

LINEAR HAPTIC PROTOTYPING.

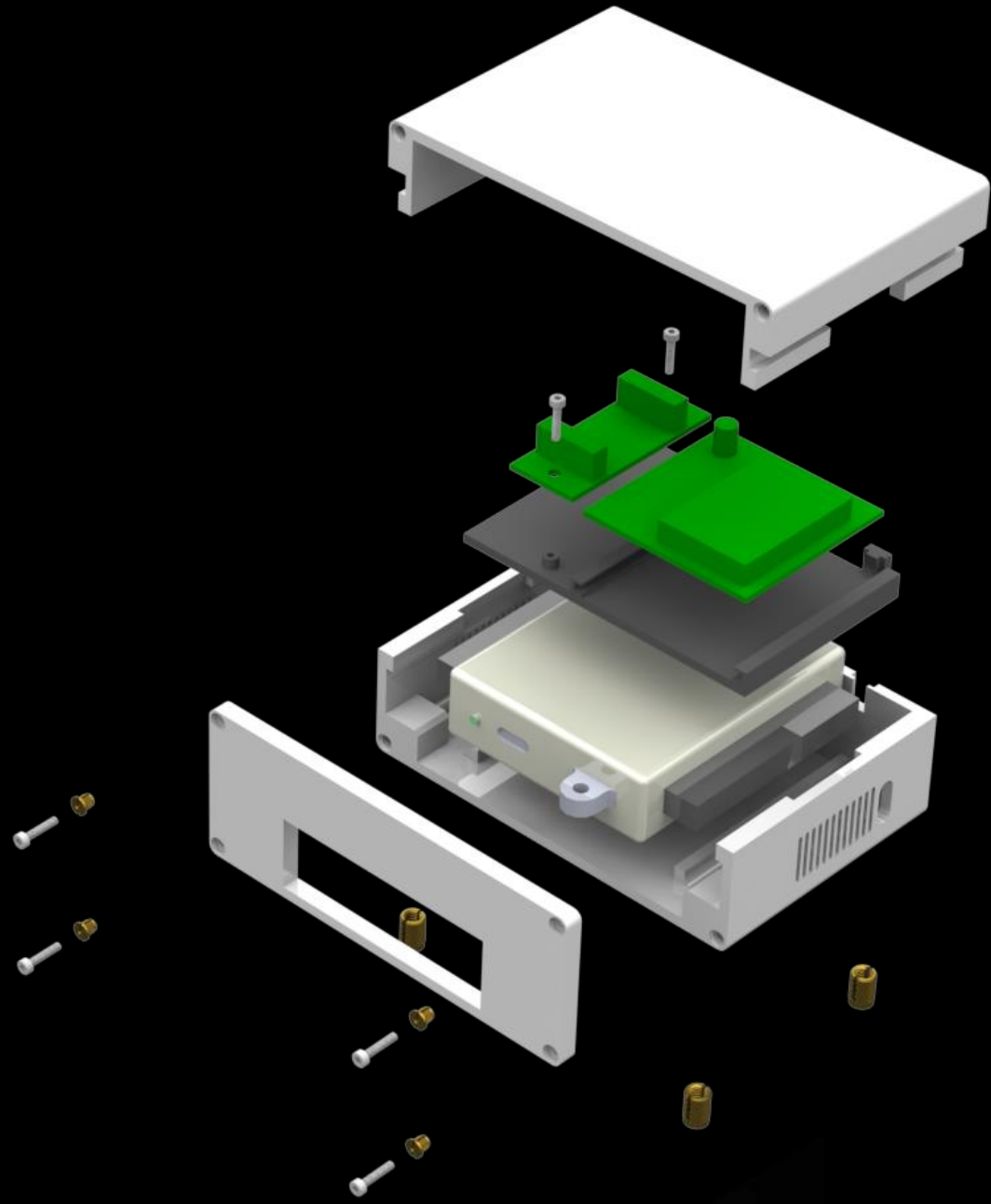
