Brush Buster

By Trina Thompson, Owen Walley, Natasha Wray
Dr. Lucas Craig, Cullen Haskins, Mechanical Engineering Technology, Capstone

Introduction

Due to poor ergonomics, lack of height adjustability, and cumbersome design, traditional lawn-trimming tools often cause discomfort, including lower back pain, numb hands, and strain. A lightweight, adjustable, and ergonomic solution that minimizes physical strain while ensuring efficient lawn care is needed.

Figure 1: The physical strain experienced from weed whacking.

Design Requirements

Design Requirmenets	
Level 1	Level 2
basic	Simutanious operation of vehicle and trimmer
basic	Easily accesable emergency stop
basic	Translation of the trimmer head in the horizontal plane
performance	Long battery life
performance	Operatable without intervention on 90% of lawn terrains
performance	Removable batteries
performance	Gaurds to potect from weed spray
excitement	Rotation of trimmer head around at least one horizontal axis
excitement	Connection range 40ft/min
excitement	Simple controls
excitement	Means for string release

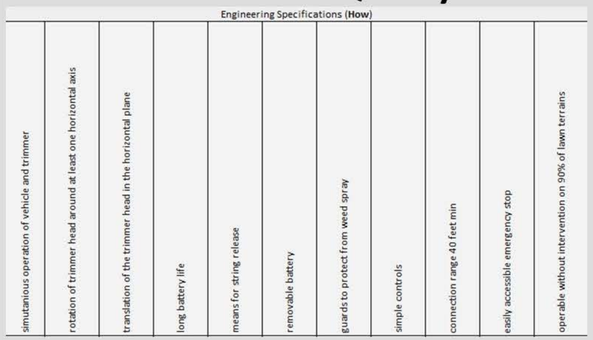
Background / Research

Parts Selection / Terminology

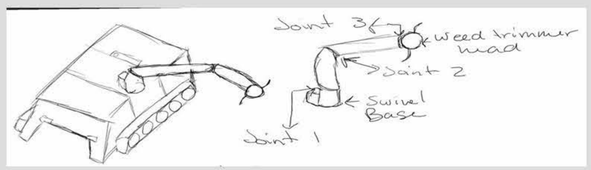
Capstone Objectives

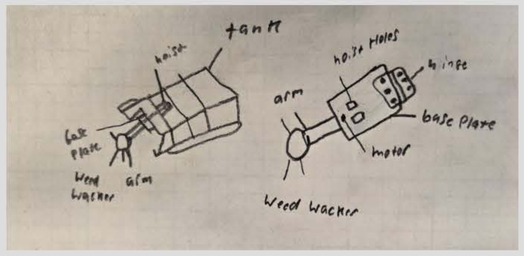
- Research and design a remote-control device to weed whack
- Assemble the Spyker Robot RC tank
- Research, design, build, and test two mounting arms to hold a battery powered weed whacker head and determine the best option
- Present a poster presentation and submit a design report

House of Quality



Pre-liminary Analysis



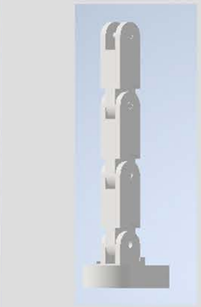


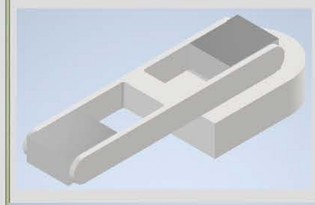
Budget:

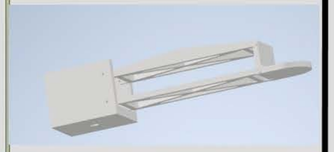
Items	Link	Cost	Quantity	Subtotal
2X Spyker KAT	SpykerWorkshop	$2,305.00	1	$2,305.00
Tactic RC controller	Amazon	$ 73.99	2	$ 147.98
Black filament	Amazon	$ 27.98	2	$ 55.96
Black filament return fee	Creality	$ 12.90	1	$ 12.90
Servo 5th scale	Amazon	$ 36.99	4	$ 147.96
Ego weed trimmer	Lowes	$ 329.00	1	$ 329.00
12-volt battery	Home Depot	$ 27.00	3	$ 81.00
Spyker STL files (missing pieces)	Spyker Workshop	$ 40.00	1	$ 40.00
Spyker STL files (Top)	Spyker Workshop	$ 8.00	1	$ 8.00
Electrical wire 12 gage	Amazon	$ 19.99	2	$ 39.98
Miscellaneous expenses		$ 50.00	1	$ 50.00
Bearings		$ 50.00	1	$ 50.00
Total (Actual)			20	$ 814.80
Total Submitted for Proposal				$ 964.72

Development of Mounting Arms

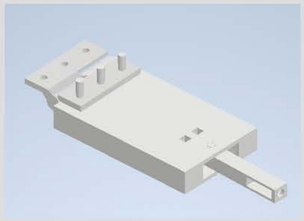
Arm 1



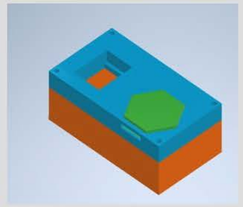


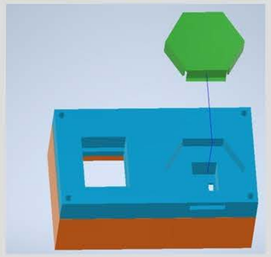


Arm 2

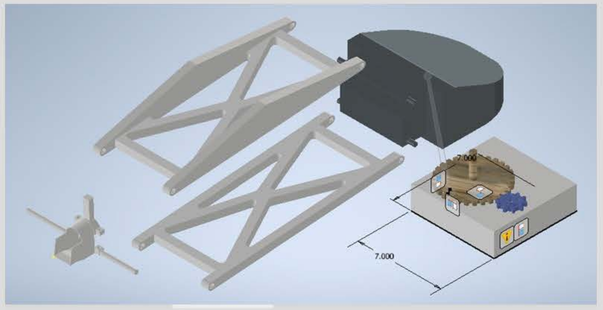


Shift to electronics box

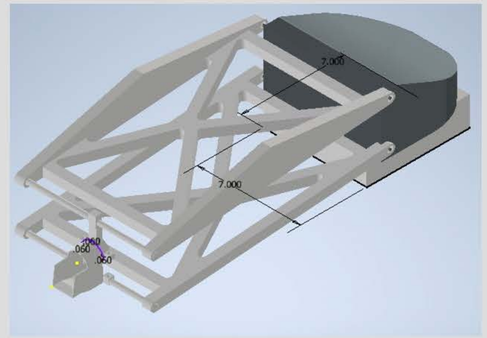




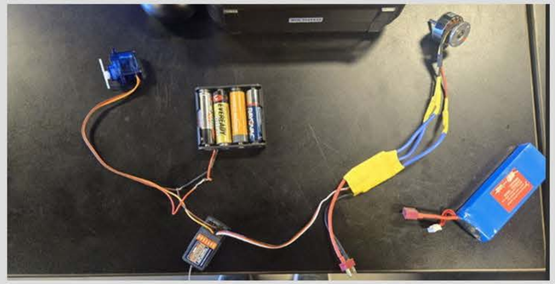
Construction of Arm/etc.



Final Design



Experimental Results



Summary

This project involved designing and building a remote-controlled (RC) tank modified to carry and operate a weed trimmer for autonomous or remote vegetation clearing. The primary objective was to create a compact, mobile platform capable of trimming grass and weeds in hard-to-reach or potentially hazardous areas without human intervention.

Complications

- Timing and communication with fellow partners
- Start with inventor models early for several redesigns

Future Work

- Getting the weed trimmer and the RC controlled by one interface
- Getting more range of motion
- Sensors to detect something near or interfere and its emergence stop
- mapping for the backyard to auto-trim