MEMORANDUM

To:	John Ridgley, Mechanical Engineering, Cal Poly SLO	
	jridgely@calpoly.edu	
From:	Jessica Perez	jpere180@calpoly.edu
	Nathan Chapman	ncchapma@calpoly.edu
	Jacquelyn Banh	jrbanh@calpoly.edu
Date:	2/3/24	
Subject:	ME405 Term Project: Preliminary Design Review	

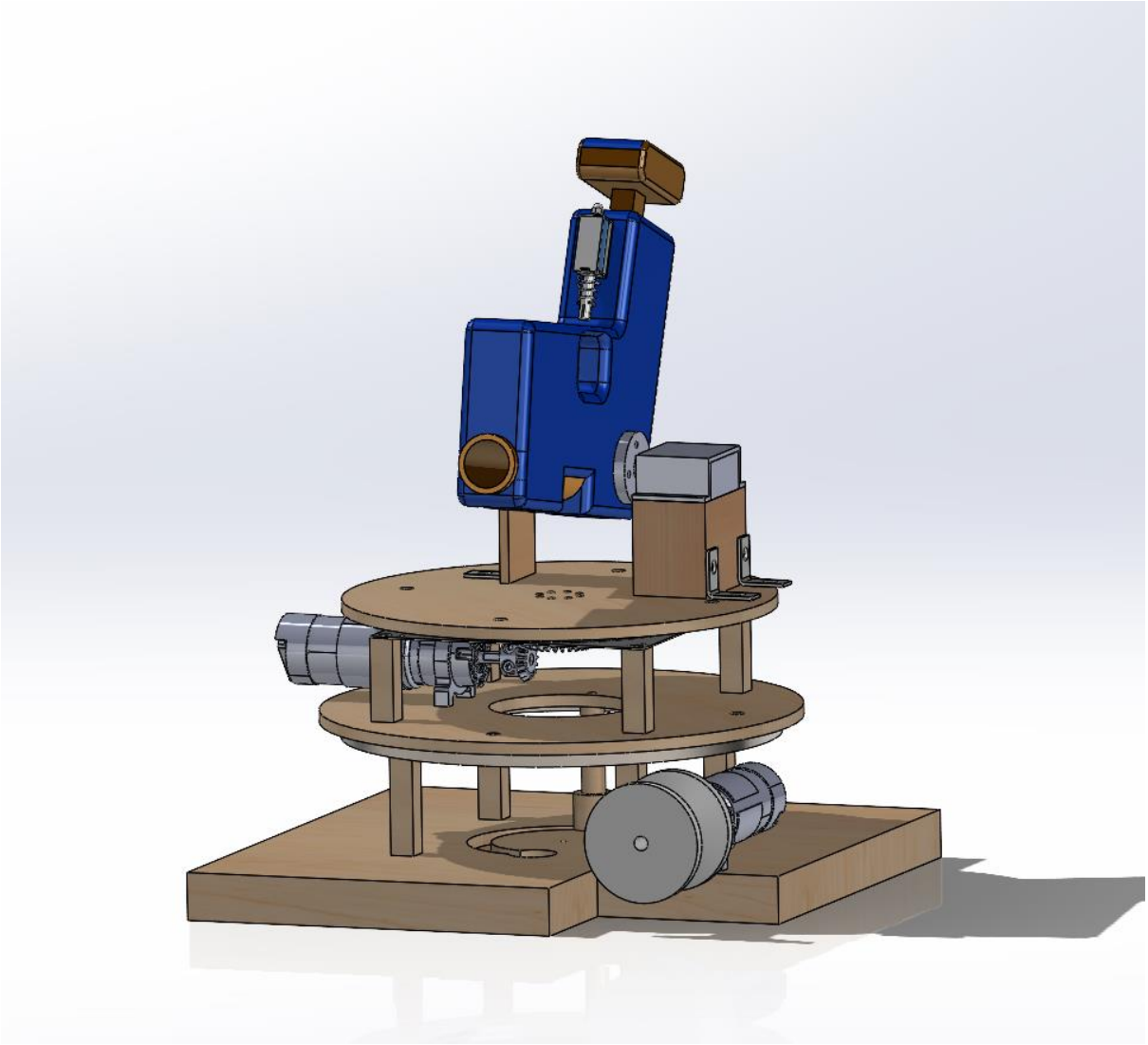
OBJECTIVE:

The object for the term project is to develop a system that can automatically track a target and launch a projectile without user intervention. The launcher will be autonomously aimed and fired with limited user intervention. A supplied thermal infrared camera will be implemented into the system for target acquisition and aiming. The launcher system will fit within a cube 2 feet on each side. The objective is to develop a quick and accurate sentry to win the final duel and uphold the honor of **DARTICUS**.

