



HDRM Hardware Check 1/3

TEAM STELLARHOLD

Recap

- ▶ Hold-down release mechanism serves to be a simple, reliable actuation device that releases folded solar panels from their folded position on a satellite.
- ▶ Opted for a pin-puller using Nitinol spring
- ▶ Designed for a 12U CubeSat



Design Iteration: First Iterations



Prototype 1: Rough visual of concept



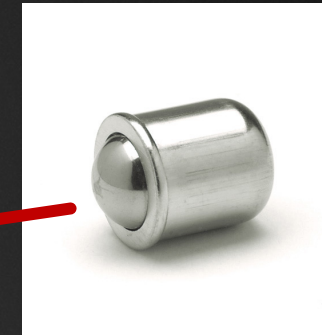
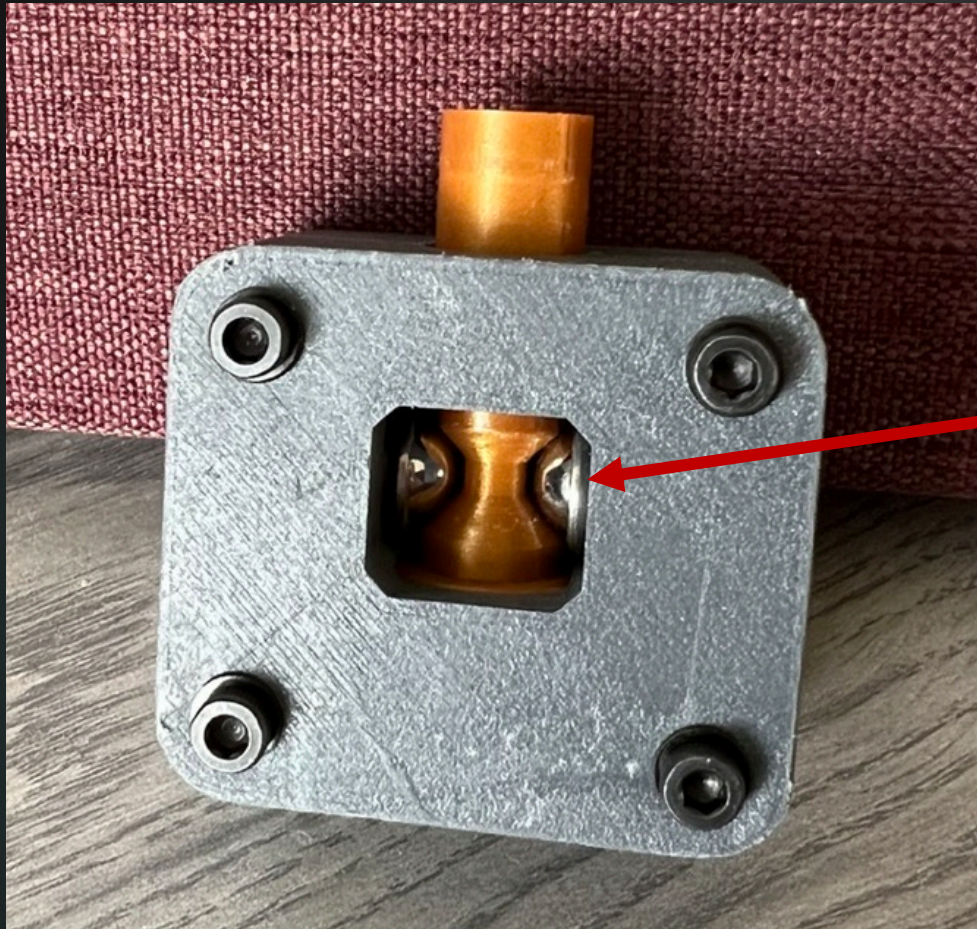
Prototype 2: Rough Demo of concept

