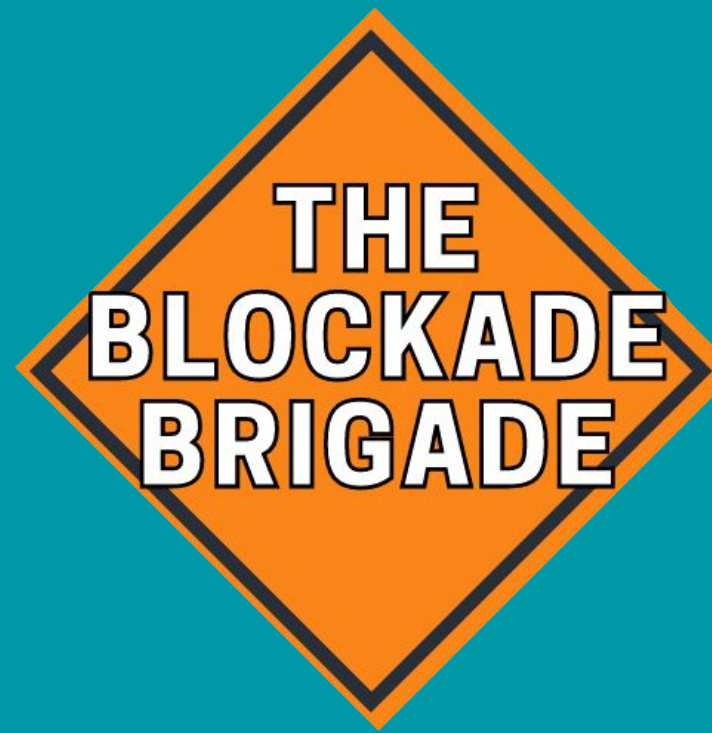


**BENHAM AVIATION SERVICES**

Benham Aviation Services

# Rapid Deployment Runway Closure System



# The Blockade Brigade



**SAN DIEGO STATE UNIVERSITY**

Department of Mechanical Engineering  
Department of Electrical and Computer Engineering

## Project Overview

**Sponsor:** Phil Benham

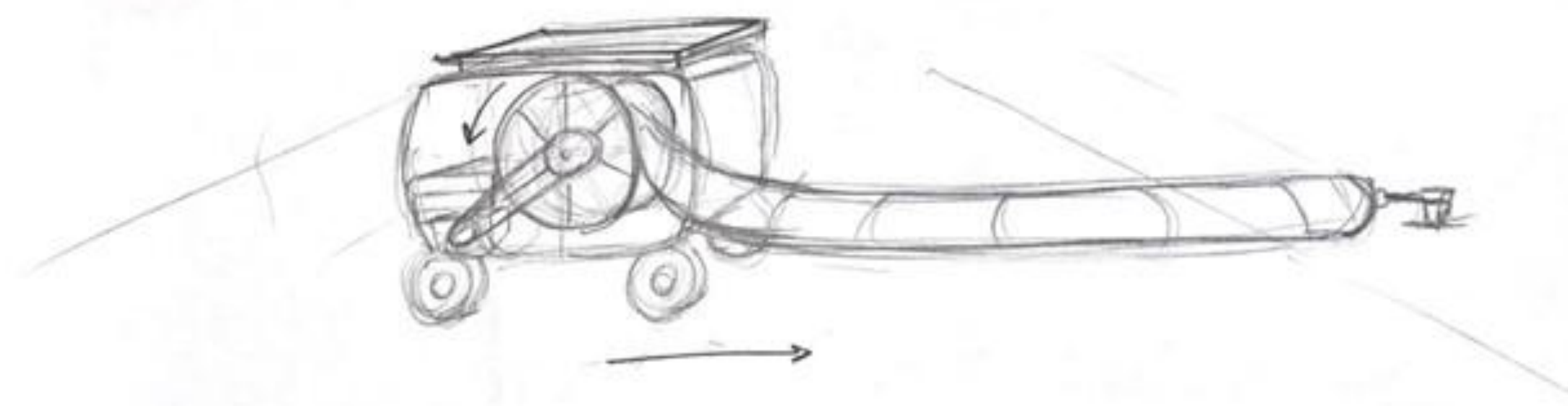
**Problem Statement:** Benham Aviation Services is looking for an automatic inflatable barrier that can be quickly deployed and retracted across a runway by one person in order to prevent unauthorized aircraft from landing.

