



Virtual Reality Tracking and Realistic Haptic Feedback Gloves



Team Introductions



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Project Background

- Sponsor: Lockheed Martin
- The purpose of this project is to improve current virtual training systems at Lockheed Martin through the design of Virtual Reality gloves that will reduce the cost and size of current simulation systems while still providing realistic feedback to the user



Figure 1: (a) A Lockheed Martin F-35 Flight Simulator.



Figure 1: (b) Same simulator at a different angle

Alexandra Hollabaugh

Customer Needs



- Provide haptic feedback when interacting with the virtual environment
- Provide tactile feedback when interacting with the real world
- Durable design while maintaining a low profile
- Able to easily transfer from one user to the next
- Allows for uninhibited range of motion
- Hypoallergenic and easily sanitized

Alexandra Hollabaugh

What is VR?

- VR stands for virtual reality and is a relatively new technology
- A headset allows for full emersion into a virtual world
- Wands are used as controllers to interact with the environment while providing limited feedback



Figure 2: Example of an HTC VIVE Pro Headset and Controller

Drawbacks of Existing VR Gloves

- Current examples are expensive
- Have numerous wires and tubes connected to the base
- Do not retain the ability to feel interactions with a non-virtual environment
- Use bulky tracking systems



Figure 5: Example of current Haptic Feedback Glove. (HaptX glove)

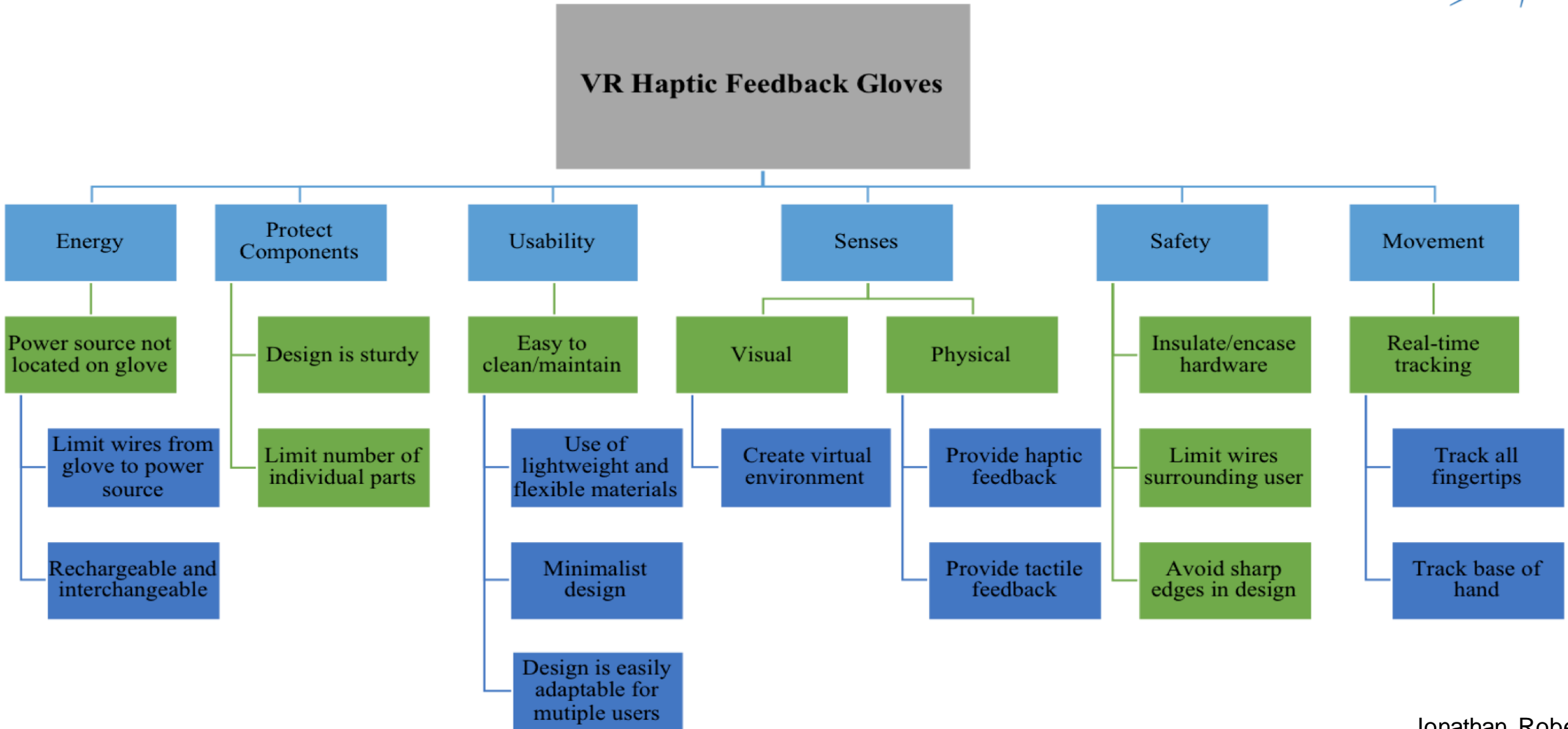
Jake Kennedy

Project Goals



- 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

Functional Decomposition



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Functional Decomposition (cont'd)

