

## Background

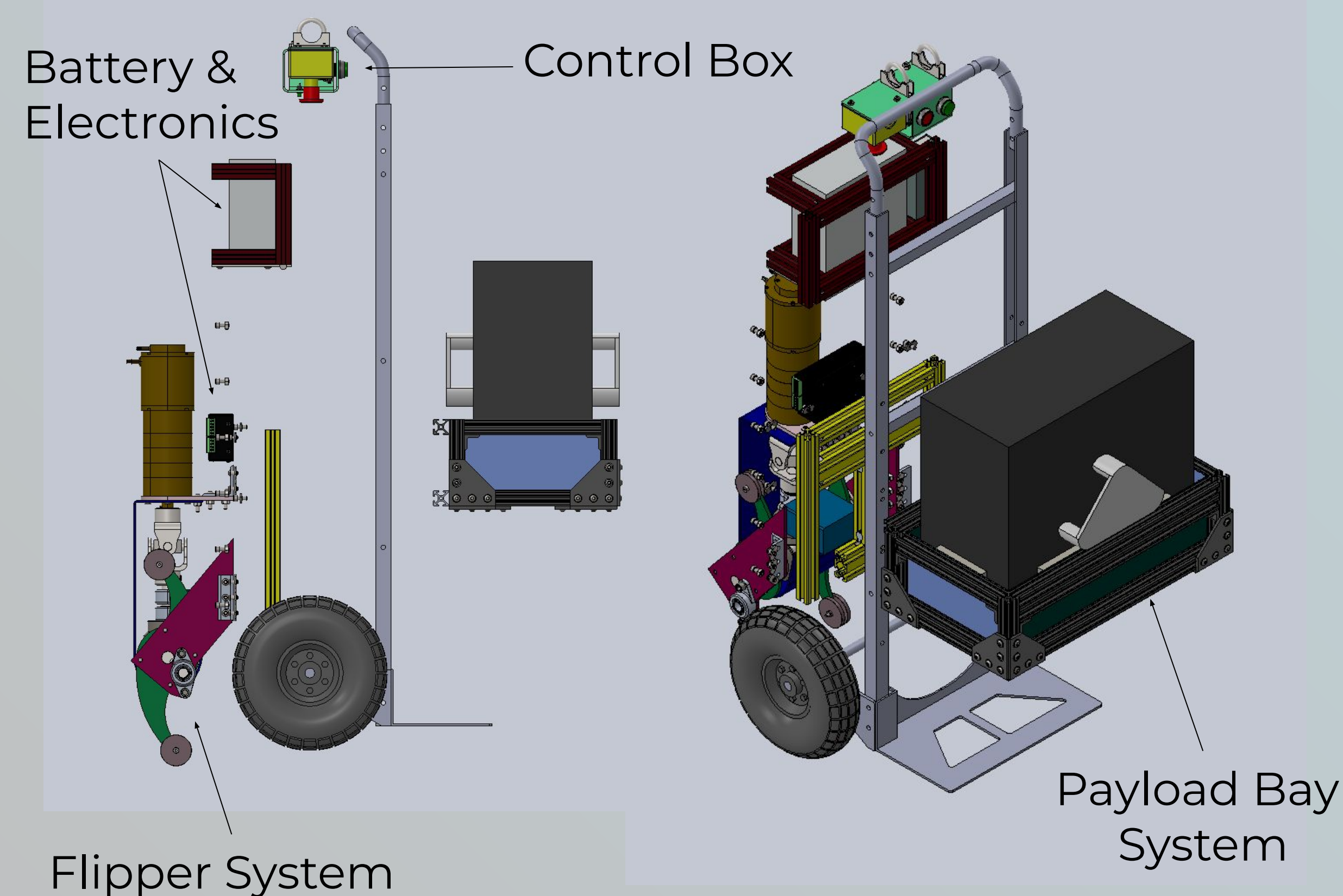
Northrop Grumman's Los Angeles location needs a better suited transportation vehicle to move around their heavy, expensive products. The goal of this project is to offer them a custom made vehicle for their needs. The vehicle must be easy to navigate in hallways and over rough terrain, must ensure the security of the products, be as lightweight as possible, must effectively damp vibrations to the test unit, and most importantly, assist its user in traversing stairs in both the upwards and downwards directions.

