

NCMUG Vision: to provide a forum for sharing knowledge and experiences of using state-of-practice transportation modeling tools, techniques and innovations appropriate to answer transportation planning and policy questions for the State of North Carolina, and promote its implementation across the State.

2019 Fall NCMUG Meeting

1 – 5 PM, Tuesday, November 5, 2019

Room 2600, ITRE/NCSU

909 Capability Drive, Research Building IV, Centennial Campus, NCSU, Raleigh, North Carolina 27606

Agenda

Moderator: Amar Pillai, NCDOT

- **INTRODUCTION**

- **MODEL DEVELOPMENT**

1:00-1:40 PM (40 minutes)

How Sensitive Are Model Calibration Reports to Input Data Error¹

Craig Gresham, Clearbox Forecast Group

Abstract

Years ago, early in Craig's career, he developed a travel demand model for Goldsboro. At (what he thought was) the end of the calibration process – the results looked great. R-squared - .97! RMSE – low! Then, to his dismay, he learned that his input data had been joined by the ArcGIS ID and not the TransCAD ID. Which meant the input housing and employment data had essentially been placed in random zones. But the calibration reports looked good. Sigh. So what does this mean? For this presentation, Craig will explore the impacts of input data errors (with a focus on location accuracy). Which types of data error are calibration reports most sensitive to? Are any calibration reports not sensitive at all? To do this, he took the Greenville Model, looked at various types of input data, randomly scrambled the TAZ (or external station) it went into, ran the model, and ran the calibration reports. From this, recommendations on which input data should be prioritized for QA/QC will be made and open discussion will be held on calibration/validation reporting in practice.

Bio

Craig Gresham: craig@clearboxforecast.com, Clearbox Forecast Group, Cary, NC

Craig has over 20 years of experience in travel demand modeling, traffic forecasting, and GIS. Mostly good. Before starting Clearbox Forecast Group in the fall of 2009, he spent 10 years at Kimley-Horn and Associates and 3 years with North Carolina DOT Transportation Planning Branch. Craig specializes in model development, HOT/HOV model analysis, multimodal analysis, project-level traffic forecasting, and socioeconomic forecasting. When not staring at a spreadsheet, he enjoys spending time with his two kids (now 12 and 10.... yikes), working on projects around the house, planning to exercise, pretending he's still good at snowboarding, camping at bluegrass festivals, and finding a good local craft beverage.

- **MODEL DEVELOPMENT WITH BIG DATA**

1:40-2:20 PM (40 minutes)

Passive Data for the NCSTM and Applications for Charlotte²

Vince Bernardin, PhD, RSG

¹ NCMUG_20191105_Present_1_ModelInputSensitivity_10-07_GRESHAM_Craig_ClearboxForecast.docx

² NCMUG_20191105_Present_2_PassiveDataNCSTM_MUMO_10-21_BERNARDIN_Vince_RSG.docx

Abstract

In order to support the development of the latest version of the NCSTM and inform the P5 project prioritization process, NCDOT purchased truck GPS data and general population smartphone data to better capture the movement of people and trucks in and through the state. The data was also licensed so as to be able to support other projects and public agencies throughout North Carolina. Charlotte is the first agency to take advantage of this to support analysis of planning and projects in their region. This presentation will provide an overview of the data and its licensing, its processing to produce origin-destination (OD) data, its expansion to represent all travel, and its application in the development of the NCSTM and analysis of projects in Charlotte.

Bio

Vince Bernardin, Vince.Bernardin@RSGInc.com, Evansville, IN

Vince Bernardin, Ph.D., is Director of RSG's Travel Forecasting Group and manages their Indiana office in the great metropolis of Evansville. Vince has project experience in over twenty states and abroad developing and applying statewide, urban, and corridor-level travel forecasting models and related analysis tools for both plan development and major project studies. He is best known for his pioneering work with big data and for his development of a "hybrid" modeling approach, which combines elements of activity-based and trip-based models. He has published on a wide variety of topics including destination and mode choice models, the complexity of travel patterns made using public transit, and the representativeness and expansion of passively collected data. Vince holds a BA in Philosophy from the University of Notre Dame, and an MS and Ph.D. in Transportation Engineering from Northwestern University.

2:20 –3:00 PM (40 minutes)

Implementation of a Multi Resolution Network Database for Statewide Models³

Jonathan Avner, and Roberto Miquel, Whitman, Requardt & Associates, LLP

Abstract

To support statewide travel demand models in Maryland and Delaware, WRA has implemented a GIS based network model that provides linkages to state and local datasets while being able to create networks for statewide and study level applications of the model. The networks are multi-resolution in that they include detail to support very fine network and zone granularity when required for specific applications including corridor studies, local planning or development of inputs to analytical multiresolution modeling systems (macro to meso to microscopic). The user interacts with the database via a graphical user interface that allows for the selection of the network resolution, associated demographics, and selection of projects to be included in the network. The opportunities for establishing a similar approach in North Carolina would include greater efficiency in deploying project level models, improved linkages to statewide and local datasets including centerline or route data, project definitions and counts and finally consistency in the development of networks across all uses of the model.

Bio

Jonathan Avner, javner@wrallp.com, Austin, TX

Jonathan has been involved in the development and application of travel demand models for over 20 years having worked on projects in several states and parts of the world. He currently leads the travel demand modeling practice at WRA.

Roberto Miquel, rmiquel@wrallp.com, Raleigh, NC

Roberto Miquel, AICP, is a transportation planner and travel demand modeler with 16 years of experience. Roberto's work has included updating and enhancing statewide travel demand models, including the North Carolina Statewide Travel Model, developing small urban area and MPO models, conducting project-level traffic forecasts, generating user benefits for project prioritization, and delivering travel demand model training courses.

