Harsh Jashvantbhai Modi

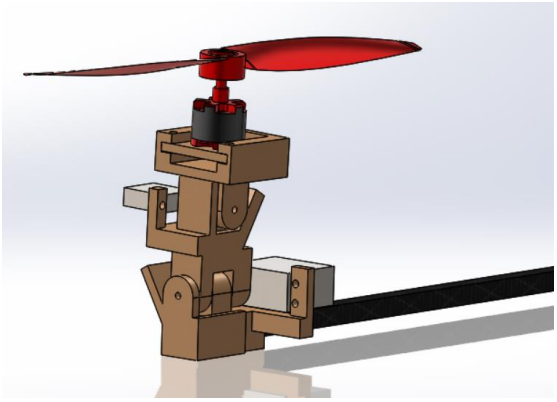
Mechanical Design Portfolio

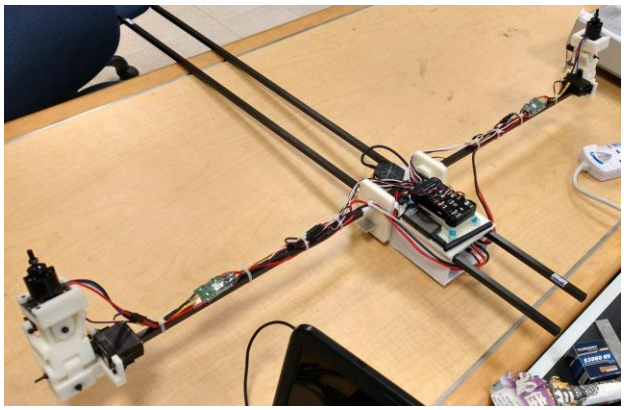
1. **Hobby project created during first year of the undergraduate:**

Created a model of my bicycle using Autodesk Inventor as I had learned the software for the first time. It was a pleasurable experience to design parts and then assemble them with actual measurements from the bicycle. The model is available at https://grabcad.com/library/bicycle-38 .

2. **Bicopter's 3DOF motor control mechanism created during internship at NTU Singapore:**

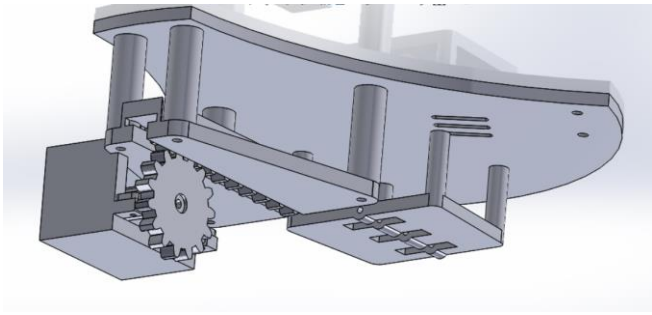
Designed a 3 DOF mechanism to precisely control the attitude and to enable the transition between hover mode and fixed-wing mode of the VTOL fixed-wing UAV. Optimized the design by stress analysis in ANSYS and then manufactured using additive manufacturing.

