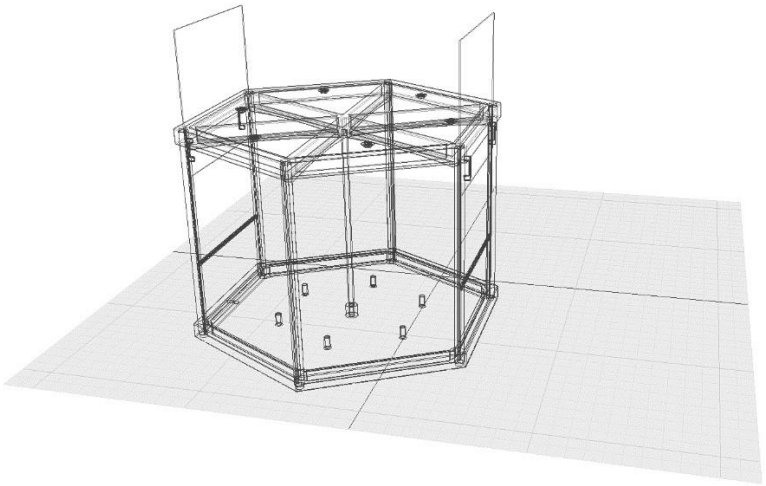
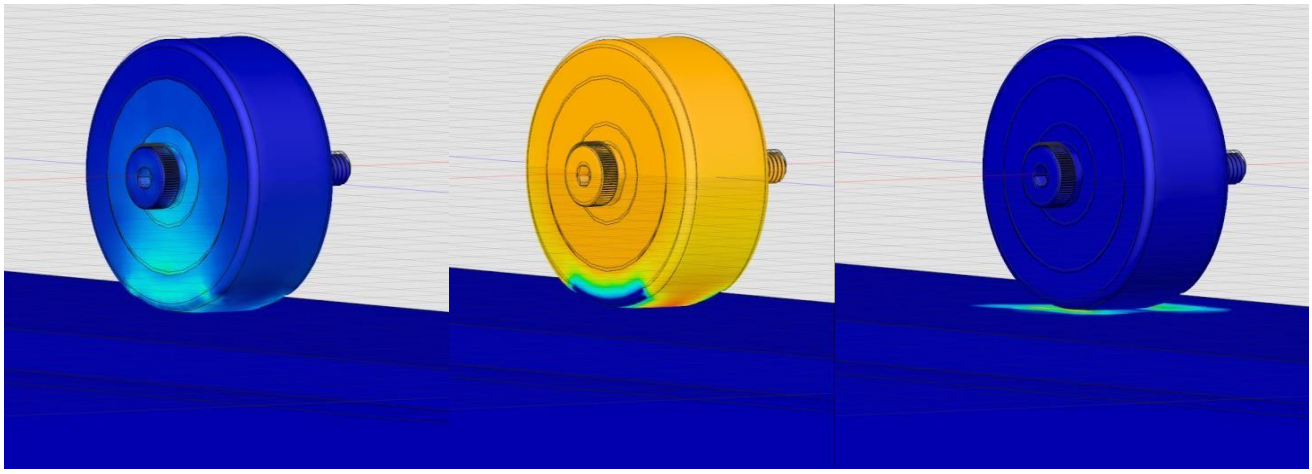
PASCAL VOYER-NGUYEN