Design Iteration: Latest Iteration



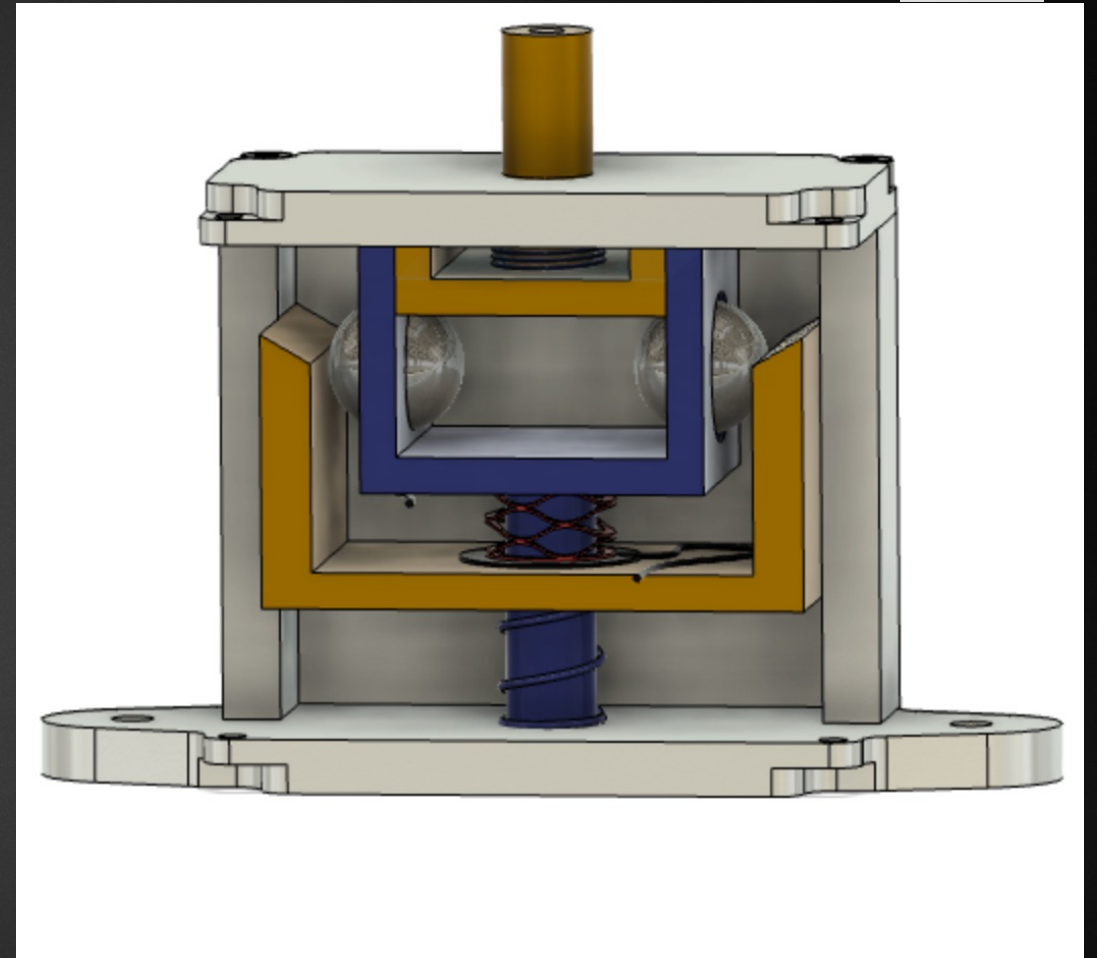
