Rapid Deployment Runway Closure System

The Blockade Brigade

Benham Aviation Services

San Diego State University
Department of Mechanical Engineering
Department of Electrical and Computer Engineering

Project Overview

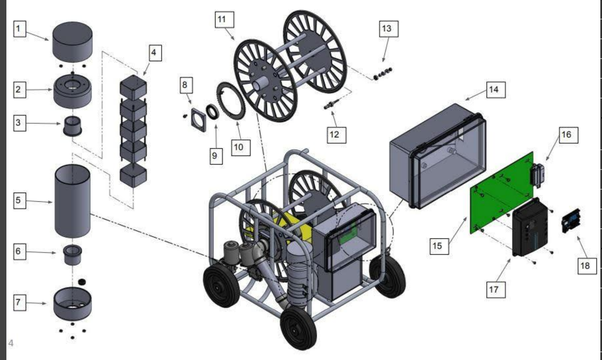
Sponsor: Phil Benham

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

CAD

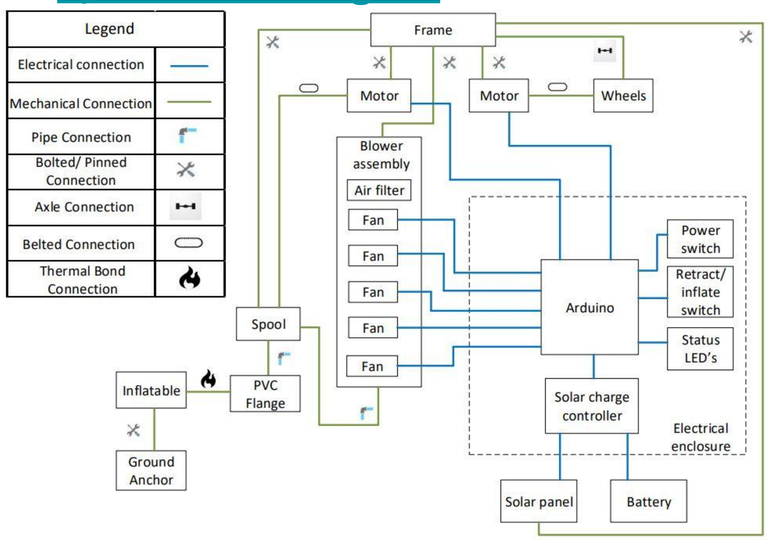


Final CAD Design Exploded View

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

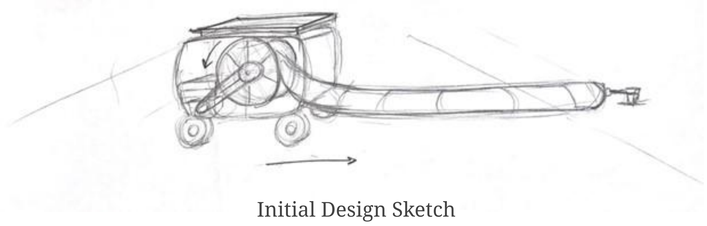
CAD Legend Table

System Level Diagram

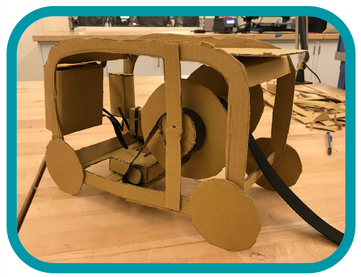


Complete System Level Diagram of Mechanical and Electrical systems

Final Design Process



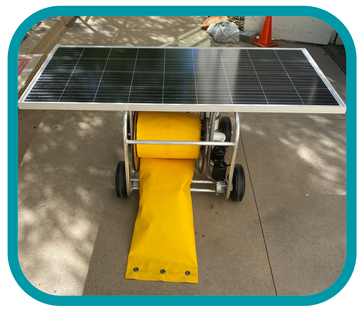
Initial Design Sketch



Preliminary Full System Prototype

Final Assembled Device

Side View



Front View

Final Device Assembly and Components

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

Testing

Retraction and Deployment Testing

Inflation and Deflation Testing

Component Heat Tolerance Testing

Sand Resistance Testing

Electrical Design

Electrical Components Enclosure: Solar Charge Controller and PCB Board

Acknowledgements

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San Diego State University:
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Dr. Chris Mi
Mr. Michael Lester
Ms. Allyson Korba

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