1. Software Development Plan
   1. Plan Introduction

This document serves as a Software Development Plan (SDP) for the rehabilitation driving simulator which will allow and assist rehabilitation for drivers who have been physically challenged in some way. The main users will be drivers who are practicing and learning how to driver again. The driving simulator will help drivers feel confident on the road again by allowing the drivers to drive on the tracks that we have created or altered. The simulator will provide a seat and controls, and the car seat will move around to provide haptic feedback to express the reality of driving. Precise computer controls is required to link to the controls and the simulated roadway to provide a life-like experience.This will help the user overcome the idea of anxiety and stress while being a new driver on the road.

The development of this project began on August 29, 2018. The team has completed several deliverables and have received certifications for research training. The team is required to make the driving experience as real as it can be. Therefore, not only is our task to create and program different driving tracks but we need to communicate with the mechanical engineers to make sure the hardware feedback is cooperating with the users control movements. The team is very passionate about the project and it is our goal to make the rehabilitation driving simulator as real as it can be.

* + 1. Project Deliverables
       1. Project Proposal/Presentation

The project proposal consists of a description of the project, and a justification of the project. The description provides a high-level overview of the project, and the justification explains the team's choice of project.

Due Week 2 (5 September)

* + - 1. Software Requirements Specification Document

The Requirements Specification serves as the contract between customer and development team, and as a road map of the specifications for the project. It formalizes the functionality that must be implemented through the project.

Due Week 5 (26 September)

* + - 1. Software Development Plan (complete)

The Software Development Plan (this document) is a detailed outline of all the documentation for and work that will be performed on the project over the course of the year.  
Due Week 7 (10 October)

* + - 1. Software Design Description Document (Architecture Section)

The Software Design Description (Architecture) presents details of the overall architecture of the software system, specifying the system components and their interrelationships.  
Due Week 11 (7 November)

* + - 1. Detailed Software Design Specification Document (Complete)

The Detailed Software Design Document provides all of the implementation details about all of the different parts of the project.   
Due Week 12 (14 November)

* + - 1. Unit Test and Integration Plan

The Unit Test and Integration Plan outlines the process which will be used to create the required final product. This document provides a detailed description of the software testing strategies used for the project.

Due Week 14 (28 November)

* + - 1. User's Manual Final Updates

The User’s Manual conveys to end users how the software is to be used. The Final Updates serve to describe the actual state of the system after development has been completed.  
Due Week 15 (5 December)

* + - 1. Final Presentations/Demonstrations

The purpose of the Final Presentation is to share the results of the project with the rest of the class and the department. Demonstrations are to offer hands-on, real-time interaction with the software (though this will clearly be somewhat difficult for our project, with its specialized hardware requirements).

Due Week 16 (12 December)

* 1. Project Resources

The software for this project will be developed by the team members working collaboratively to create tracks and courses for the users to practice and rehabilitate their driving skills. The team will also be completing all documentation, presentations, and anything else needed for the project.

* + 1. Hardware Resources
* SimGear GT Elite driving simulator
* 3 external monitors with HDMI connections
* WiFi or wired internet connections
* Windows system
  + 1. Software Resources
* Windows 10
* SimGear
* SimCommander 4
* SimTools
* VisualStudio
* Project Cars 2
* American Truck Simulator
* City Car Driving v1.5
* More TBD  
  1. Project Organization
     1. Deliverables:

The deliverables to-date are the Project Proposal and Presentation, Requirements Specification, Preliminary Development Schedule, and Software Development Plan. Geoff Colman and Jackson Myers completed the project proposal presentation and documentation. After, they both communicated with Simon Wroblewski and Marissa Alvarez to complete the rest of the documentation as a team. In the future, they will be completing the rest of the documentation together combining their unique ideas.

* + 1. Experiment Scheduler:

This UI-based component of the project will act as a launcher, initializing scripts to run our core software and its various components and extensions. By managing user profiles, it will also act as a means of tracking and saving data about individual participants.

* + 1. Training Scenarios:

For this task, we will be inviting volunteers who have signed the informed consent form to participate in research on simulated driving with quasi-haptic feedback. All of the team members will gather a few volunteers to gain more data for our project’s research goals.

* + 1. Test Scenarios:

This part of the software involves evaluating participants on their abilities to properly engage in novel driving scenarios, both with and without the haptics, based upon their training. Participants will be scored on various metrics, such as lane holding, stopping distance, ability to avoid collisions, etc.

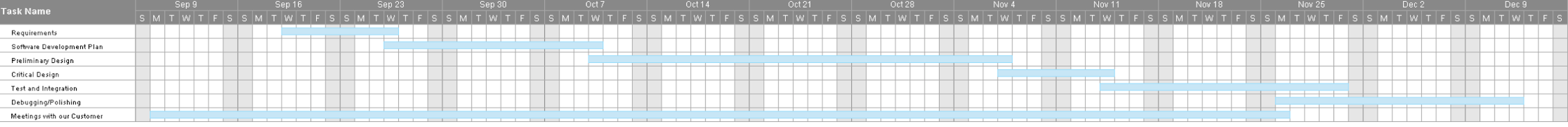
* + 1. Data Acquisition:

This piece of software will allow us to harvest data from training and test scenarios such that it can be analyzed for research. Saved data will remain associated with the user to judge areas of improvement.

* 1. Project Schedule

The project schedule provides information about the project outline.  
  
The first part of the project to be implemented will be the Data Acquisition (telemetry) system. Independent of any other subsystems, the ability to objectively evaluate the user is paramount to the research and therapy program.  
  
The next part of the project to be implemented will be the Test and Training Scenarios. As the respective structure and functionality is relatively closely related, it’s sensible to develop them in parallel.  
  
The next part of the project to be implemented will be the Experiment Scheduler. This component is the user application that will bring all of the other pieces together by managing their execution and data.

* + 1. Pert/GANTT Chart



* + 1. Task/Resource Table

|  |  |  |  |
| --- | --- | --- | --- |
| Task | Software Resources | Hardware Resources | Human Resources |
| Experiment Scheduler | TBD | TBD | TBD |
| Training Scenarios | SimCommander, Simtools, ATS, PC2 | SimGear, external monitors | TBD |
| Test Scenarios | SimCommander, Simtools, ATS, PC2 | SimGear, external monitors | TBD |
| Data Acquisition | SimCommander, Simtools, ATS, PC2 | SimGear | TBD |
| Deliverables | Google Docs, Slack | N/A | Marissa, Geoff, Simon, Jackson |