Walker Robotics

Samantha McLain , Andrew Tipton,
Alberto Escobar-Ruiz, Caleb Seaton

- Sponsor
  - Walker School of Engineering
- Acknowledgements
  - Professor Makarewicz
  - David Burnett

Problem

- Ignite participation and interest in the Olivet Robotics Club
- Compete in a VEX competition

Breakdown

- 3 parts
  - Base
  - Arm
  - Programming
- 3 sub-teams

Base Requirements

- Stability
- Accessibility
- Light Weight
- Within the length and width requirements set forth by VEX

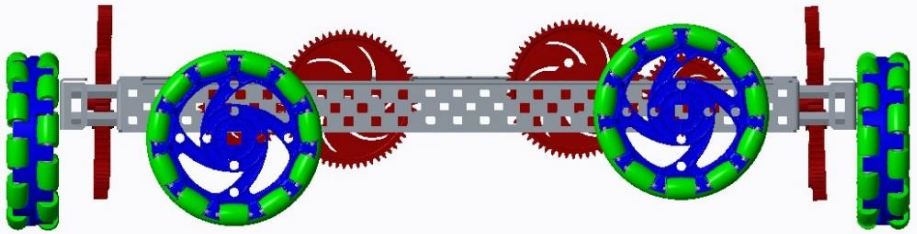
Base Verification and Testing – Forward/Backward

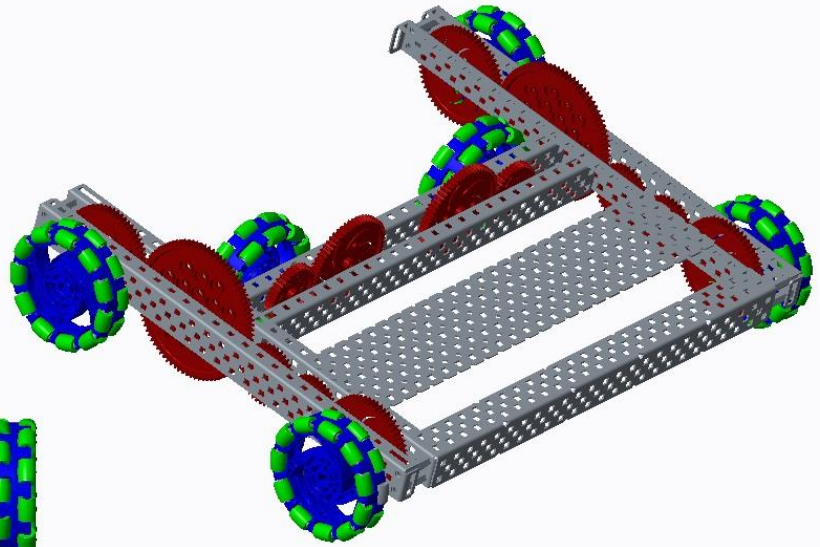
Forward/Backward					
Trials	Distance [in]	standard dev [in]	Time [s]	Speed [in/s]	standard dev [s]
1	130	0.5	7	18.571	0.001
2	140.5	0.5	7	20.071	0.001
3	132.5	0.5	7	18.929	0.001
4	131	0.5	7	18.714	0.001
5	129	0.5	7	18.429	0.001
6	127	0.5	7	18.143	0.001
7	125.5	0.5	7	17.929	0.001
Average	130.786			18.68	
			standard dev	0.07	

