



Automatic Trash Lock (GUST)

By All Weather Trash Team

Sponsored By USAF and NSIN



SAN DIEGO STATE UNIVERSITY

Department of Mechanical Engineering

Project Overview

Problem Statement:

High wind conditions at Ellsworth AFB have led to tipped residential trash cans causing an unsightly mess of spilled trash, costly cleanup, and risk to aircraft

Need:

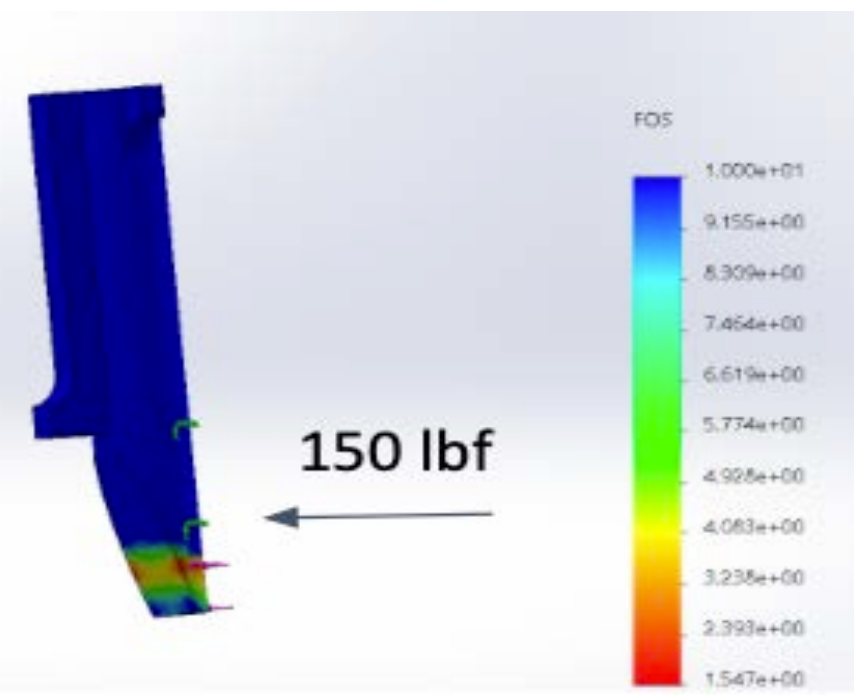
The trash can lid must stay closed whenever tipped over, must auto-lock when users interact to dispose of trash, and lastly must open when inverted by the local refuse company's trash collection truck.

