

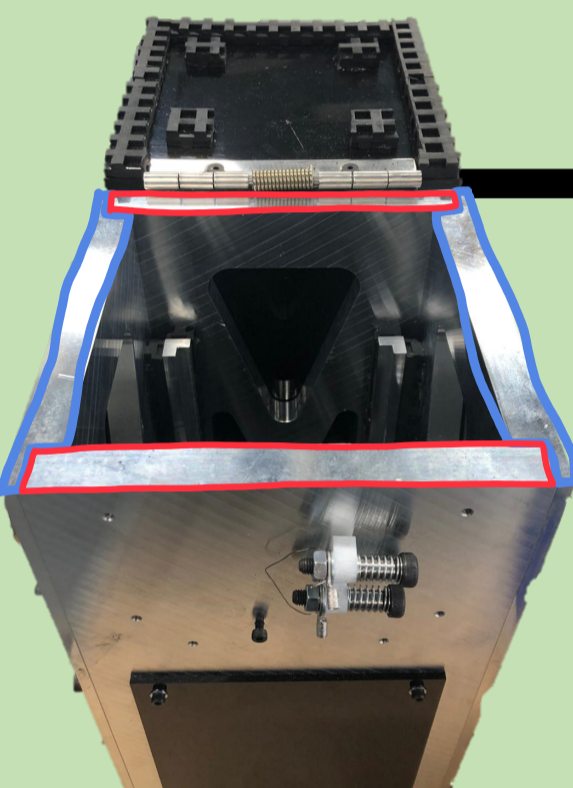
3U CUBESAT DEPLOYMENT SYSTEM

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METALPOD

Burn Wire
Release mechanism for both door & pusher plate

- Actuation in under a minute (dependant on voltage)
- Reusable & reliable design
- Laser cut PTFE saddle alternative to ceramic**
- Expected peak temperature of 574°C

