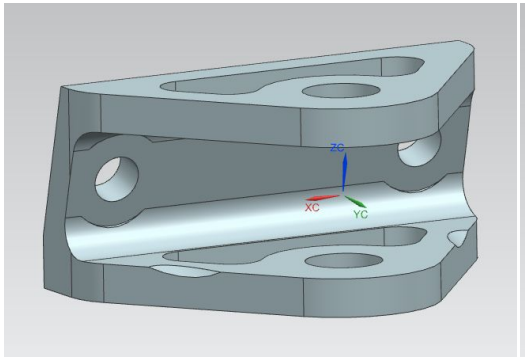
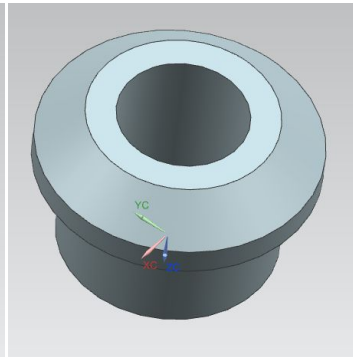
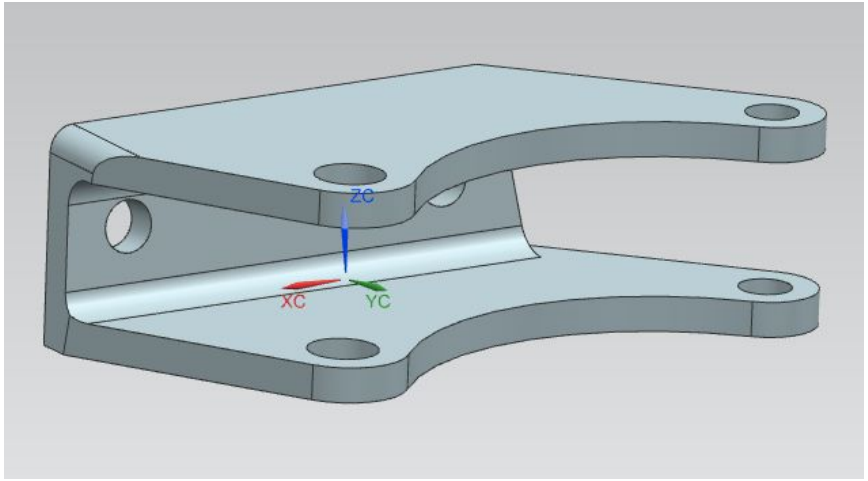
Engineering Projects Portfolio

Pavel Matyukhin

Suspension Clevises for GFR24 (Capstone Project in progress)





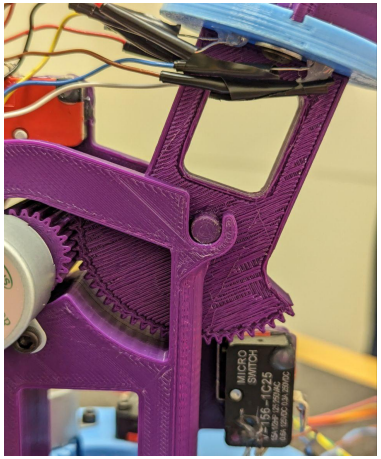


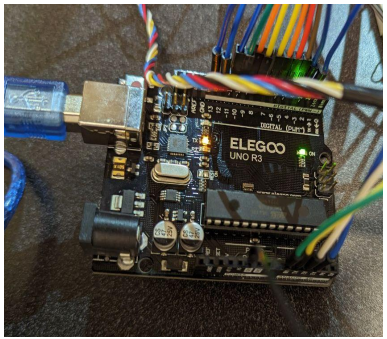
- Redesign of Suspension Clevises for GFR24e and 24d electric racecars
- 11 unique components, 88 parts over 4 cars
- All parts designed for Safety Factor >1.8
- Reduced total weight of the system from 1100g to 700g compared to previous year
- Improved manufacturability by standardizing features across all parts and sizing for tools
- Reduced the number of unique parts by keeping features symmetrical where appropriate
- Manufactured on a 3-axis CNC mill