Engineering Analysis

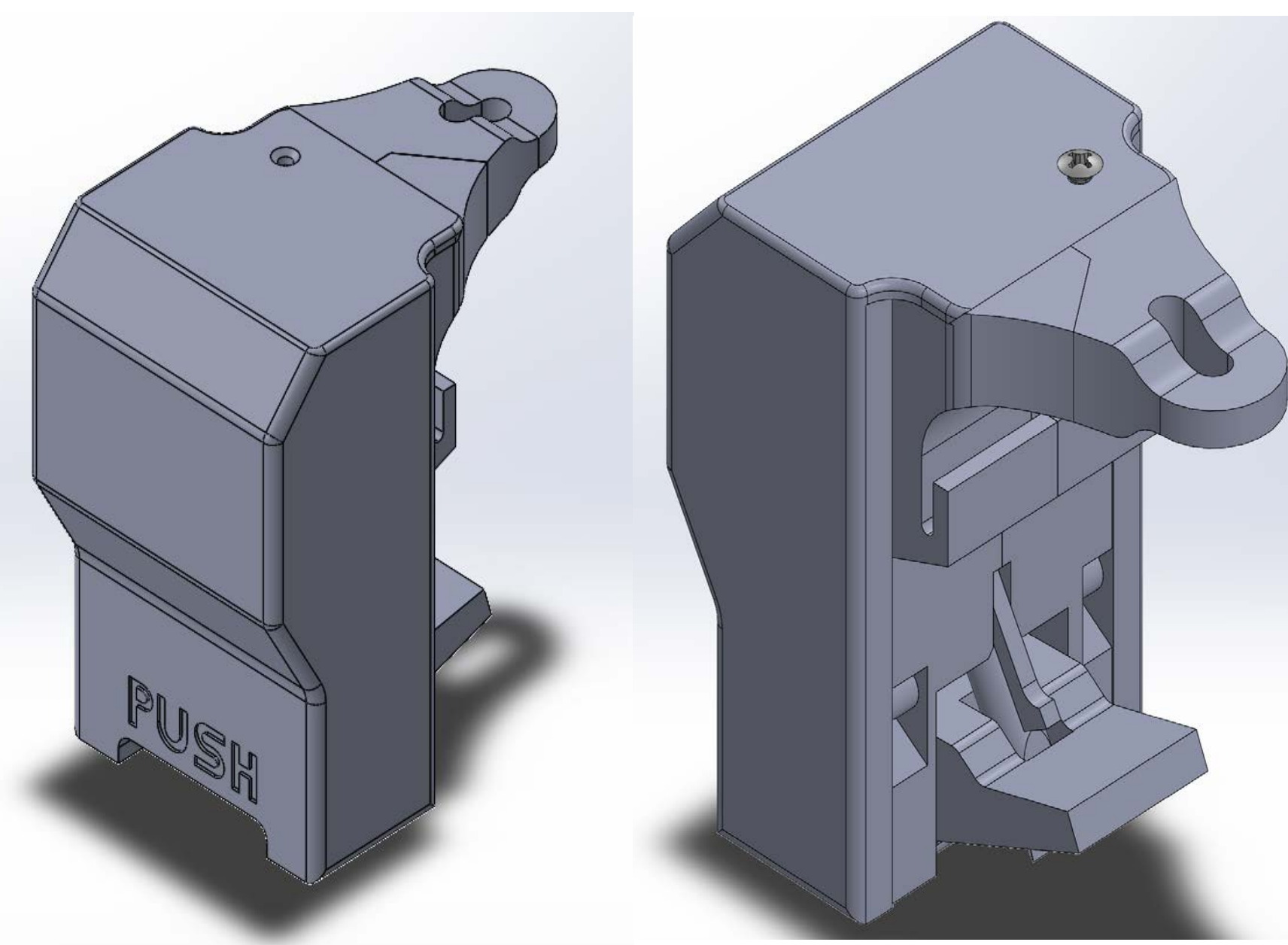
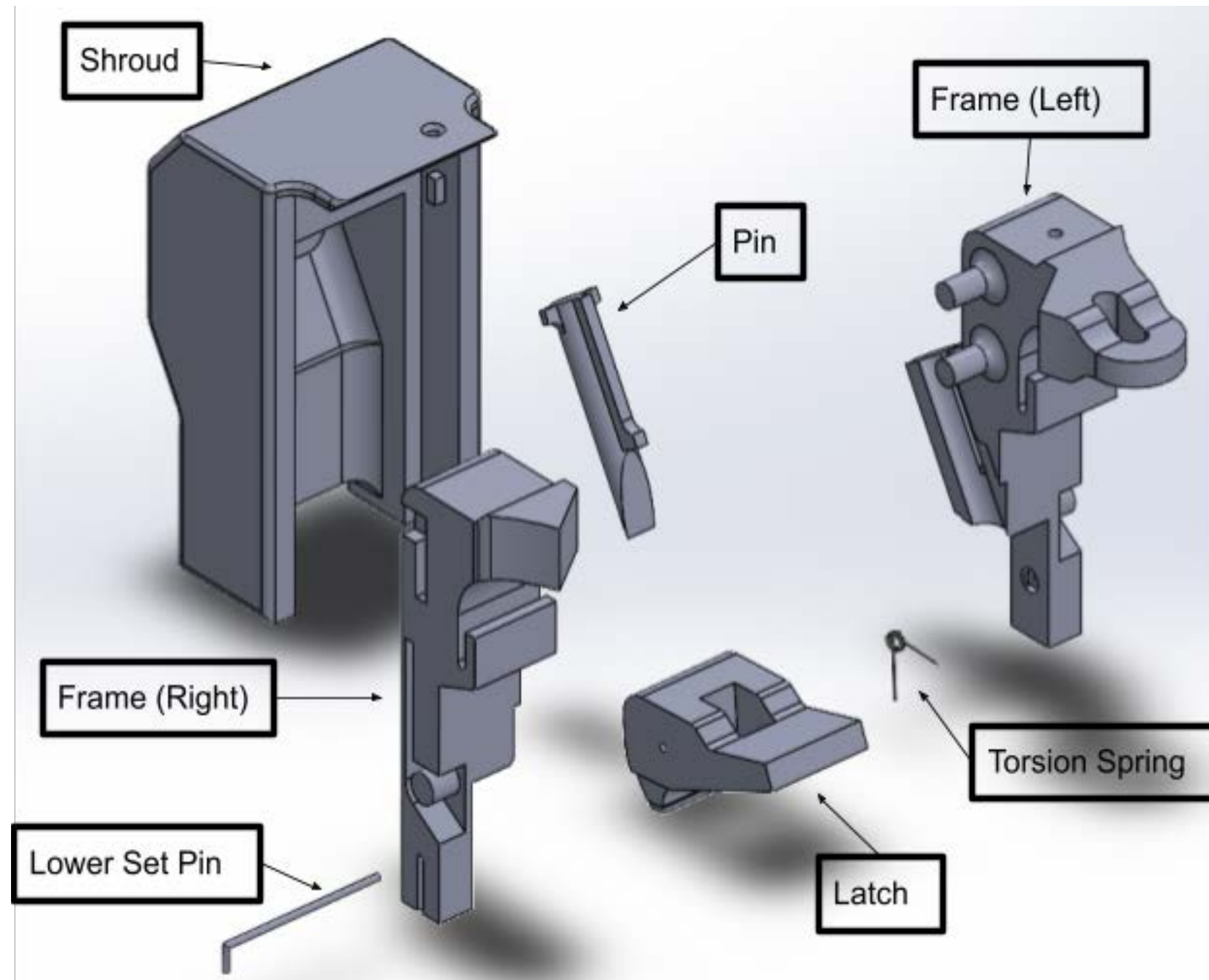
Factor of Safety Analysis on all Parts with ASA & Ultem 1010 Resin

