ESE 350 Final Project Proposal:

Wireless Rifle Controller for the Nintendo Entertainment System

**Introduction**

Over the past decade, video games have become increasingly more interactive. Players are no longer tethered via button presses but are now free to physically interact with their favorite games. In 1998, the first Dance Dance Revolution arcade game hit Japan. In 2005, Red Octane introduced Guitar Hero. Now with the Nintendo Wii, we have an entire collection of games that utilize motion-sensitive controllers for game play. However, these new motion-sensitive controllers are not always backwards-compatible with older games and game consoles.

**Project Overview**

To promote the spirit of interactivity for all games, past and present, we propose the development and implementation of a wireless rifle controller for shooter games on the Nintendo Entertainment System (NES). We would like to provide players with a more natural interface instead of the classic NES controller (Directional Pad, A, B, Start, and Select). Specifically, we will develop this wireless rifle controller to play a classic NES game called Cabal. Our idea is to take a stock toy gun and mount an accelerometer-enabled microcontroller on or inside of it. This will allow players to physically move the controller to play the game, providing a more interactive gaming experience.

Cabal has two game play states: strafing and firing. While in the strafing state, the directional pad moves the character in the game. To switch to the firing state, the player holds down the “A” button to shoot the character’s weapon, causing the character to become stationary. While in the firing state, the directional pad moves the crosshair to direct the firing of the weapon.

We intend to map the player’s physical movements to the controller buttons using a Firefly microcontroller node (one on each gun and two receiver node as well). An added benefit of using this input device will be that it is wireless, allowing players freedom of movement while playing.

**Materials**

* (1) NES Game Console\*
* (1) Cabal video game\*
* (2) NES controllers ($20)
* (2) “RuffStuff Electronic Blasters Combat M16” toy guns ($20)
* (4) Firefly microcontroller nodes\*
* (2) Firefly Basic Sensor Boards\*
* (1) Firefly programmer/debugger board\*

\*Previously acquired

**Project Plan**

To best manage our time and resources, we have divided the project into 3 phases to be completed over three weeks.

1. Interface Firefly microcontroller node with NES controller to understand how the controller communicates with the game console.
2. Interface Firefly microcontroller node with NES game console and the PC to send controller input using the serial terminal.
3. Install Firefly microcontroller node in toy gun and wirelessly transmit accelerometer data to Firefly receiver node.

**Supplementary Goals**

If time allows, we may pursue these additional project goals:

* Install DC motor in toy gun for vibrational “force feedback” while firing.
* Use IR detection for motion-sensing instead of accelerometer
* Adapt controller for an additional game
* Adapt controller for an additional game console (e.g. Super Nintendo)