3D Printed Suspension Clevises (in progress)

- Alternative version of suspension clevises for GFR24 race cars
- Designed through nTopology, implementing topology optimization and static stress analysis
- Potential weight savings of more than 20% from traditional design
- Design was made considering both functional and aesthetic features
- Currently, physical parts are being printed

Arduino Sun-Tracker



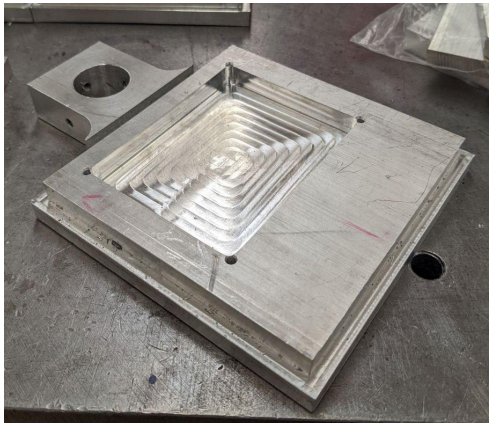


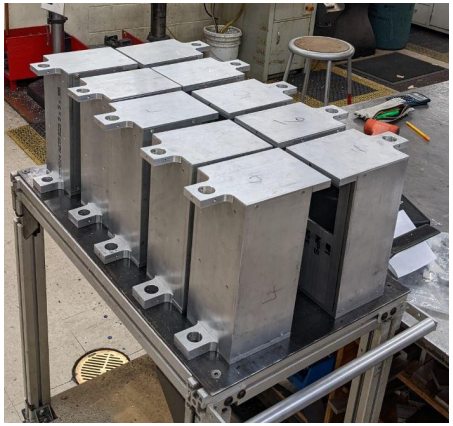
- A Sun-tracker assembly that tracks source of light and records light levels in real time
- Consists of 3D printed case, gearing mechanism, light splitter; switches, sensors and stepper motors for 2 axis movement
- Light is detected by 4 photosensors, separated by a 3D printed “light splitter”
- Utilizes 2 stepper motors to rotate sensors around 2 axes to point at source of light
- Continuously locates source of light and records light levels derived from electrical values
- Runs on single Arduino Uno board

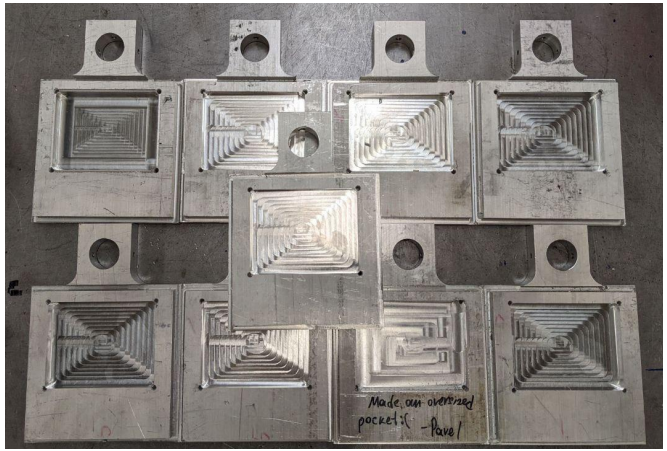
Kitchen Multi-Tool

- Class project designed considering customer requirements and products available on the market
- Concepts were generated using DFMEA and house of quality methods
- Designed, manufactured, assembled and tested within 6 weeks
- Utilizes 3D printed parts and off the shelf electronic components
- Allows variable speed settings, and multiple tool attachments which are attached on a common thread
- Includes documentation with technical specifications and engineering drawings

Camera Housing Assemblies (Manufacturing Project)







- Housings for outdoor cameras
- A set of 10 identical aluminum assemblies consisting of 6 components each
- Made engineering drawings using GD&T standards for components
- Some components were manufactured on Manual mill and 3 axis CNC mill
- Fast-paced project completed and assembled in 5 weeks