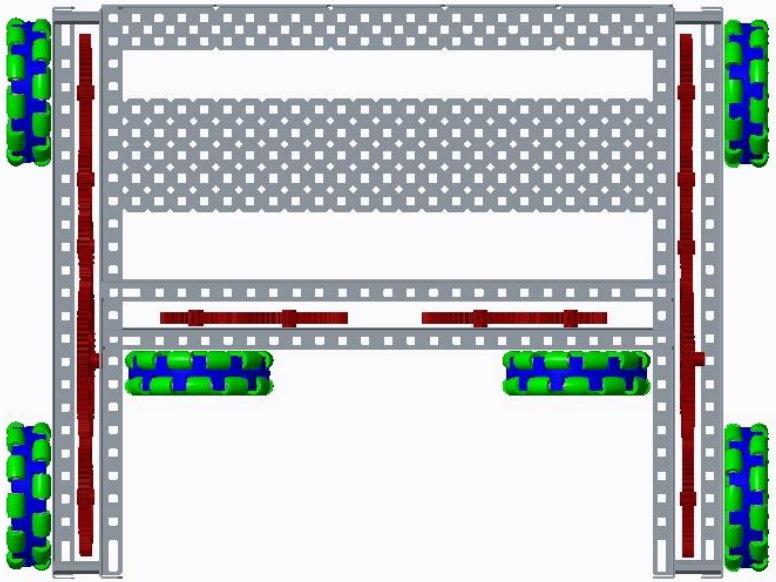
Base Verification and Testing – Lateral

Right/Left					
Trials	Distance [in]	standard dev [in]	Time [s]	Speed [in/s]	standard dev [s]
1	108	0.5	3	36	0.001
2	108	0.5	3	36	0.001
3	108	0.5	3	36	0.001
4	107.5	0.5	3	35.833	0.001
5	107.5	0.5	3	35.833	0.001
6	107	0.5	3	35.667	0.001
7	108	0.5	3	36.000	0.001
Average	107.714			35.90	
			standard dev	0.17	

