UNC CHARLOTTE
The WILLIAM STATES LEE COLLEGE of ENGINEERING
Industrial Solutions Laboratory

Company Information

Company Name	*Freightliner Custom Chassis*	**Date Submitted**	*04/28/2021*
Project Title	*Design of a Virtual Reality Training Tool* **(FCCC_VR)**	**Planned Starting Semester**	*Fall 2021*

Senior Design Project Description

Personnel

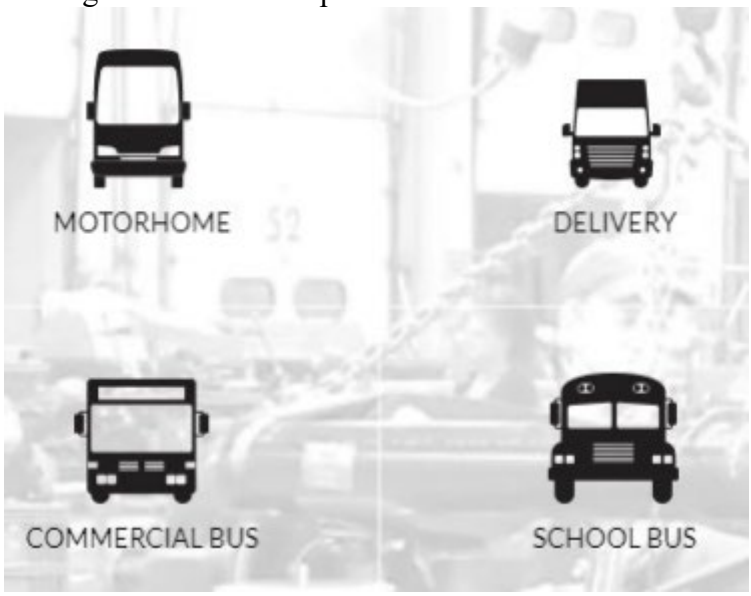
Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.

Please provide your estimate of staffing in the below table. The Senior Design Committee will adjust as appropriate based on scope and discipline skills:

Discipline	**Number**	**Discipline**	**Number**
Mechanical		Electrical	
Computer	4-6	Systems	
Other ( )			

Company and Project Overview:

Established in 1995 and trusted by some of the most respected names in the RV, walk-in van, commercial bus and school bus industries, Freightliner Custom Chassis Corporation (FCCC) is a leading manufacturer of premium vehicle chassis.



As part of the Daimler family, Freightliner Custom Chassis shares the heritage and engineering

excellence of Freightliner and Mercedes-Benz – leveraging expertise in heavy-duty durability and precision performance to infuse each of our chassis with the best of all worlds. Located in Gaffney, South Carolina, FCCC employs more than 650 employees in our manufacturing, customer support and retail facilities. As the world's largest manufacturer of diesel walk-in van chassis, nearly two-thirds of all diesel walk-in van chassis sold today are made by FCCC.

FCC holds more than half the market in Class A diesel motorhome chassis and more than a quarter of the market in conventional school bus chassis. Freightliner Custom Chassis is committed to delivering superior quality and a key component is operator training for assembly operations. This project will design improved technology for that training.

Project Requirements:

Training is key to delivering world class quality in Freightliner products. As a company driven by innovation, Daimler and Freightliner are constantly seeking new technology to improve quality. One idea that FCC would like to explore is to use Virtual Reality as a training tool. Virtual reality is appealing as it can be done in a safe environment where there is no risk of an untrained employee getting hurt in an unfamiliar environment or inadvertently impacting quality. The objective of the project is to develop a training platform capable of importing training templates to automatically create virtual reality training scenarios. To do this, three parts are envisioned. 1) Templates – templates are what a manufacturing engineer would fill out that document step-by-step instructions for the operation that is being trained. Team will design what the form of the template is and what technology/form, etc. is used. This would include a specification of which tool to use in the step and what the trainee is to do with the tool. 2) Create a VR environment that the trainee would train in. FCC would define a pilot work cell for this project to test this concept. Using FCC provided tools, the students will utilize Lidar 3D scanning assets to create virtual environment. 3) Method to download the template information into the VR environment to create a VR training tool that the trainee can work through to simulate the required operator steps in the work cell. After completing the virtual training, the student would graduate to a live environment. With the familiarity developed with the VR experience, it is envisioned that the trainee would be more comfortable in the live environment and contribute to product quality.

Expected Deliverables/Results:

- Training templates tools – a standardized tool to put step-by-step instructions into for loading into the VR module.
- Platform/technique to build the VR environment using scanning tools
- Process for loading templates into the training scenario VR environment.
- Implement and test use of the VR based training product to verify results comparison to traditional methods.
- Virtual reality training experience of **One Assembly** operation as a pilot

Disposition of Deliverables at the End of the Project:

Source software files, templates, final experience build to be delivered at the end of the project.

List here any specific skills, requirements, specific courses, knowledge needed or suggested (If none please state none):

- 3D Game engine knowledge
- 3D asset creation
- C# software programming
- VR experience
- Ability to travel to Freightliner location in Gaffney, SC as required for scanning and design reviews.