

# SPROUT UP

## Assistive Standing Device

Evan Grealish, Steph Akakabota, Lleyton Elliott,  
Darius Nguepi, Michael Rubin, Zhenyu Hu

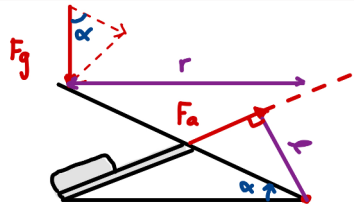
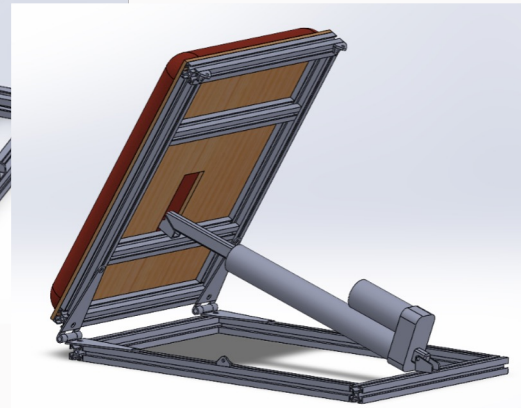
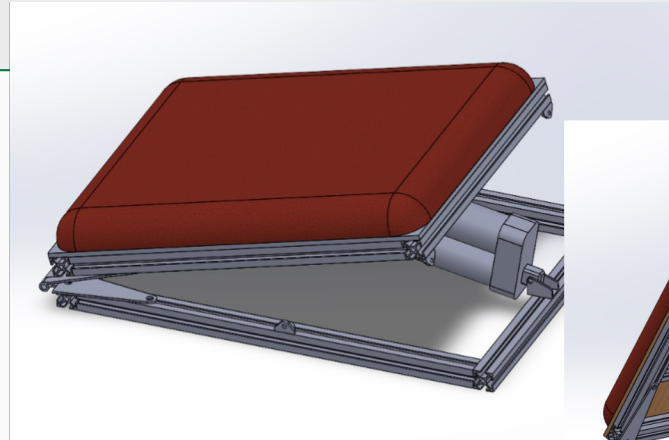


# Mechanical Design: Seat & Actuation

SPROUT UP

## Priorities:

- **Weight:** 3kg
- **Power:** 60%
- **Speed:** 4 sec
- **Battery:** 2 x (80g, 35A, 1Ah) = 20 cyc
- **Prototype Cost:** <\$150
- **Manufacturability:** Off the shelf parts



$$F_g = (m \cdot 0.5)g \sim 400\text{N}$$
$$\frac{T_g}{T_a} = F_g \cdot r \sim 120\text{N}$$
$$T_a = F_a \cdot l \sim 70\text{N}$$

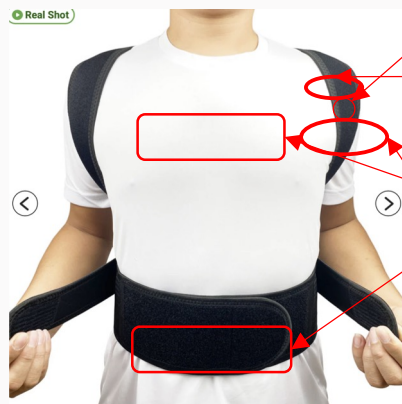
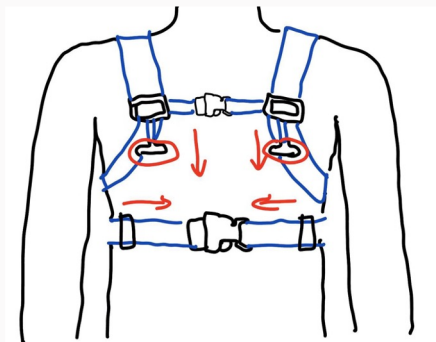
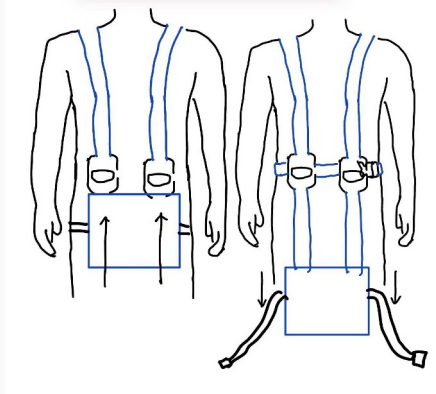
$$\frac{T_a}{T_g} = \frac{70}{120} = 60\% \text{ assistance}$$

## Next Steps:

- FEA analysis
- Order and Assemble Prototype
- Production Design
- Reduce weight & size