ENGINEERING DESIGN PORTFORLIO

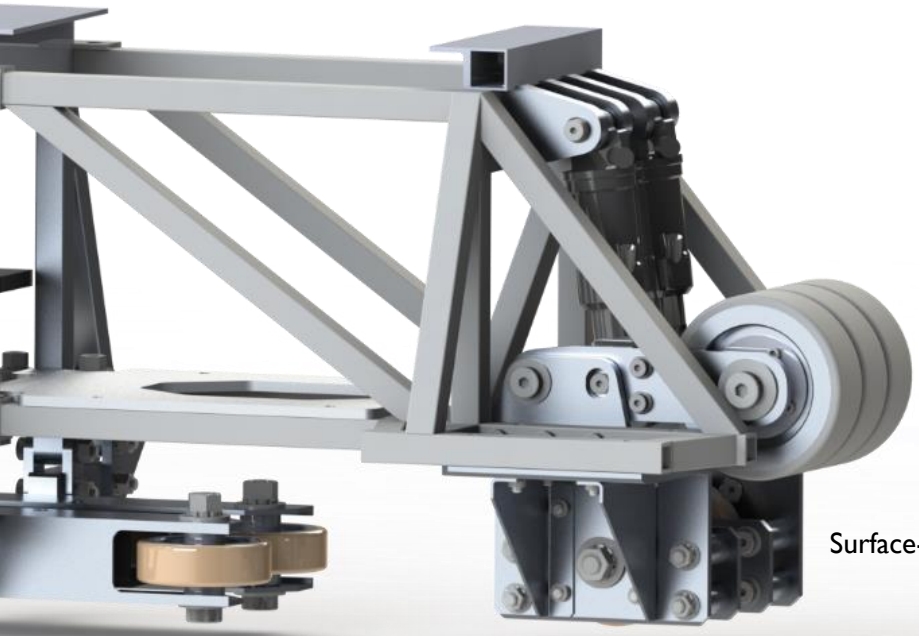


HYPERLOOP – GUIDANCE & AEROBODY

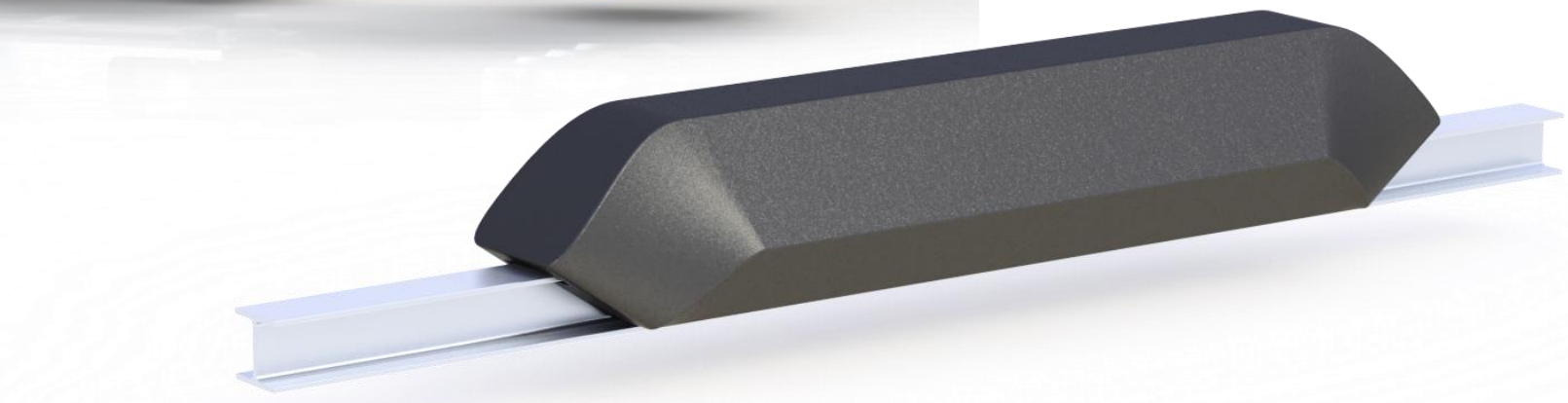
Stress, deflection, reactive force analysis and displayed mesh of Hyperloop pod guide wheels simulated in Fusion 360



Detailed view of guidance system, wheels provide suspension and guide pod along track, identical system at the rear