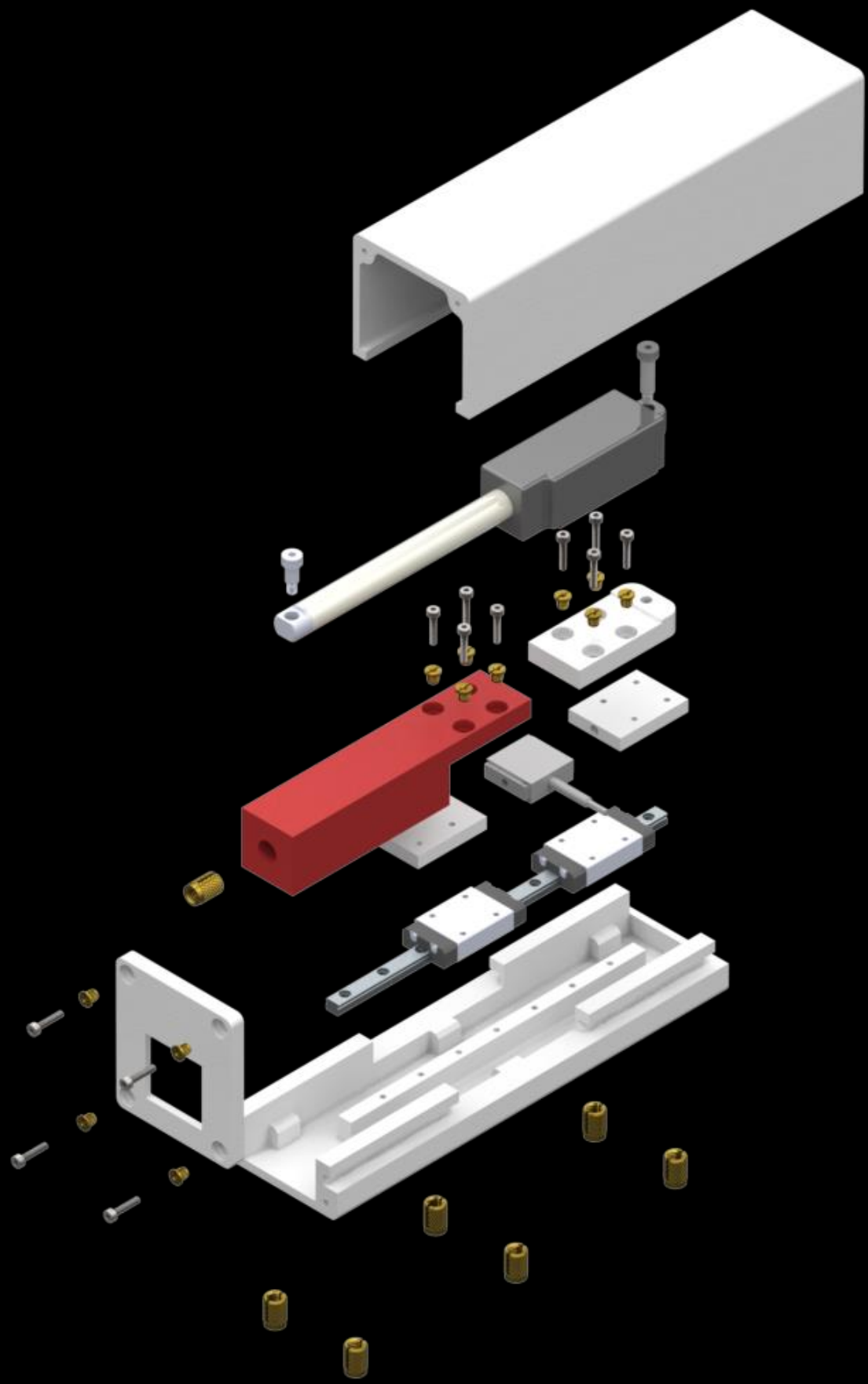
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Overview.

