

Natural User Interface and Virtual Reality Integration in Video Games

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1 Introduction

One of the current issues in the gaming industry, specifically in real-time strategy (RTS) gaming, is figuring out a way to provide the user with more a immersive and enjoyable experience. The standard RTS game implements multiple dimensions by a layered style of interactions. Two layers: ground and sky. Units exists in either layers and most units can only interact with at most one layer. This emulates a three dimensional strategy game, but is not truly three dimensional. This is the initial question – is it possible to have a truly three dimensional RTS game?

Based on the emergence of virtual reality and natural user interface technologies, the challenge may very well be answerable. The traditional keyboard and mouse with a monitor is incapable of interacting with three dimensional space easily. The only possible way is to keep one axis constant and then move along the other two. A natural user interface, however, receives input in three-dimensional space from the physical world. Virtual reality is then used to help aid the player immersion and camera perspective. The question now becomes – is it possible to integrate virtual reality and natural user interface to create a truly three dimensional RTS game?

2 Problem Statement

Design and develop a true three dimensional RTS game integrating virtual reality and a natural user interface.

3 Technologies

- Virtual Reality: Oculus Rift
- Natural User Interface: Leap Motion
- Game Engine: Unity

4 Core (Primary) Deliverables

4.1 Interfaces

- Display the scene in virtual reality interface.
- Scene camera rotates as the virtual reality interface rotates.
- Receive input from a natural user interface and perform the corresponding actions associated with each gesture.
 - Camera Zoom
 - In-Game Pause
 - Menu Interactions
 - Unit Selection (Single Selection, Group Selection)
 - Unit Movement (Point-and-Click)
 - Unit Actions (Attack, Construct)

4.2 Game

- Multiplayer Connectivity with Another Player
- Two Spaceships
 - Mothership
 - Fighter

4.3 Misc.

- Main Menu
- Network Lobby
- Minimal HUD

5 Secondary Deliverables

5.1 Interface

- Unit Actions (Repair, Allocate Internal Resources, Replace/Upgrade Modules)

5.2 Game

- Resources
- Variety of Spaceships
 - Cruiser

- Frigate
- Spaceship Module Framework
 - Engine
 - Matter Generator
 - Power Generator
 - Radar
 - Shields
 - Stealth
- Spaceship Weapons Customization
 - Laser
 - Missile

5.3 Misc.

- 3D Models
- Expanded HUD
- GUI
- Sound Effects
- Music

6 Timeline

Winter 2015		
Week 4	Jan. 26	Specification (Version 1) Design (Version 1)
Week 8	Feb. 23	Testing Documentation
Week 9	Mar. 2	Prototype
Week 10	Mar. 9	Specification (Version 2) Design (Version 2)
Spring 2015		
Week 5	Apr. 27	Beta System
Week 6	May 4	Final Testing Documentation Preliminary Delivery
Week 9	May 25	Final System
Week 11	Jun. 8	Presentation