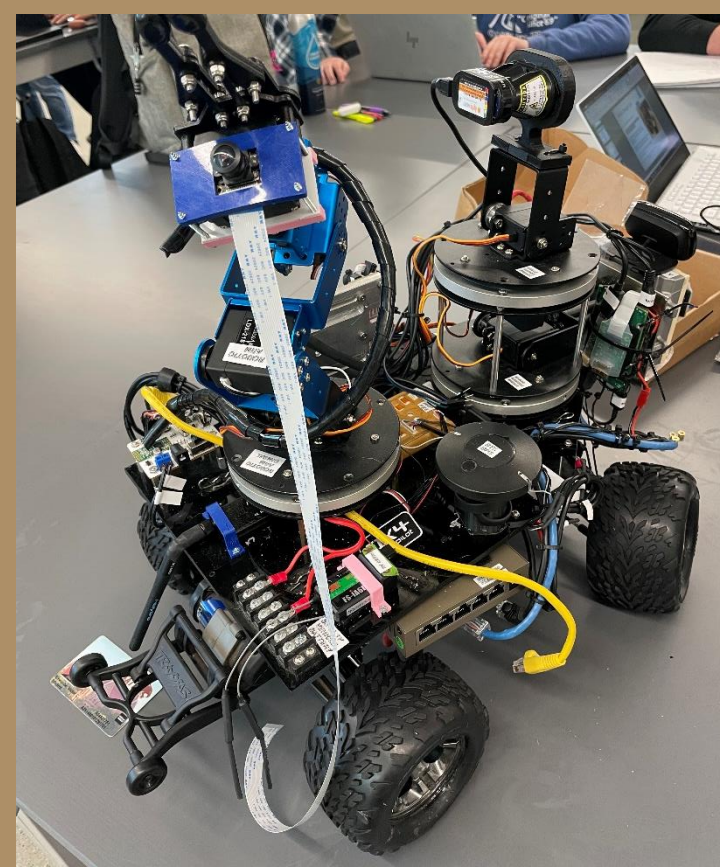


M2.03 – Airogistic Drone Recovery Rover

Katherine Ausanka, James Smetzer, Victor Ekwuribe, Sergio Sepulveda
Sponsors: Jeff Michalski

Project Purpose

Our sponsor has a drone dome where people can bring their racer drones for test flights. An autonomous drone recovery rover is necessary to eliminate the need for a person to walk over and pick up a drone every time one has fallen. This is detrimental by adding time and cost to the process. Our project supports the electrical engineering team in ensuring all sensors and components are mounted safely and effectively and implementing the mechanical operation of the drone pick-up.



Problem Statement

Robotic Arm and Drone Cage

There was not a previous solution for picking up the drone at all positions and orientations.

Component Mounts

Previous mounts included Velcro attachments or there weren't any present. More permanent mounting was needed.

Tires and Suspension

Original tires and suspension could not hold the weight of mounted components

Customer Requirements

Robotic Arm and Drone Cage

Be able to pick up a fallen drone
Compatible with camera and vision system
Not interfere with other components on the rover

Component Mounts

Hold important electronic components in place while taking into consideration space management and shock absorption

Tires and Suspension

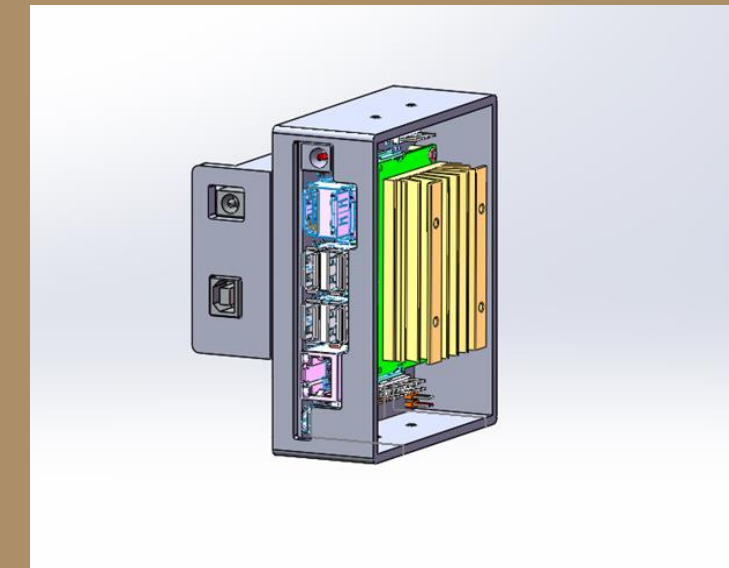
Allow movement of rover without damaging components
Assists the suspension of the top plate
Support top plate and all components on the rover

