Davis Undergraduate Engineering Network Construction Project

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01. Design and Manufacturing Process

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01. Design and Manufacturing Process

Design and Manufacturing Process (1/4):

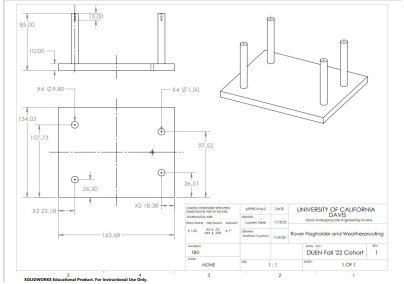
- Rover:
    - ELEGOO Conqueror Robot Tank

Final Conqueror Tank Assembly::

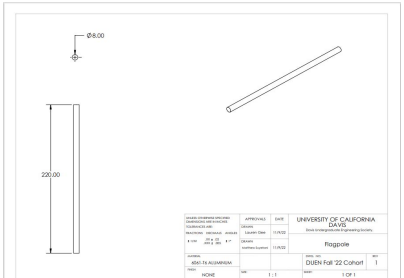
Design and Manufacturing Process (2/4):

- Computer Aided Design (CAD):
  - Designed, dimensioned and manufactured multiple interactions
  - Testing fit & improved on previous iterations
  - Attached to rover
- Flagpole Component:
  - CAD design and errors that popped up
  - Switch to wooden pole instead