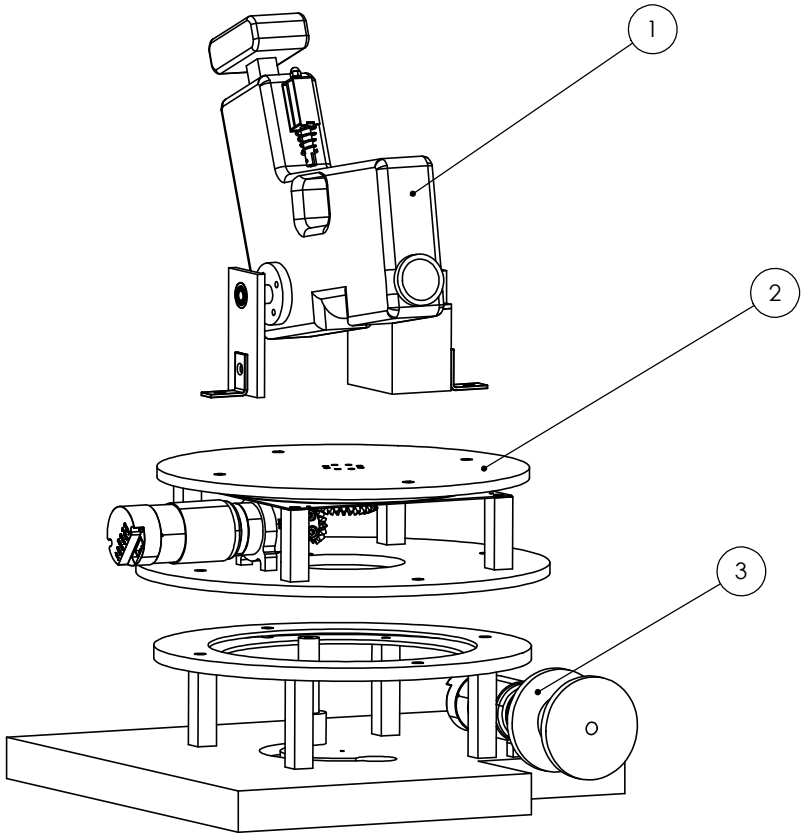
DESIGN IMPLEMENTATION:

The **D**ueling **A**utonomous infra**R**ed **T**racking **I**ron**C**lad **U**nrivaled **S**entry (**DARTICUS**) has been designed to meet the requirements listed using a modified NERF Rival Knockout XX-100 Blaster. The sentry will use a series of lubricated turntables to allow for rotation about the Y-axis. The first turntable will be used to rapidly pivot the sentry 180 degrees at the beginning of the duel to face the blaster in the direction of the target. This will be done by attaching a string to one end of the first turntable which will be rapidly wound up by a motor. The first turntable will then slot into the base to give the second turntable a fixed foundation. The second turntable will be used to accurately aim the blaster horizontally. A stepper motor will drive gears that will rotate the second turntable with a fine resolution. If time allows, the angle of the blaster will be directly driven by another stepper motor to angle the blaster at the correct altitude. Otherwise, scope will be reduced to the two prime turntable motors and trigger system. The catch on the blaster spring will be released using a solenoid attached to the trigger lever arm. This will require the blaster to be manually reloaded and the solenoid reset with every shot, so **DARTICUS** will be 100% accurate with every dart. The target will be quickly aimed at and fired upon, and the duel will be won.

CAD DESIGN:

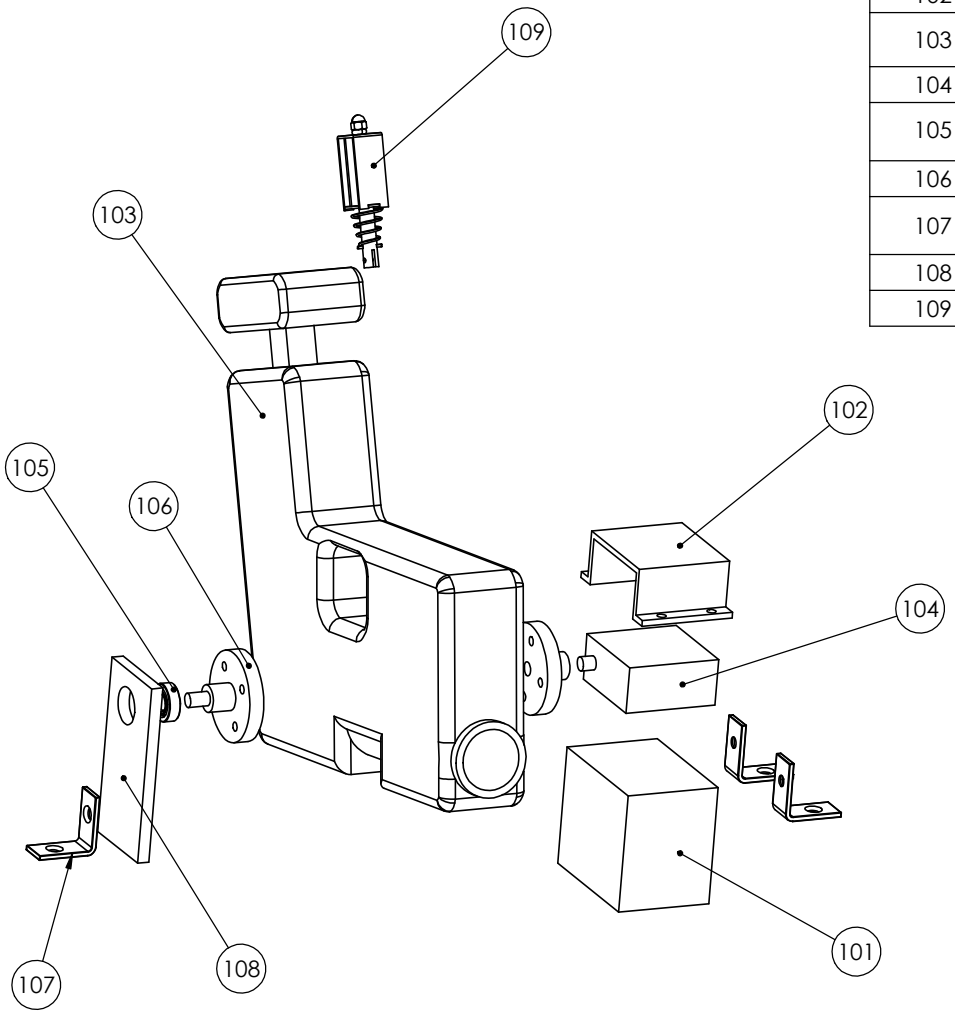


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	A1100	BLASTER MOUNT ASSEMBLY	1
2	A1200	SMALL TURNTABLE ASSEMBLY	1
3	A1300	BASE PLATE ASSEMBLY	1



