Natural User Interface and Virtual Reality Integration
in Real-Time Strategy (RTS) Games

Last Revised: January 22, 2015

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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