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Summary

Lockheed Martin has requested the design of one pair of virtual reality gloves to use in military training simulators. The gloves will need to be accurately tracked in real time and provide recognizable haptic feedback in the form of vibrations. The gloves will be used in an M1A2 Abrams tank simulated environment.

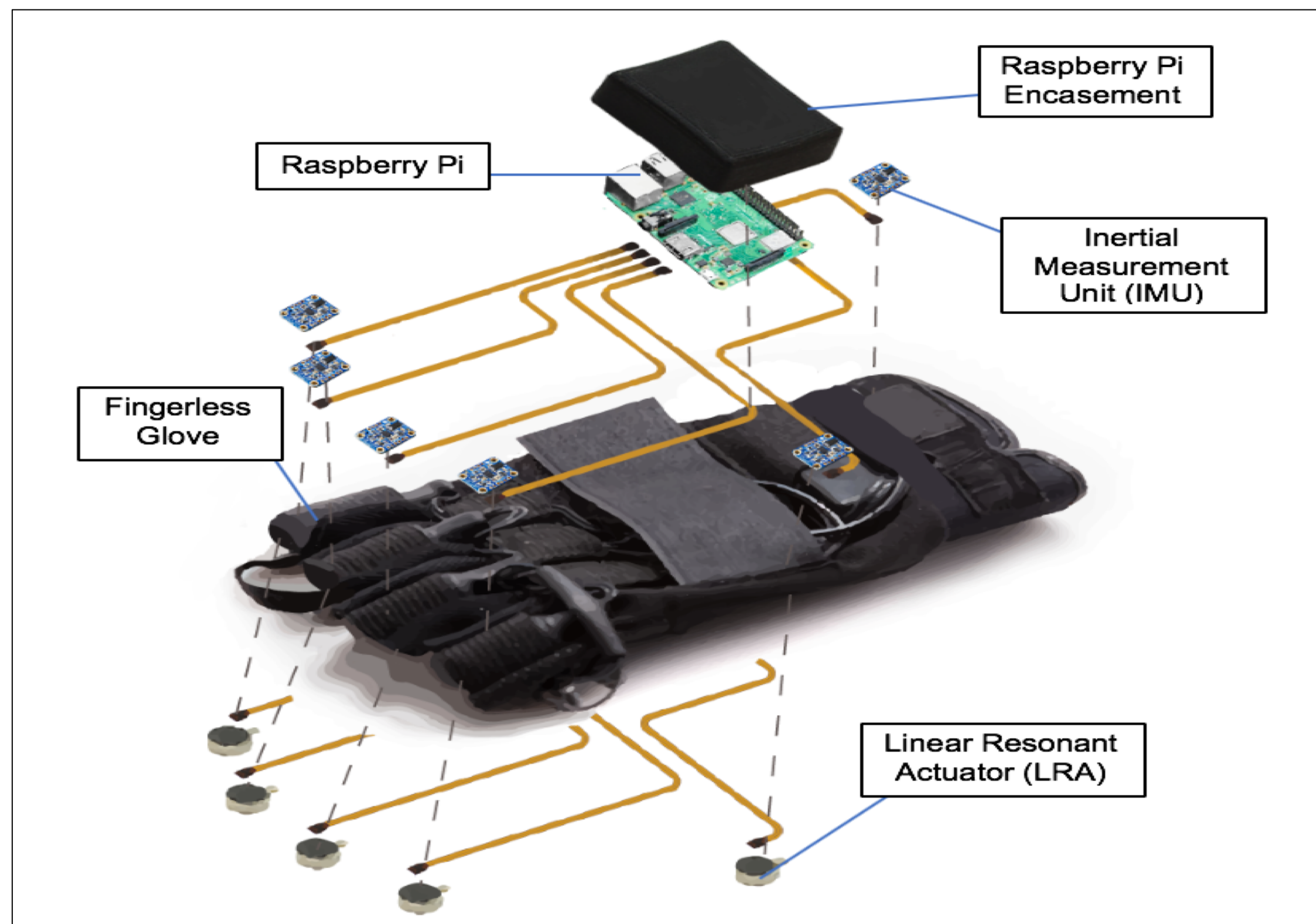
Background

- Current training simulators are large physical recreations of military vehicles. This causes the simulators to be bulky, expensive, and require a lot of time and work for setup.
- The U.S. military is attempting to replace these current simulators by creating mobile training devices that employ virtual reality feedback. These devices will include both haptic and tactile feedback to provide a realistic environment that will supply a non-visual confirmation that the user has come in contact with some object in either the physical environment or the virtual environment.
