

# Evaluating the reliability of inexpensive hardware to test autonomous benchmarking problems



Cade Evans, Dang Tran, Dr. Hongsheng He

Electrical Engineering and Computer Science Department, Wichita State University

## Introduction

-A low cost, and reliable system is essential for autonomous research and finding solutions to robot development problems

-Using commercially available sensors and a preexisting mobile base will ensure a low cost reliable robot

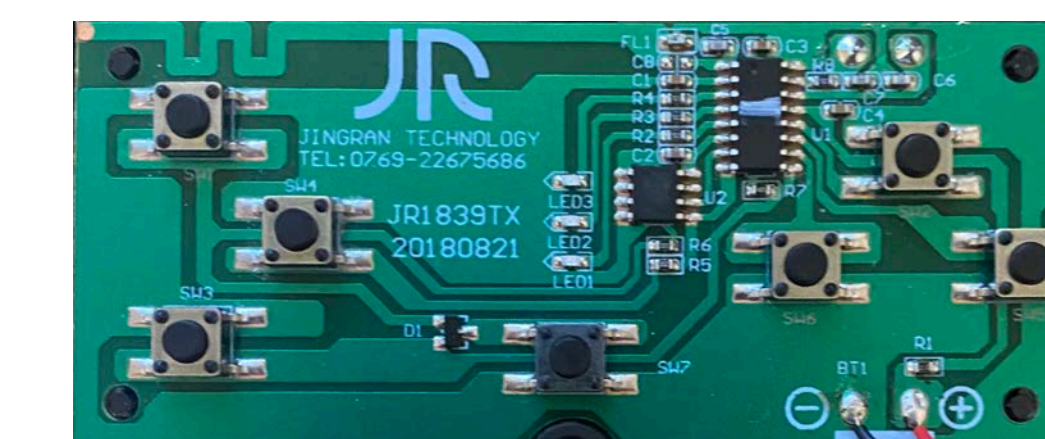
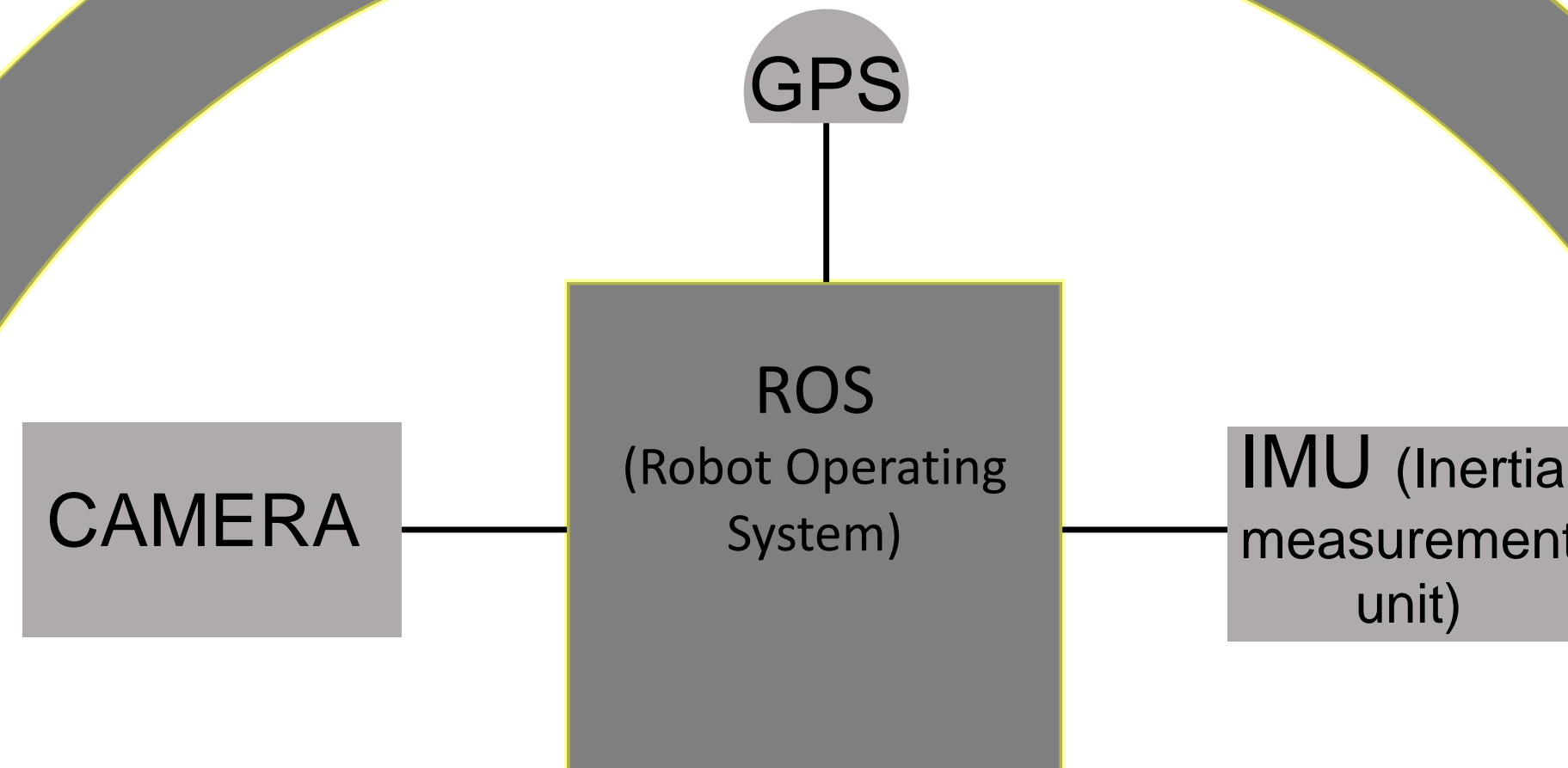
-Once completed this project will prove as a powerful and cost-effective benchmarking tool to develop and improve autonomous technology