Base Design







Arm Requirements

- Light weight
- Pick Up design
- Strength
- Mobility
- Accessibility

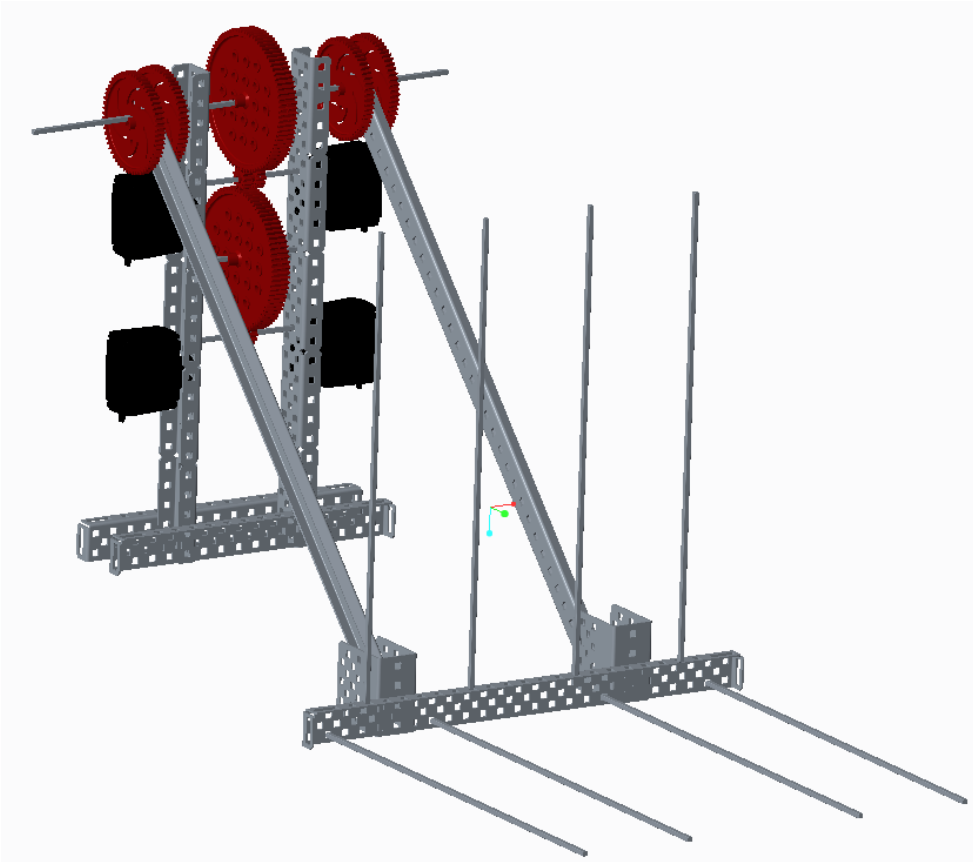
Arm Verification and Testing

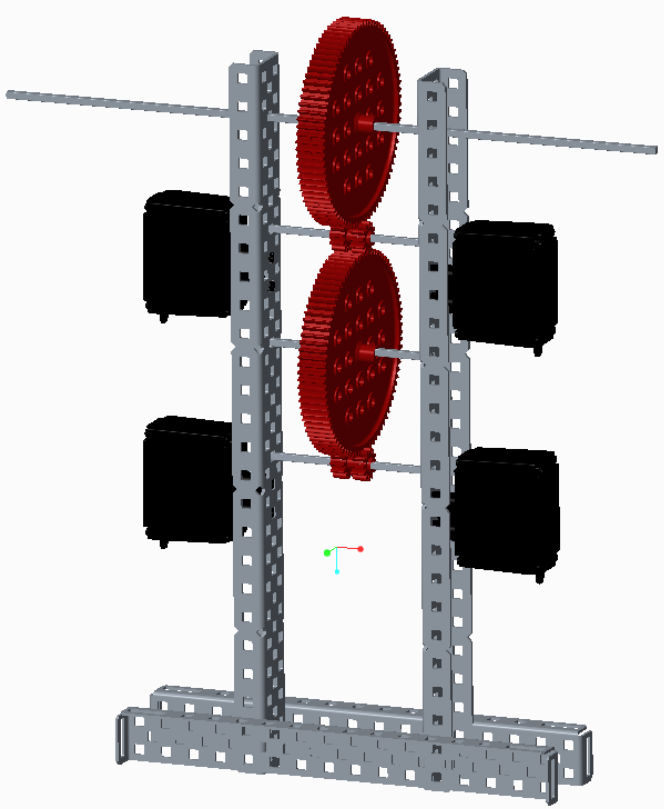
- Measure maximum lifting
- Record data
- Must lift minimum 0.65 lbs
  - Weight of the star

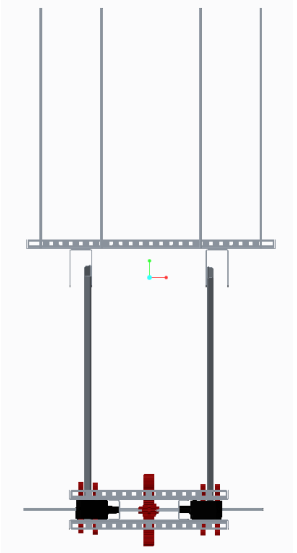
Maximum Lifting Weight	
Arm	
Weight [grams]	Pass/Fail
250	Pass
300	Pass
350	Pass
400	Pass
450	Pass
500	Pass
550	Pass
575	Pass
600	Fail