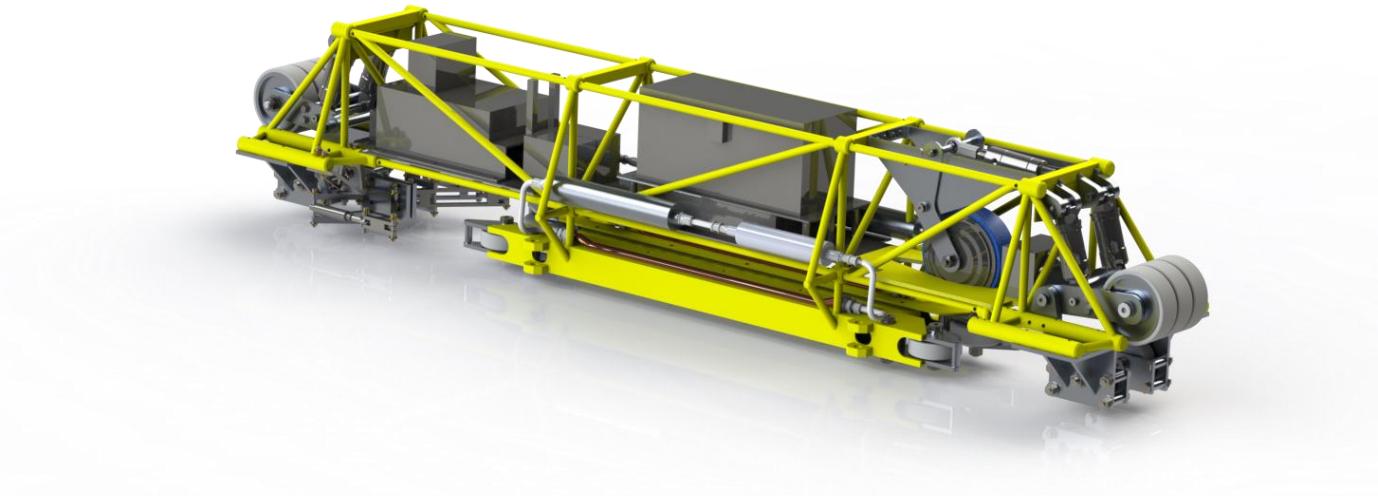


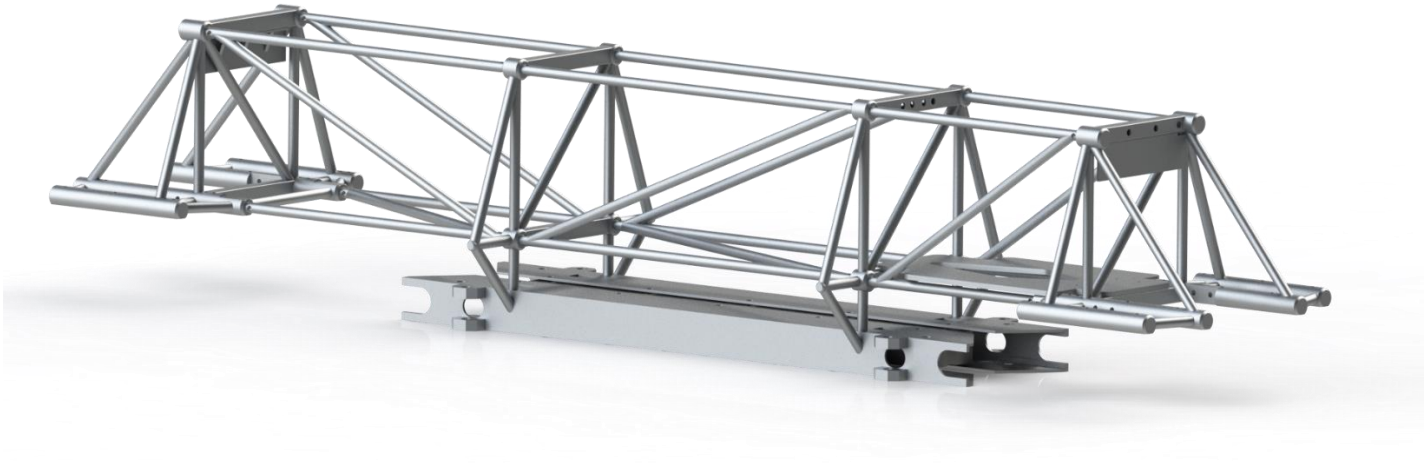
Surface-model of streamlined aerobody based off clay models