**Needs:**

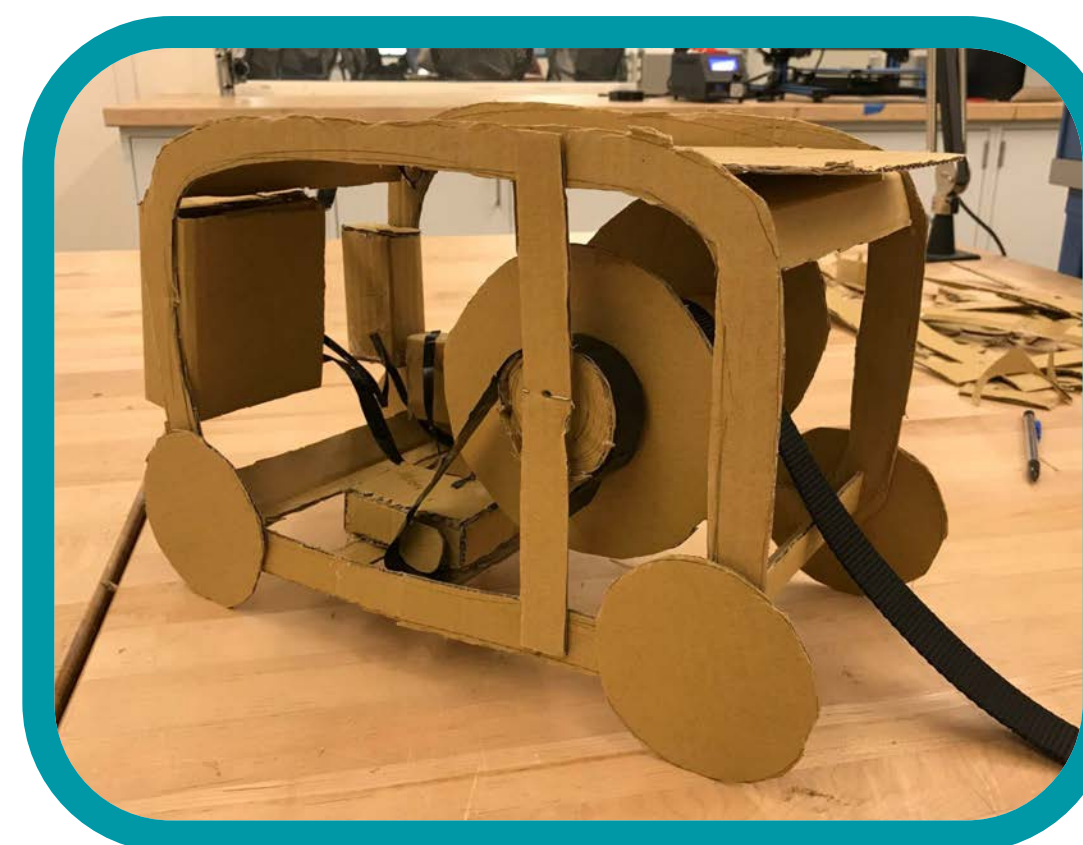
- Exhibit appearance of a barrier
- Be self retracting
- Withstand desert environment
- Be solar powered
- Be harmless to an aircraft
- Operable by a single person