FOS @ C	Shroud	Pin	Outer Tab	Latch
ASA	18	1.01	6.2	1.1
Ultem 1010	44	1.2	14	2.4

- Stress analysis was performed using Solidworks simulation to determine if the pin could achieve a reliable factor of safety at a max force of 150 lbf.

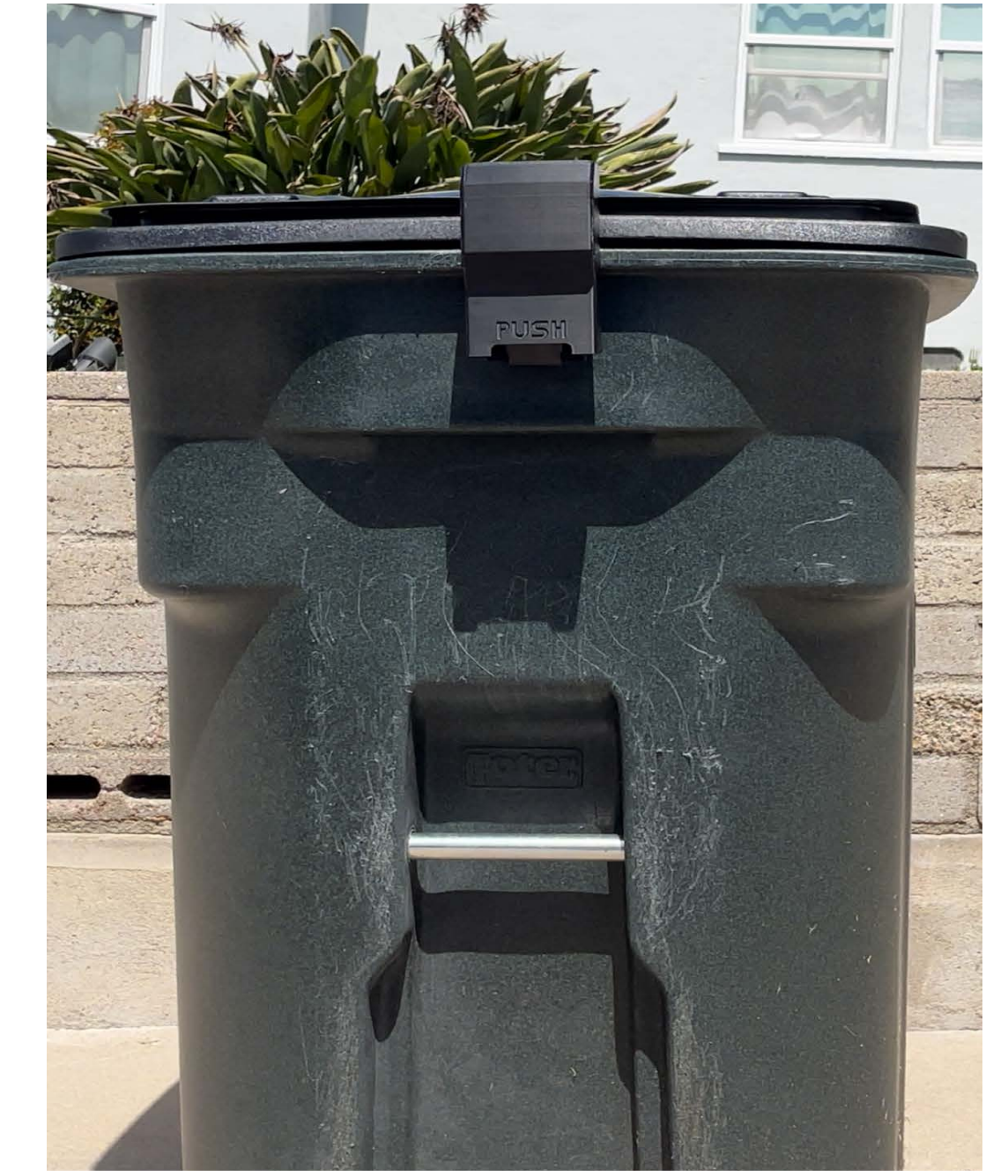
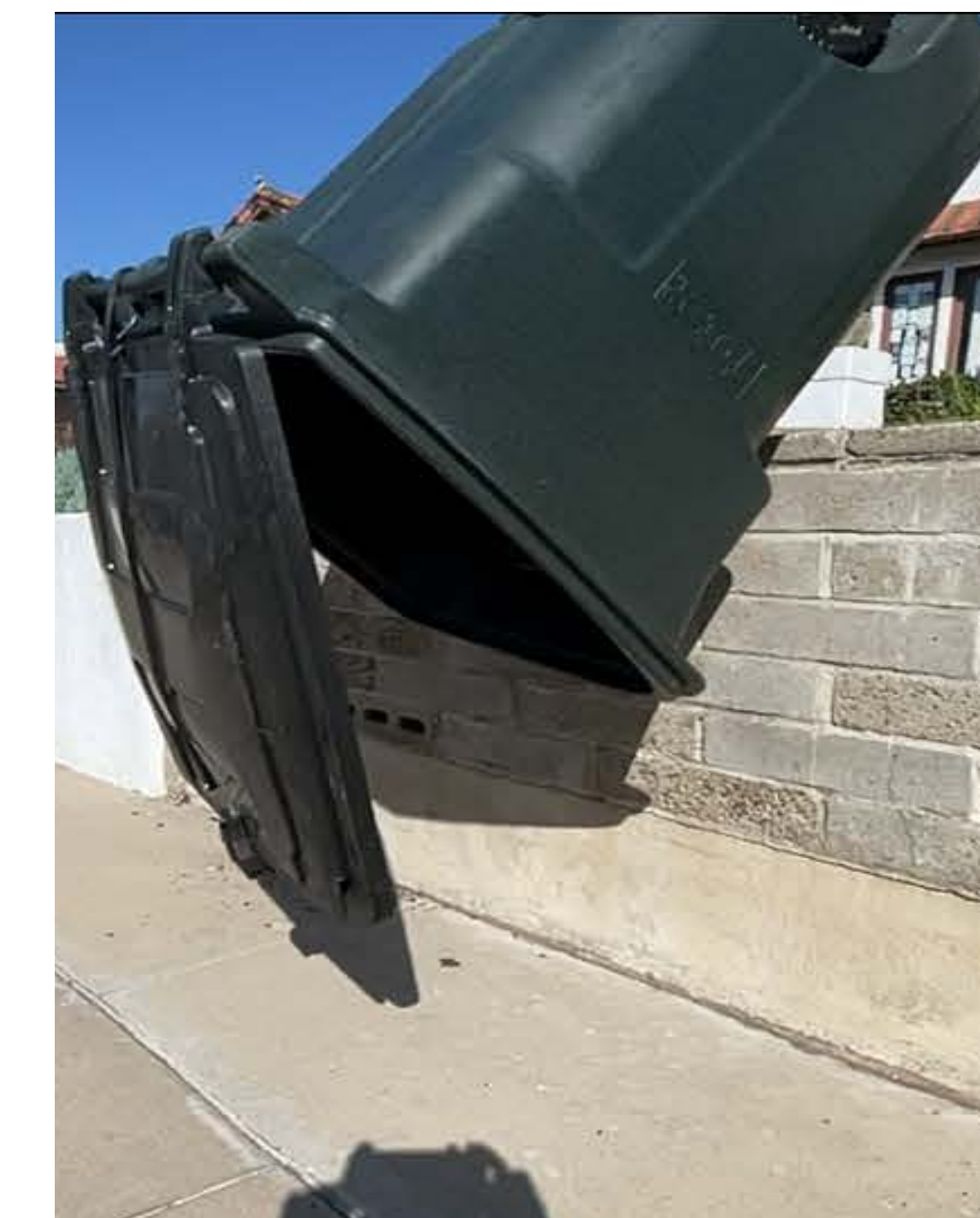