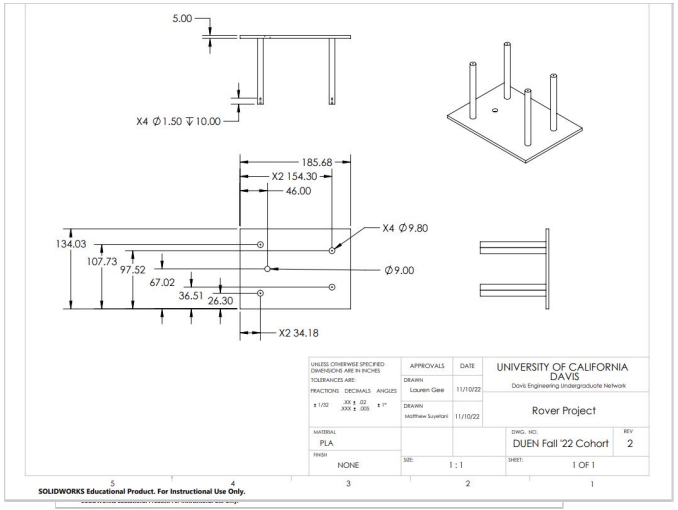
initial CAD Designs



Original Flagpole CAD Design

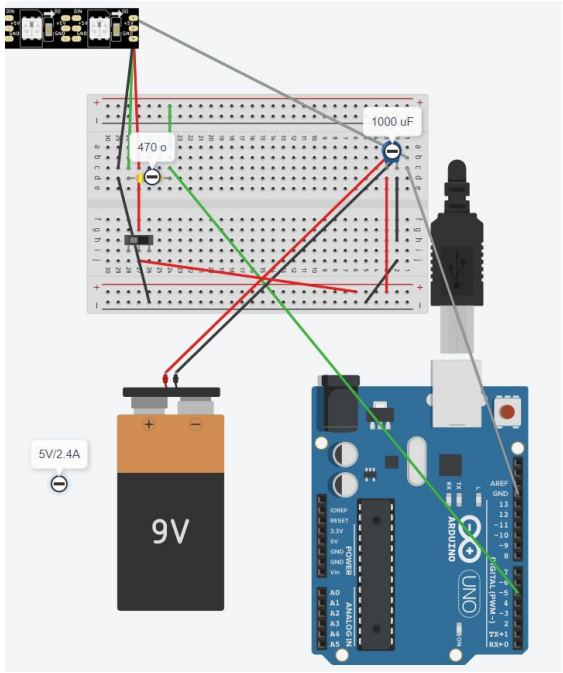


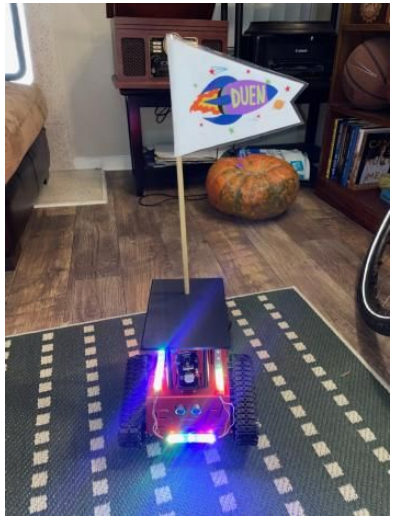
Final CAD Design



Design and Manufacturing Process (3/4):

- LED Strip Component
  - Build circuit between power bank, Arduino, and LED
  - Code LED to light up in a cascading pattern
  - Fitting parts onto rover






```
for(int i=TAIL_LED;i<LED_COUNT;i++){
  // pixels.Color takes RGB values, from 0,0,0 up to 255,255,255
  strip.setPixelColor(i, strip.Color(0, 0, 0)); // Turn off light
  strip.show(); // This sends the updated pixel color to the hardware.
  delay(DELAY_VAL); // Delay for a period of time (in milliseconds).
}
```

Design and Manufacturing Process (4/4):

- Flag Advertisement Component:
  - Design sketch
  - Approval from all members
  - Printing and lamination process

Flag Final Design

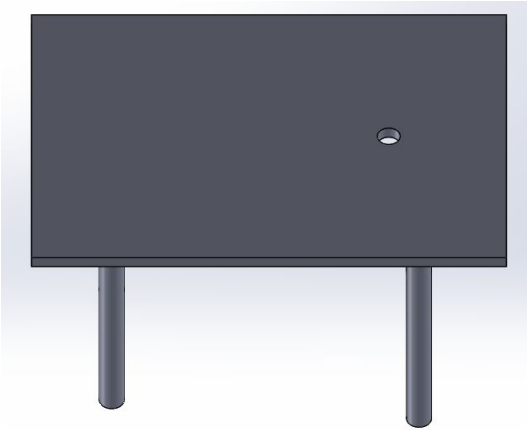
Final Product

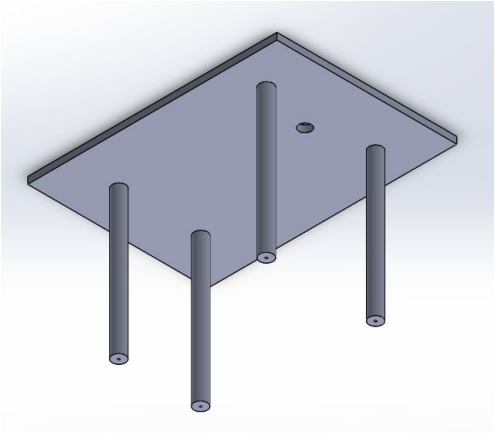
02. Features Changed From Initial Design Proposal

Features Changed From Initial Design Proposal:

- No iPad or tablet component
- Additional CAD component to cover upper rover components & hold flag
- Flagpole, lighting, and LED strips

Final Design In Solidworks





03. Challenges & Overcoming Them

Challenges and Overcoming Them:

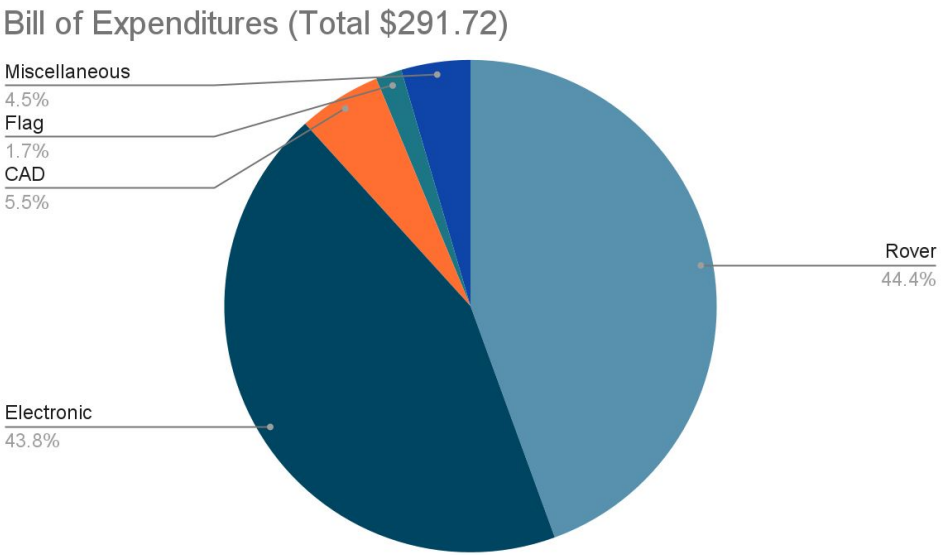
- Errors of CAD designing and dimensioning
- 3D printer was not accurate and did not match hole dimensions
- Errors with flag printing and lamination
- Electrical wiring and circuitry

First and second CAD iteration

04. Bill of Materials & Expenditures

Bill of Materials and Expenditures:

- ELEGOO Conqueror Robot Tank Set
- PLA used for 3D printing materials
- Power bank
- Light light strip
- Breadboard
- Wooden flagpole
- Double sided tape

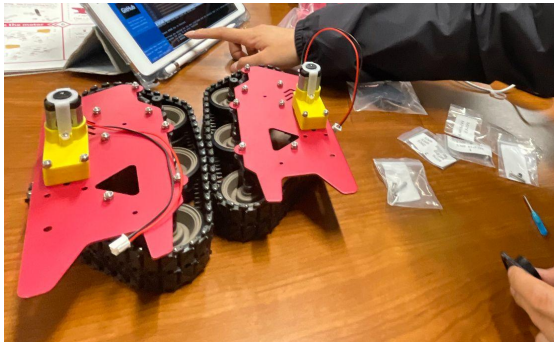


05. Photos of The Process

Photos Of The Process (1/3):

- Explanations

Left and Right Rover Base Components:

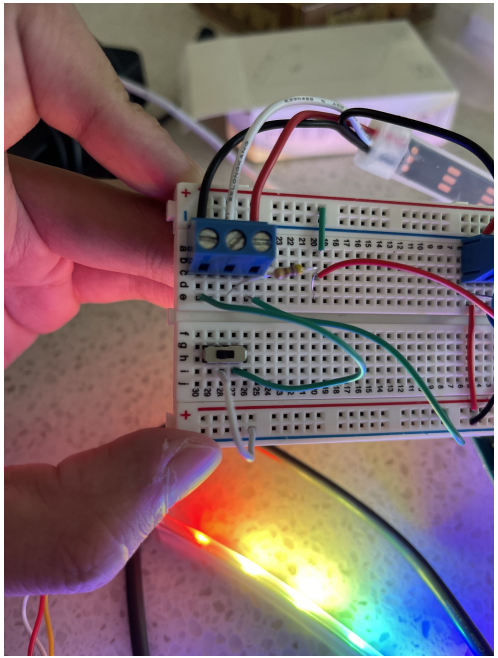


Drilling Screws to Attach CAD & Rover Component

Photos Of The Process (2/3):

- Explanations

Finishing the LED Circuit (switch still needed fixing)



Photos Of The Process (3/3):

- Explanations

Fully Constructed Rover Without LEDs

Fully Constructed Rover with LEDs

06. Information To Keep In Mind During Operation

Information to Keep in Mind During Operation:

- Refer back to the manual for parts that may fall of during usage
- Keep rover off of high-surfaces while powered on
- The battery should be fully charged
    - Disconnect rover from power when working with electricity.
- Never forcibly rotate the servo by external force while the power is on
- Low battery can cause wifi disconnection and the camera getting stuck

Thank You!

A special thank you to the Construction Chairs, Giancarlo and Connor and our Program Managers, Samantha and Stacy!

Any Questions?

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