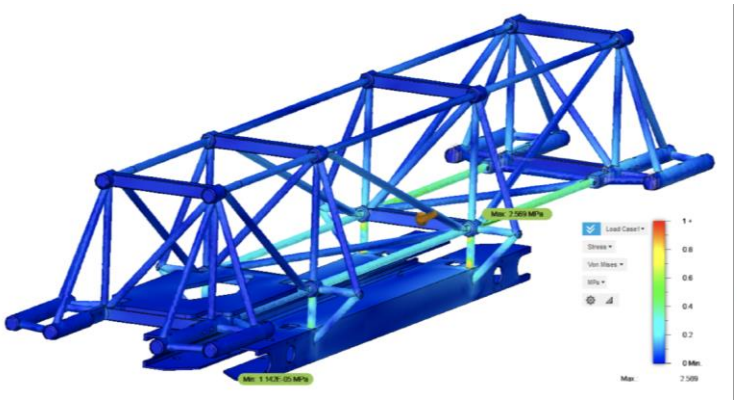


HYPERLOOP - CHASSIS

Design and analysis of a welded space-frame chassis under multiple simulated load cases for the 2019 Hyperloop competition

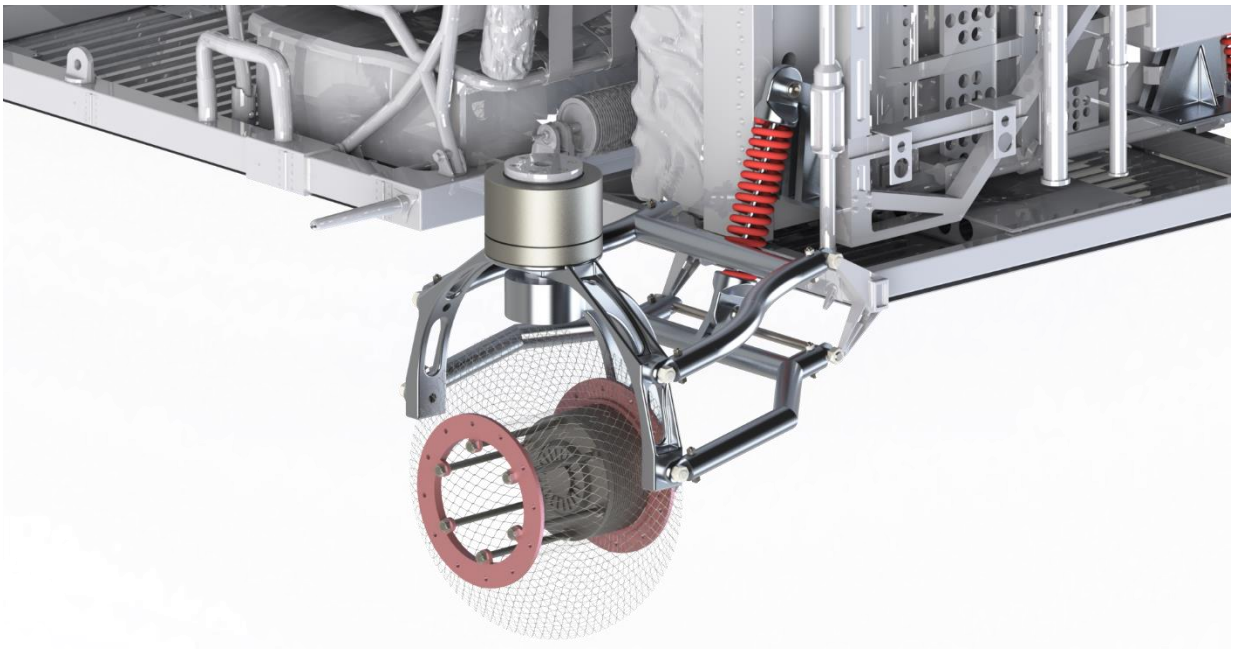






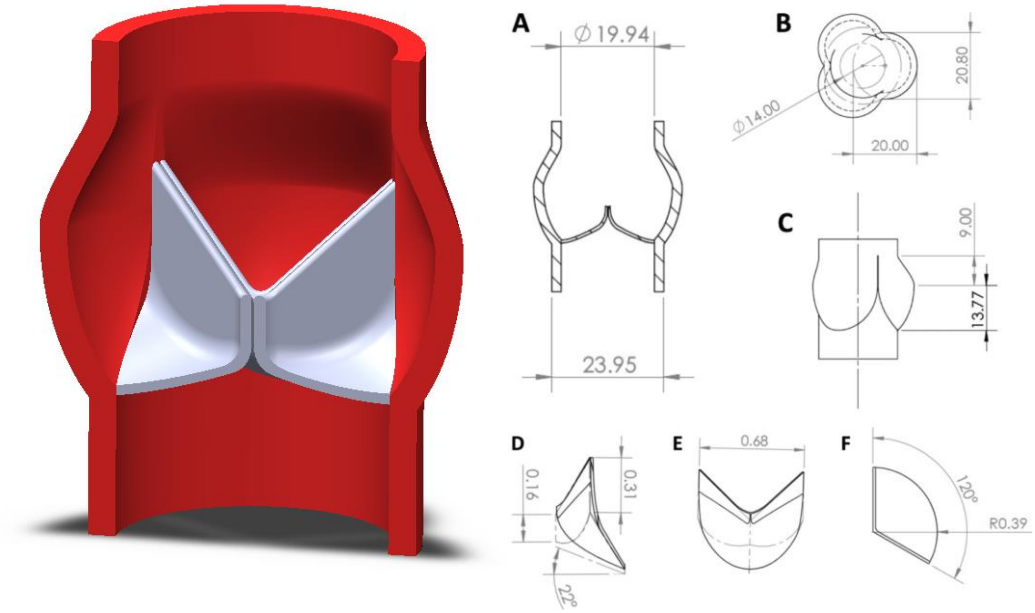
LUNAR ROVER POWERTRAIN

Omni-directional lunar rover powertrain module compatible with the existing Apollo mission rovers modeled on Solidworks

