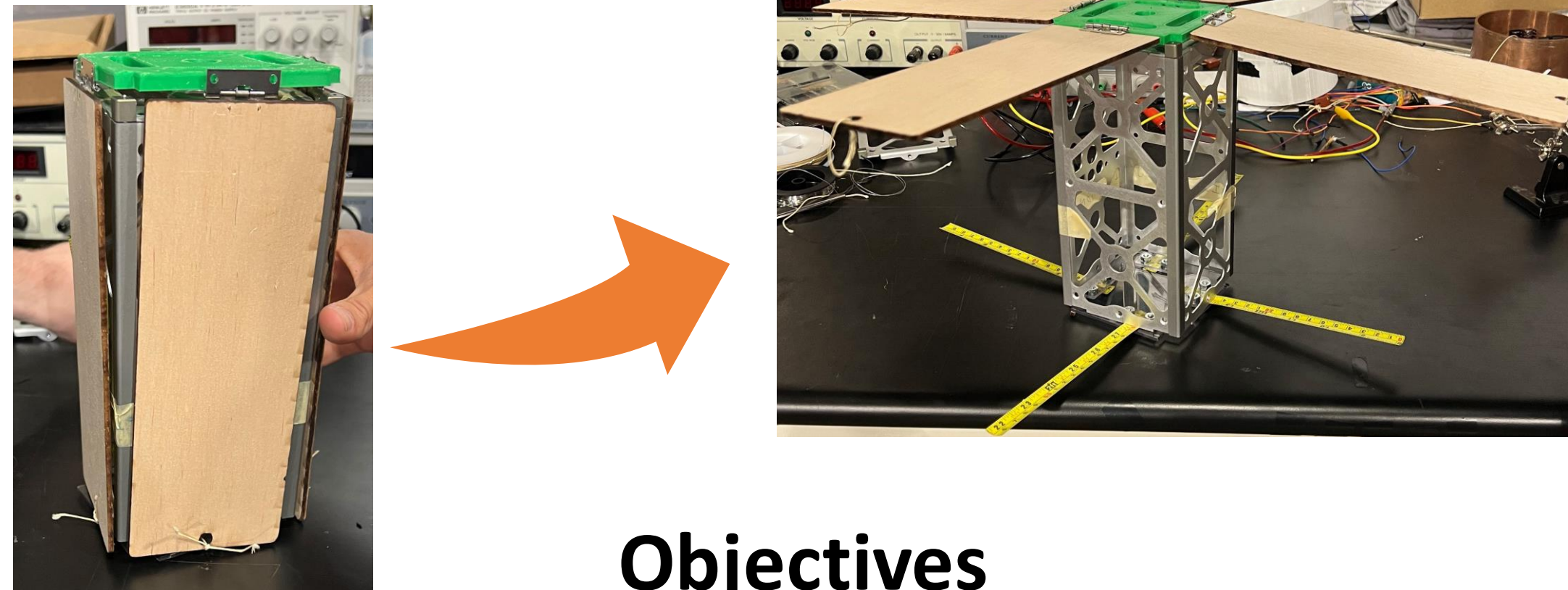


# UCI CubeSat: Solar Panel Deployment

Emily Breneman, Rami Makarem, Jade Phillips, Jerold Sandel, Hugo Vargas  
Department of Mechanical and Aerospace Engineering at University of California, Irvine  
Sponsored by Professor David Copp

## Introduction

The self-deploying mechanisms in modern CubeSat configurations traditionally contain four separate solar panels that provide the energy intake required to run the electronic components within the CubeSat via solar energy, radiant energy emitted by the sun. The Solar Panel Deployment project aims to design a functional deployment mechanism for the solar panels on the 2U satellite from the UCI CubeSat team.