## Final Design Process



Initial Design Sketch



Preliminary Full System Prototype



Final Assembled Device



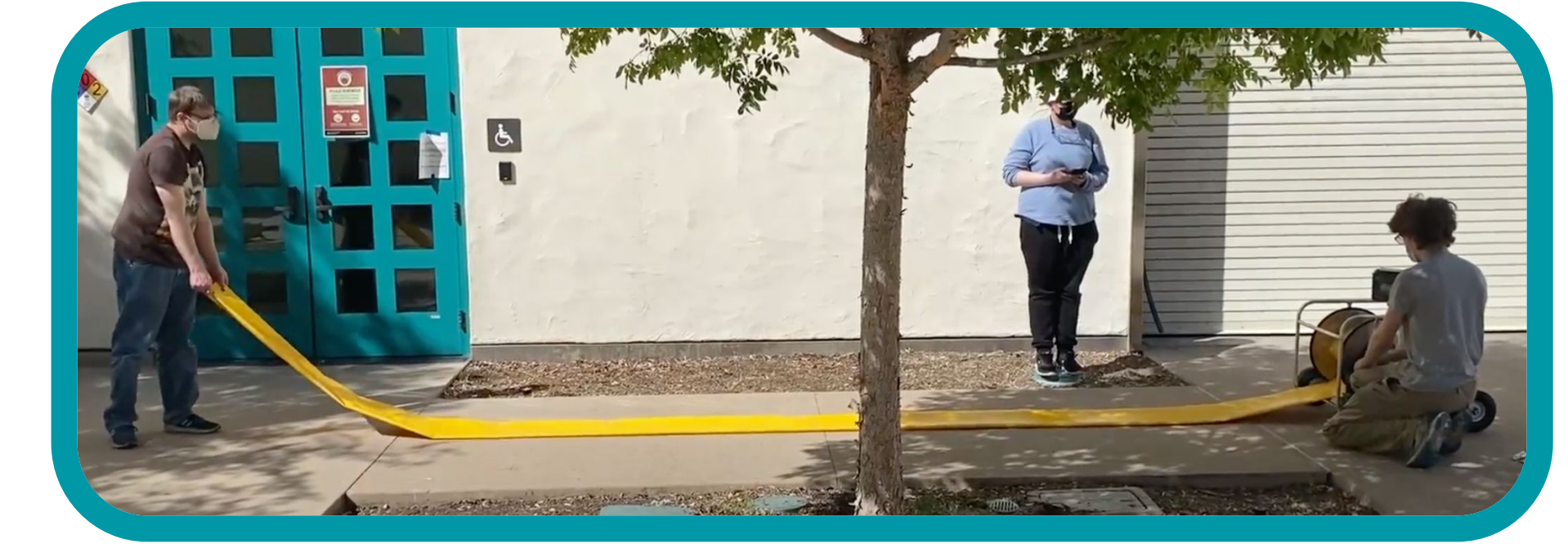
Side View



Front View

Final Device Assembly and Components

## Testing



Retraction and Deployment Testing



Inflation and Deflation Testing

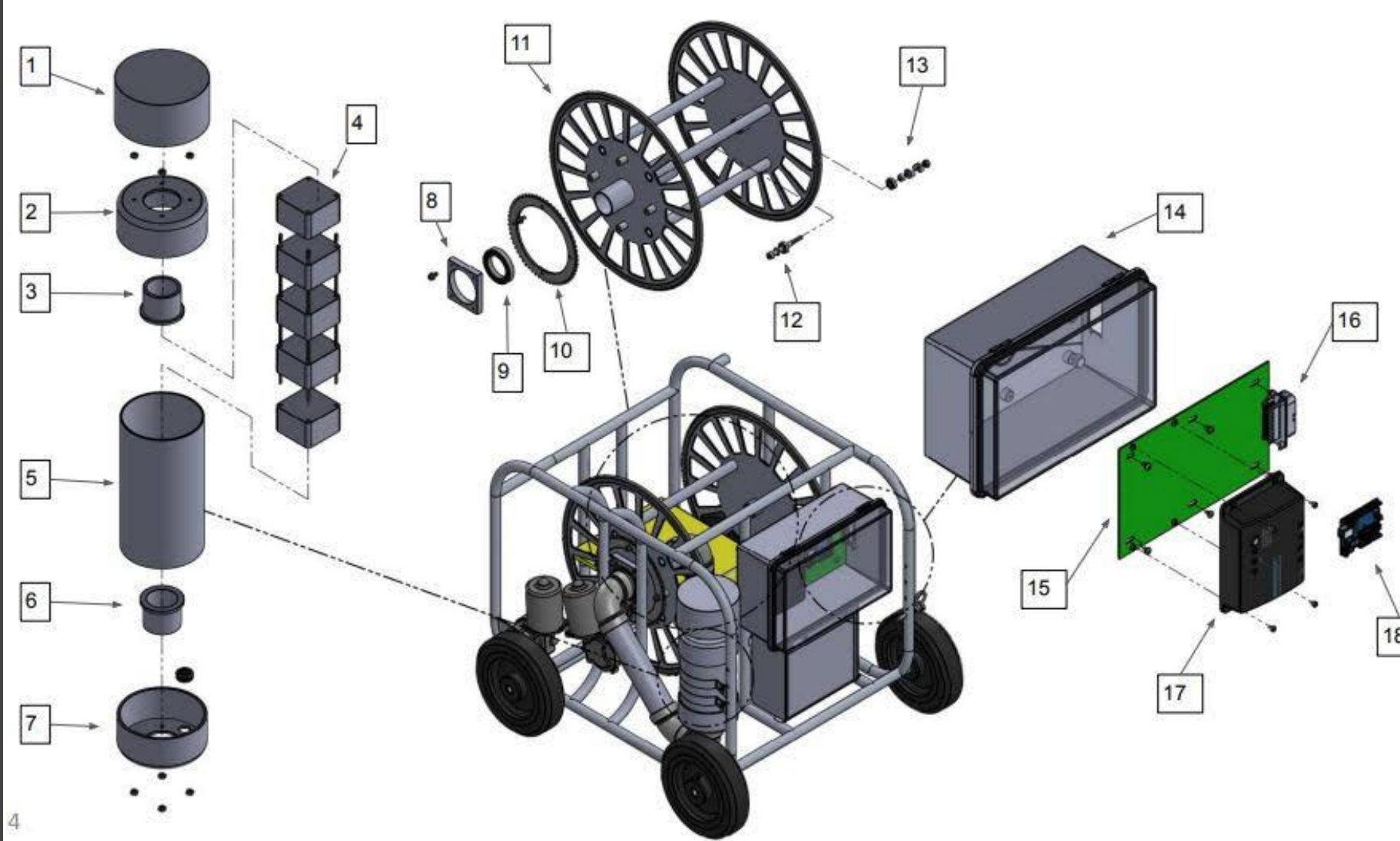


Component Heat Tolerance Testing



Sand Resistance Testing

## CAD

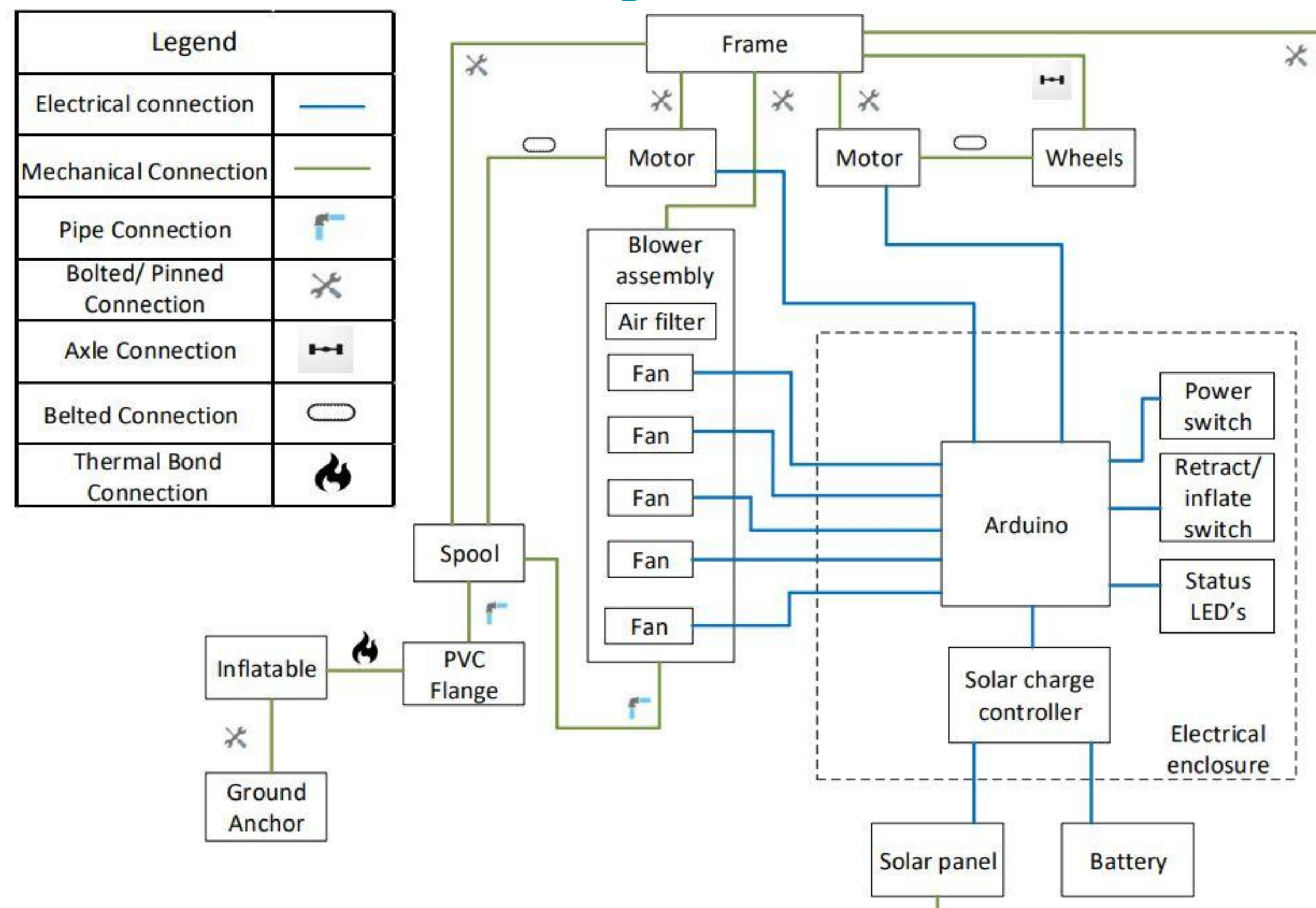


Final CAD Design Exploded View

Part #	System	Components
1	Air Assembly	Air Filter
2		Endcap, Input Side
3		Reducer Bushing
4		Fans
5		Air Blower Tube
6		Reducer Bushing
7		Endcap, Output Side