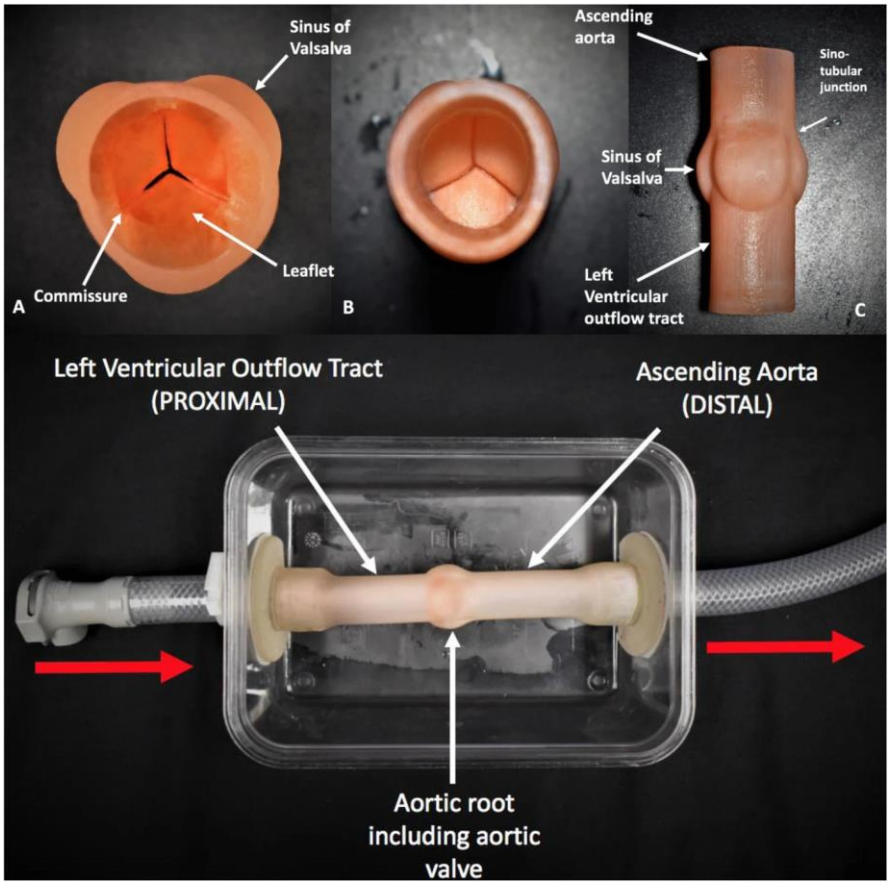


HEART VALVES

Parametrised geometric model of Aortic valve and leaflets using Solidworks.



Functional 3D printed valves and phantom model testing rig for MRI. Key anatomical features identified.

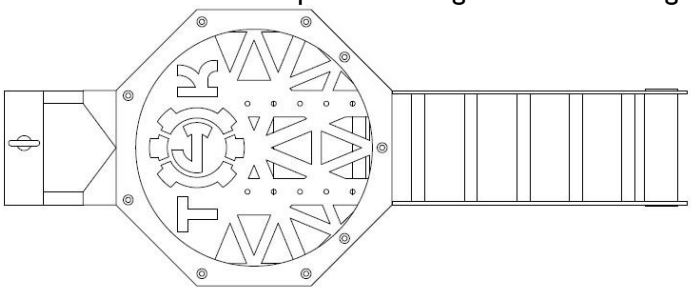


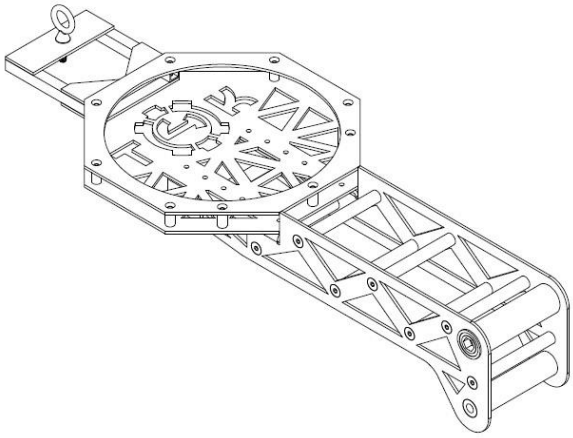
MICROGRAVITY TOILET

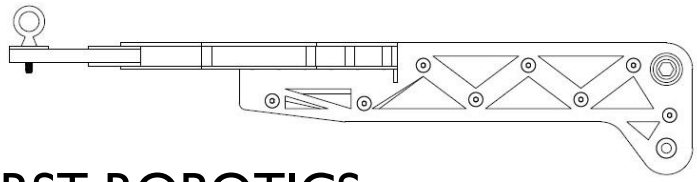
Design of CenTo, a novel centrifugal toilet design for lunar gravity and microgravity. CenTo uses centrifugal force to capture and force human waste through a passive one-way seal mechanism. Also included are a radial fan to manage smell and a specialised seat geometry that cradles the pelvis to help crew align themselves. The design was submitted for NASA's 2020 2020 Lunar Loo challenge hosted on Hero^{X}.