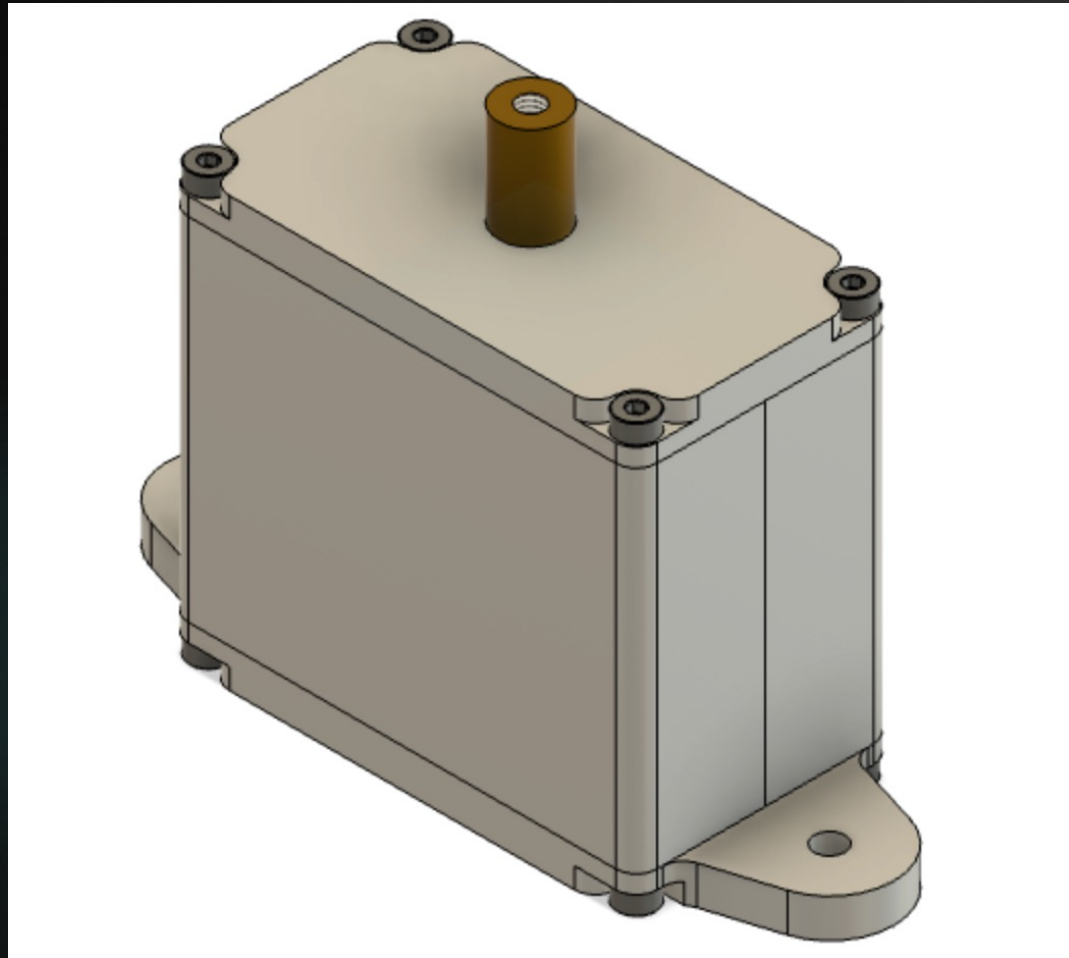
Prototype 3: Optimized demo of concept

