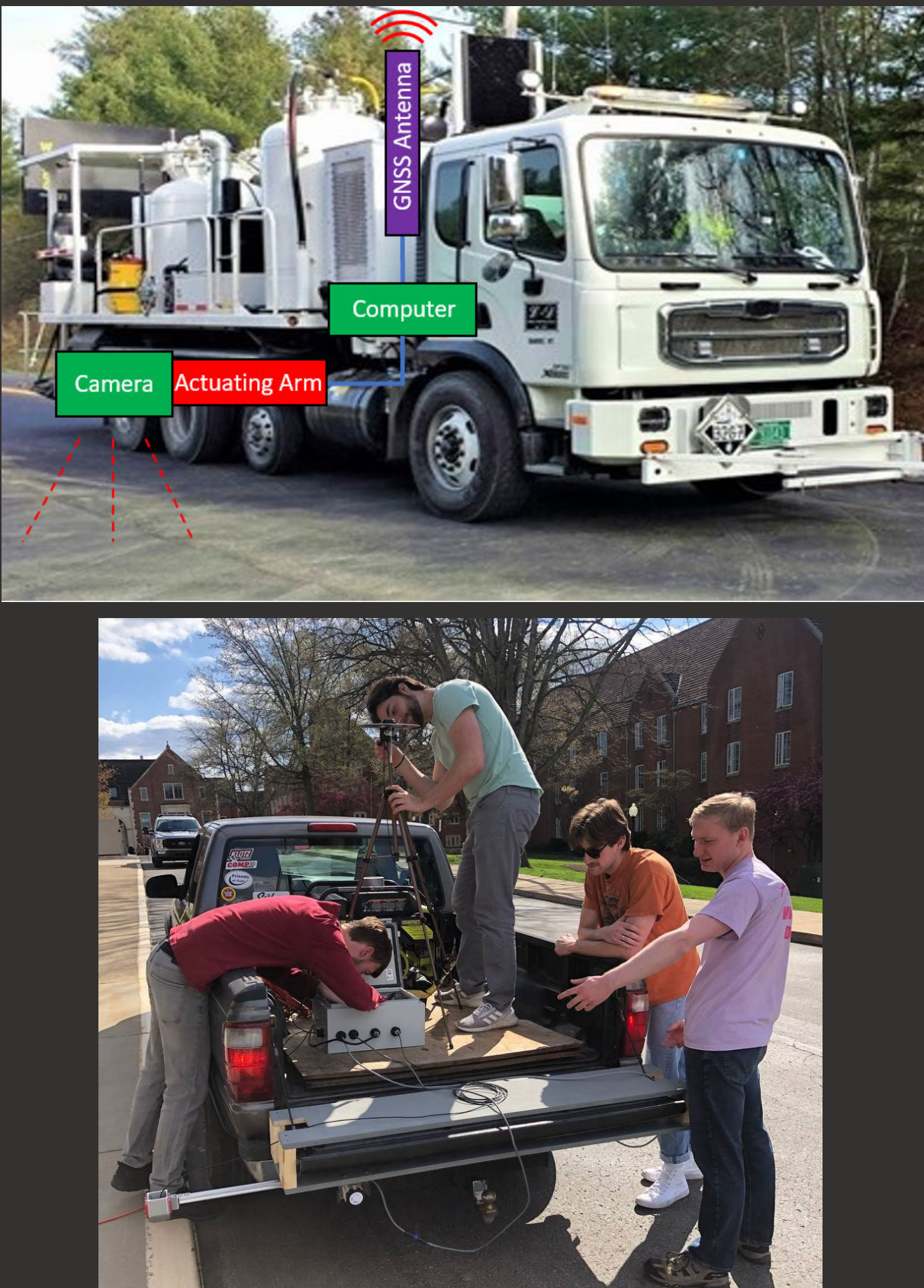


PROJECT BACKGROUND

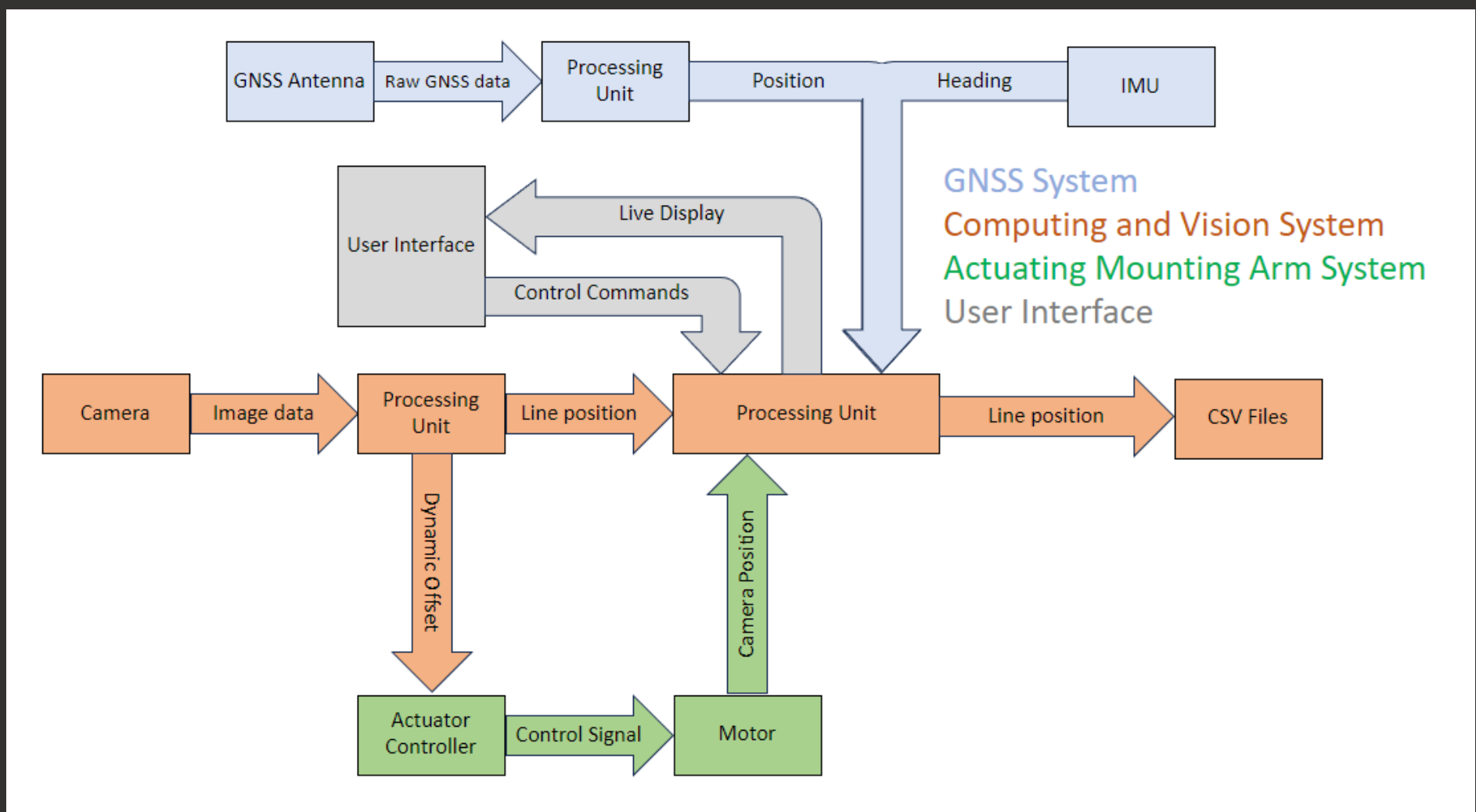
V-Markings is a company that maintains a database of road lines that is updated as soon as new lines are made. By mounting cameras, computing devices, and GNSS devices to paint trucks, any changes made to the road markings are captured immediately. The data V-Markings collects is used by companies to improve autonomous driving and HD maps.



