E2.08 – Autonomous Sumo Bot
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TEXAS STATE UNIVERSITY
The rising STAR of Texas

Auto-Bot

Meet the Team

Rigoberto Cerda   Daniel Alonso   Preston Enriquez   Alex Quijano

Project Description

Auto-Bot is a two-wheeled autonomous Robo-Car that is designed to detect objects, boundaries, and navigate simultaneously.

Project Requirements

Robo-Car size :
- ❖ Width: ≤ 17 cm
- ❖ Length: ≤ 17 cm
- ❖ No restrictions on height
- ❖ Weight: ≤ 1200 grams

Robo-Car features :
- ❖ Non-destructive
- ❖ Autonomous (Cannot be aided remotely)
- ❖ Battery powered throughout the length of Senior Design Day
- ❖ Restricted on using cameras for object detection
- ❖ A 5 second delay after starting up the Robo-Car

Robo-Car competition:
The block push and round robin sumo competition will be held in the sumo ring, while the traversal will be held at a different location.
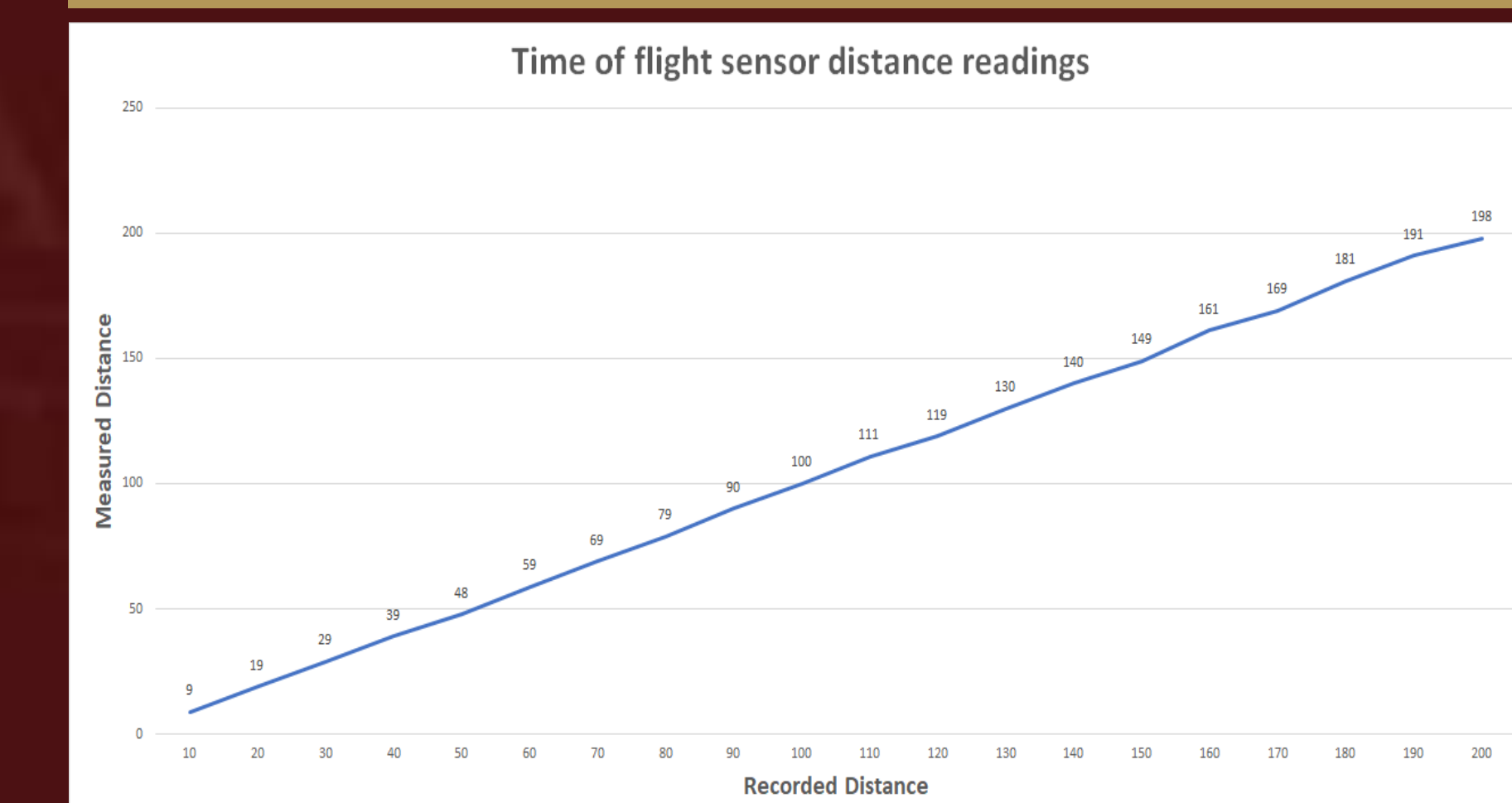
Hallway Traversal