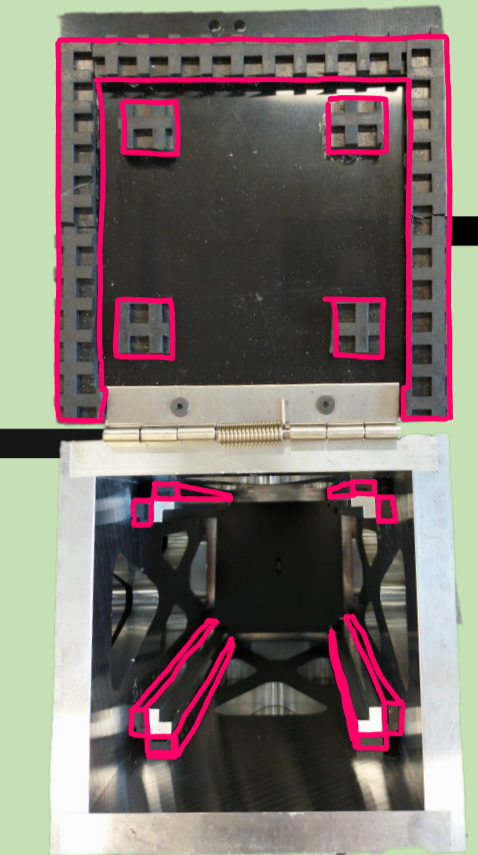
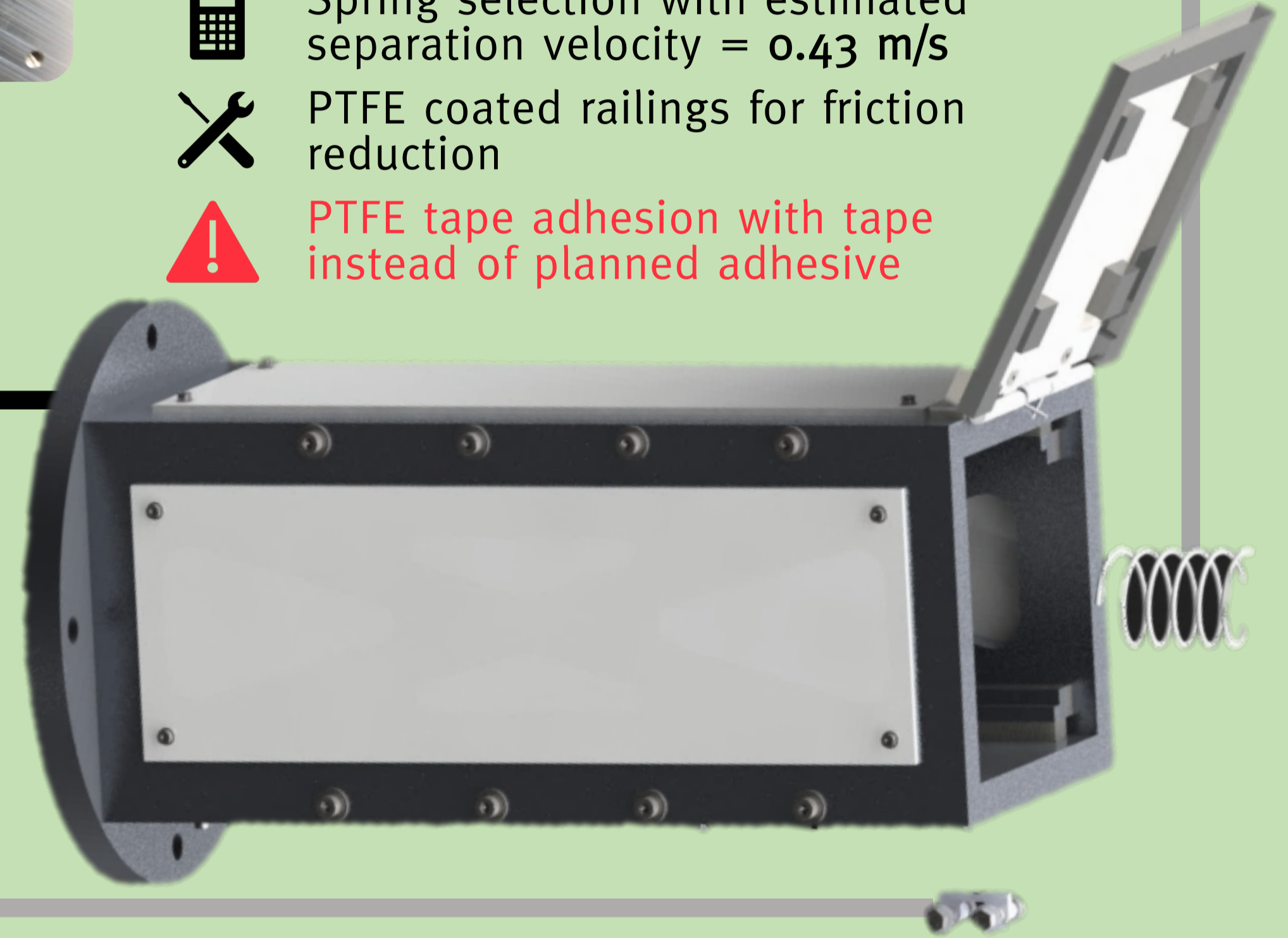


- Casing**
- Sturdy & stiff frame
 - Stress concentrations at holes
 - Safety Factor of 4

Protect satellite during launch | **Deploy CubeSat quickly and reliably**

Deployment
Spring release & rail guide propulsion method

- Spring selection with estimated separation velocity = 0.43 m/s
- PTFE coated railings for friction reduction
- PTFE tape adhesion with tape instead of planned adhesive**

