UNIVERSITY TRANSPORTATION CENTER

RESEARCH BRIEF

PROJECT TITLE: **Spatial Analysis of Accessible Seating Area on the Next Generation Passenger Rail Cars Using 3-D Modeling and Virtual Reality**

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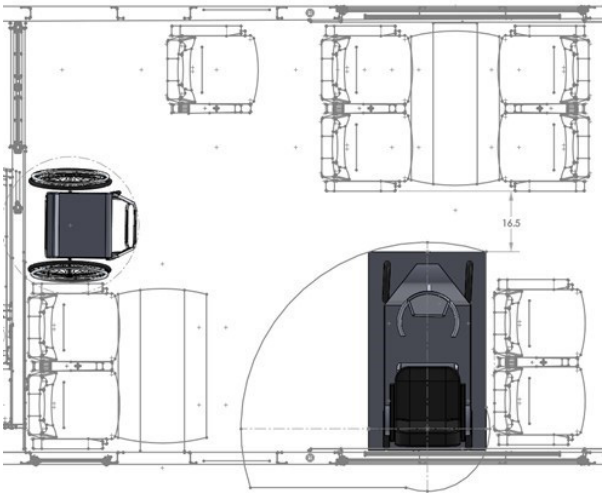
INSTITUTION: OREGON STATE UNIVERSITY

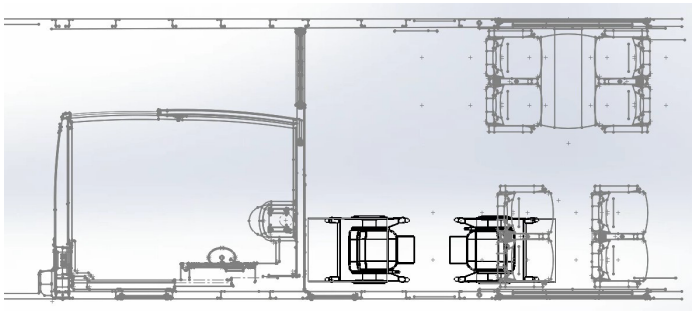
ESTIMATED COMPLETION DATE: AUGUST 2019

SPONSORS: THE PACIFIC NORTHWEST TRANSPORTATION CONSORTIUM, TRB IDEA

Background

The proposed project extends work that was conducted for the US Access Board and the Federal Railroad Administration. The previous project conducted a preliminary spatial analysis to determine if two or more wheeled mobility devices (WhMD) could be accommodated in the seating compartment on the next generation passenger trains. The previous project identified that it is possible to spatially accommodate two WhMD. Additional analysis is necessary to develop detailed layouts for the accessible seating area to accommodate two WhMD and also provide for containment of both occupied and unoccupied WhMD to optimize occupant protection of people who use WhMD and other passengers. The original project showed that it is possible to accommodate two WhMD with the loss of one or two revenue seats. The significant concern is that occupant protection and containment of WhMD is severely compromised.





Research Project

The original research that is proposed is to use 3-D modeling tools, anthropometric digital human models, and virtual reality to design and evaluate passenger rail environments for inclusivity and safety while also considering design constraints for vehicle builders and operators. By itself, 3-D modeling provides a means of digitally evaluating design feasibility of potential accommodations. Including anthropometric human models into early phases of design then accounts for human factors and ergonomic factors as well, however a physical mockup would still be required to access validity and target user opinion. It is proposed that creating a virtual reality environment based on evaluated 3-D models and using it for human subject evaluation will create a framework that eliminates the need for a potentially expensive and time-consuming physical mockup. Using digital evaluation would also permit the inclusion of analysis for many different types of WhMD, design scenarios, and anthropometric users within the same space. It is anticipated that one of the results of this project will be a framework for using 3-D modeling and virtual reality to evaluate and test spatial consumption, feasibility, human factors, and human-environment interaction on other modes of rail travel as well, for example transit and light rail vehicles.