## Results

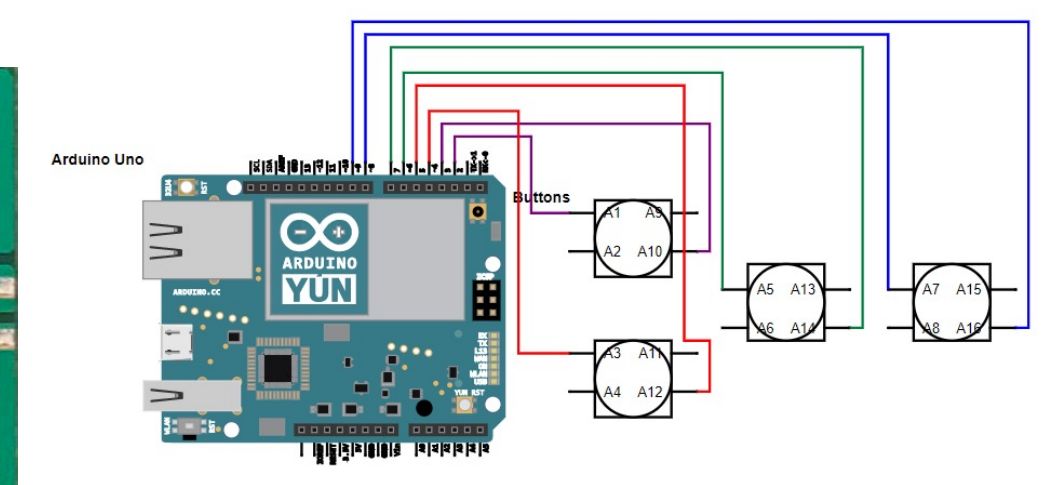
-Current focus is to take control of the vehicle with a computer

-This is the first step because a strong communication between the vehicle and the sensors is required in order to test complex autonomous problems