Situation: Client requests a certain feel to a latch or other linear motion device.

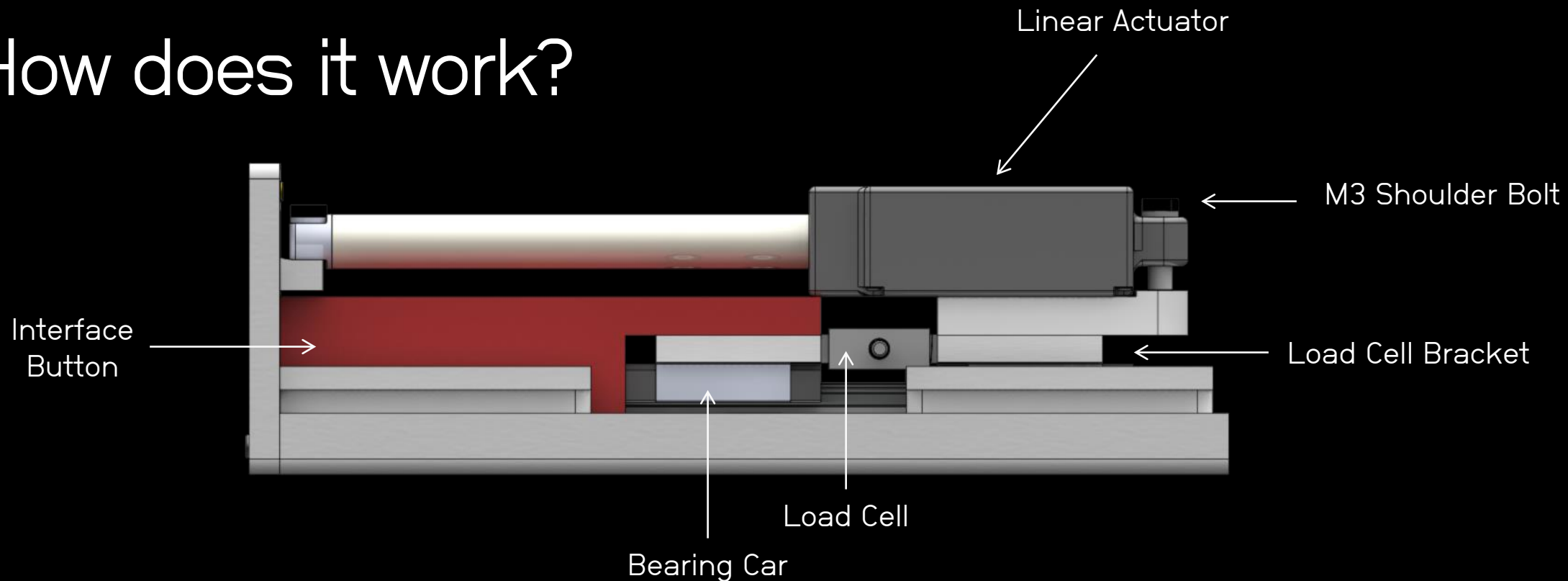
Problem: How do you assign mechanical properties to the feel of the latch?

Solution: Instantly simulate any force or “feeling”



Behind the Scenes.

How does it work?



- Pressure/tension on button → signal from load cell → scaled movement by linear actuator.
- Change of voltage applied to actuator changes movement to force ratio.
- Designed for 1" of movement.

Behind the Scenes.

Powering it all up.