CAD Models – Exploded View



Final Product

- GUST is made using ASA for its UV resistance and high tensile strength.
- The gravity-driven internal components keep the trash can closed when knocked over and open the trash can when inverted by the trash truck.

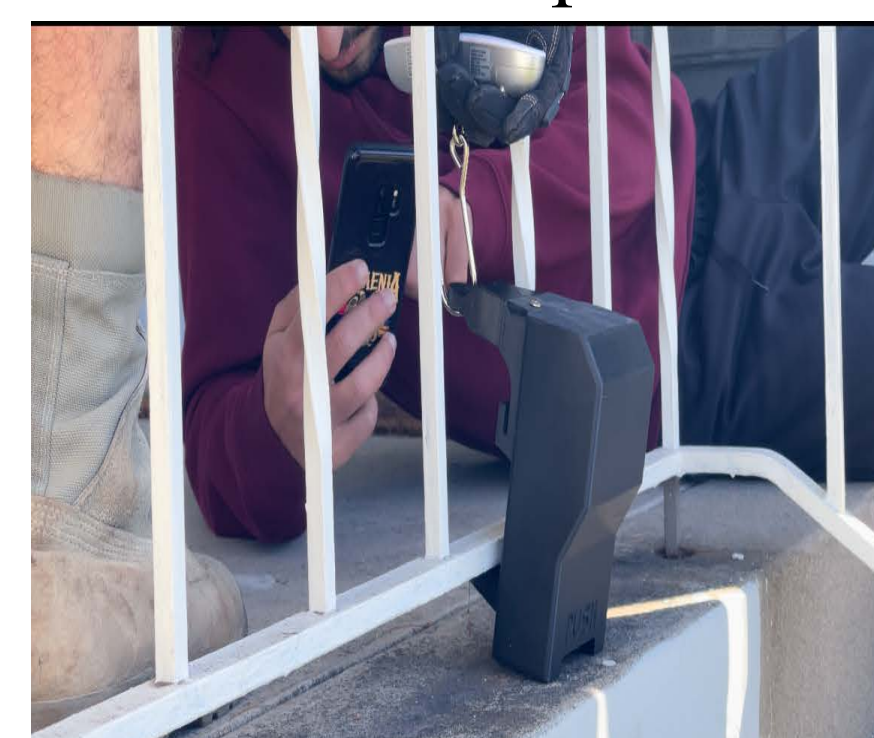


Prototype Iterations



Testing Methods

- Manual Tip Test
- Refuse truck pickup test
- Load stress on latch and pin
- Freezing weather condition affects



Team Members



Hector Cea
(Team Lead)
Analyst/Research Lead



Jacob Hoppe
CAD Specialist/
Design Lead



Collin Vizina
Manufacturing
Lead/Prototyping



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Research/Supply
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Acknowledgments

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