

# Data-Informed Scenario Planning for Mobility Decision Making in Resource Constrained Communities

Jerome P. Lynch, Robert Goodspeed, Neda Masoud, Todd Shurn, Curt Wolf (University of Michigan), Tierra Bills (Wayne State), Pascal Van Hentenryck (Georgia Tech), Paul Gillespie, TJ Taylor (TCATA), Ryan Thyfault (Kinexus), John Egelhaaf, Kim Gallagher (Southwest Michigan Planning Commission)

Award Type: IRG, Solicitation FY 2018

**PROJECT GOAL:** The overarching goal of this project is to explore how under-resourced communities utilize smart and connected technologies to implement novel but lean solutions to address community challenges.

## COMMUNITY:

Project team works with the Benton Harbor (Michigan) community to explore the mobility needs of residents as they seek greater access to employment, healthcare and education. TCATA, the public transit provider, is a project partner.

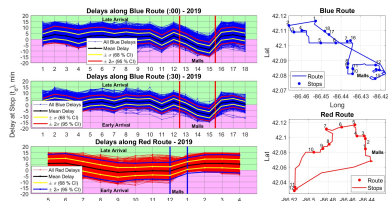


## INTELLECTUAL MERIT:

- Developing activity-based travel demand models representative of the small community
- Advancing machine learning to collect fixed route ridership origin-destination data
- Developing real-time optimization algorithms for route assignment and user trip planning
- Advancing data-driven scenario planning to achieve consensus with solution stakeholders
- Implementing solutions with TCATA and evaluating solution impact for community

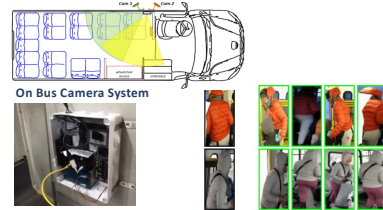
## MAJOR PROJECT ACCOMPLISHMENTS TO DATE:

- 1 Installation of commercial cellular GPS trackers to collect data on fixed and on-demand system performance



Distribution of Arrival Delays at Fixed Stops on Blue and Red Routes

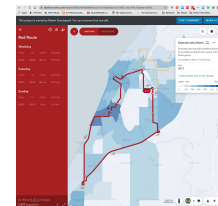
- 2 Trained Mask R-CNN detector and OSNet re-identification CNN to create O-D pairs of ridership without storing images



GPU Camera System

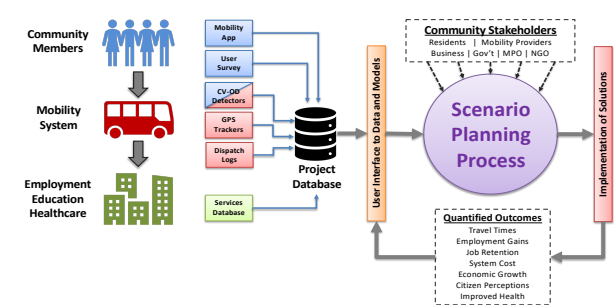
Re-identified Riders of the TCATA System

- 3 Implementing mapping platform for hosting community engagement for scenario planning



Benton Harbor Service Visualized in Remix

## OVERVIEW OF PROJECT SCOPE:



## BROADER IMPACTS:

- The project aims to improve mobility solutions that allow Benton Harbor residents to improve their access to jobs, healthcare and schooling
- Providing equal access to data ensures a higher level of trust between stakeholders aiming to solve community-based problems
- Scenario planning based on predictive analytics allow stakeholders to better contextualize data when envisioning possible futures
- Advancing how communities can benefit from research collaborations

## NEXT STEPS:

- We will be prioritizing the use of the service optimization framework that has been informed by the Benton Harbor activity-based travel demand model
- A dashboard is being created to share performance data with the community and to enhance awareness of the system performance
- An app that allow TCATA riders to find mobility solutions is near completion
- We are emphasizing the implementation of the scenario planning process to explore novel transit solutions and to predict solution impacts