

# Assignment 1 – Proposal

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INFR 3380U: Industrial Design for Game Hardware

Roderick “R.J.” Montague (100701758)

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# Agenda

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- Project Description
  - Project Definition
  - Project Justification
- Design Thinking Process
- Product Comparison
- Planning
- Conclusions
- References



# Project Description

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Defining and Justifying the Project

# Project Definition

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- **Product:** Haptic Glove Lite (HG Lite)
- Haptic Glove for Haptic Feedback
  - No Force Feedback/Movement Restriction
  - Designed for Virtual Reality
- Use in Combination with Other VR Tools
  - Slim, Consumer Oriented Design
  - Low Cost



# Justification

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- Virtual Reality Industry is Growing
  - Oculus, PlayStation VR, Etc.
- Enhance VR Experience
  - Enhancing Without Changing Playstyle
  - Add-on for Existing Systems
- Ease of Access for Consumer



# Design Thinking Process

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The 5 Stages of the Design Thinking Process

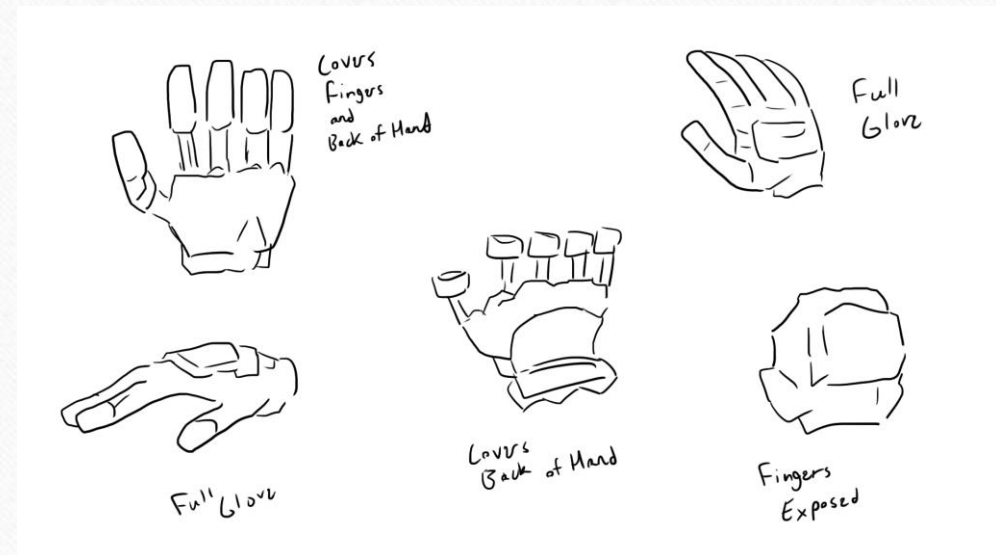
# Steps 1 and 2: Empathise and Define

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- Virtual Reality is Currently Expensive
  - Prices Going Down in Future
  - Need Affordable Solutions
- Lack of Haptic Feedback Hurts Immersion
  - Lack of Impact and Weight

# Step 3: Ideate

- Slim, Lightweight Design
  - Compact Design
- Testing for Different Levels of Coverage
  - Only Fingers, or Fingers Exposed
  - Palm, Backhand, or Whole Hand
- Need to Consider Hardware





# Steps 4 and 5: Prototyping and Testing

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- Physical Mock-up for Later Assignment
  - Define Look and Size
- 3D Model and Digital Representation
  - Unity Demonstration
- Likely Little to No Physical Testing
  - Concerns Realization of Hardware

# Product Comparisons

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Product Timeline

# Teletact I and II (1990 – 1991)

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- Teletact - Early Haptic Glove Prototype Released in 1990
  - Produced by UK National Advanced Robotics Research Centre
  - Utilized 20 Air Pressure Pockets
- Teletact II – Enhanced Glove Released in 1991
  - Improved Air Pocket Density, and Two Pressure Ranges
- Air Pocket Inflation/Deflation for Simulation



Teletact II



# Cyber Glove Systems (1990 – Present)

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- Haptic System Hardware and Software Company
  - Founded in 1990, Devested from Parent Company Immersion Corporation in 2009
  - Sells Variety of Haptic Products
    - CyberGlove (Motion Capture), CyberTouch (Haptic Feedback), CyberGrasp (Force Feedback), etc.



CyberGlove II & III



CyberTouch II & III



CyberGrasp

# Senso Glove (2018 – Present)

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- Started Production in 2015
  - Released First Revision in 2018
- Controller for Virtual Reality and Augmented Reality
- Inexpensive, Ease of Access Haptic Glove
  - Available in Various Sizes





# HaptX Glove DK2 (2021 – Present)

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- Advanced HaptX Glove Announced in January 2021
- Displace User's Skin as Haptic Feedback
  - Additional to Vibration and Force Feedback
- 130 Discrete Points of Tactical Feedback
- High Accuracy Hand Tracking





# bHaptics Tact Glove (2021 – Present)

- Slim Haptic Gloves for Virtual Reality
  - Announced December 2021
    - Developer Kits Releasing in 2022
  - Consumer Oriented
  - Hand Tracking Capabilities
  - Haptic Feedback, But No Force Feedback
- Usable with Existing Headsets
  - E.g., Quest 2 and HoloLens 2



# Planning

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Project Plans

# Planning – Deliverables and Due Dates

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- Assignment 2 – Electronics Prototype – 02/18/2022
- Assignment 3 – Design – 03/11/2022
  - Technical Drawings, Parts, Assemblies, and Simulation
- Assignment 4 – Progress Presentations – 03/18/2022
- • Assignment 5 – Makerspace – 03/25/2022
  - Iterative design and 3D Printing
- Final Presentation and Report – 04/14/2022



# Conclusions

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Project Summary

# Conclusions

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- **Project Idea:** Haptic Glove Lite (HG Lite)
- Haptic Components Enhance Virtual Reality
- VR is Expensive – Need Common Use Solution
  - VR Gaming of Interest
- Provides Haptic Feedback to VR Interactions
  - No Movement Restrictions
  - No Hand Movement Tracking



# References

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Citations



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Thank You For Listening