## Overview / Design Specs

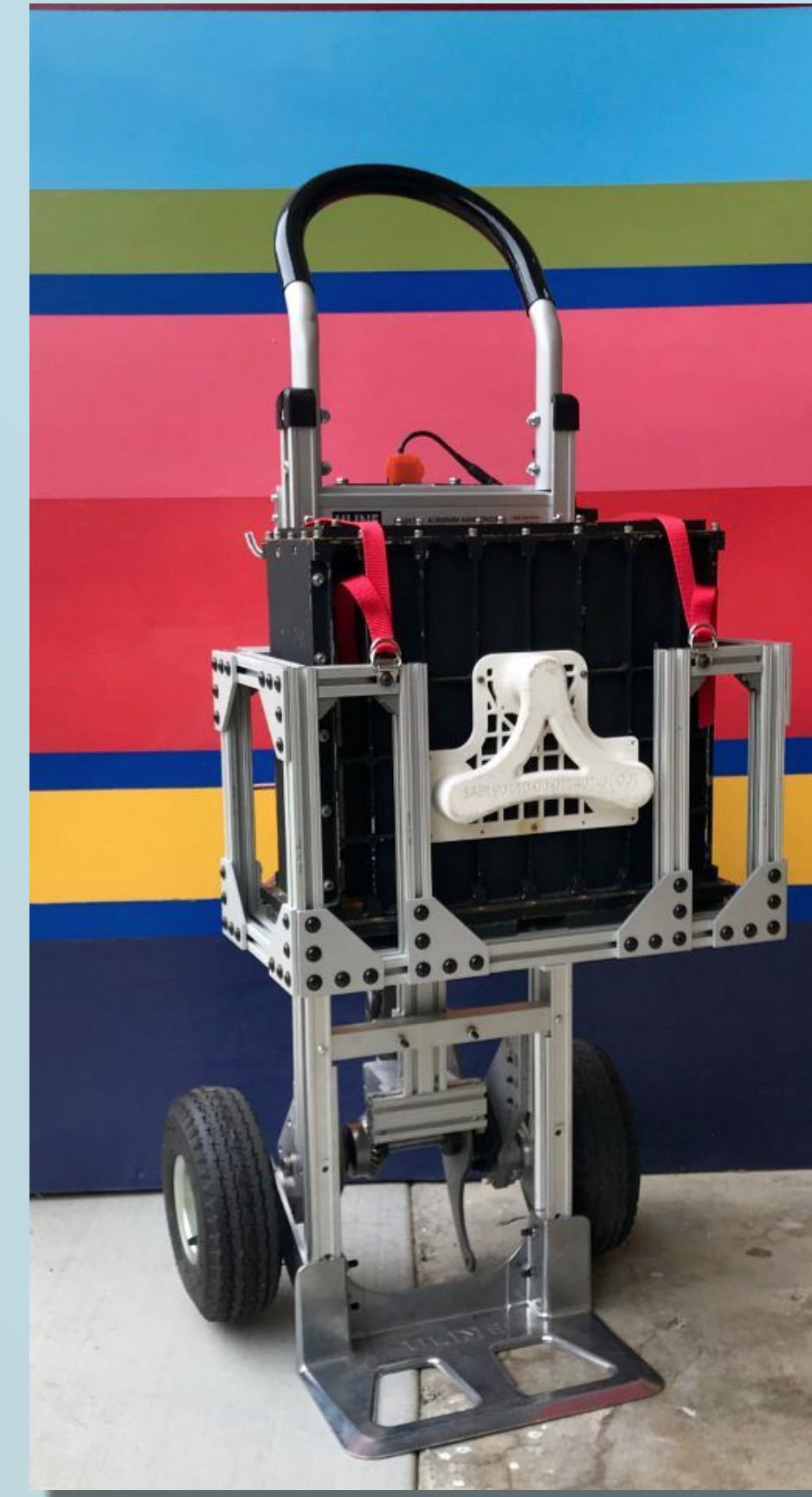
The system uses two actuated flippers to push the system up a stair. This is controlled by the user to make the system go up a flight of stairs

- Capable of climbing speed of 38 stairs per minute
- System can carry a maximum payload weight of 60 lbs

## Exploded View



## Ascent System

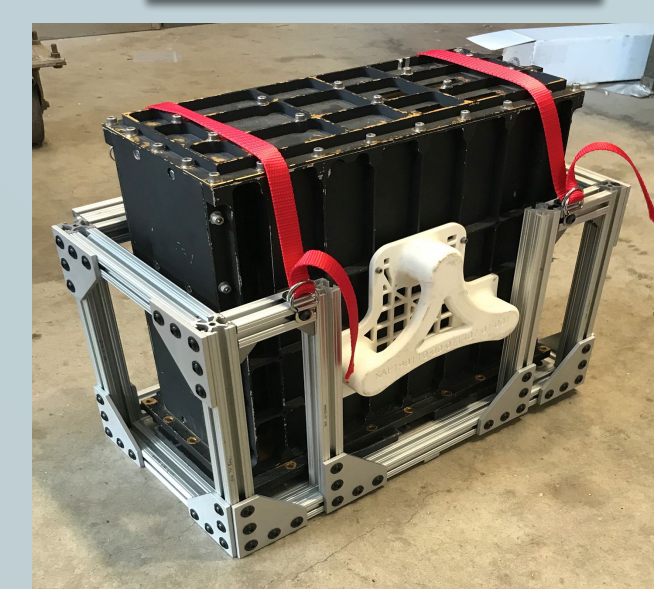


## Hardware / Key Components



### Flipper System

- Comprised of a 155 W motor and two 12" flippers.
- Rated torque: 1021 in-lbs



### Payload Bay System

- Houses the test unit
- Avoid excess impact forces using shock absorbing sorbothane sheets