Block Push

Hardware Diagram
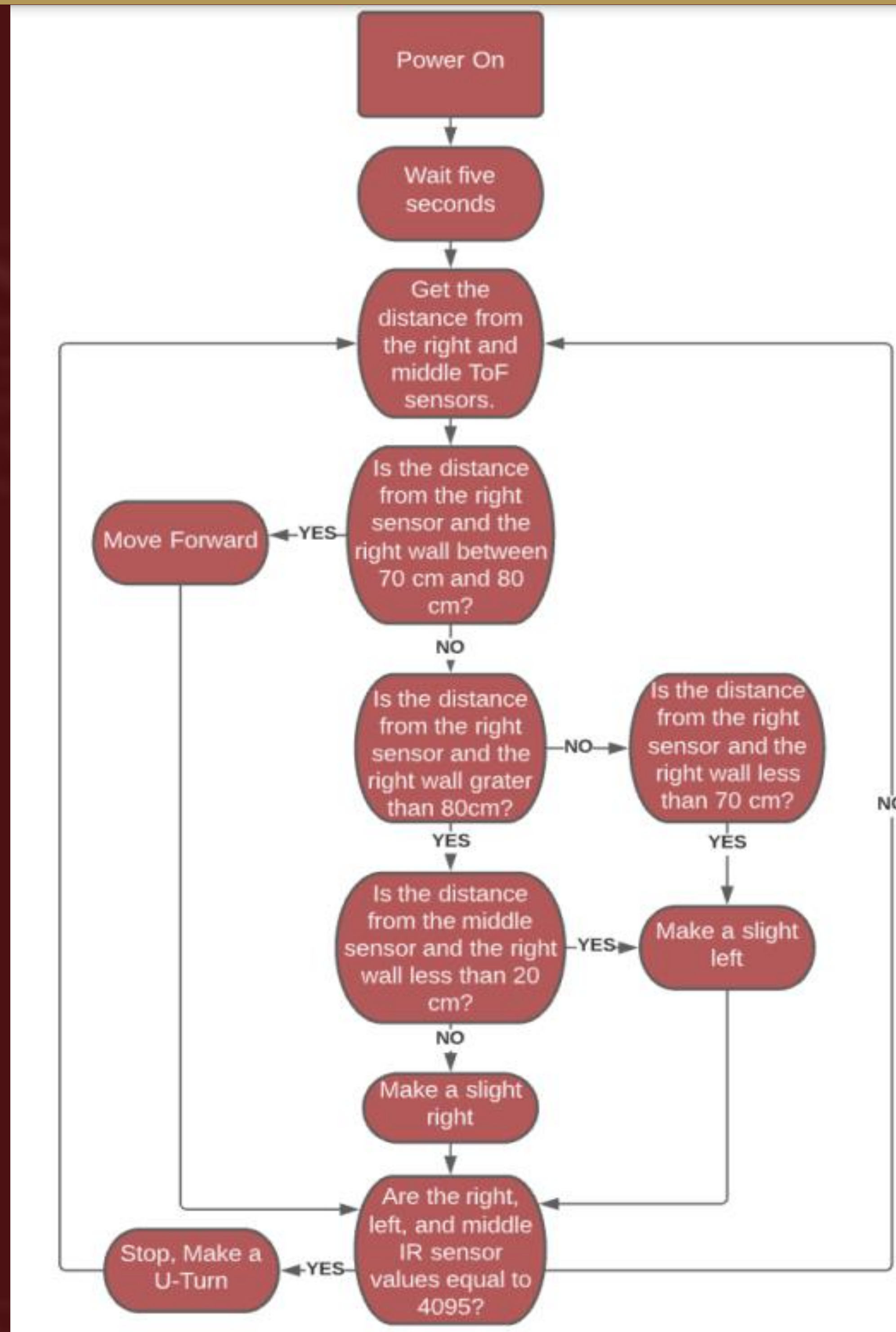
Test Cases

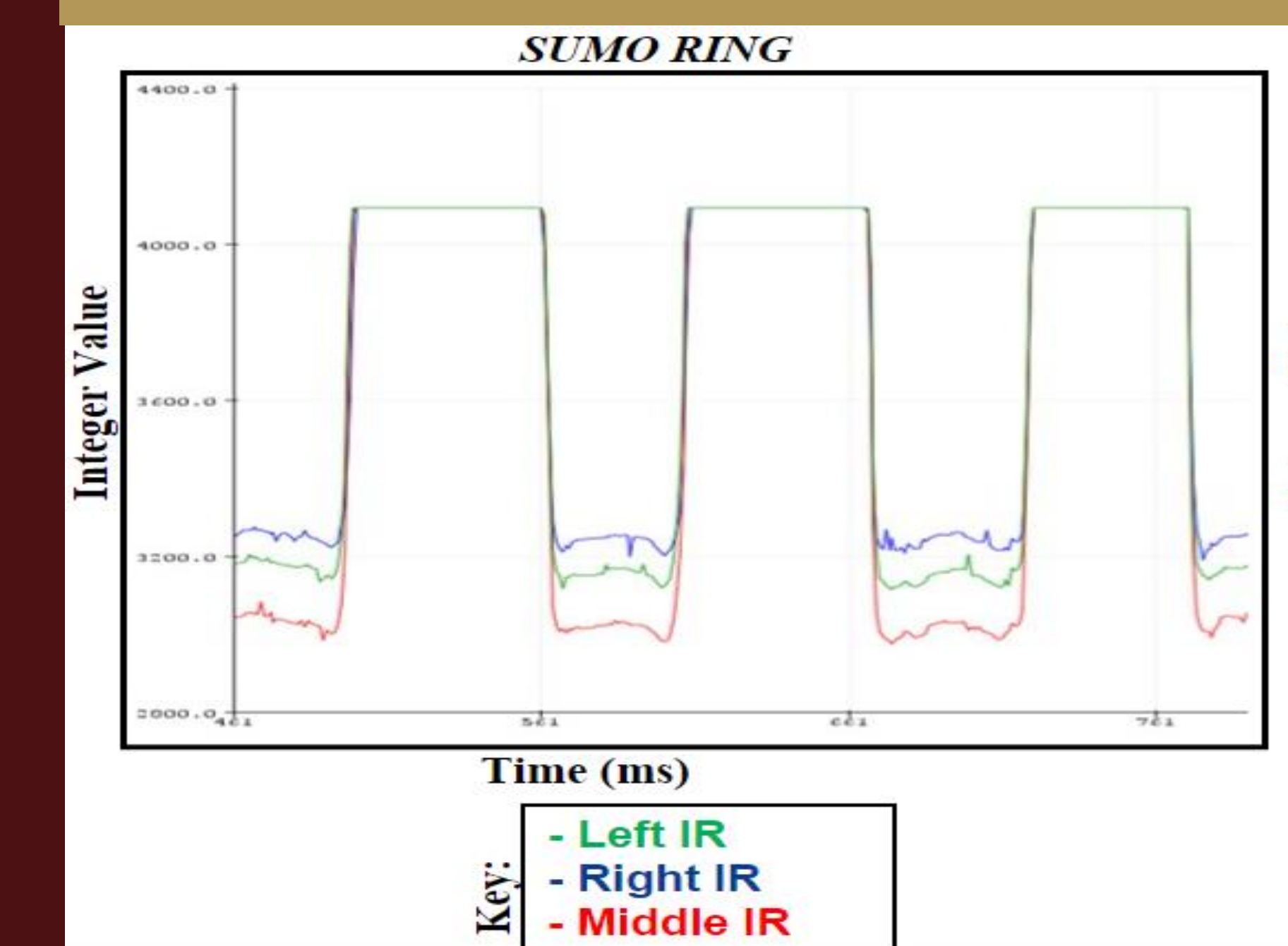| Requirement	Criteria
Sumobot Tournament with another Robo-Car.	**PASS:** Was successful in detecting another Robo-Car with its Time-of-Flight sensors, within the sumo ring. As well as competing against another Robo-Car
Block Push	**PASS:** Pushed a randomly placed block out of the sumo ring from original position within 10 seconds
Course Traversal	**PASS:** Successfully traversed at a rate of 20 ft, and able to perform a U-turn on a black poster board
Power	**PASS:** The Robo-Car can function throughout the entire length of Senior Design Day of continuous usage
Weight Limit	**PASS:** The weight has been kept beneath the 1200.0g limit

Power Dissipation

Component	Voltage (V)	Current (mA)	Power(mW)
ESP32	4.9 V	0.8 mA	3.92 mW
Battery Pack	9.0 V	N/A	N/A
Time-of-Flight	5.0 V	0.02 mA	0.10 mW
Multiplexer	5.0 V	0.02 mA	0.10 mW
Motor Driver	7.6 V	200 mA	1.52 mW
Line Sensors	3.3 V	0.035 mA	0.12 mW

Object Readings

Time of flight sensor distance readings

Boundary Readings

SUMO RING

Key: — Left IR   — Right IR   — Middle IR