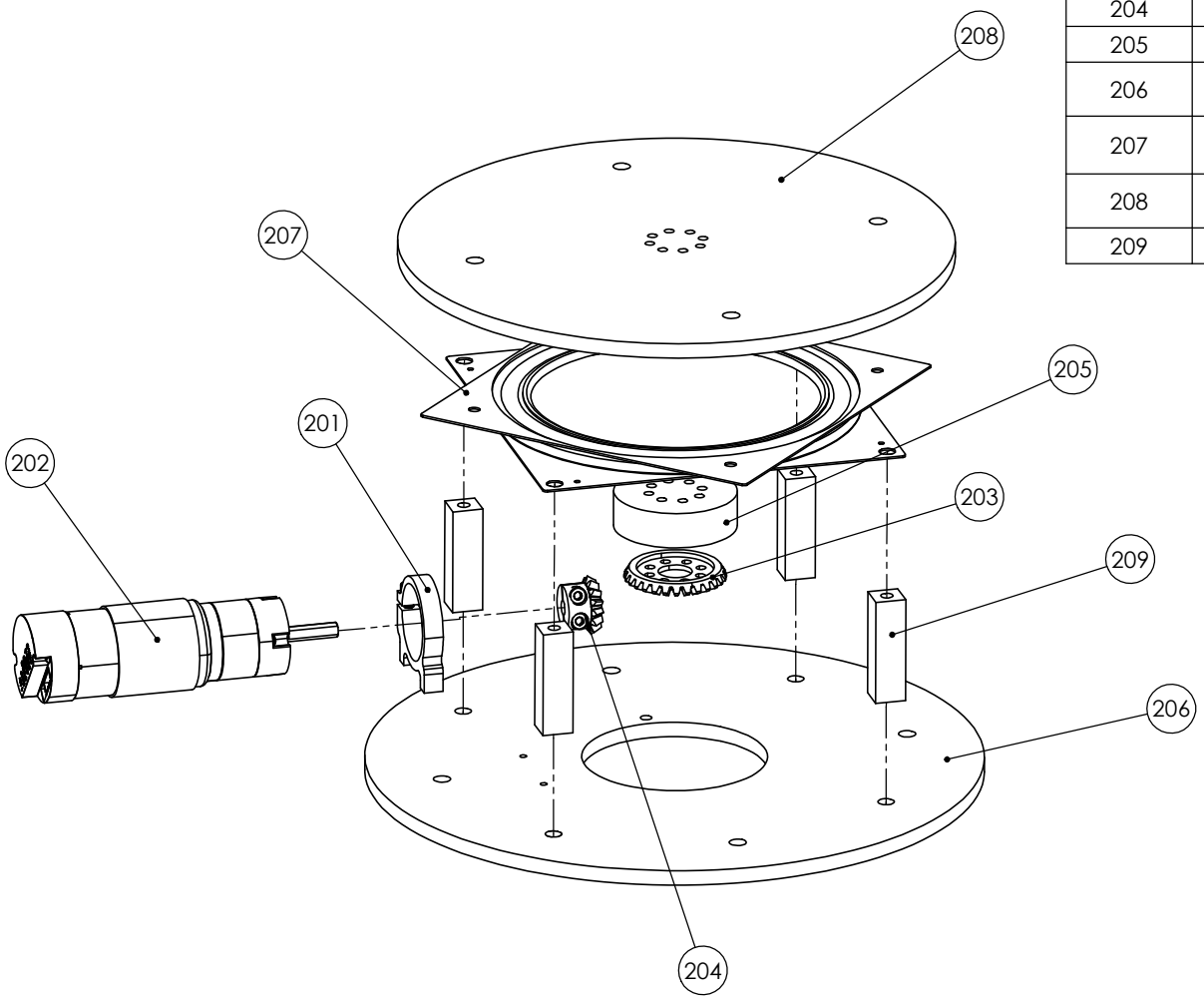
Cal Poly Mechanical Engineering ME 405 - WINTER 2024	Lab Section: 04	Assignment #	Title: DARTICUS		Drwn. By: JACQUELYN BANH
	Dwg. #:	Nxt Asb: A1000	Date: 2/4/2024	Scale: 1=3	Chkd. By: NATHAN C. & JESSICA P.

ITEM NO.	MANUFACTURER	DESCRIPTION	QTY.
101		SERVO MOUNT BLOCK	1
102		SERVO MOUNT BRACKET	1
103	NERF	NERF RIVAL XX-100	1
104		SERVO	1
105	MCMASTER CARR (57155K357)	Stainless Steel Ball Bearing	1
106		SERVO NERF ADAPTER	2
107	MCMASTER CARR (1556A41)	Galvanized Steel Corner Bracket	3
108		BEARING MOUNT	1
109		TRIGGER SOLENOID	1

