# RVIZ AND LIDAR PROJECT

(Status update)

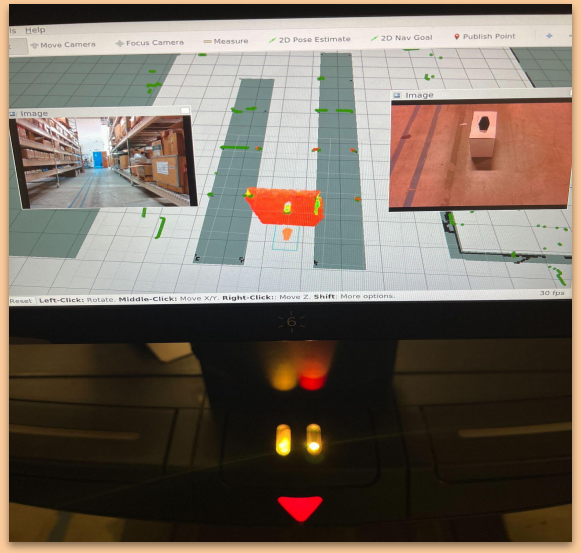
# Objectives completed:

1. Remotely starting rviz on a chuck's gui.

a. Helpful for a 3P while diagnosing an issue.

b. To open rviz:

- ssh into chuck while it's running or sent on movement loop.
- In terminal type: `$ chuck stop mfp-gui` and then `$ chuck rviz`



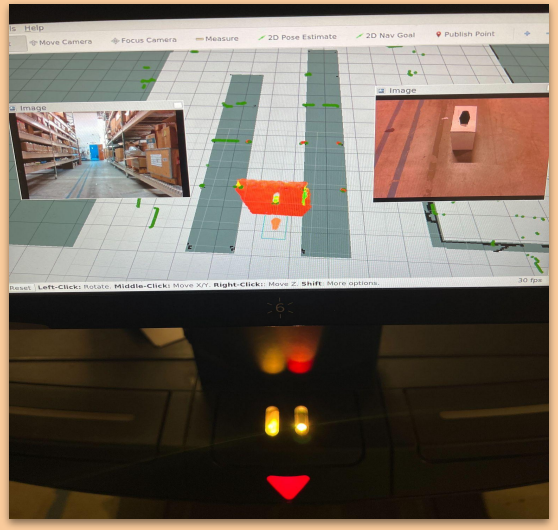
## 2. Have live feed from both cameras on rviz

a. Helpful in diagnosing, debugging or troubleshooting hardstops and other movement issues of chuck.

b. How to switch on:

- Change the sensor.launch file parameters and then restart chuck (to be done just once)
- Select the correct topic in rviz (a default .rviz file can also be made)
- I'll be documenting all these steps