8	Spool Assembly	Bearing Mounting Block
9		Bearing
10		Spool Drive Sprocket
11		Spool Assembly
12		Axle and bearing
13	Axle fasteners	
14	Electrical Assembly	Electric Enclosure
15		Main PCBA
16		Panel Mount Connector
17		Solar charge Controller
18		Arduino Uno

CAD Legend Table

## System Level Diagram



Complete System Level Diagram of Mechanical and Electrical systems

## Team Members

Mechanical Engineering Team



Alyssa Elkins  
Chassis Lead



Nick Wolford  
Mechanical Lead  
Inflatable Lead  
Design Lead



Timothy Turner  
Air Blower Lead  
CAD Design Lead



Ala Zeidan  
Electrical Coordinator  
System Operations Lead

Electrical and Computer Engineering Team



Bianca Yusif  
Air Blower Lead



Khalid Nunow  
PCB Lead



Marc Tawangco  
Electrical Lead



Jomari Paguia  
Control Systems Lead



Sean Connolly  
Battery/Power Systems Lead

## Electrical Design



Electrical Components Enclosure: Solar Charge Controller and PCB Board

## Acknowledgements

We would like to thank the following individuals for their support and contributions in the development of our RDRCS:

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Mr. Phil Benham

**San Diego State University:**  
Dr. Scott Shaffar  
Professor Barry Dorr  
Dr. Chris Mi  
Mr. Michael Lester  
Ms. Allyson Korba