

MEAM510

Design Review-1

Final Project - Group 3

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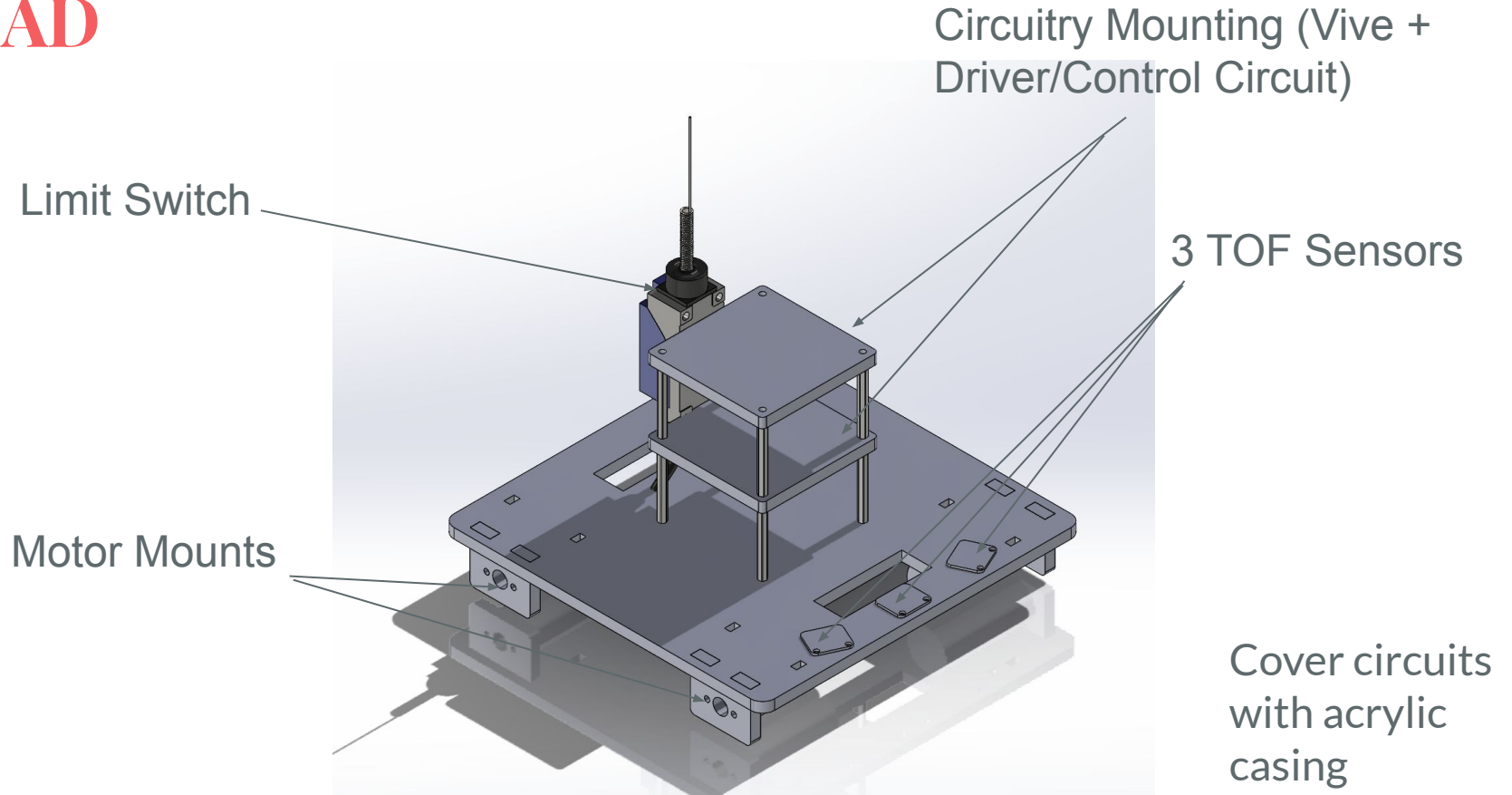
Algorithm Overview

Our car is a 4 wheel skid-steer

The basic structure of our autonomy algorithm is

1. Implement occupancy grid
2. Generate waypoints between current pos and target pos
3. Implement no-entry zone that prevents us from attacking our side.
4. Initiate bug algorithm whenever we detect an obstacle to avoid obstacle.
5. Regenerate waypoints to target
6. Wall Following using ToF
7. Ramp detection using Magnetometer
8. Attack using rotating arm at the front of the robot

CAD



List of Components

Component	Part Number	Quantity	Price
ESP32 S3	ESP32 S3 Development Board	1	\$6.32
DC Motor	JGA25-371 DC Gearmotor	4	$\$17.12 \times 4 = \68.48
H-Bridge	L298N	2	$\$6.39 \times 2 = \12.78
Voltage Regulator	MP1584EN	1	\$5.66
LiPo Battery	Turnigy 11.1V 3c	1	\$14.99
Time of flight sensor	VL53L0X	4	\$12.99
Op-Amp	TLV272	1	Ministore
Photodiode	PD70-01C IR	1	Ministore
Wheels	Mecanum wheels	4	\$20
TOTAL	(+misc not added)		\$51.43

Tentative Schedule

22 TODAY - Design Rev 1	23	24 Mobile Base Design Finalize	25 Dead Reckoning + Vive Circuit Tuning	26 Testing	27 Design Rev 2	28
29 Order components	30	1 Hardware Assembly + Circuits	2 Hardware Assembly + Circuits	3	4 Controller Tuning	5 Wall Following Logic Imp
6 Robot Testing	7 Robot Testing	8	9 Graded Evaluation	10 Final Improvements Start	11	

Potential Hardships

- Tuning Vive Detection Circuit + Localization at edge environments
(Figure out use of Magnetometer/IMUs for ramp detection or loc at edges)
- Assembly (Placement) and Control of Attack Weapon (use separate controller or not)
- Cases for Manual Control (WiFi Comm)
- Overcome controller overshoot