TEAM GOALS

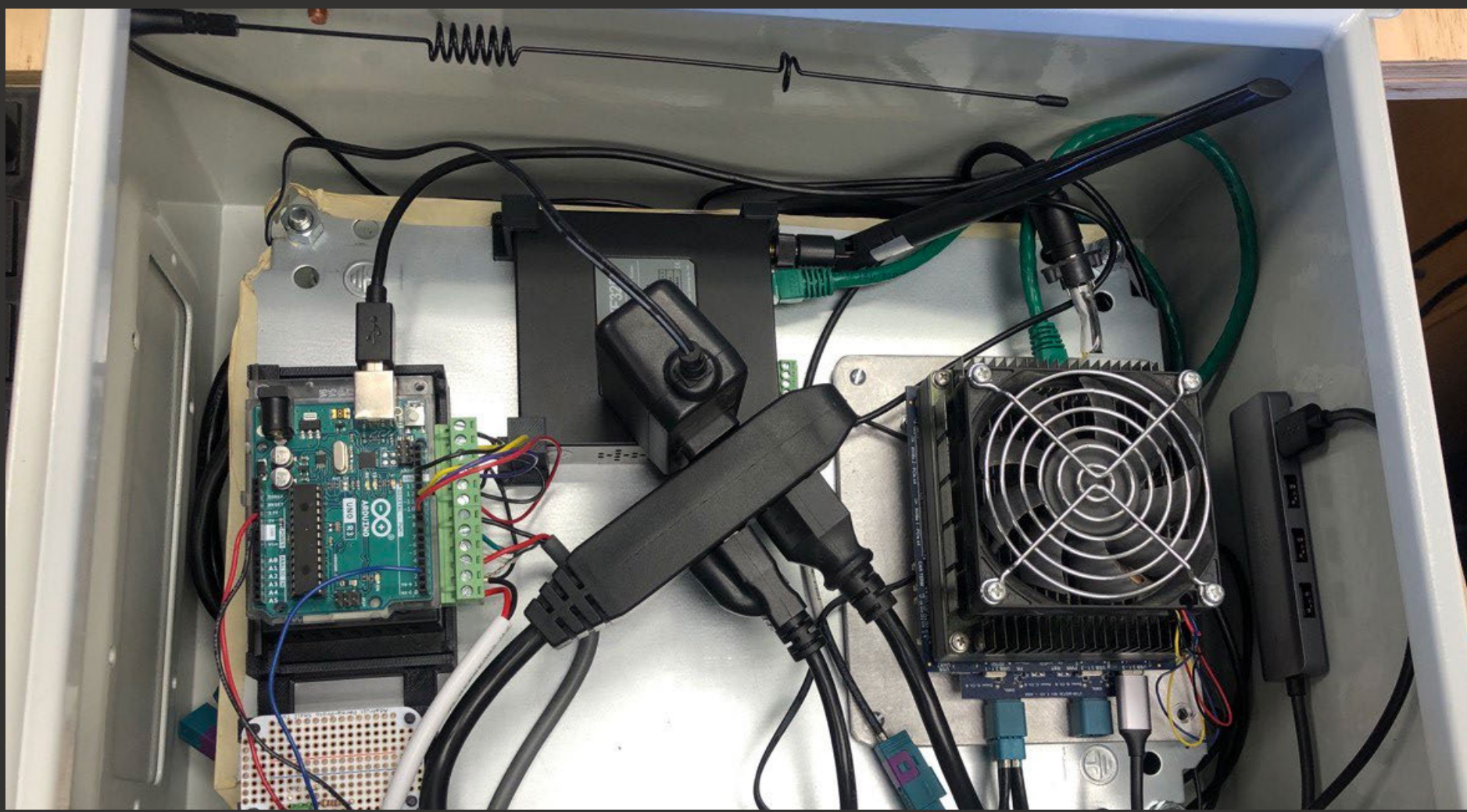
- Build a working prototype of a line localization system to detect line within a 0.5 meter accuracy
- Build an actuating arm that keeps the camera centered over the lines and can be easily mounted to trucks
- Explore alternative options for a GNSS location system
- Develop a line center detection algorithm that uses machine learning
- Create a user friendly interface

SYSTEM ARCHITECTURE



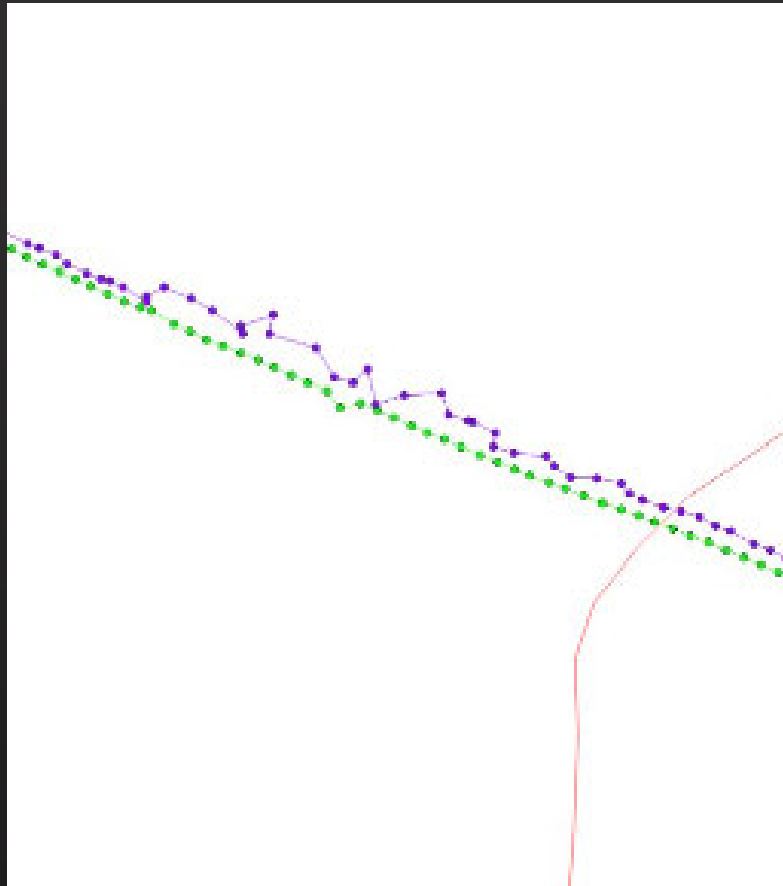
The four major portions of the system flow into the central processing unit before being packaged into an formatted CSV output file.