³ NCMUG_20191105_Present_3_Multi Resolution Networks for Statewide Models_09-30_AVNER_Jonathan_MIQUEL_Roberto_WRA.docx

- **PERFORMANCE MEASUREMENT**

3:00-3:40 PM (40 minutes)

Model Performance Output Online Dashboard Visualization Tool⁴

Li Jin, Ph.D, AICP, Kittelson & Associates, Inc.

Abstract

FAST Act requires use of performance-based approaches in statewide, metropolitan, and non-metropolitan transportation planning. The performance measures can serve as basis for measuring transportation system and tracking results over time. Data driven approach, along with public involvement and policy considerations, can be used to develop investment and policy priorities based on quantifiable analysis. Performance-based planning and programming is critical to ensure that transportation investment decisions will be developed to meet established goals.

The online performance measure visualization web tool will support policy makers from DOTs or MPOs to visualize the transportation system improvements using historical and future performance measures. Authorized users could potentially benefit from having this type of interactive tool readily available by selecting segments to visualize the more frequently updated and detailed data results that are relevant to that segments or particular geographies, and they can use the online program to create output summaries (tables, graphics, etc.) for publications and presentations. This presentation will introduce the online performance measures tool developed for Florida DOT. The tool is scalable and can be extended to visualize roadway systems in NCDOT.

Bio

Li Jin, ljin@kittelson.com, Kittelson & Associates, Raleigh, NC

Li has over 12 years of experience in travel demand modeling, corridor traffic forecasting, data analysis, performance measures, and GIS. Li received his Ph. D. from Purdue University in 2008. He worked at Kittelson's Florida offices for ten years, and Kittelson's Raleigh office from August, 2018. Outside of work, Li is busy bringing his kids to several activities and walking with his dog.

3:40-4:20 PM (40 minutes)

NCDOT Project ATLAS

Michelle Warf, Environmental Analysis Unit NCDOT⁵

Abstract

NCDOT Project ATLAS (Advancing Technology through Linkages, Automation and Screening) ATLAS stands for Advancing Transportation through Linkages, Automation and Screening. It is an online assembly of improved business processes, data and tools aimed at helping NCDOT deliver projects with more efficiency and confidence based on GIS data. Along with a compilation and vetting of over 600 data layers, ATLAS will provide four web-based GIS tools: The Data Search Tool, the Screening Tool, the Workbench, and the Application Admin Tool.

Bio

Michelle Warf: mlWarf@ncdot.gov.

Michelle is an Environmental Program Consultant with the Environmental Analysis Unit, Mitigation and Modeling Group at NCDOT. She comes to NCDOT from the Natural Heritage Program where she was a Senior Environmental Scientist/Data Manager. Prior to that, she was a Marine Spatial Analyst with NOAA, where she monitored subsurface movement of oil in response to the Deepwater Horizon spill. She has a wide range of experience in biological sciences, GIS and modeling that are dedicated almost entirely to Project ATLAS.

⁴ NCMUG_20191105_Present_4_Model Performance Measure Online Visualization Tool_10-01_JIN_Li_KAI.docx

⁵ NCMUG_20191105_Present_5_ATLAS_11-04_WARF_Michelle_NCDOT.pdf

4:20 – 5:00 PM (40 minutes)

Transit Project Ranking⁶

Jason Schronce, Sarah Lee, NCDOT Strategic Prioritization Office

Abstract:

NCDOT has a mature Project Prioritization process (defined by the Strategic Transportation Investments Law) where capital projects are evaluated, scored, and those results are used to produce our 10-year State Transportation Improvement Plan (STIP). As the project scoring process has continually improved over the years, NCDOT has constantly looked at ways to incorporate new data and techniques into the Prioritization framework. One data type used in the Transit mode scoring includes expected future ridership that is obtained through North Carolina regional modeling efforts.

The P5.0 scoring process (which created the 2020-2029 STIP) yielded many challenges on the appropriate methods to compare multiple model output equably across the state. The SPOT Office will share how this information is used in scoring and the methods by which data is requested, captured, and evaluated. We are also seeking feedback from modeling experts, especially the users and creators of the North Carolina regional models for process improvement ideas for the approaching P6.0 scoring process.

Bio:

Jason Schronce, PE: jschronce@ncdot.gov, NCDOT Strategic Prioritization Office, Raleigh, NC

Jason Schronce is the Manager of North Carolina DOT's Strategic Prioritization Office (SPOT) that guides and oversees the process of applying the Strategic Transportation Investments Law that ultimately helps create the 10-year State Transportation Improvement Plan (STIP). Jason graduated from NC State University with a degree in Civil Engineering. He is a licensed professional engineer and has a diverse resume in railroad design, traffic safety, and forensic investigations.

Sarah Lee: selee@ncdot.gov, NCDOT Strategic Prioritization Office, Raleigh, NC

Sarah is a graduate of UNC Charlotte with a Bachelor of Science in Civil Engineering and has worked at NCDOT since 2007. Prior to her current role, Sarah developed long range transportation plans and worked with many Metropolitan and Rural Planning Organizations throughout the state. She currently resides in the Strategic Prioritization Office, implementing the Department's project prioritization process and the Strategic Transportation Investments legislation. Sarah is primarily responsible for the Department's five non-highway modes within the prioritization process and works with associated partners across the state.

Note: Four (4) PDHs can be earned at the meeting (roster sheet & forms will be provided).

⁶ NCMUG_20191105_Present_6_TransitProjectRank_09-29_SCHRONCEJason_LEESarah_NCDOT.docx