Spring 2021

Lidar Mount



Microprocessor Mount



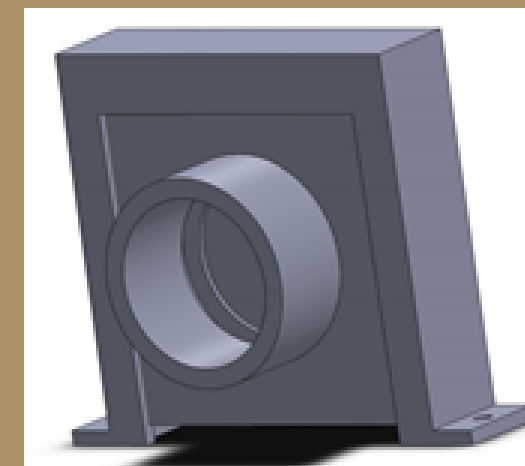
Suspension



Robotic Arm



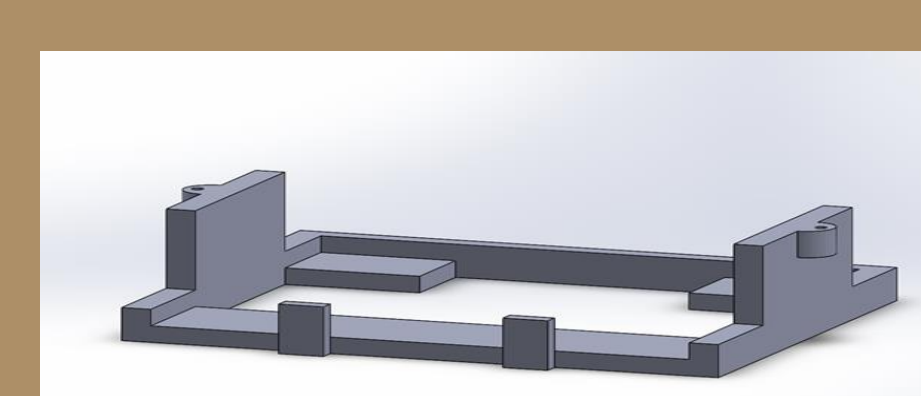
Camera Mount



Tires with Foam Inserts



Battery Mount

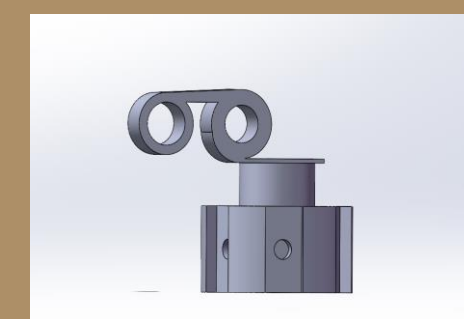


Fall 2021

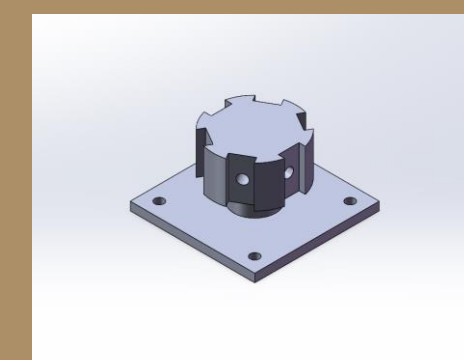
Drone Cage



Drone Cage Assembly



Bottom Mounting Hub



Top Mounting Hub

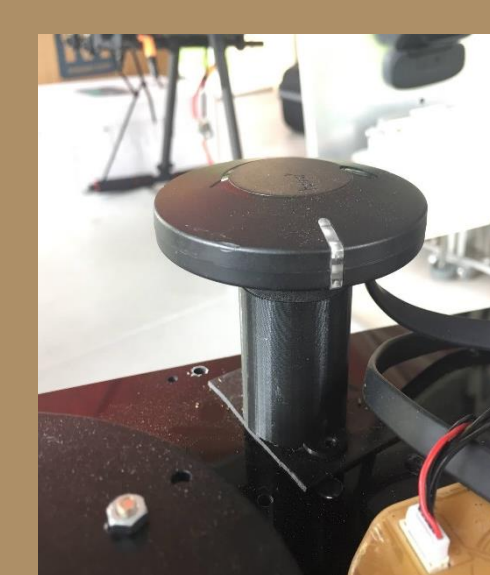
Lidar Mount



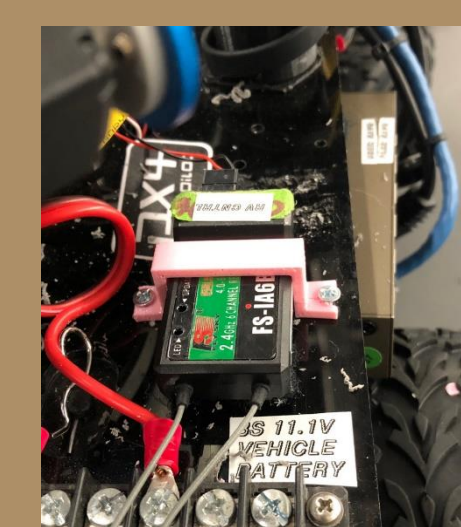
Radio RC



GPS Mount