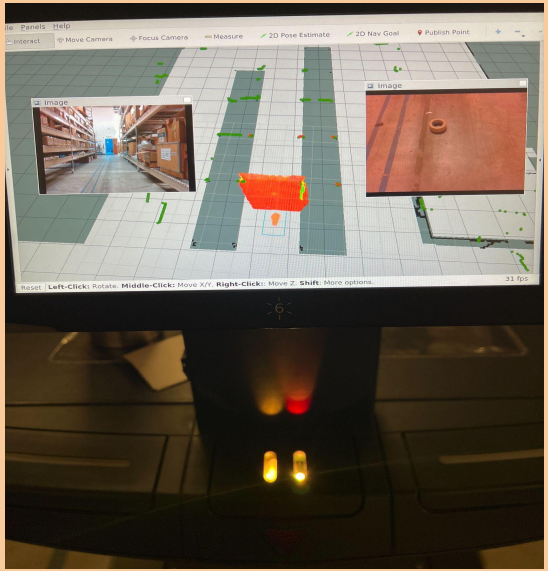
Front forward



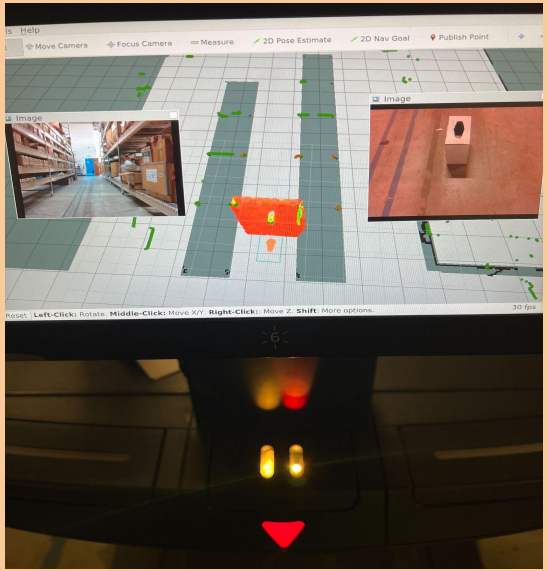

Front downward

## 3. Detect when the hardstop is ‘just’ because of downward facing camera

a. When a hardstop is because of small size objects and reflections, live feed from downward camera would help in diagnosing. LiDAR doesn’t detect these objects



