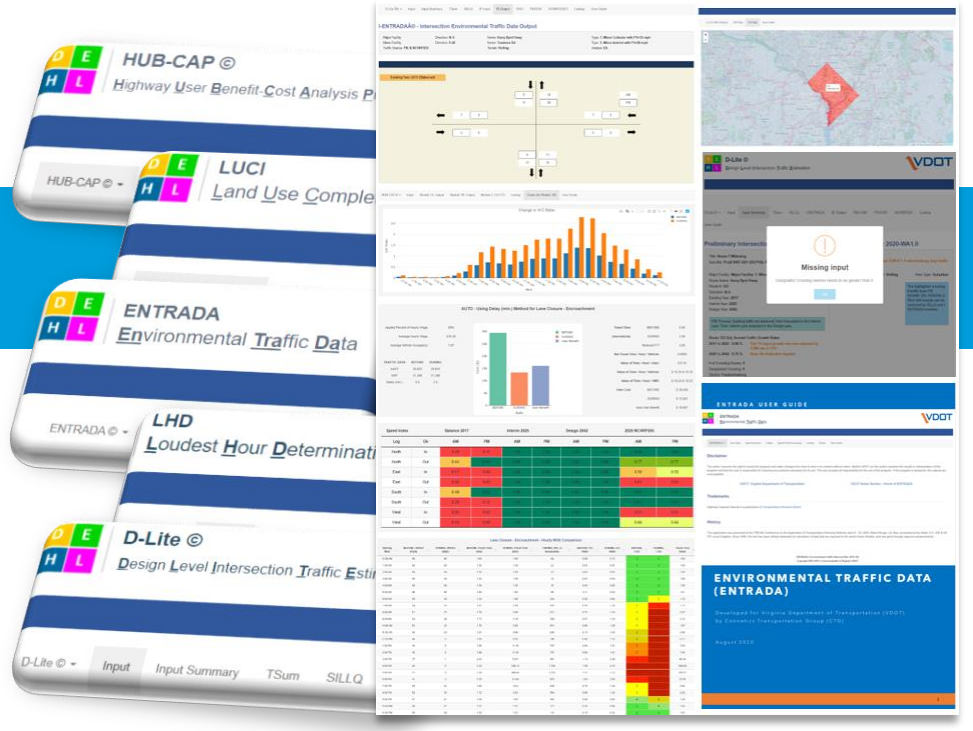
VDOT Traffic Tools

- **Environmental Traffic Data (ENTRADA):** to estimate hourly traffic volume and speed for noise studies
- **Loudest Hour Determination (LHD:** to determine the loudest hour using ENTRADA output
- **Highway User Benefit-Cost Analysis Program (HUB-CAP)**: to quantify road user benefits/costs based on roadway geographic, traffic, and operation characteristics
- **Land Use Complete Interactive (LUCI)**: to estimate traffic growth as a function of land development
- **Design Level Intersection Traffic Estimation (D-LITE)**:to balance and forecast turning movements for a roadway

Challenges VDOT had to deal with:

- Five existing Excel-macro programs had aged due to uneven code and user interface updates made over time
- Its inconsistent user-interface formatting and version control issues led to confusions, rework and project development delays

CTG upgraded the existing programs into online interactive platforms, developed user guides and video tutorials, provided online training sessions, and supported web deployment.



Outcomes:

- Streamlined user-interfaces with built-in input error check functions
- Eliminated the concern of using inaccurate version
- Two notable features: “export input file” and “import input file”
  - ✓ Allow users to revisit a previously-run scenarios for review or run another scenario by changing few parameters/inputs