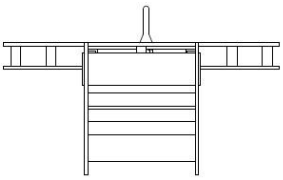
CATAPULT

30” Sheet metal catapult arm designed to launch large 24” inflatable exercise balls









FIRST ROBOTICS

Robot designed to compete in the *FIRST* Robotics 2016 competition featuring a collapsible climbing system designed to fit under a 24” low-bar, extend to 6 feet and lift a 120-pound robot (2 pivoting arms)

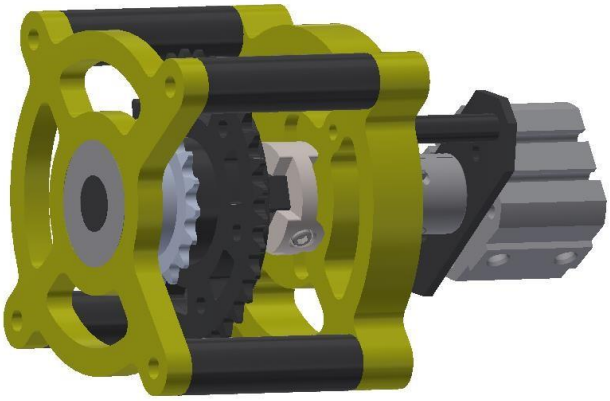
ARMS

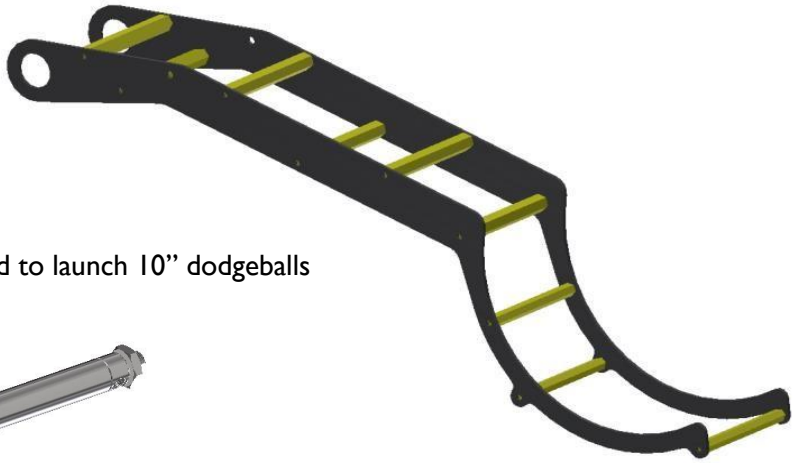
Detailed view of climber arms

3 collapsing rectangular aluminum tubes

TRANSMISSION

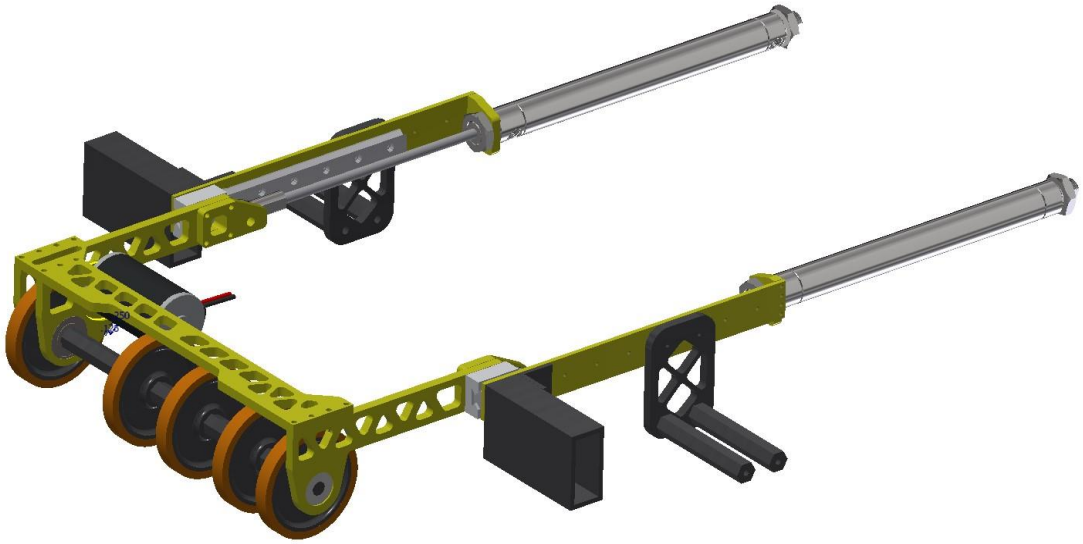
Transmission and locking system for climbing mechanism actuated by a pneumatic shifter cylinder





