Modeling Methodology and Simulation of Port-of-Entry Systems Benjamin Melamed (PI), Weiwei Chen (Co-PI), Mingfei Teng (Graduate Student) Rutgers University

Problem Statement

CBP-OFO needs decision support tools for Port-of-Entry (POE) planning for both optimizing operations and for long-term evolution. To this end, it needs flexible and high-fidelity simulation models that compute POE performance metrics, primarily waiting time statistics.

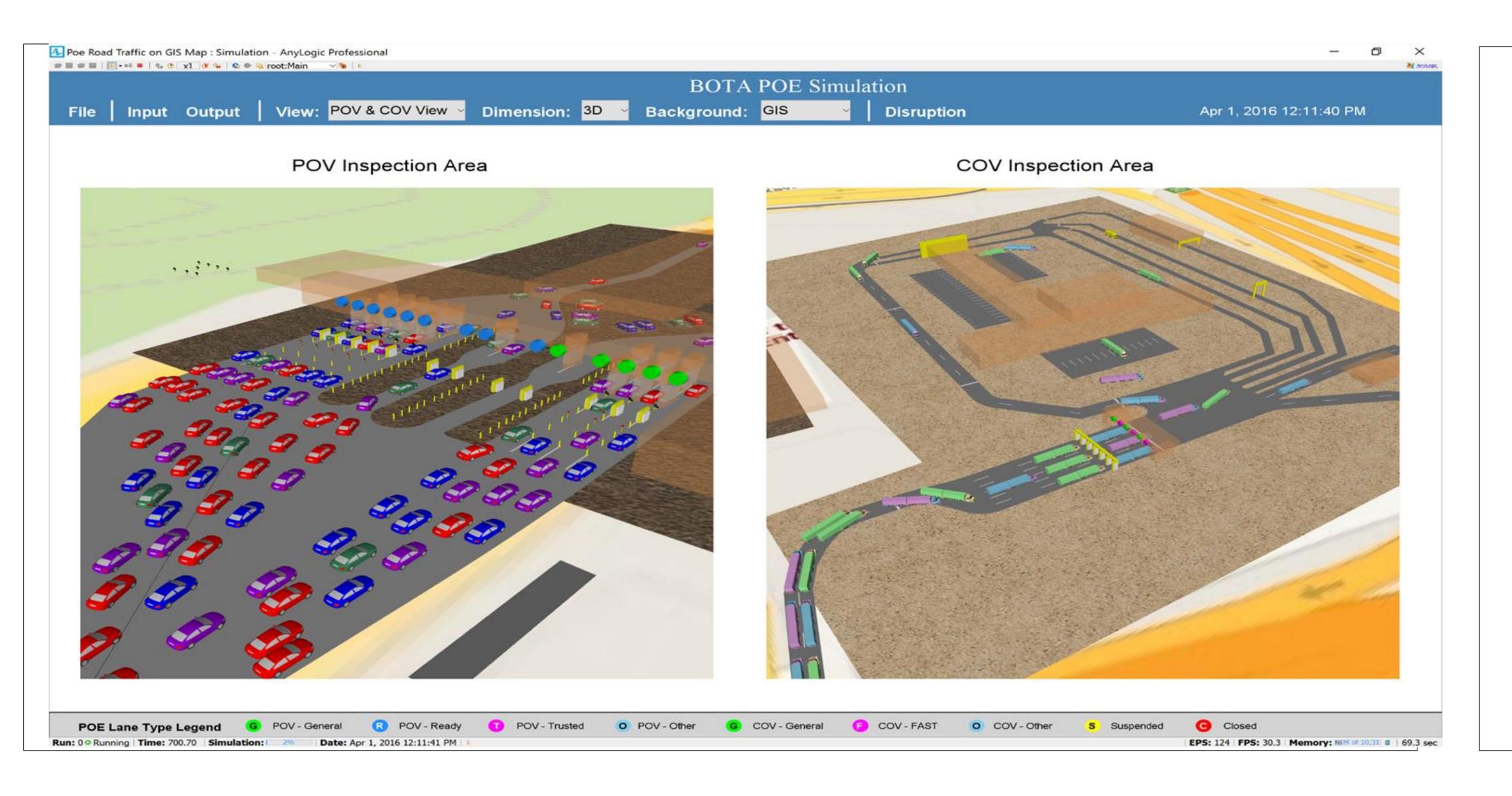
Project beneficiaries and end users CBP-OFO Analysts, port-of-entry directors, drivers crossing POEs.

Gains desired

Creation of a simulation tool and detailed POE models that allow flexible experimentation with POE configurations aiming to decrease POE driver waiting times and increase inspection personnel utilization.

Pains at present

Inability to flexibly gauge the impact of impending congestion due to traffic surges or disruptions, and experiment flexibly with mitigations.





This material is based upon work supported by the U.S. Department of Homeland Security under Grant Award Number 2015-ST-061-BSH001. This grant is awarded to the Borders, Trade, and Immigration (BTI) Institute: A DHS Center of Excellence led by the University of Houston, and includes support for the project Modeling Methodology and Simulation of Port-of-Entry Systems awarded to Rutgers University. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Department of Homeland Security.

Project products & services

- Suite of detailed POE simulation models, dubbed Port-of-Entry Simulation System (POESS)
- Accompanying documentation consisting of user guide and technical reports for each POE modeled

GAINS created

- Short term (evaluated by end-user satisfaction survey): ability to flexibly gauge the impact of impending congestion and experiment with mitigations, and better schedule inspection personnel
- Long term (evaluated by field measurements): shorter average waiting times and increased inspection personnel utilization

PAINS alleviated

- Long average waiting times of drivers at POEs
- Inefficient inspection personnel utilization

Key Accomplishments

- Developed a modeling and simulation methodology for POESS, documented in a technical report
- Completed a POESS simulation model of the Bridge of the Americas (BOTA) POE in El Paso, Texas, and its accompanying user guide and technical reports
- Validated the BOTA model and delivered it to our end-user analyst group at CBP-OFO
- Conducted a usability survey of end users yielding overall end-user satisfaction rate of 83.3%, well over the requisite minimum of 75%

Next Steps

- Modeling the Peace Arch POE in Blaine, Washington (in progress)
- Modeling the Calexico East POE in Calexico, California



BTI Institute Borders • Trade • Immigration A Department of Homeland Security Center of Excellence