# Ergonomics & disengaging

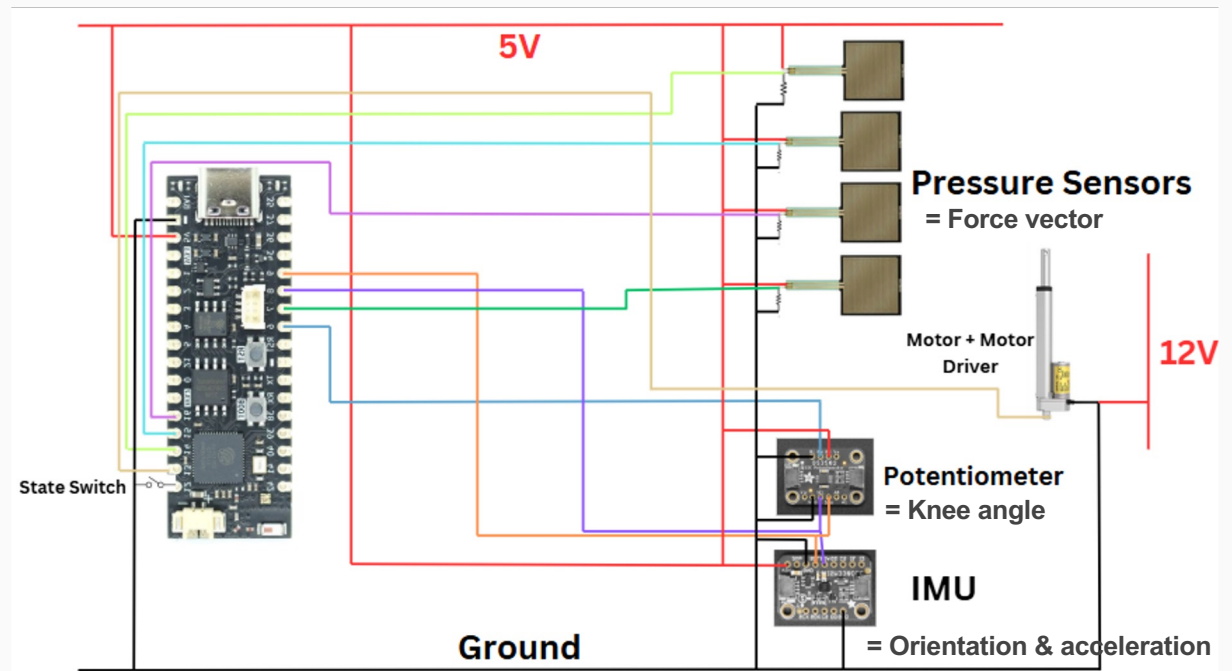
SPROUT UP



# Electronics

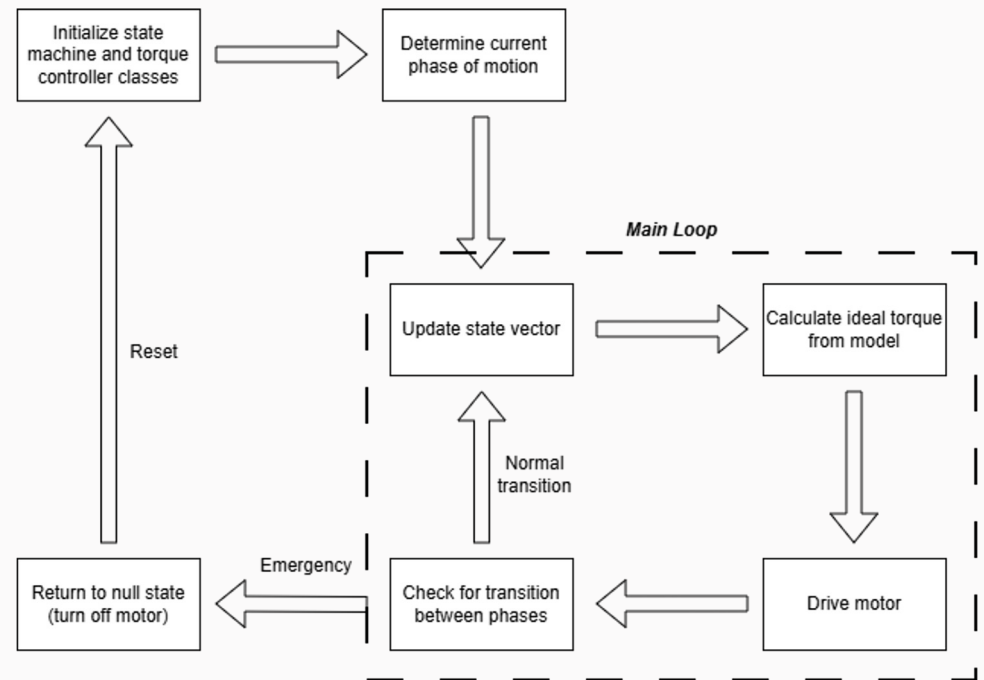
SPROUT UP

- **Status:** Electronics chosen and specced
- **Risk factors:** Noise and connectivity
- **Remaining work:** Order materials, test outputs, and integrate sensors to control scheme



# Logic and Modeling

- **Status:** Kinematics and code structure is finished
- **Risk factors:** model robustness + emergency override needed
- **Remaining work:** implement dynamic model, assign phase transition thresholds, write low-level hardware/sensor code



Code block diagram

# Project Timeline

SPROUT UP