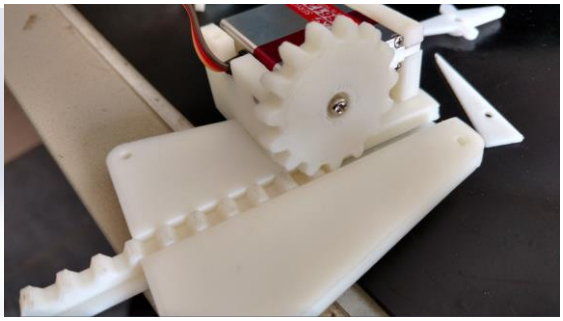




3. **Servo actuated object drop mechanism:**

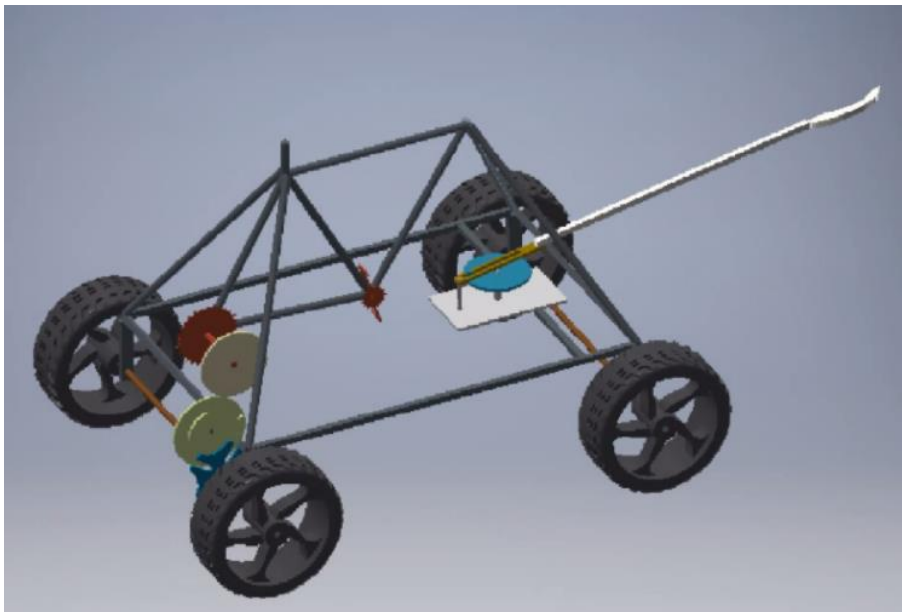
Designed a servo motor actuated mechanism to drop object from an UAV when desired. Used a design concept of rack and pinion mechanism. Manufactured using 3D printing. Worked on a this small project to help out a colleague at NTU Singapore internship.





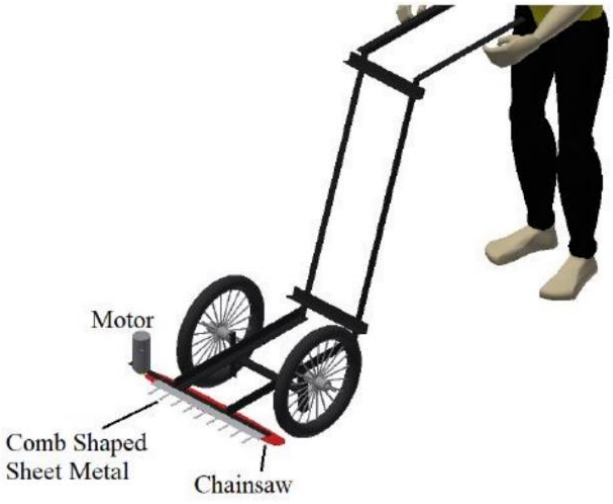
4. **Pedal powered wheat harvester:**

Designed a wheat pedal powered heat harvester which can be used in the small farms. The model used mechanisms such as Geneva wheel mechanism and quick return mechanism. Manufactured some parts using CNC machine. Project done as a course project “Synthesis and Analytics of Mechanisms”