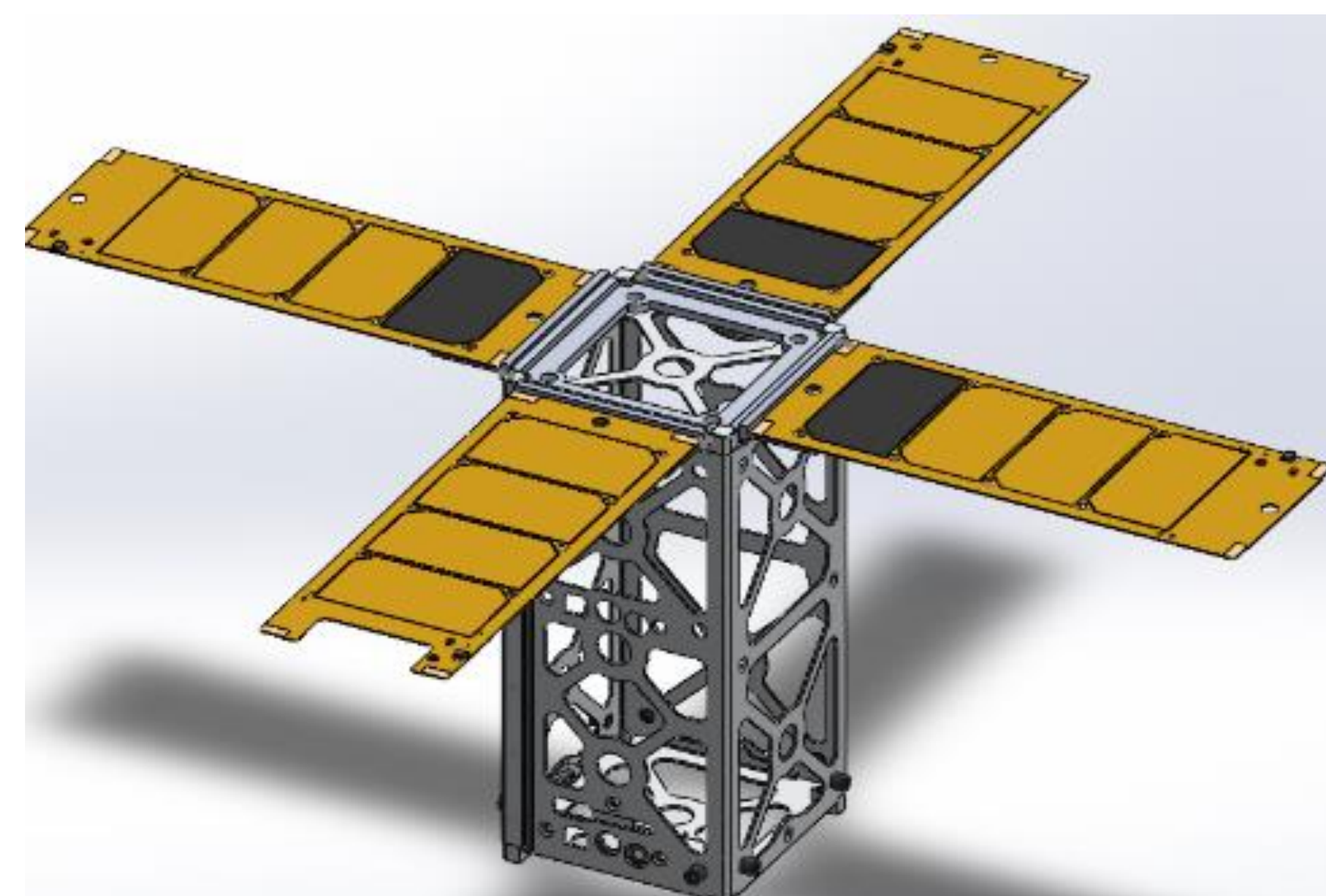
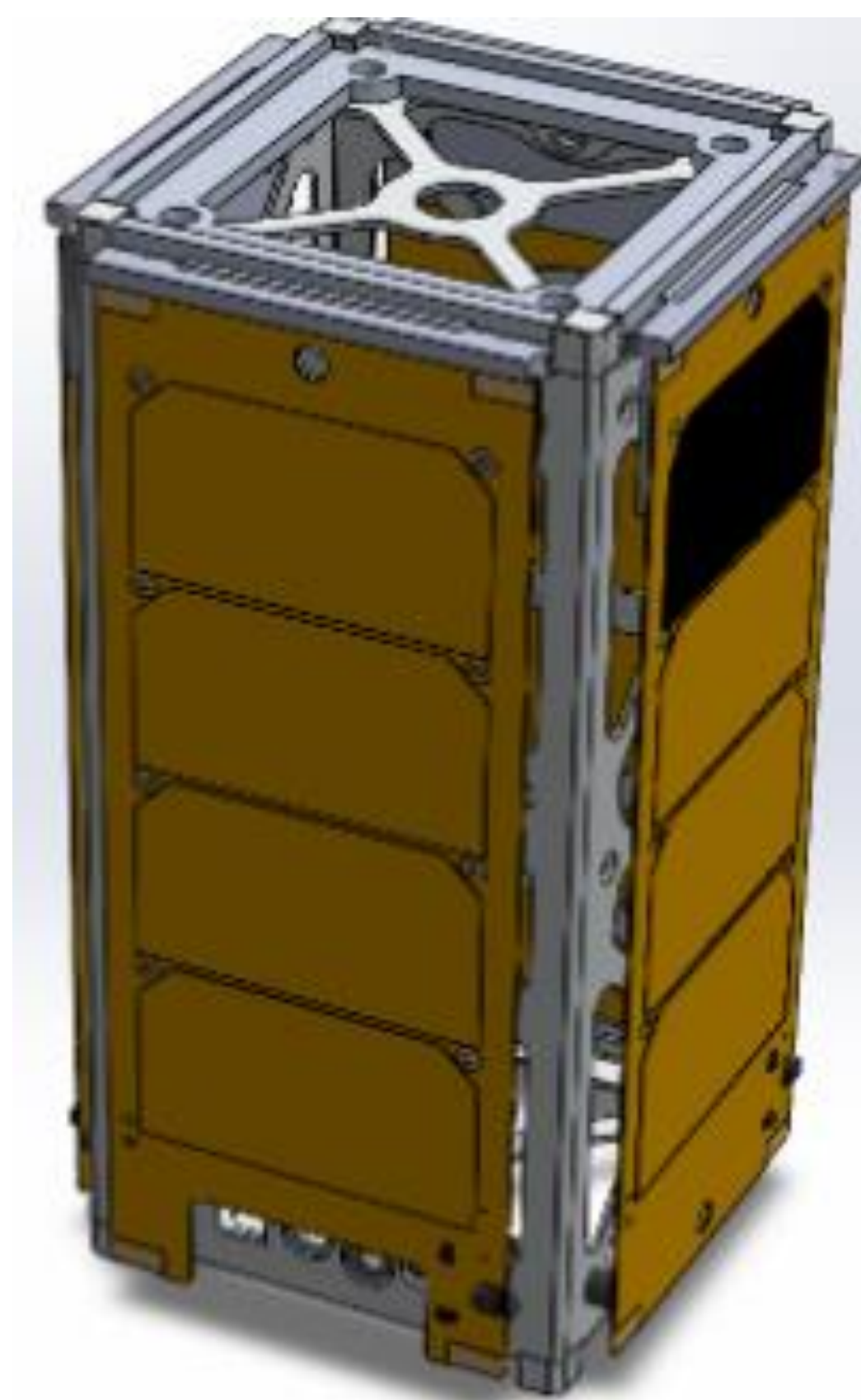
## Objectives