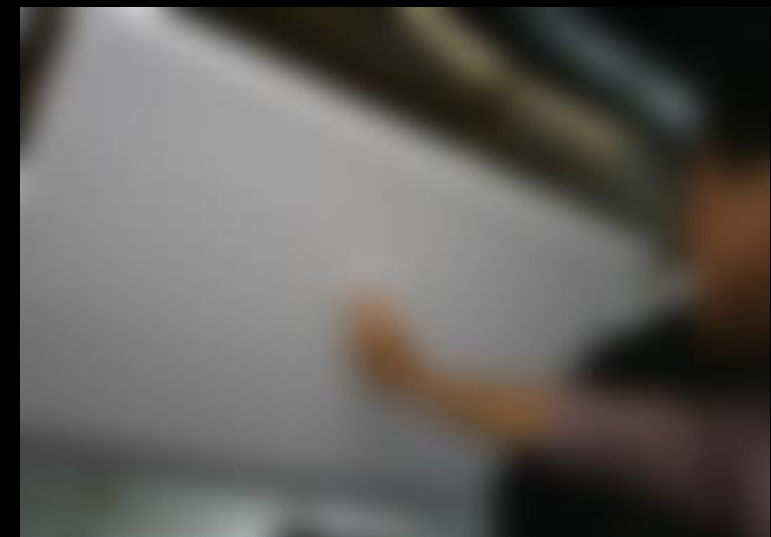
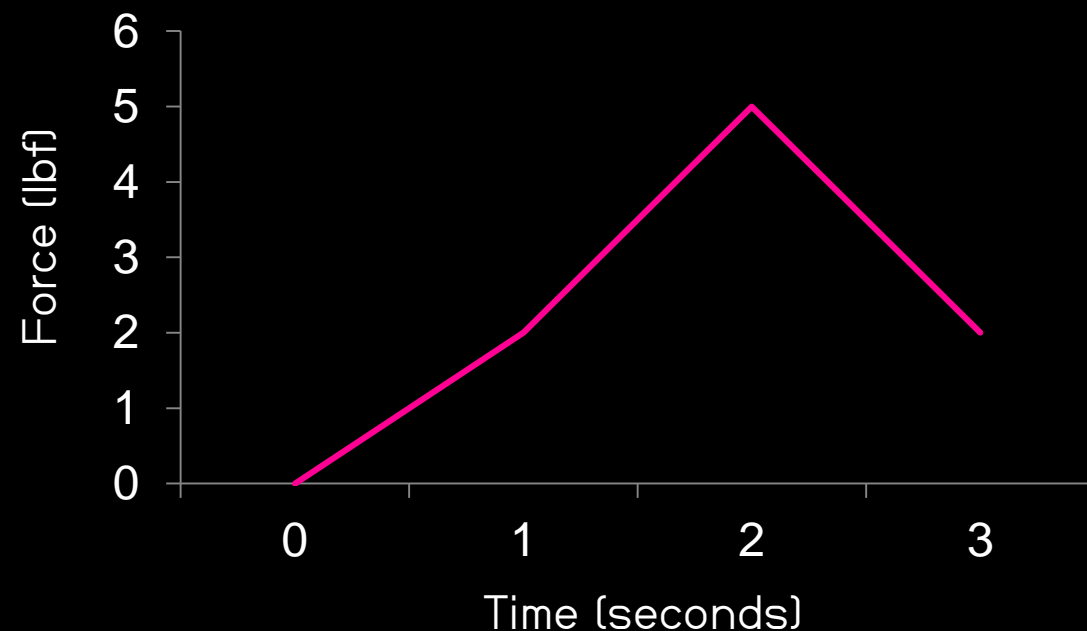
- Currently low portability
- Tethered to power supply
- 0–30V to system, changing rate/strength of feedback
- Data through LabView
 - Main control unit: USB DAQ controller
 - Load Cell controller, LAC controller
- External connections: USB, PSU

Project Status.

What we can do: Link data and mechanics, creating scaled movement.

What we would like to do:

- Customization
- Installation and case studies



Design Intent.