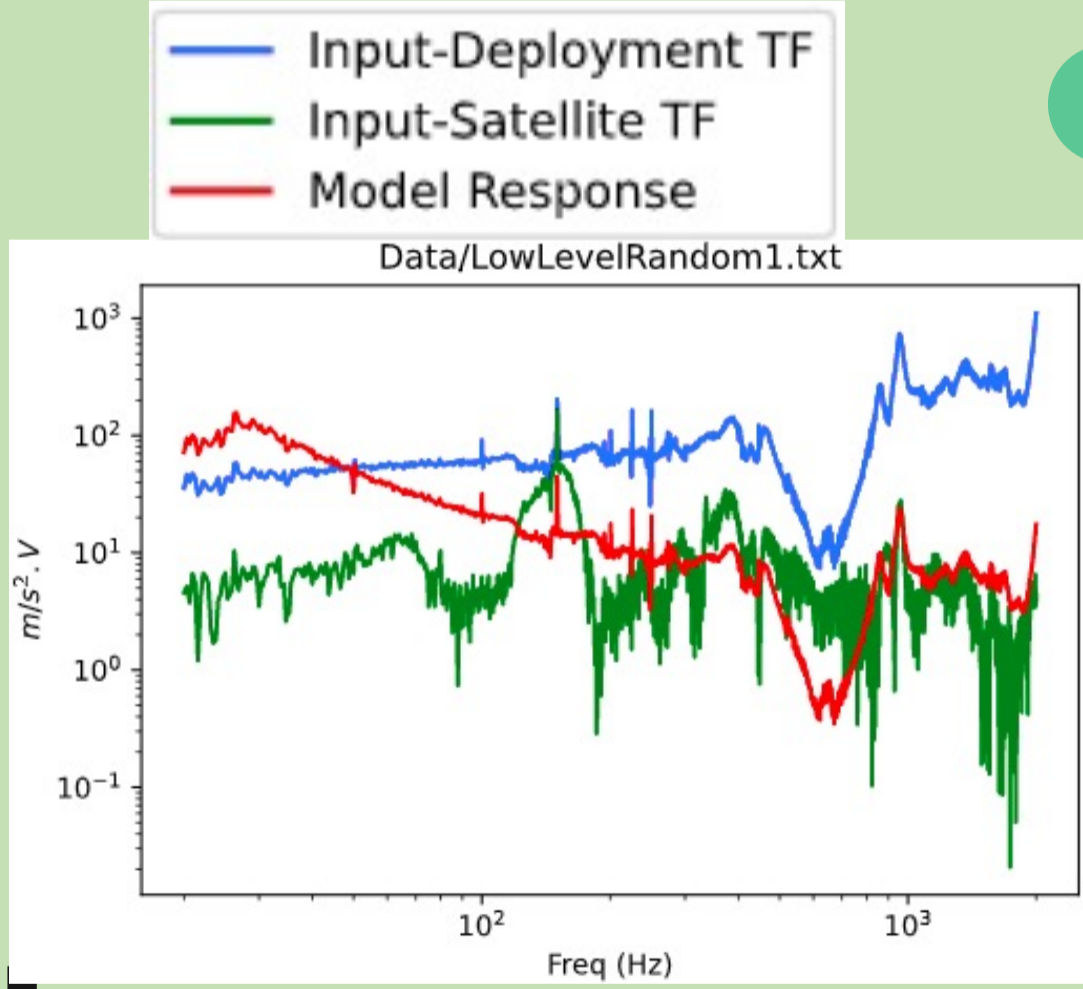


Isolation damping
Fully constrained damping implementation

- NBR Damped railings (XY) and pusher plate & door (Z)
- SDOF model $\omega_0 = 20\text{Hz}$ (XY) & 28Hz (Z), $\zeta = 0.28$

Pusher Plate
Unique base of propulsion

- Lengthened corner guides to prevent twisting
- CNC machined Acetal Polymer
- Cylindrical guide keeping spring perpendicular
- Different sized grooves can fit other springs if needed



TESTING

Vibration (lateral only)

Casing evaluation

- Qualitative: System integrity maintained
- Quantitative: Estimated real peak acceleration used in re-simulation

Isolation evaluation

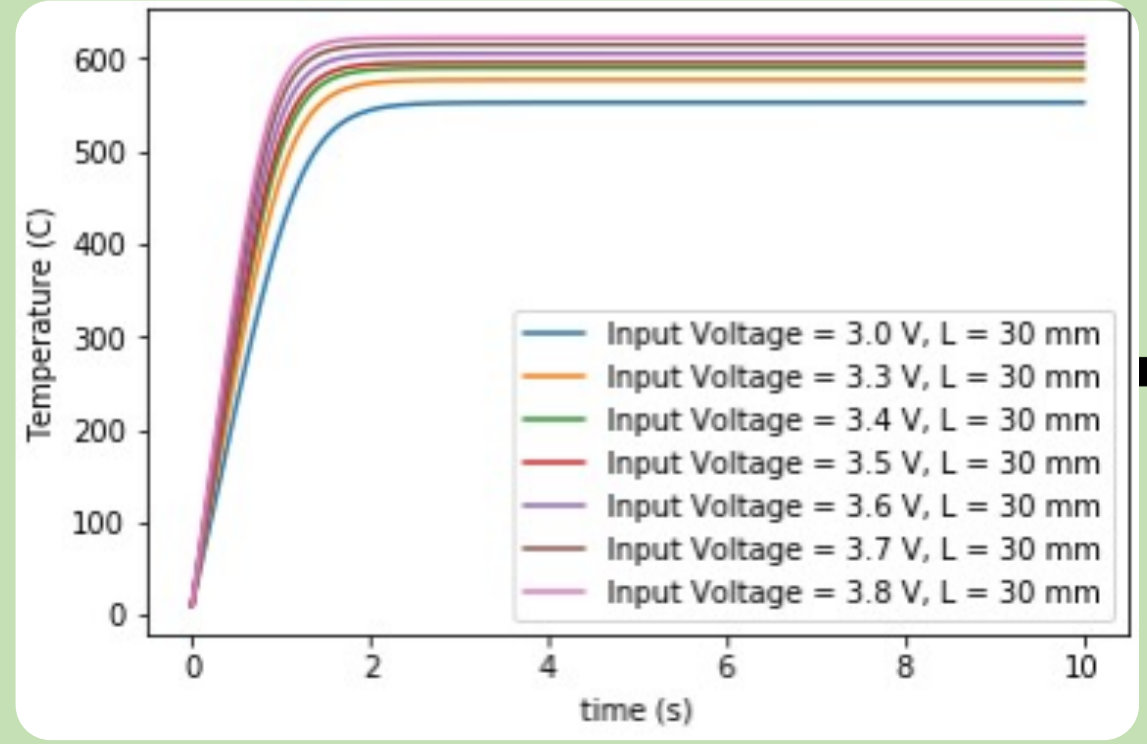
- Significant vibration isolation after 100 Hz
- Isolation at deployer's resonance, preventing "deployer amplification"
- $\omega_{test} = 60\text{Hz}$, $\zeta_{test} = 0.13$

