**1.**      **Project Implementation**

For the drivetrains we used mecanum wheels to allow for strafing. Our intake uses surgical tubing in which we used 3D printed carriers to hold them in place. Our outtake is a bucket that goes down to drop the pixel. We used the REV Control Hub. As for software, we used Android studio to code all the autonomous and driver-controlled actions. Our autonomous codes detect where our team prop is using a distance sensor. and place a pixel on the tape it is on. This is fairly accurate most of the time. Then it goes to the backdrop and places the pixel on it.

**2.**      **Results and Data**

         Document the results and data which may include technical performances and your final output. Present the data logically in tables, images, charts, graphs, and any other useful format.

**3.**      **Lessons Learned**

         When we first started out as a team, we used a claw to pick up the pixel. We then used a rack and pinion to extend and put the pixel on the backdrop. As we found out, picking up the pixel with the claw was not consistent enough and sometimes would not even pick up the pixel. When we were able to pick up the pixel, the rack and pinion was not long enough and did not reach the backdrop. The distance sensor also is not reliable enough so we will use a touch sensor. The distance sensor would not detect the team prop entirely and detect something else farther away. We were going to use a webcam to detect the team prop. We would do it by checking which spike marker tape had the most color saturation and proceeding the autonomous code from there. Our current bucket is not the most efficient outtake we could do. During competitions the pixels drop from the bucket too slowly. What we will do is use a prong release outtake, so we can use our bucket design but add prongs to where the pixels go in. The prongs will touch the backdrop and push a cover connected to it and let the pixels out. For our intake, we were going to use compliant wheels, but after we tested the surgical tubing and the compliant wheels, we found out that the surgical tubing intake the pixels better. We also learned that using 3 - D printed parts for important parts of the robot was good as we broke our shaft that we mounted our surgical tubing on. We now use a metal shaft. We also changed the way we mounted our surgical tubing. We used to use compliant wheels to mount our surgical tubing, but the surgical tubing would fall off easily. We then 3 – D printed a surgical holder (*18253 Beach Bots*), and our surgical tubing doesn’t fall off anymore.