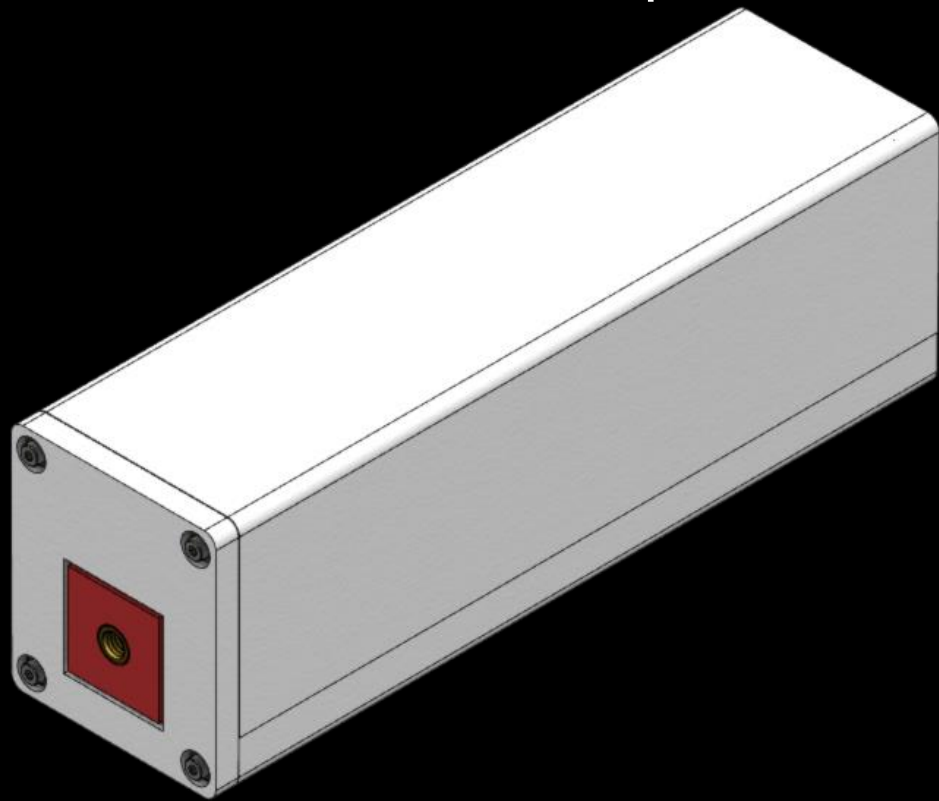
Designing with goals in mind.

- **Minimalistic:** Never out of place
- **Ease of use/installation:** Self Explanatory
- **Modular:** Reprintable, redesignable
- **Versatile:** Won't hold designs back

Design Intent.

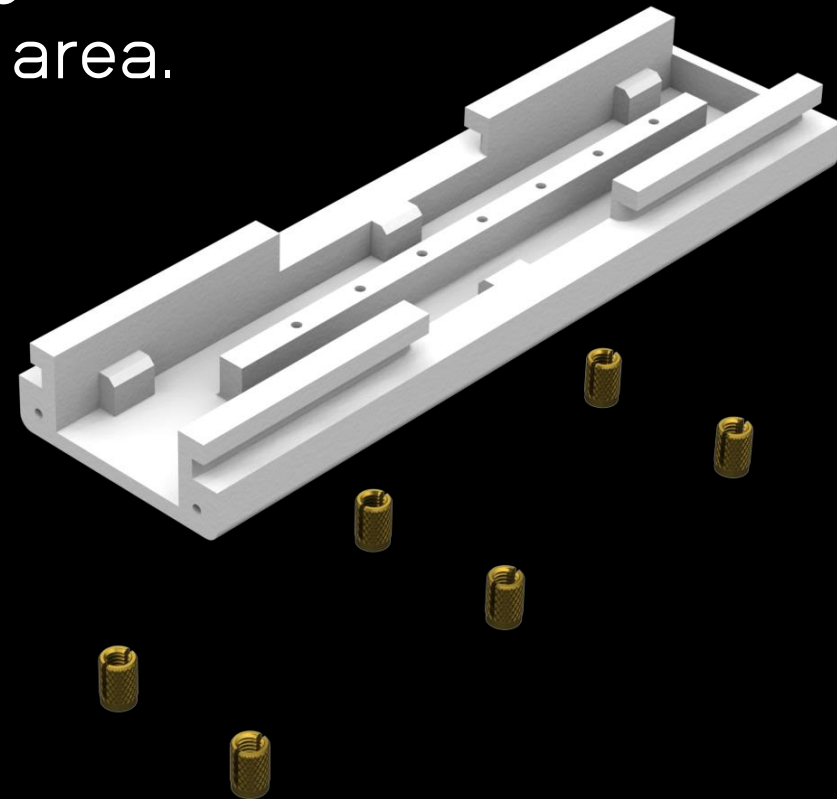
Addressing goals.

Minimalistic: Implement anywhere.



- Low profile shape
- “Stacked design” reducing mounted surface area.