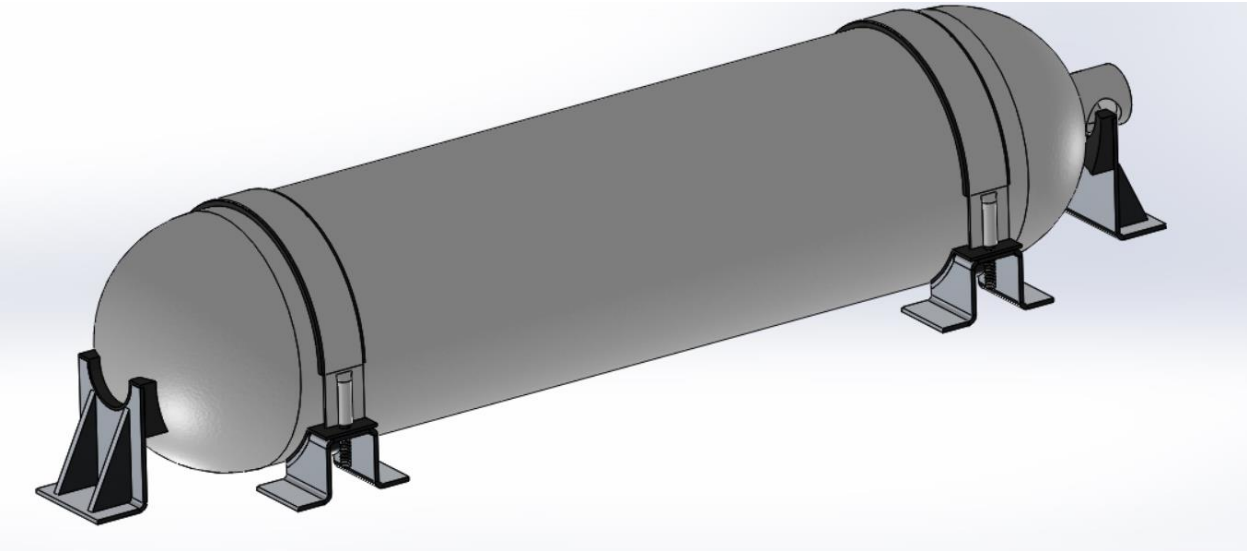
5. Small DC Motor Powered wheat harvester:

As a continuation of the previous project, designed small DC motor powered wheat harvester as the previous model had some flaws and the pedal power is not sufficient to cut the wheat. Presented a paper in the conference and published as a selected proceedings in “Lecture Notes in Mechanical Engineering” – Springer https://doi.org/10.1007/978-981-15-4477-4_32



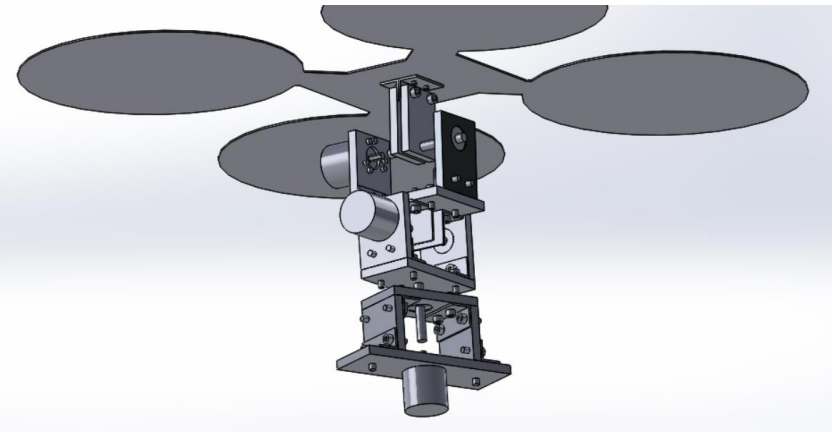
6. **Cylinder support**

Designed high pressure cylinder supports for European Hyperloop Week as a member of “Hyperloop IITB” team. Design considered manufacturability using sheet metal components.



7. **3 DOF Attitude Testing Platform:**

Designed 3 DOF attitude testing platform to safely test the quadcopter’s attitude controller without a need to fly. Manufactured components using laser cutting and assembled them to test the attitude controller performance. Designed as a part of masters project at IIT Bombay.



8. Brushless DC Motor Thrust Measurement Equipment:

Designed and manufactured a simple thrust measurement equipment to measure the thrust generated by the motor-propeller combination given the input PWM signal value. Designed as a part of masters project at IIT Bombay. Used extensively during the project.