SYSTEM HARDWARE



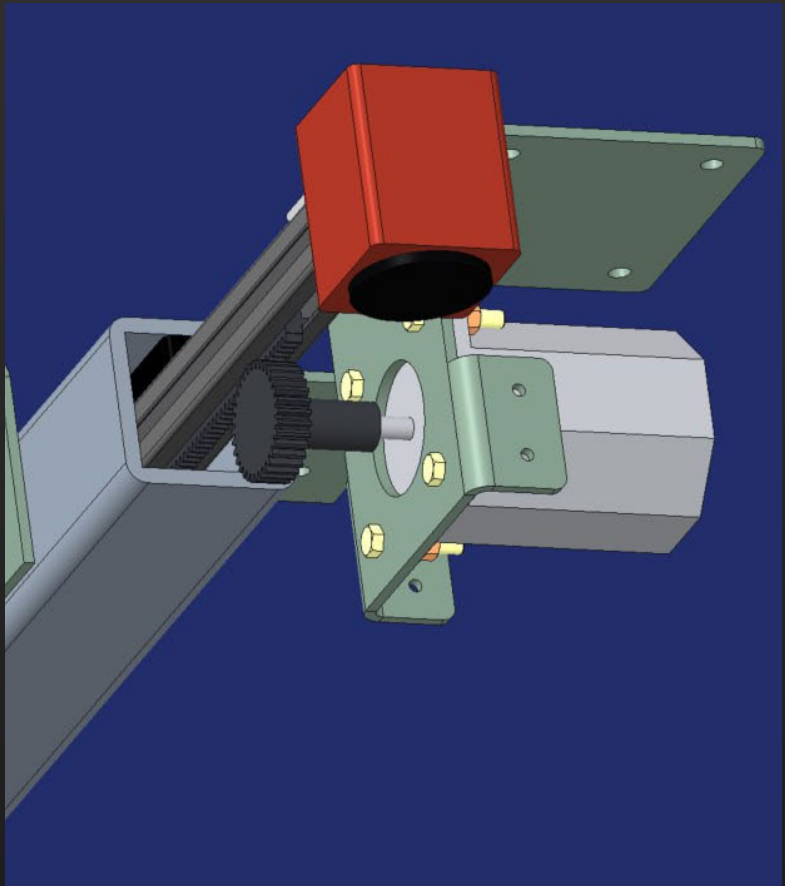
The entire system is controlled through the central processing unit. The unit consists of a NVIDIA Jetson computer, an Arduino microcontroller, and a Yifan LTE modem.