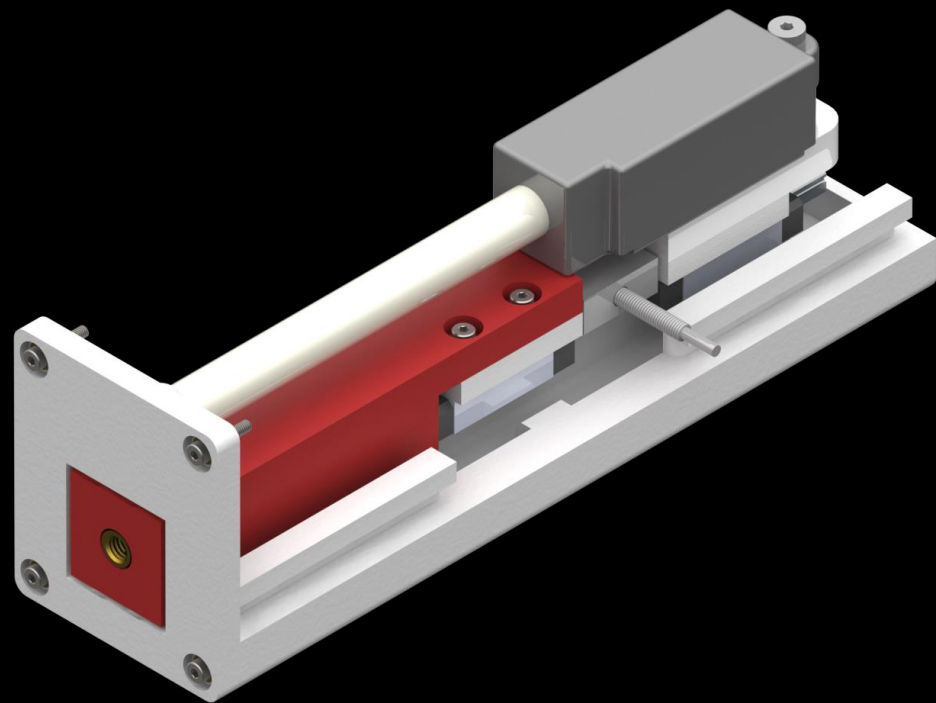
- Internal bracketing
- Flush fasteners and inserts



Design Intent.

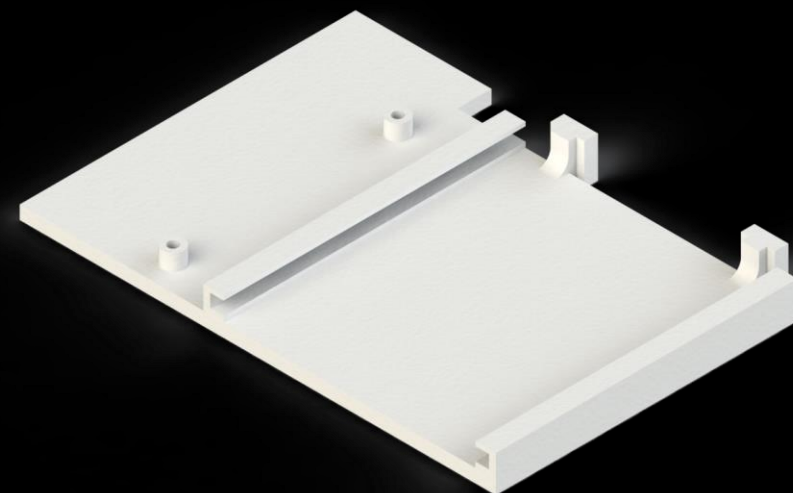
Addressing goals.