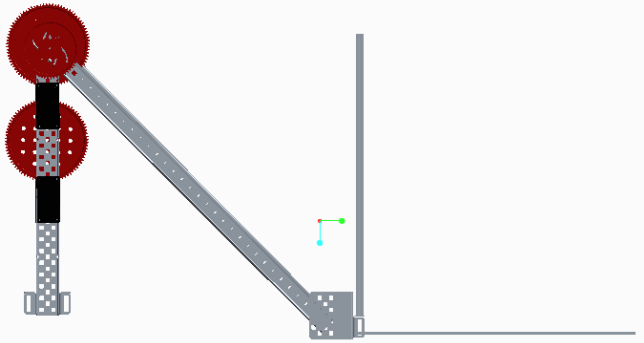
OLIVET NAZARENE UNIVERSITY

Arm Design

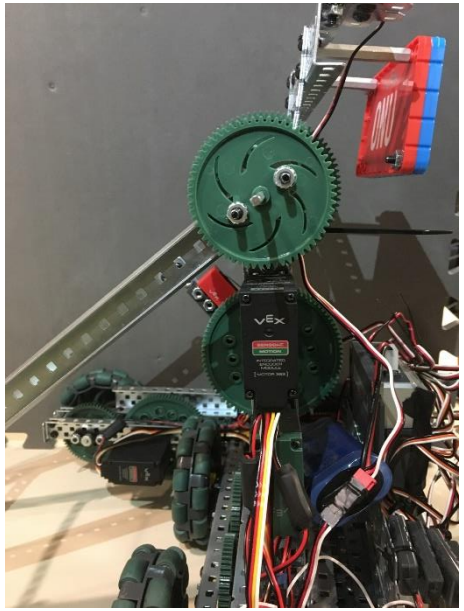


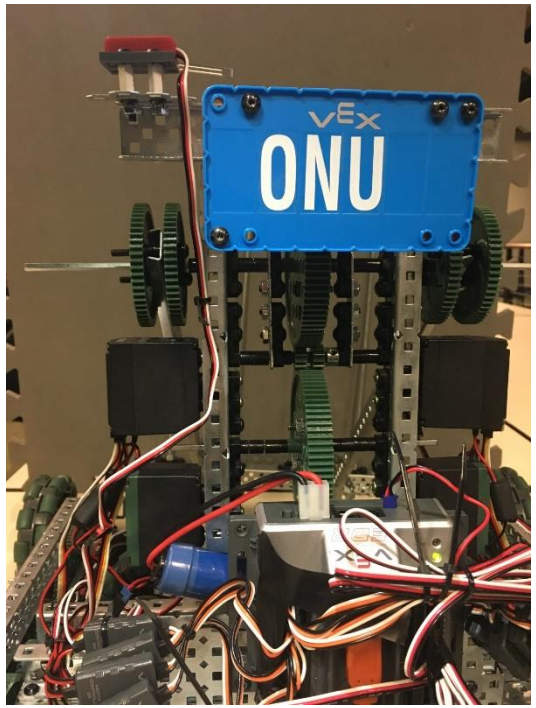


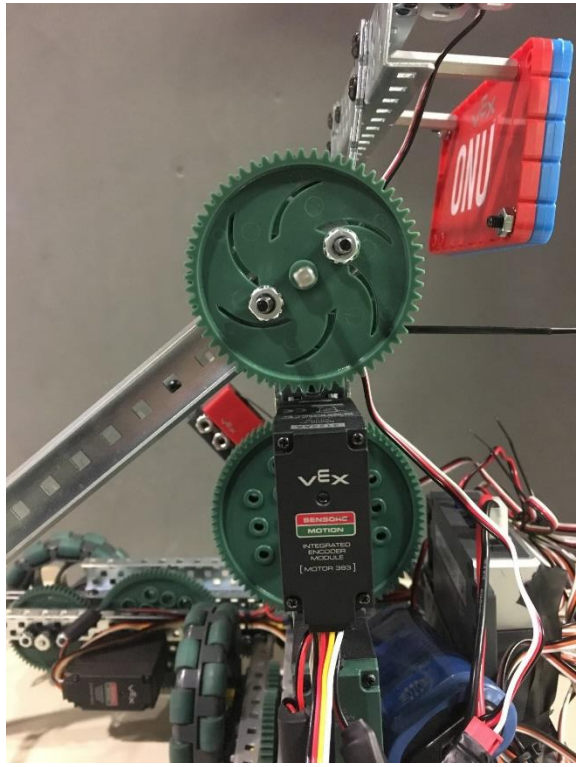


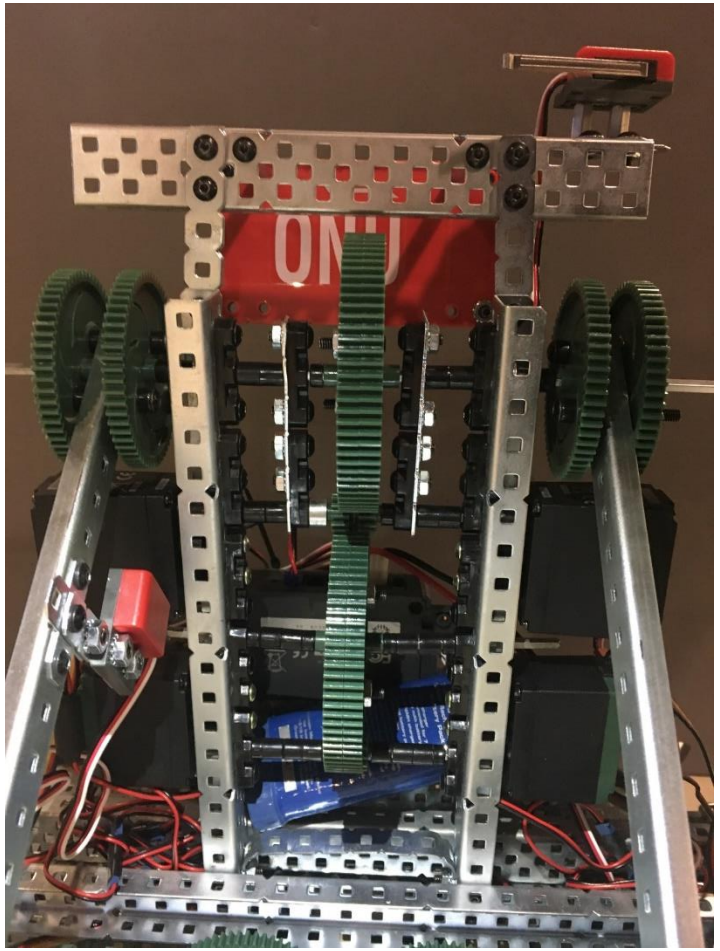


Gearing of the Arm









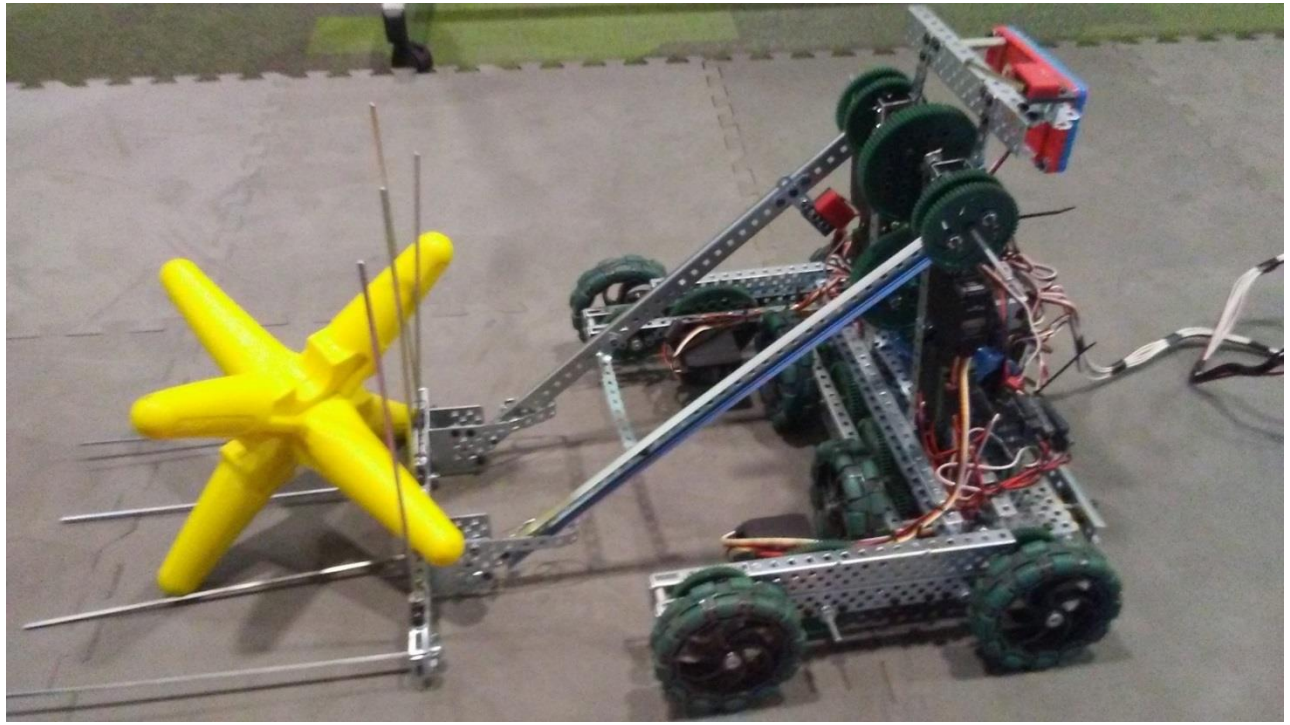
Programming