CATAPULT

Pneumatic powered catapult arm of robot designed to launch 10” dodgeballs



INTAKE

Extendable ball intake of robot powered by 2 pneumatic cylinders and a brushed motor

GEARBOX

2-speed drivetrain gearboxes with pneumatic shifter

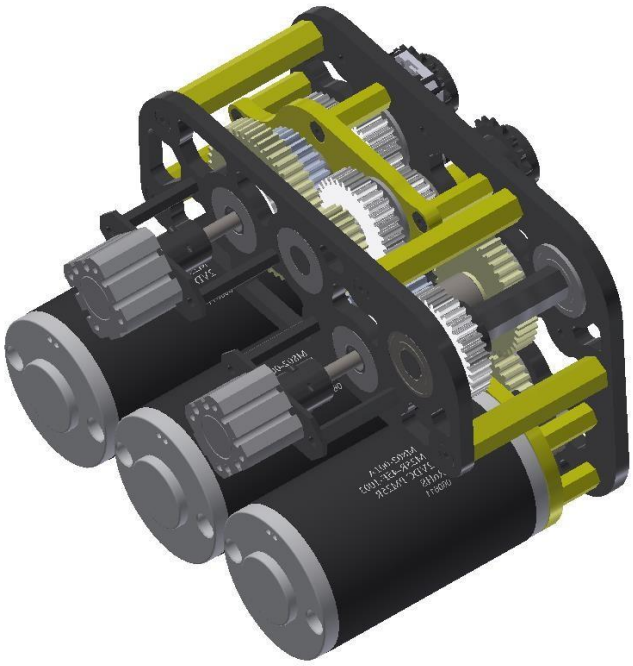
Accommodates 3 CIM motors each

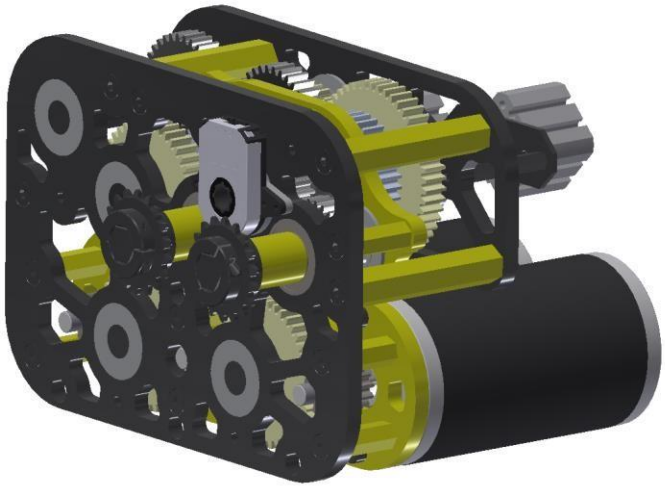
2 ball shifters actuated by their own pneumatic cylinders

Machined out of 1/4” aluminium plates

Dual output shafts

Power take-off





HEXAGRO GREENHOUSE

A portable greenhouse designed for small communities in northern Canada where the cost of importing fresh produce is exceptionally high

Fastener-less design – the entire greenhouse can be assembled without the use of power-tools or fasteners for ease of use and re-usability