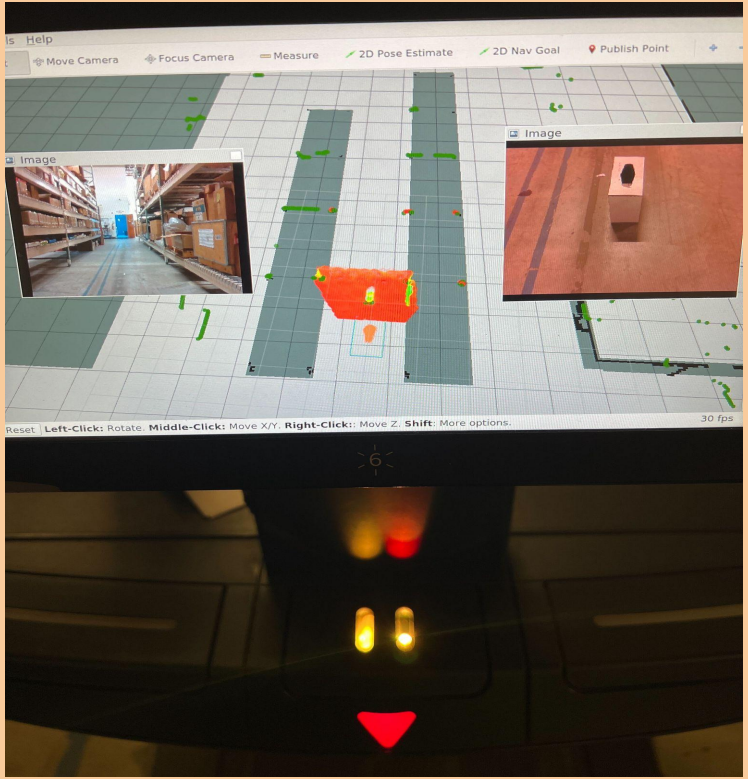

Not detected by LiDAR




Detected by LiDAR

# 4. Detecting reason for harstop when both sensors see same object

## a. Getting the live feed is helpful



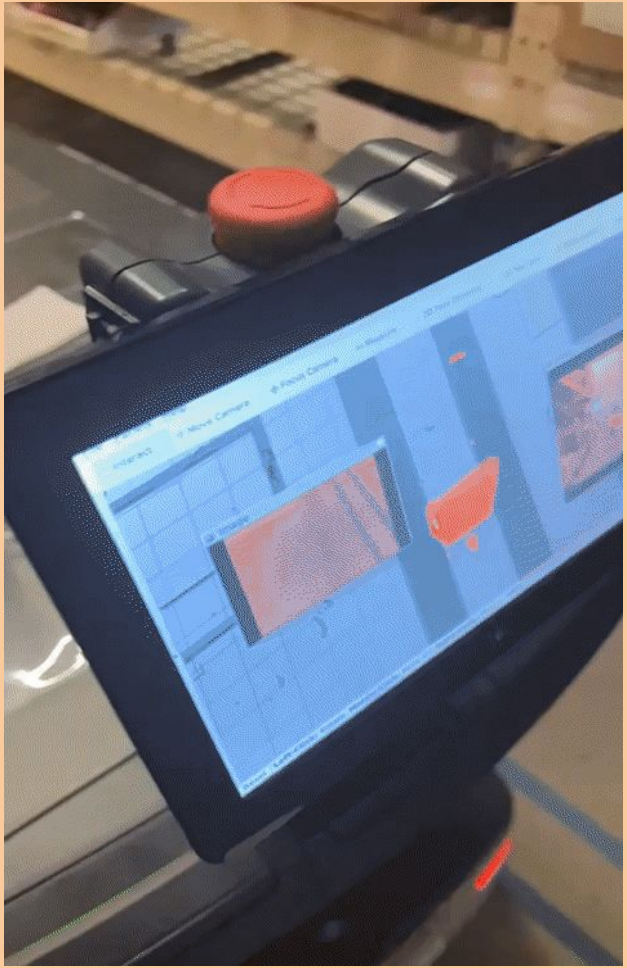

Both sensors see same object

# 3 Ways of accessing rviz

1) On-site
   - A 3P tech on site can visualize the chuck and observe its behavior either through chuck gui or PC
   - Pros- This method is fastest and most efficient since there is no lag when rviz is run on chuck's gui
   - Cons- The primary purpose is to troubleshoot remotely (discussed in next slide)