- SDOF model fails to predict low frequency response**
- Testing changes & limitations may have affected results**

Separation Velocity

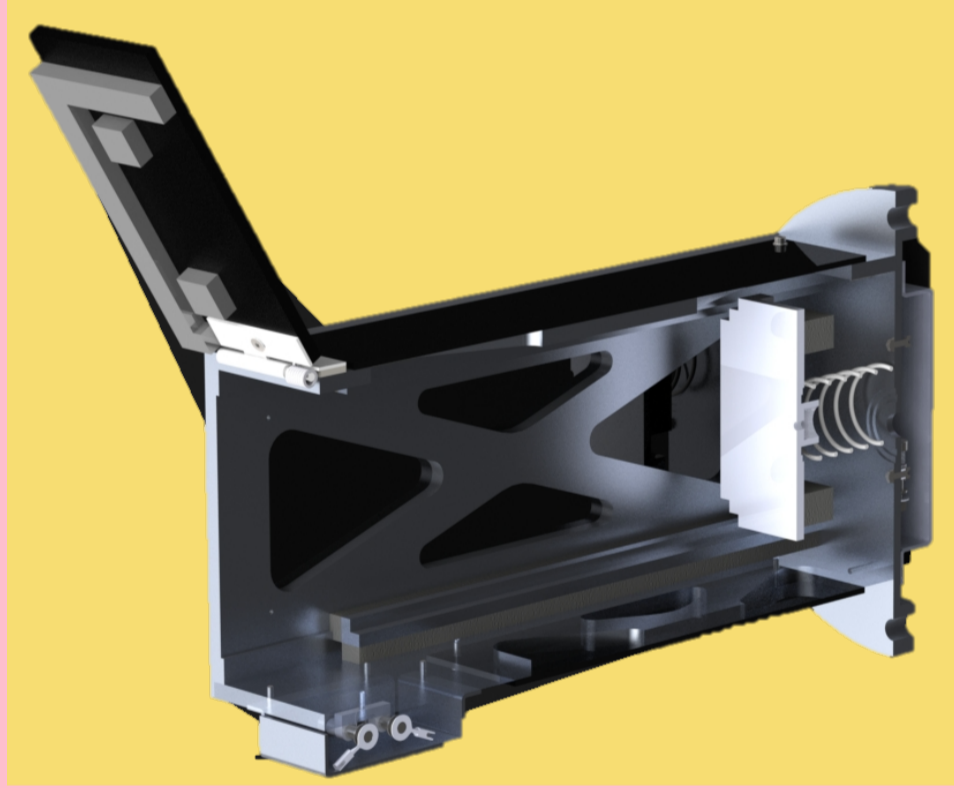
- Average velocity = 0.18 m/s
- Unaccounted friction – could be due to PTFE assembly issues
- Unable to meet separation velocity requirements**

Burn wire



- Cutting & actuation achieved at higher-than-expected voltage
- 45% voltage loss – higher expected temperature**
- Other significant form of heat loss (conduction & convection) prevents saddle from melting

REDESIGN



- Stiffer spring required
- Design for double sided tape PTFE attachment method
- Remove bolt holes and weld panels together
- Reduce thickness of panels to 7.5mm
- New safety factor of 5.1 (needs further evaluation)
- Revised saddle material: ceramic to PTFE
- Adjusted voltage input settings