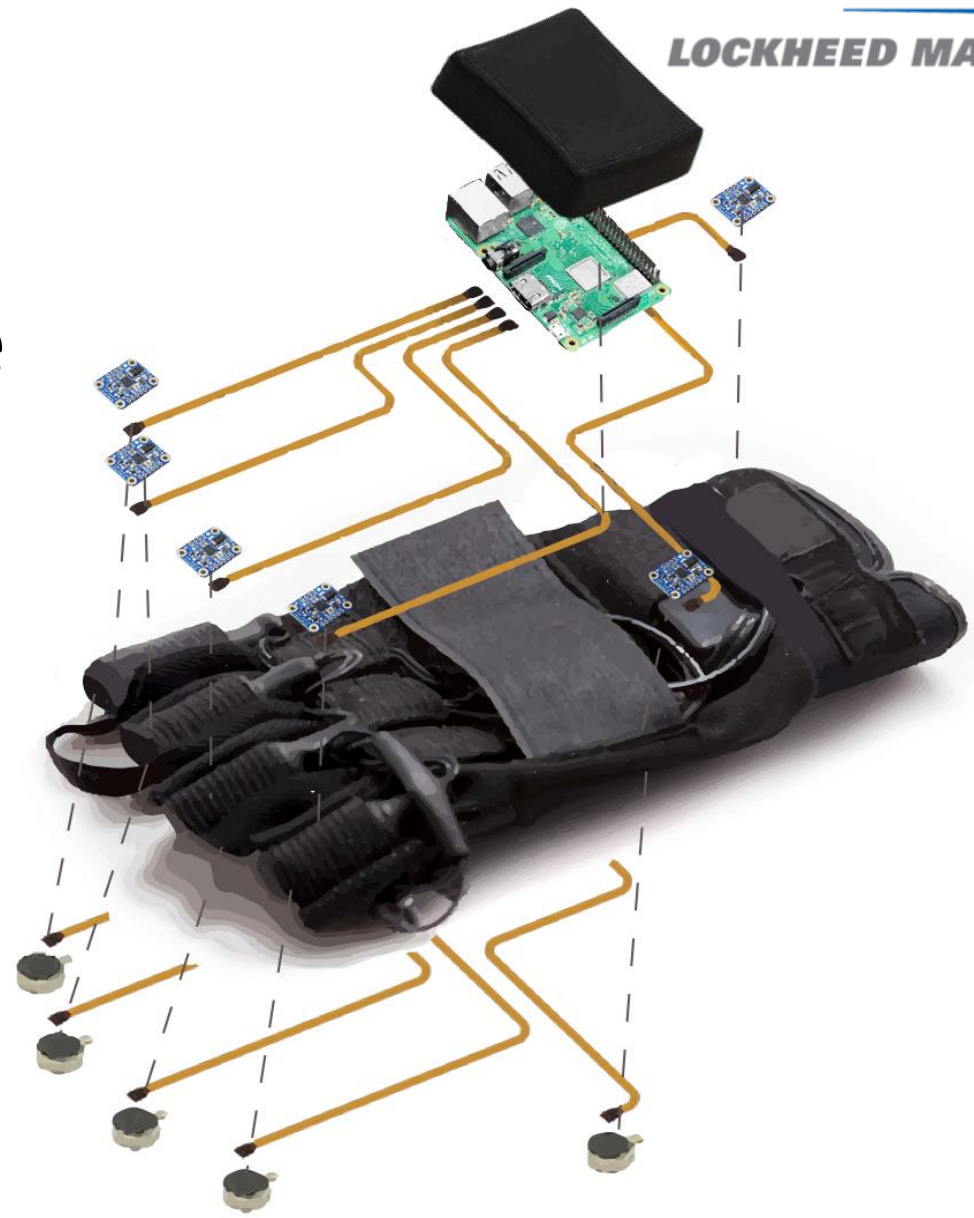


- Track the movement of hands and fingers in real time
- Provide haptic and tactile feedback for the hands
- Allow design to be easily adaptable for multiple users

Jonathan Roberts

Moving Forward

- Mount electronic hardware
- Interface all electronics
- Program electronics
- Integrate hardware with virtual environment



Jonathan Roberts

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