-It has taken a few iterations, but we settled on a design that ensures simplicity and reliability



Buggy Controller PCB



Control Circuit

## Methods and Materials

1. Gain control over the vehicle with a computer
2. Sensor integration and fusion to allow for situational awareness
3. Mount sensors onto the vehicle
4. Create algorithms to sort data from each sensor and use it to execute commands



24v Challenger XL 2.0 4x4 Ride On Buggy



Garmin GPS 16x



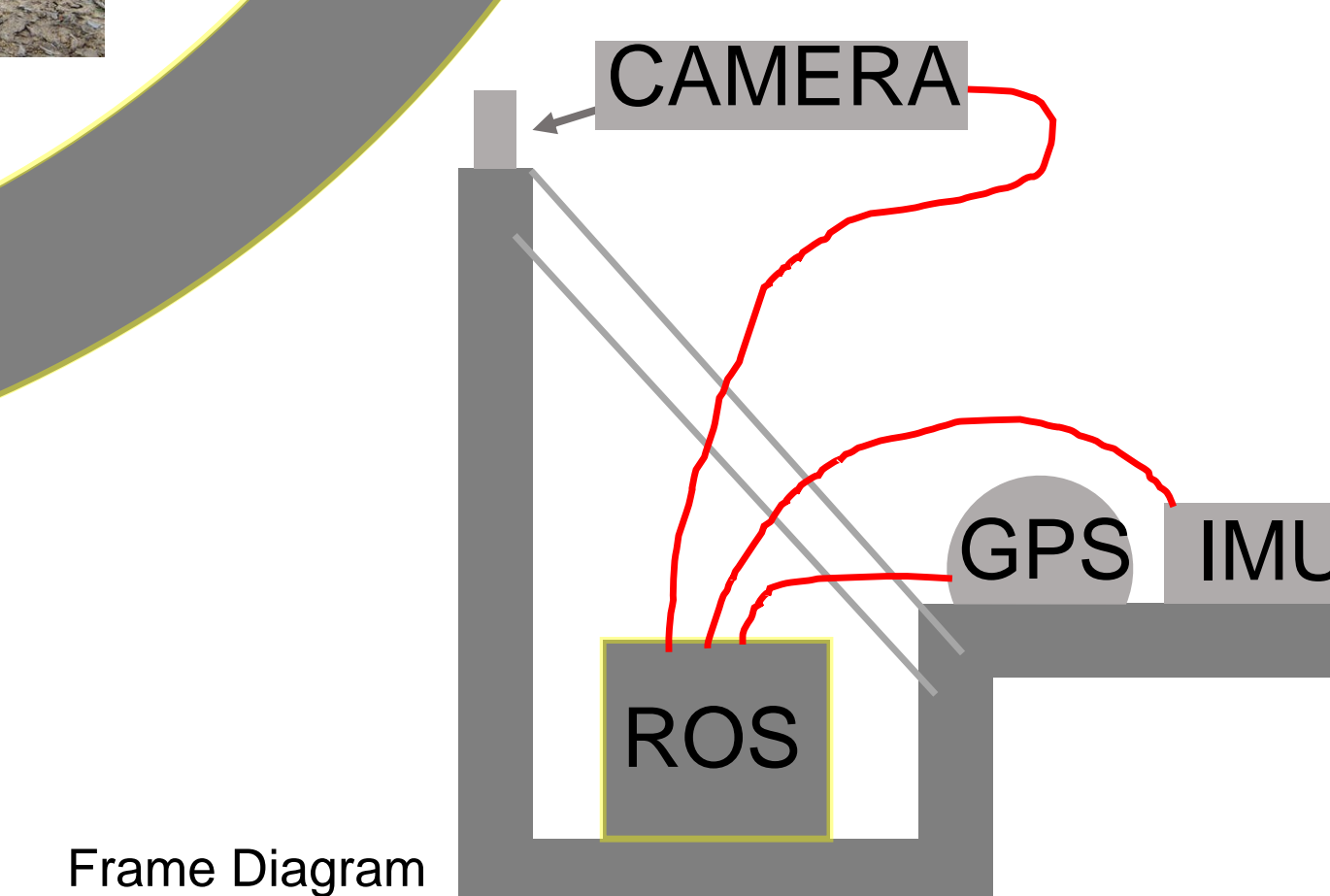
Realsense D435 Camera



