UNIVERSITY TRANSPORTATION CENTER

RESEARCH BRIEF

PROJECT TITLE: **Application of Augmented Reality and Tangible Interfaces to Minimize Work Zone Effects on Mobility through Participatory Planning**

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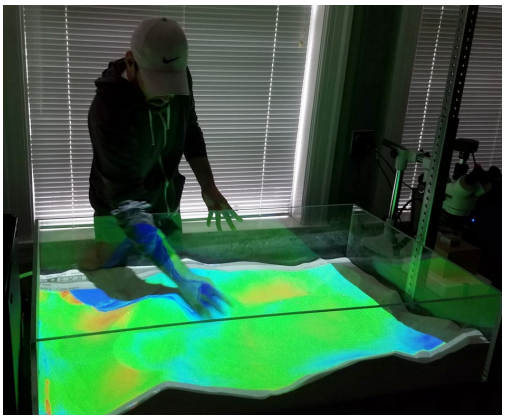
INSTITUTION: SINGLE-INSTITUTION PROJECT
ESTIMATED COMPLETION DATE: AUGUST 2020
SPONSORS: THE PACIFIC NORTHWEST TRANSPORTATION CONSORTIUM, OSU

Background

Highway work-zones account for about 10% of congestion, but are an absolute necessity in ensuring that our transportation infrastructure can meet the mobility demands of growing populations. Unlike other causes of congestions such as crashes, weather events, and rush-hour, work zones are a result of planned actions by stakeholders. Further, work zones require human workers to work in proximity to passing traffic, which creates a hazardous work environment. Therefore, the two issues of commuter mobility through work zones and worker safety motivate the development of novel means of planning for work zones by ensuring that all safety precautions are taken while still ensuring that commuters are not unduly affected. This research will thus develop a novel interface that enables decision-makers to obtain real-time feedback on work zone strategies through visualizations of how they affect both construction schedule and impact commuter mobility. The developed decision-support system will consist of a tangible interface and use augmented reality to enable participatory planning by difference stakeholders on the design of construction work zones. It is expected that the developed interface will enable participatory planning and provide a novel means of interacting with collected geospatial traffic data and in simulating traffic operations.



Research Project

This research uses augmented reality and virtual reality to provide real-time simulations of traffic flow through a work zone. Particularly, a tangible interface will be provided to enable stakeholders to physically interact with various work zone elements to view their effect on commuters in real-time. A review of the state of art and practice on the specification and standards for the design of highway work-zones will be performed to identify the key decision points. The Unity™ game engine will be utilized to create a reconfigurable highway work zone incorporating above decision alternatives and through which the flow of traffic will be simulated. The Vuforia™ augmented reality platform will then be used to enable users to create tangible markers to physically manipulate the work zone elements, resulting in changes that are immediately displayed in the ongoing traffic simulation. Finally the entire simulation will be set up on an AR sandbox interface that utilizes a camera and projector to enable decision-makers to physically affect the simulation by reconfiguring the work zone. It is expected this research will result in a novel interface to study and design work zones that enables rapid prototyping and simulation of different work zone configurations.