Design Iteration: Alternative Design



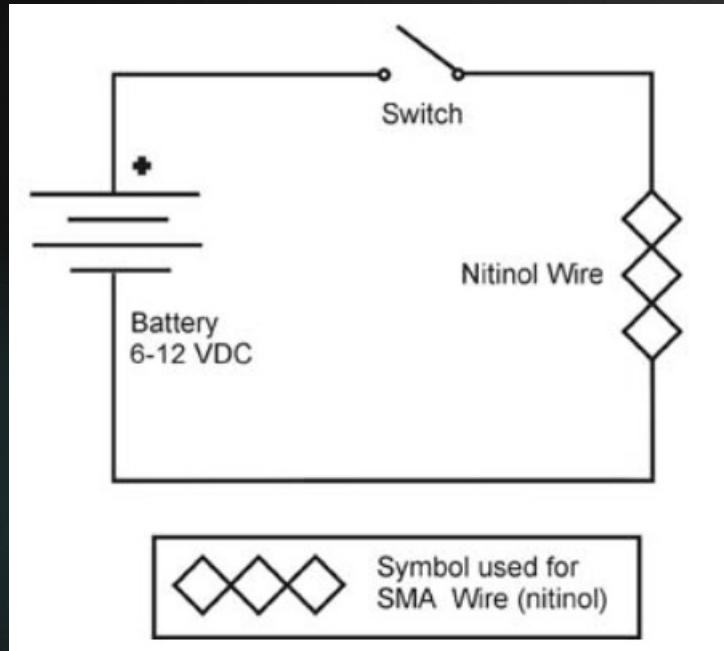
Alternate Design: Proof of concept

Final Design: CAD Model

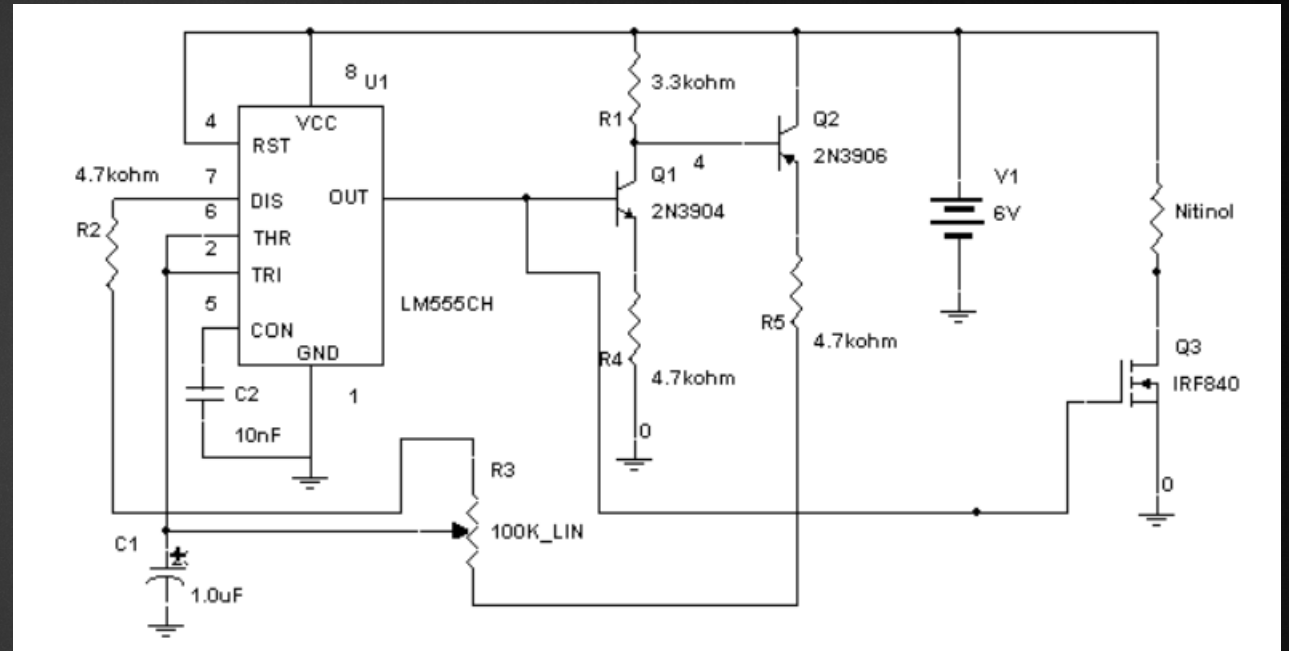


Final Design: Parametric CAD, DFM and fully optimized.

Electrical Schematics










SMA DC Circuit



SMA Pulse Width Modulated Circuit

Purchasing Plan (Updated)

- **Green** = Ordered and Received
- **Yellow** = Ordered but Not Received
- **Red** = Not Yet Ordered
- SMA spring in design process
- Possible updates to come (mylar, PID, Power Supply, etc.)

Part Description:	Cost: (\$)	Quantity:	Part Status:	Make/ Buy:	Primary Vender:	Manufacturer:	
Acrylic Sheets	21.83	2	09/06/22	Buy	Amazon	Acrylic Mega Store	
Nitinol Spring (2.4 mm)	19.58	1	02/23/22	Buy	Amazon	Kellogg's Research Lab	
Aluminum Block	40.39	2	09/06/22	Buy	Amazon	VERNUOS	
Generic Springs	14.18	1	09/06/22	Buy	Amazon	Ninoge	
Custom SMA 100 Spring (estimate)		1	09/25/22 (latest)	Buy	Memry	Memry	
Ball-Nose Plunger	8.38	2	04/05/22	Buy	McMaster-Carr	McMaster-Carr	
Arduino	49.12	1	09/06/22	Buy	Amazon	Arduino	
Testing Total:	\$100		Repairs Total:		\$100		
Part Total:							\$324.08
Part Total with Taxes (estimated):							\$400.00
Total:							\$600.00

Ordered and Received

Ordered but Not Received

Not Yet Ordered

Manufacturing Plan

Component	Who	Start	Finish	Duration (Days)	Materials	Percentage of Build
CubeSat Demo	Maia	9/12/2022	9/23/2022	11	Acrylic	10%
PWM Circuit	Valentin	9/12/2022	9/23/2022	11	Arduino/ wires	25%
Lock Piece	Nate	9/30/2022	10/14/2022	14	Aluminum	10%
Bearing Lock	Valentin/ Nate	9/30/2022	10/14/2022	14	Aluminum	10%
Bottom Pin Platform	Maia	10/3/2022	10/14/2022	11	Aluminum	10%
SMA Integration	Team	10/3/2022	10/14/2022	11	Nitinol	20%
Pin	Maia	10/15/2022	10/28/2022	13	Aluminum	5%
Base	Valentin	10/20/2022	10/28/2022	8	Aluminum	5%
Front Plate	Valentin	10/20/2022	10/28/2022	8	Aluminum	5%

Demonstration