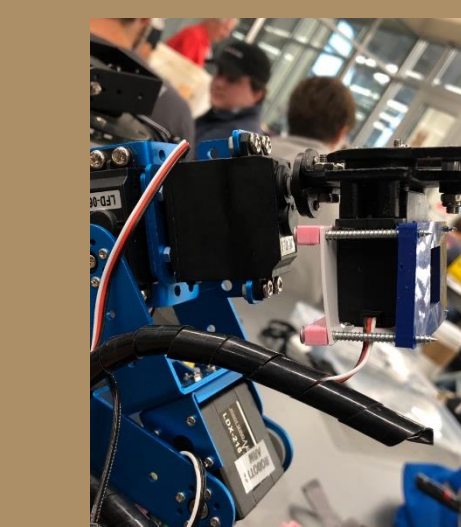
Radio Telemetry



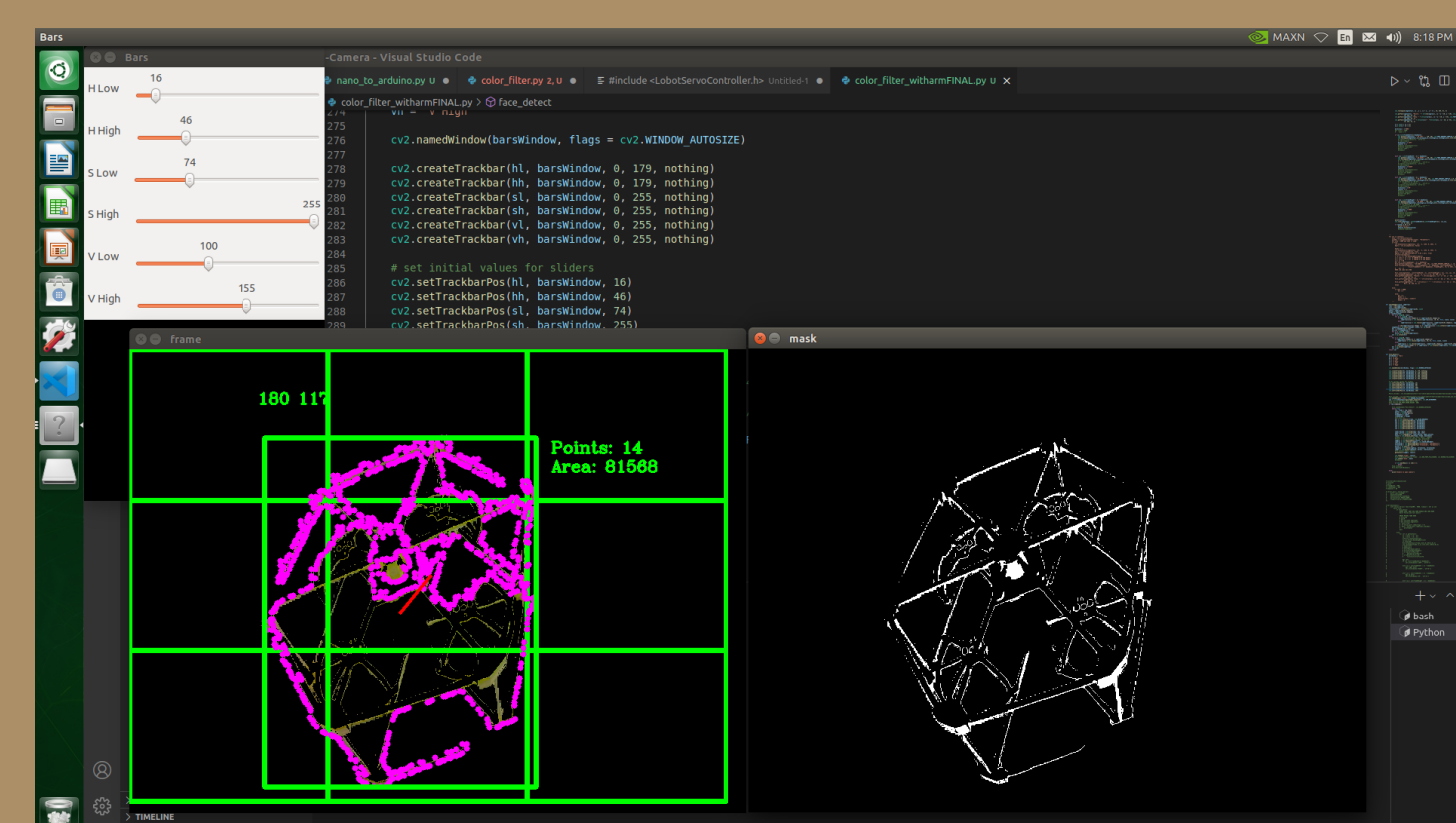
Ethernet Hub



Camera Mount

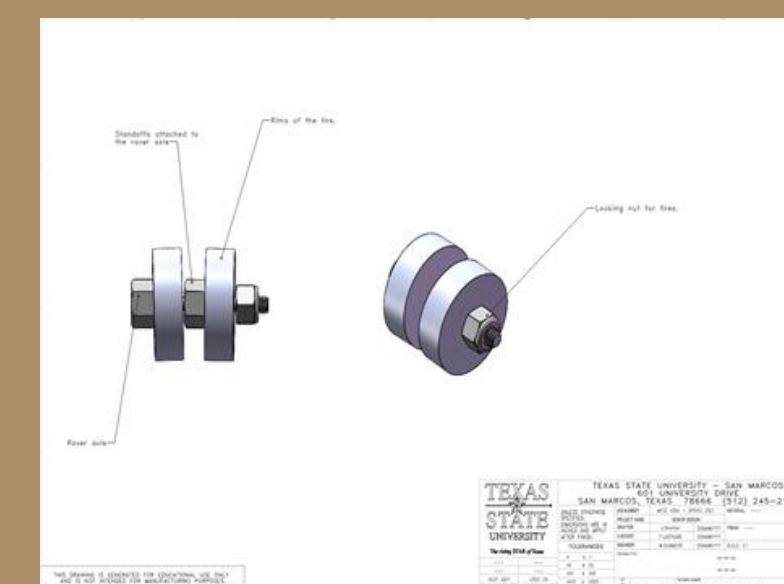


Rover with Drone Assembly



Vision Test

Air-Filled Tires



Tire Assembly Concept



Air-Filled Tire Assembly

Suspension



Rover Suspension Assembly



Underside Stainless Steel Support Bar

Future Work

Robotic arm and Drone Cage

Perform pick-up test with EE team at different landing positions and orientations
Identify and implement new paint material/method
Perform racer drone fly test
Flight assessment
Crash landing assessment

Component mounting

Modifications to mounts for more component security during driving
Battery mount modifications to aid in top plate security

Tires and suspension

Tire assembly modifications with drive test
Stabilization test using accelerometer in the IMU

Team Members



Left to right: James Smetzer, Stephen Marines, Jordan Smesny, Victor Ekwuribe, Sergio Sepulveda, Katherine Ausanka, Nate Lazaga

Acknowledgements

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