LiDAR doesn’t detect

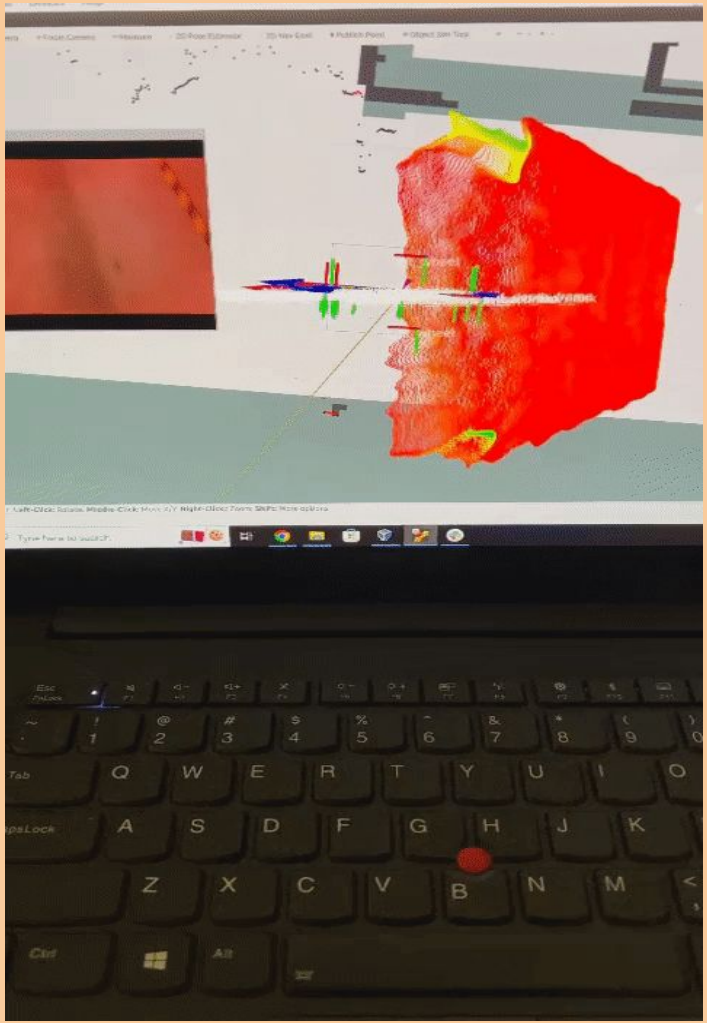
LiDAR doesn’t detect



## 2) Vpn into chuck

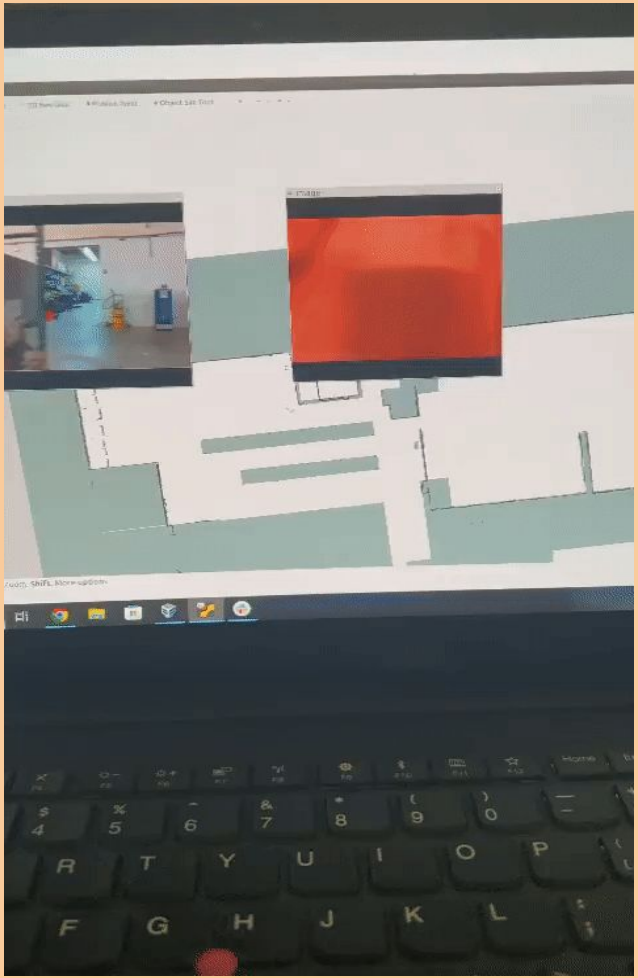
- In this, our team will remotely vpn into a chuck and use the custom rviz file to visualize all the necessary data.
- Pros: Most convenient since it is remote. Helpful to debug issues
- Cons: There is a lot of lag…lots and lots of lag :(
    - Wifi signal issues will make it worse

Accessing rviz remotely



## 3) Collecting rosbags for the required duration and analyzing (ongoing)

- Elimination of lag
- Can be done remotely
- Steps:
    1. Ssh into chuck
    2. Let the chuck move to the place where hardstop/ movement issue is occurring
    3. Simultaneously record rosbag
    4. Copy the rosbag on your local pc or use google cloud to download it ( to be discussed)
    5. Play the bag on rviz and visualize



Running collected rosbag on PC

# Challenges in implementing

- The downward facing camera live feed requires change in launch file (permission issues)
- Requires ROS installation on team’s laptops (not time consuming)
- Access for creating Google cloud bucket to upload and download (discuss with Jeff Cohen and Brian)
- It would be difficult to collect longer duration rosbags (file size would be too big)

# LiDAR Proximity Detection (ongoing)

- Can be done remotely without the need of downloading rosbags
- Can be run on a live chuck
- The python script outputs the angle of an obstacle that is present at a distance of less than 11 cm from LiDAR
- Explaining the code:
  - LiDAR outputs beam from -104 to 104 degrees
  - Total 627 beams, at an increment of 0.33 degrees
  - The center beam is at 313th index
  - So, if an obstacle is to left of chuck, angle is negative
  - If an obstacle is to right of chuck, angle is positive
- little caveats:
  - All distances are from LiDAR so multiple scripts might be needed. For e.g two different scripts for LiDAR shroud case and hanging lights case
  - There are certain beams that show distance as less but are actually ignored (soution: see the output pattern)

THANK YOU!!!