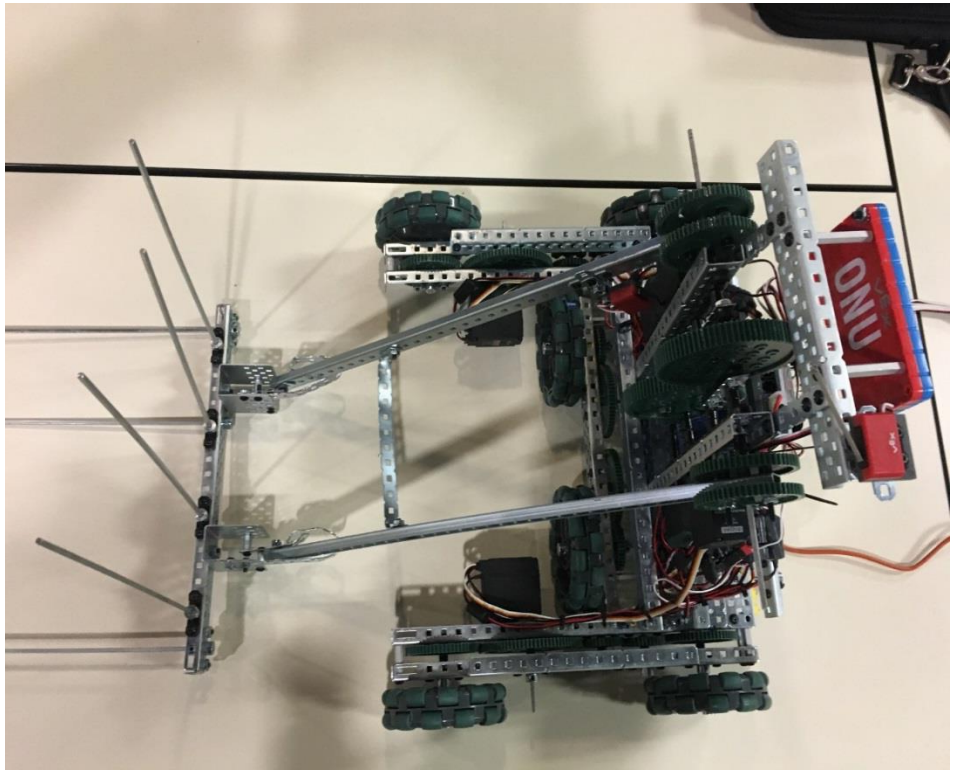
- 3 Parts
- Ideas
- Problems

```
void autonomousNoArm() {
        wait1Msec(500);
        turn(0);
        move(0, 24);
        setArmSpeed(minArmSpeed);
        wait1Msec(250);
        setArmSpeed(0);
        move(0, -20);
        turn(-90);
        move(0, -12);
        move(0, 48);
        setArmSpeed(minArmSpeed);
        wait1Msec(1000);
        setArmSpeed(0);

        move(48, 0);

}
```

Competition Day

- Saturday, February 11, 2017
- 7th place out of 11 teams





Lessons Learned

- Skilled Portion
- Design journal
- The budget makes a difference
- Measure Robot prior to Competition day
- Extra Power Supply