Design Document_Group 12_ISS

1. Introduction

The purpose of this document is to explain the needs of our client and how we plan to address them. As software development is an iterative process, it is expected that the actual product will evolve during development. What is proposed here should be treated as an initial standard rather than a rigid description of the final prototype.

Key Definitions:

- **ISS** is an acronym that stands for the International Space Station
- **HMD**
- (Insert term here)
- (Insert term here)
- (Insert term here)
- (Insert term here)

This document first reviews the needs of our client, the various constraints imposed by these needs, and details the potential risks that may be faced during development. It then goes into more detail about the specific functionality of the planned prototype and provides two operational scenarios describing the experience of two hypothetical users.

2. General Overview and Design Guidelines

2.1 Client Needs

Our client is a science/history teacher for high-school age children and wants to give students hands on experience with the history of the International Space Station and its ongoing scientific impact. Specifically, she wants students to be able to reenact an important scientific experiment in order to understand its significance and how the ISS was essential in making the experiment possible.

2.2 Design Constraints

2.2.1 Hardware Constraints

The ISS's pressurized module, where most experiments have been conducted, is 67 meters (218 feet) in length, and the inside is very cramped with all The equipment that is required by the crew and various experiments. Based on

these facts the hardware should be able to support a trackable space at least 12' in length while the width could be 6' at a minimum. The hardware used must be able to support a tracked space of this size. Either a wired or wireless HMD can be utilized based upon availability or preference. However, a cable management system is recommended if a wired HMD is used.

External tracking systems are recommended if available for their addition to the overall accuracy as the utilized space should remain static and will not be moved often if at all.

Based on the above constraints the user can use most commercially available HMD's on the market today with specific choices being determined by preference. For a more enhanced graphical experience and more accurate tracking systems, the Valve Index is recommended. For a more budget friendly option, the Quest series of HMD are acceptable and will not impact the overall performance of the final product.

2.2.2 Software Constraints

(I'm not sure what to put here as we have not talked about any particular experiments that would use software. Maybe a decent familiarity with Unity?)

2.2.3 User Constraints

Users must conform to typical requirements for HMDs (e.g. cannot have epilepsy, must not be extremely susceptible to motion sickness), with an added emphasis on not being extremely susceptible to motion sickness as there is likely to be some form of zero gravity movement which could negatively impact users.

2.2.4 Physical Constraints

This application needs to be deployed in a minimum of a 12’x6’ space with a level floor. Users must be completely unobstructed within this space.

2.3 Risks

(Shouldn't be any real risks associated with using this product beyond the usual risks associated with physical simulations. If you have any ideas feel free to add them here.)

3. System Design

3.1 Supported Tasks

3.2 Environment Description

3.3 Locomotion and Interaction

4. Operational Scenarios

4.1 First Scenario

4.2 Second Scenario