Modular: Fix on the go (3D printer not included)



- Minimized interdependency
- Fixable on the go

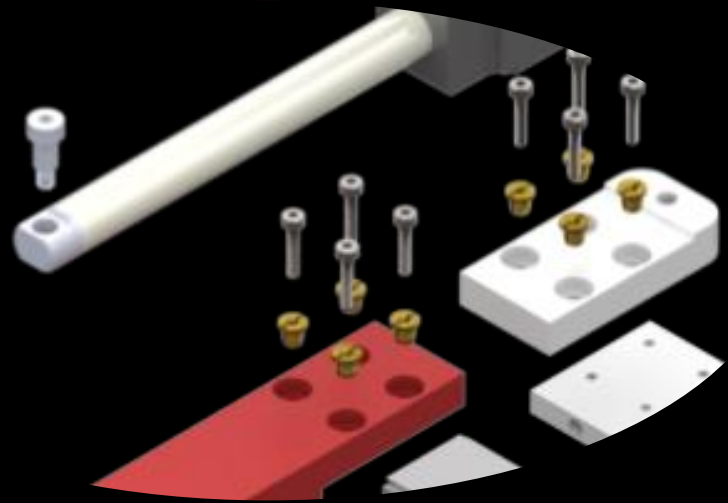
- Modular Electronics
- Room for expansion, change



Design Intent.

Addressing goals.

Ease of Use: “Plug and play”.



- Common fastening types across system

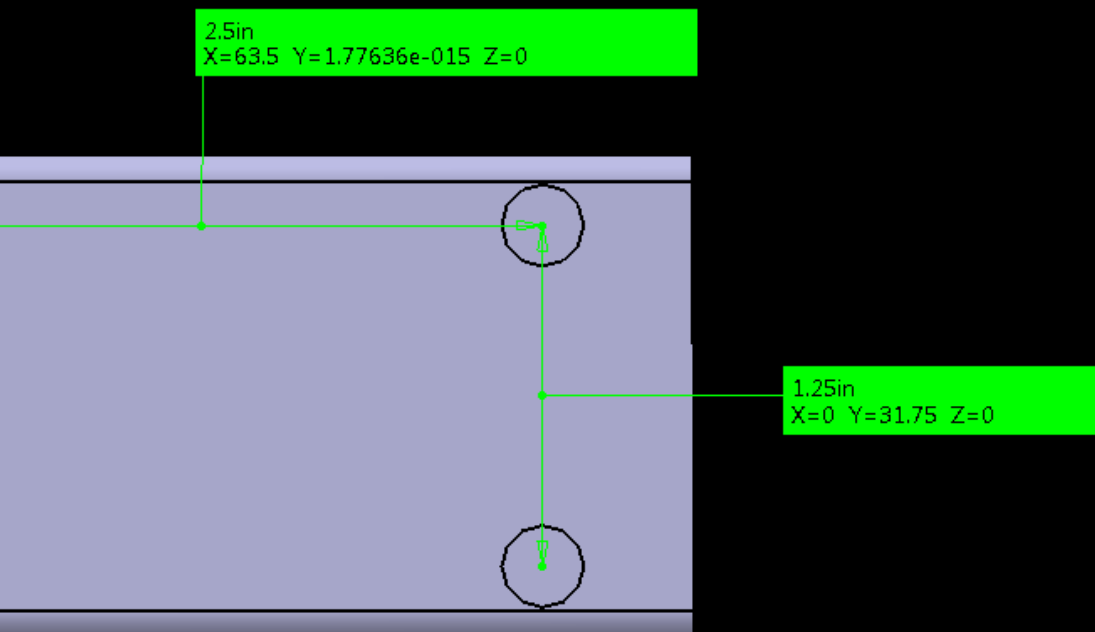
- Simplified electronics enclosure
- Modular cables, wireless connections (intended)



Design Intent.

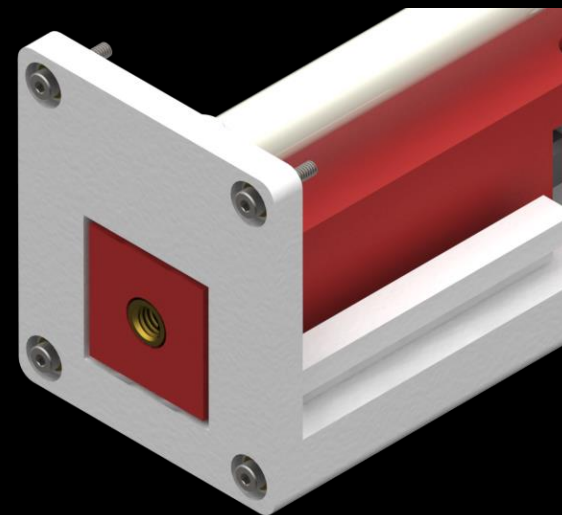
Addressing goals.