 - **Haptic feedback:** is the sensation of touch from interaction with the virtual environment. The haptic feedback will deliver a confirmation that the user came into contact with the environment without having to visually check.
 - **Tactile feedback:** is the sense of touch felt within a physical environment. For the most realistic training experience, tactile feedback is essential to incorporate into training systems.

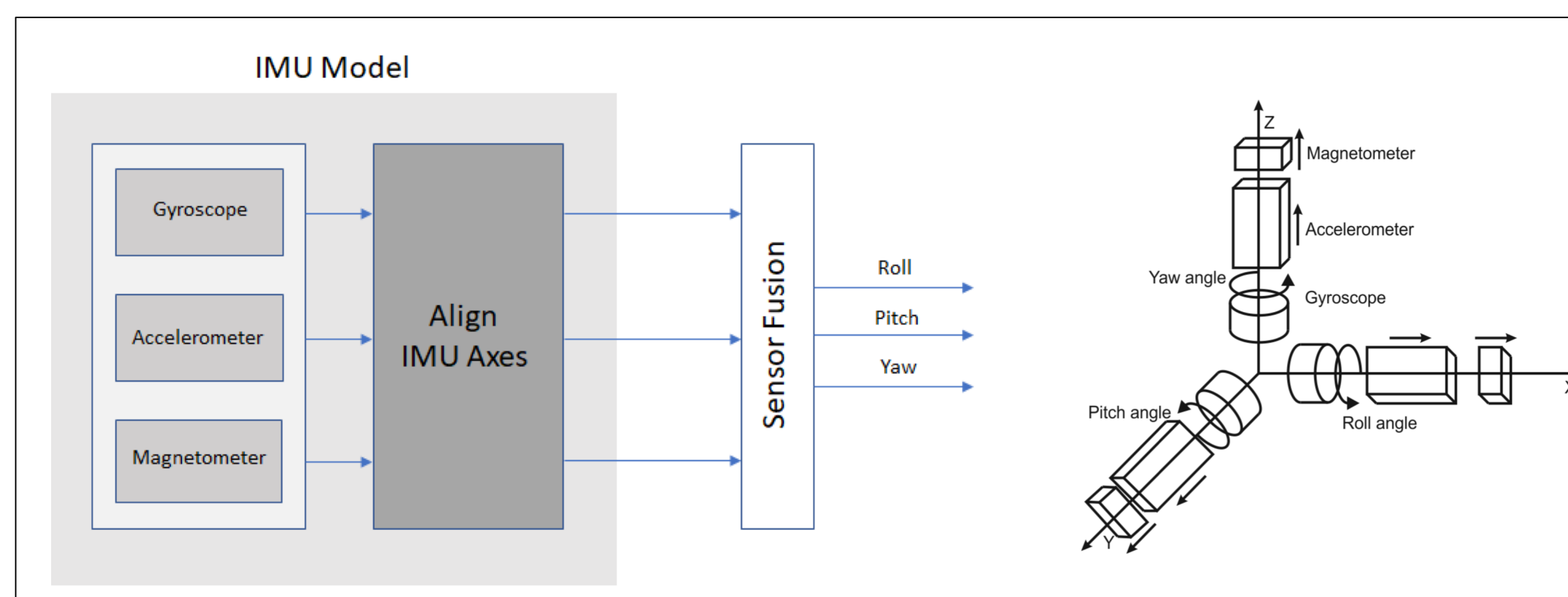
Objectives

- Design a pair of gloves that are portable, lightweight, and durable
- Provide haptic feedback for the palms of both hands and all ten fingers
- Design the virtual environment using Unity real time graphics engine
- Overall design compatible with the HTC Vive VR system