MTI-670 IMU

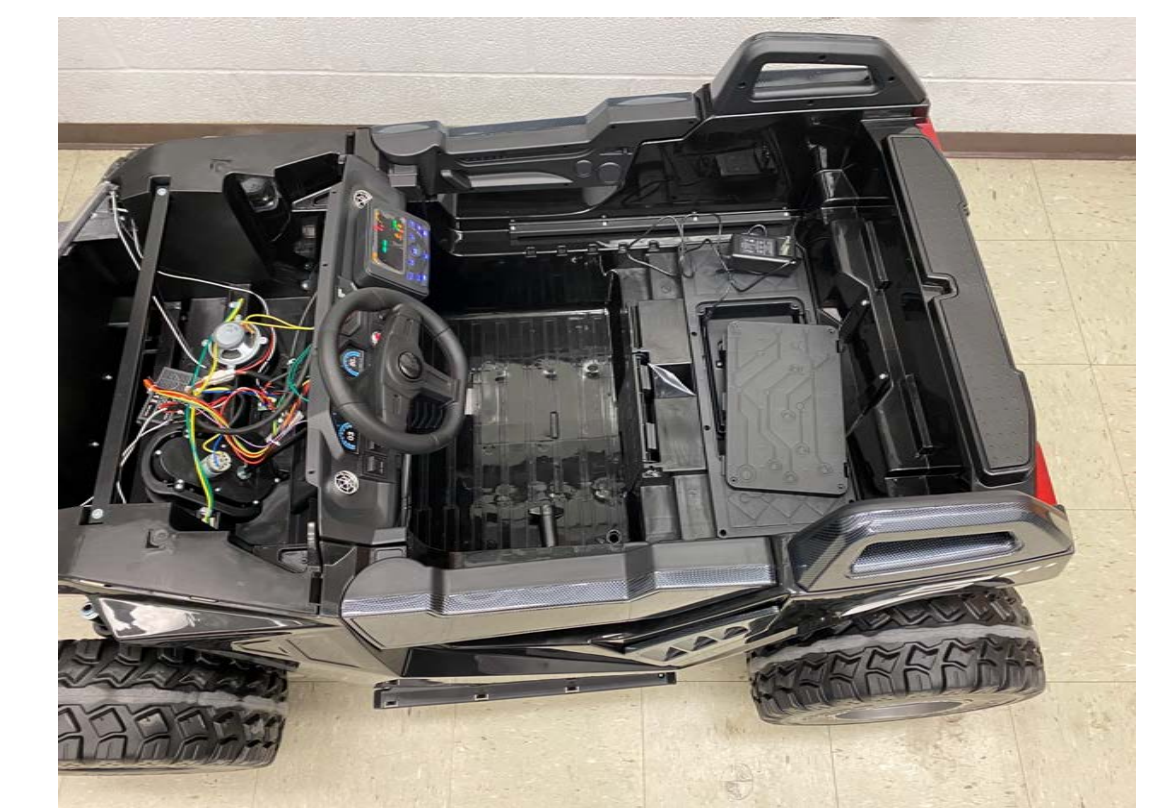
## Moving forward

- Constructing a rigged modular frame to attach sensors to
- Integrating each sensor into ROS
- Sort effectively through the noise and execute commands based on that sorted information



Frame Diagram

Buggy Top View



## Future Directions

-Implement more sensors such as, Radar, Lidar, and ultrasonic sensors in order to be able to benchmark more advanced autonomous technology.

## Acknowledgements

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