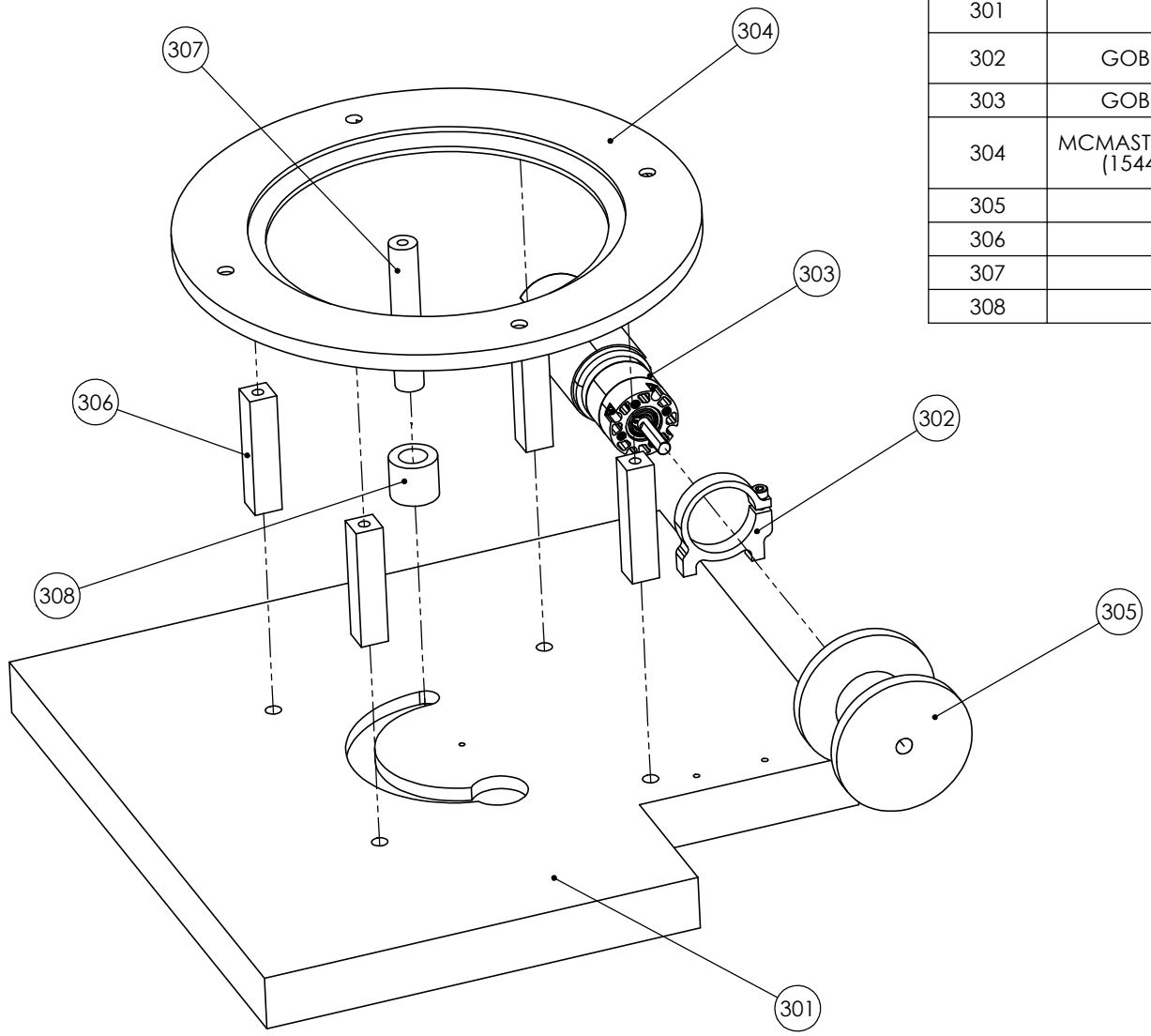


Cal Poly Mechanical Engineering ME 405 - WINTER 2024	Lab Section: 04	TERM PROJECT	Title: BLASTER MOUNT ASSEMBLY		Drwn. By: JACQUELYN BANH
	Dwg. #:	Nxt Asb: A1100	Date: 2/3/2024	Scale: 1=2	Chkd. By: NATHAN C. & JESSICA P.

PART NO.	MANUFACTURER	DESCRIPTION	QTY.
201	GOBILDA	MOTOR CLAMP	1
202	GOBILDA	MOTOR	1
203		BIG BEVEL GEAR	1
204		SMALL BEVEL GEAR	1
205		GEAR HUB	1
206		BIG TURNTABLE MOUNT PLATE	1
207	MCMASTER CARR (1544T1)	Lubricated Turntable	1
208		SMALL TURNTABLE MOUNT PLATE	1
209		BASE SUPPORTS - TIER 2	4



Cal Poly Mechanical Engineering ME 405 - WINTER 2024	Lab Section: 04	TERM PROJECT	Title: SMALL TURNTABLE ASSEMBLY		Drwn. By: JACQUELYN BANH
	Dwg. #:	Nxt Asb: A1200	Date: 2/4/2024	Scale: 1=2	Chkd. By: NATHAN C. & JESSICA P.



PART NO.	MANUFACTURER	DESCRIPTION	QTY.
301		DARTICUS BASE PLATE	1
302	GOBILDA	MOTOR CLAMP	1
303	GOBILDA	MOTOR	1
304	MCMASTER CARR (1544T12)	9" ROUND TURNTABLE	1
305		SPOOL	1
306		BASE SUPPORTS	4
307		ROLLER PIN	1
308		ROLLER STOPPER	1

Cal Poly Mechanical Engineering ME 405 - WINTER 2024	Lab Section: 04	TERM PROJECT	Title: BASE PLATE ASSEMBLY		Drwn. By: JACQUELYN BANH
	Dwg. #:	Nxt Asb: A1300	Date: 2/4/2024	Scale: 1=2	Chkd. By: NATHAN C. & JESSICA P.