**Abstract**

This document will explore the various components of the ‘Autonomous Search and Destroy Robot’. It will go into details about every aspect of the machine from the software and all the logic involved, to the hardware. From the locomotion, to the color, target detection, and firing. All of these will be discussed in this document.

**INTRODUCTION**

The goal of this project is to build a robot capable of seeking out and firing at targets at ranges of 2,4, and 6 feet. To accomplish this, the robot will move along a track of 1” reflective tape which will be used to chart a course for the robot to follow. Along the course, there are 3 points at which red tape is placed. When the robot detects the red tape, it’ll come to a halt and seek out the targets which will produce light of 20Hz and are 1.5 feet off the floor. When the target has been located and fired at, the robot will continue along the track till it detects another patch of red tape and the targeting and firing process will be repeated on this occasion and once more after this instance. The robot will then head back to the beginning of the course till it detects green tape which will cause it to stop. Details of how all this will be accomplished will be revealed in the coming paragraphs.

**FIRING MECHANISM**

When the color sensors beneath the Rover detect the red tape, the servo will then rotate the frequency detection circuit to pick up the frequency. When the target has been located by the phototransistor and filter at large, a second servo will turn the firing mechanism in the direction of the target. To ascertain the location of the target, a bandpass filter will be utilized. The firing mechanism will feature an airsoft gun gearbox and motor. The Airsoft A36GC will be mounted on a servo which will be used for targeting. The gearbox will consist of a system of 3 gears which will draw back a spring, this will enable the gun reload. A magazine will be situated under the nozzle with an opening enabling more rounds to enter the chamber. A spring beneath the magazine will push the rounds into the chamber. The main component of the firing mechanism is the motor which will control the gears. The operation of this motor will be handled by a MOSFET which will act as a switch. The will be no current flow from the drain to the source of the MOSFET when the gate is in an active low state. The source of the MOSFET will be connected to the motor while the gate will be connected to the Basys 3 board. When the input of the gate is at an active high then current will be allowed to flow into the motor. Hence, the MOSFET will act as the trigger.