Versatile: “Can do.”



- Common dimensions
- Mountable to any surface/orientation

- Can actuate any force with horizontal component



Manufacturing.

Trial and error, and error and error.

Method of choice: 3D printing

Why?

- Use as a test bed for the 40-03 3D printer
- Ability to adapt to unforeseen design challenges

Common issues
encountered

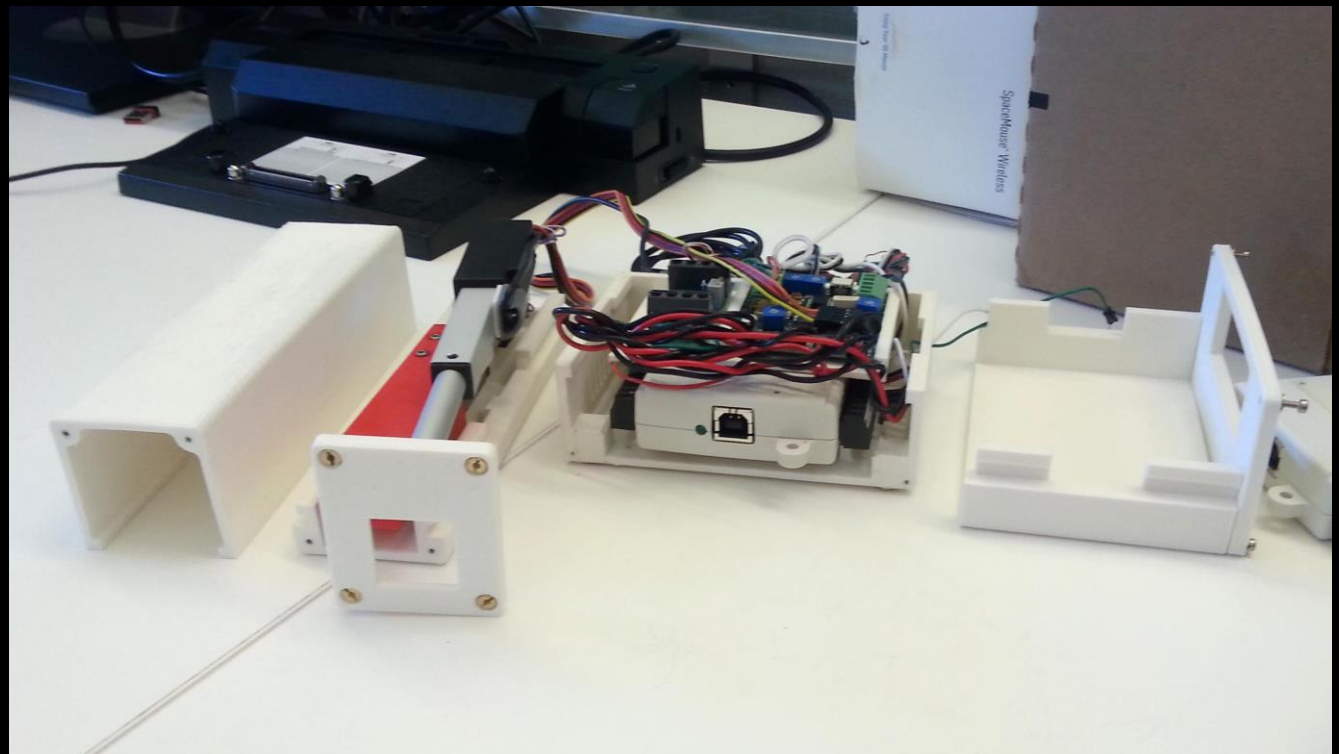


Reflections.

Results.

Success: Mechanically sound and working package

Remaining Issues: Brittle prints, LabView integration not fully tested



Reflections.

What now?

Still much to be investigated and tested
Revision 1 provides the baseline



The
possibilities
are endless.
Where do we
go from here?



DESIGN
THIS
DAY.