### Battery & Electronics

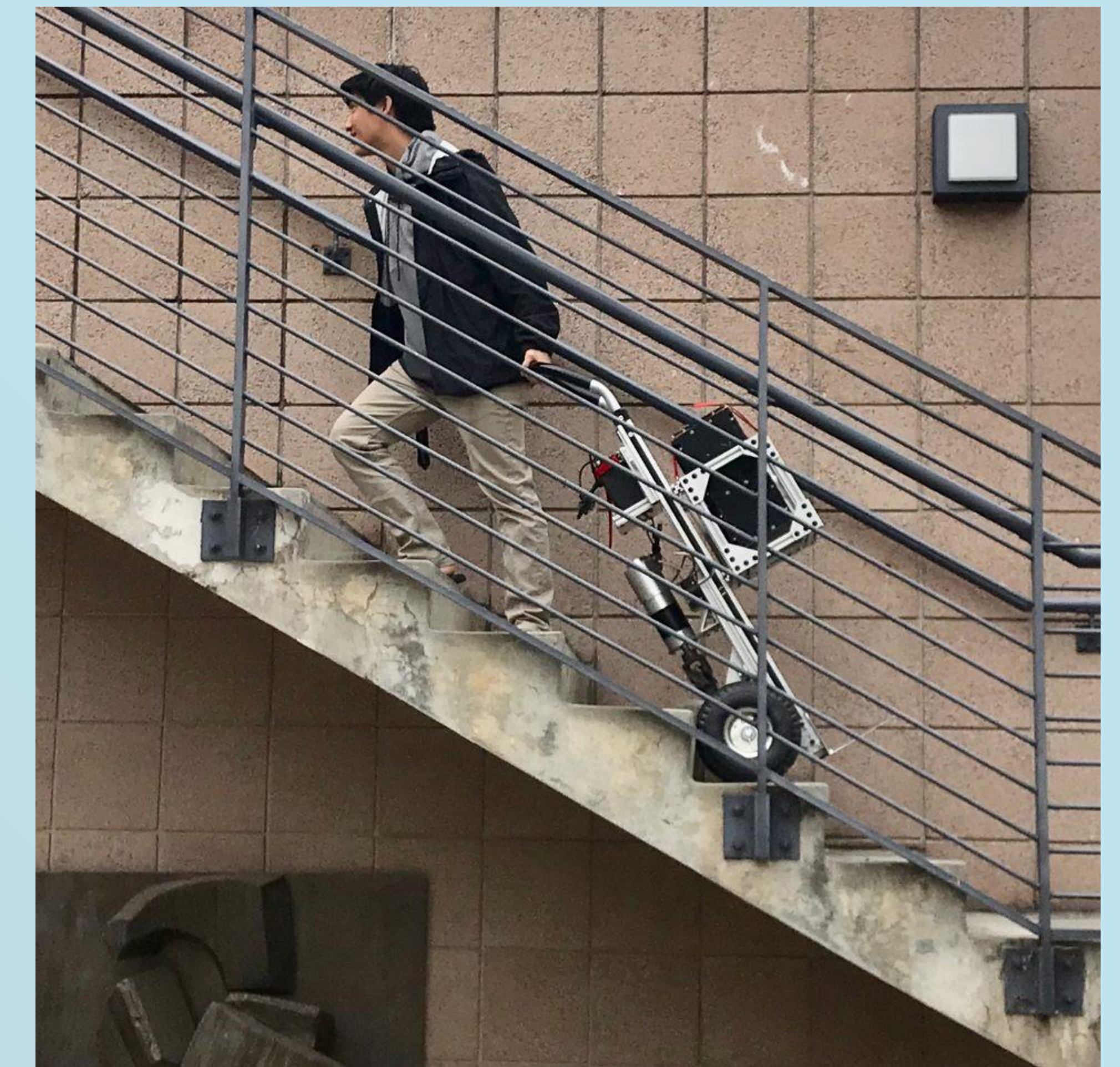
- Rated Current: 18 A
- Capacity: 12.5 A-hr



### Control Box

- Allows user interactions
- Included forward and backwards button and an emergency power shut off

## The Ascent System in Use



The full system has been tested qualitatively and successfully climbed a staircase. The Ascent System has great potential to work in practice while carrying the test unit.