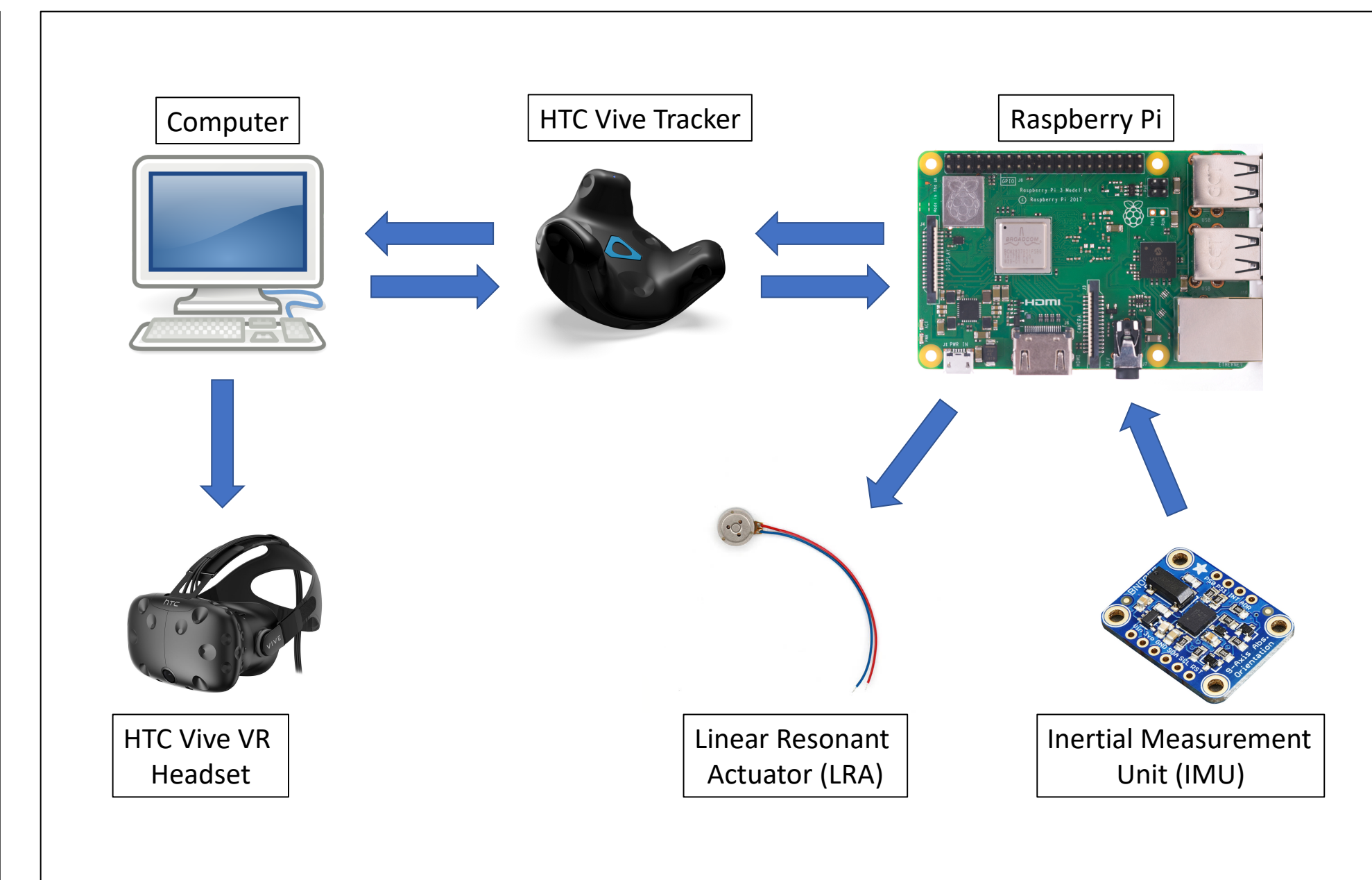
Design Components



Tracking System



Communications System



Future Work

Design Components

- Perform prototype testing
- Finalize designs and dimensions

Electronic System

- Assemble electronic components
- Perform initial testing

Software Design

- Implement a virtual reality environment using Unity
- Configure tracking and feedback system to interact with virtual environment

Acknowledgments

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