GNSS System



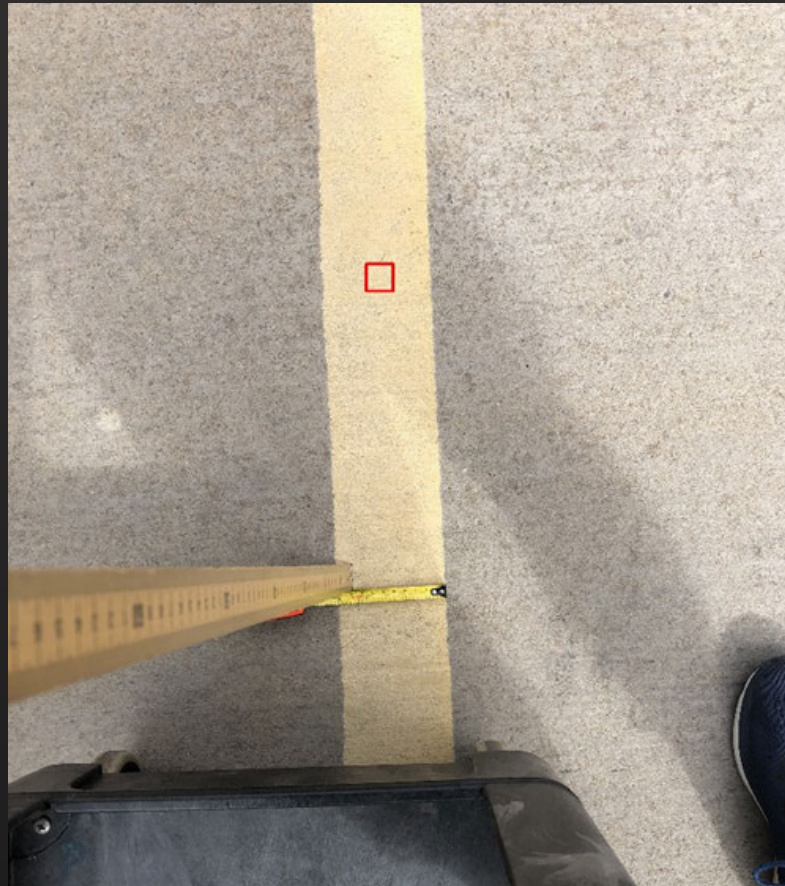
Gathers GNSS data and computes a corrected trace of the position points.
Original : Purple
Corrected : Green

Actuating Arm



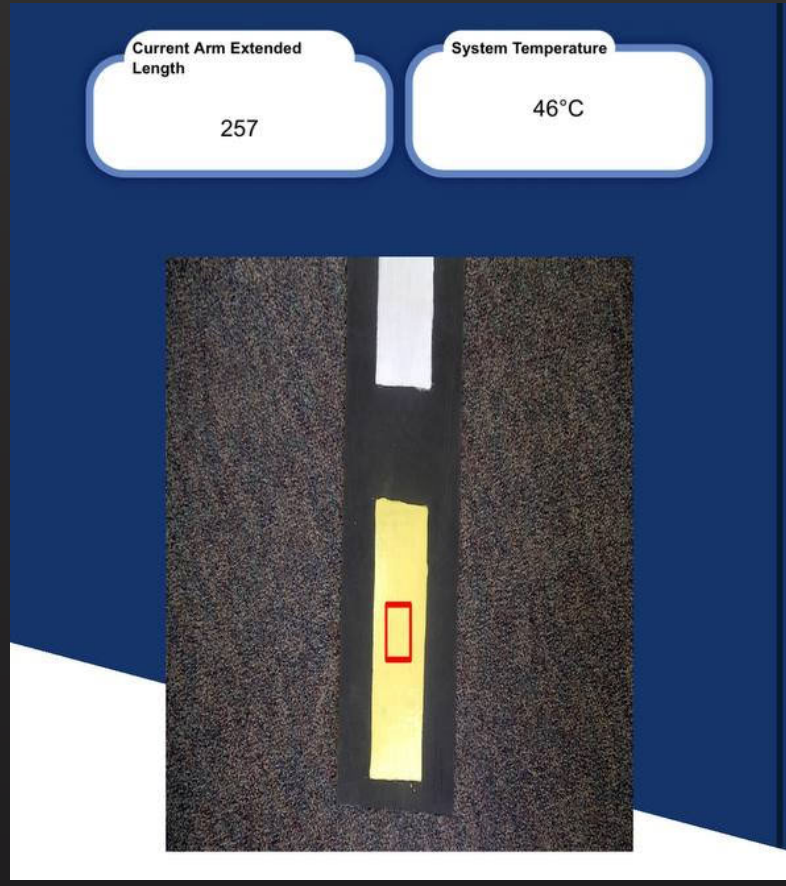
Utilizes a rack and pinion design to extend the camera adjacent to the truck to center over road lines.

Computer Vision System



Determines line positions from the camera stream. Implements both a 5-stage filtering approach utilizing machine learning.

User Interface



A user interface made for an easy and more intuitive interaction between the Jetson system and the user.

THE TEAM



From left to right:
Matthew Montazzoli, Ryley Grossman, Dr. Luke Rumbaugh, Connor Seese, Thaddaeus Woo, Andrew Bergey, Nathaniel Stuyck, Chase Malenke, Darren McCleery

Special Thanks to

- V-Markings
- Jason Jemison and Kevin MacVitte
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