- Ensure that the mechanism consistently deploys.
- Confirm the power draw matches the existing satellite's needs.
- Design conforms to the weight and size of the existing satellite.

## Power Supply

Our design has a total of four Pumpkin Solar Panels with the following attributes:

- Efficiency of 30.7% BOL
- Supply a total of ~5W to the system.

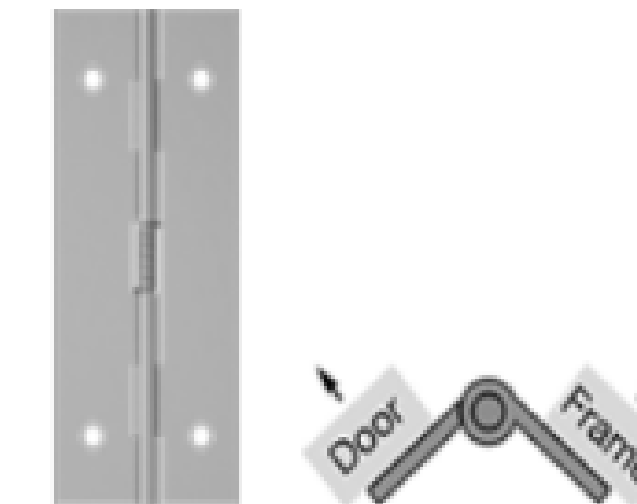


## Self-Deployment Method

Our self-deployment mechanism consisted of a self-closing hinge system, and a burn-wire release mechanism.

### Self-Closing Hinge System:

- Not Thermally or Electrically Conductive
- Easy to integrate into previously existing UCI Design
- Mechanically simple/lightweight design, easy to alter for testing
- Sufficient spring torque necessary to fully deploy panels



### Burn-Wire Release Mechanism:

- Current is ran through Nichrome wire, which burns a Vectran wire, releasing the panels
- Easy to acquire materials and manufacture
- Symmetric deployment about CubeSat
- Simple mechanical design

