

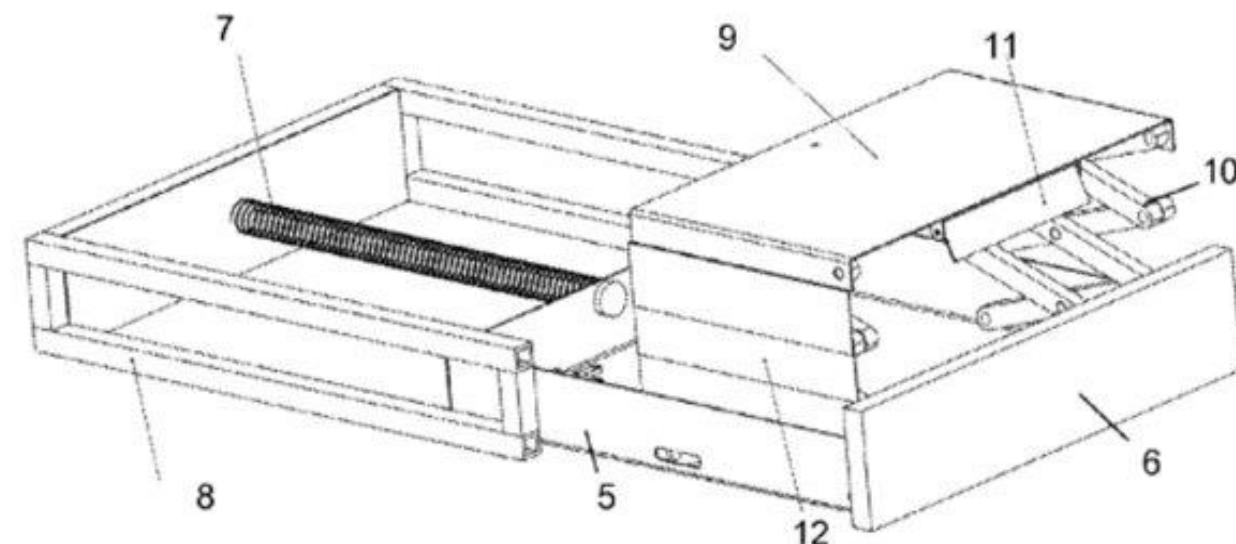
Company Vision

- To create a product that is useful and desirable in modern homes and kitchens
- To appeal to cabinet manufacturers to possibly incorporate the design into their options when designing kitchen cabinets
- To have our product be a standard kitchen device in households everywhere

Existing Solutions



Common 2-Step Stool
Stored elsewhere when not in use

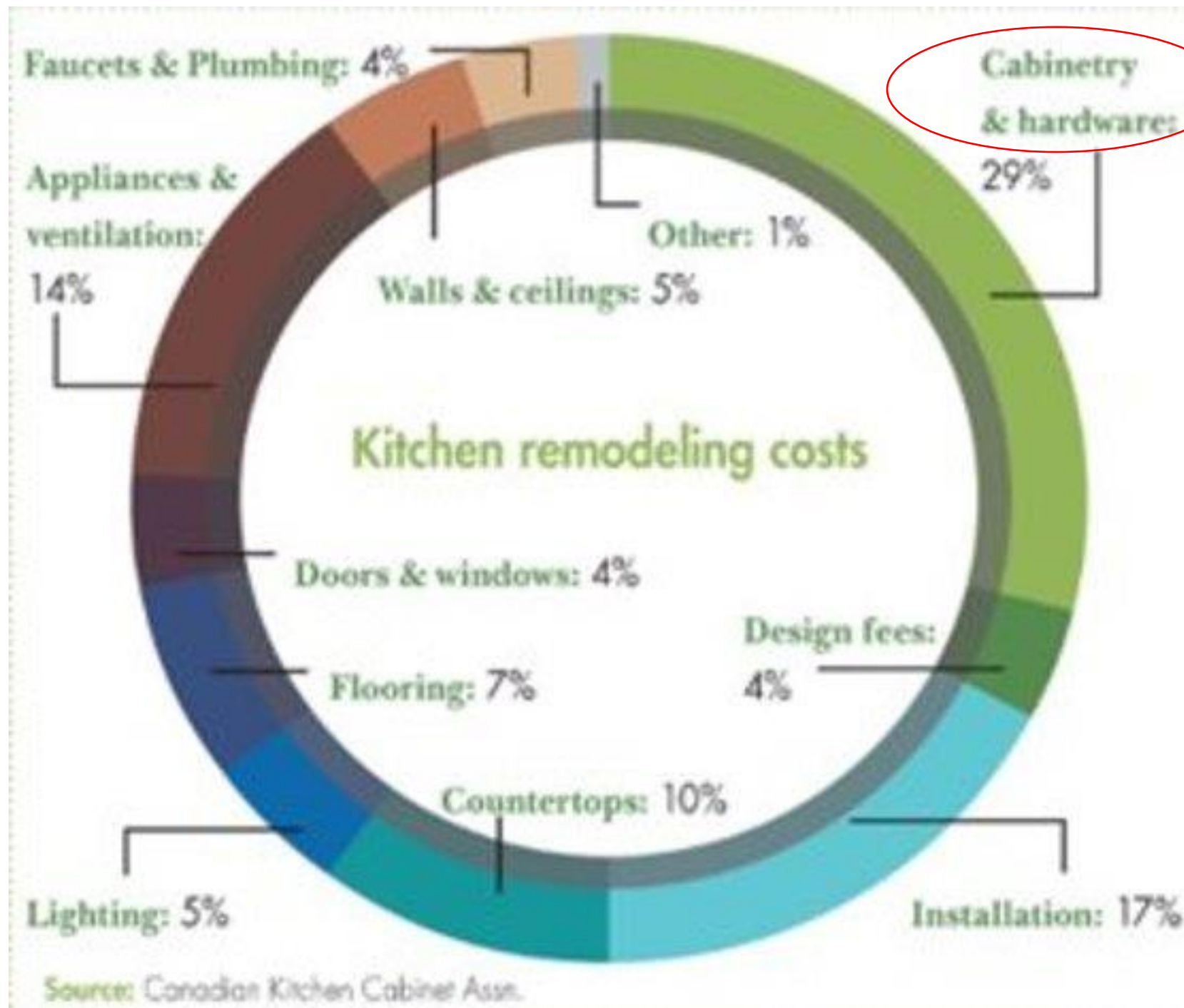


Similar Patent
Requires use of hands to be pulled out/put in



Cabinet incorporated
Can only be installed on the side of a set of cabinets

Business Case



- Final Cost of about \$400
- Projected sales in United States kitchen cabinet sets are estimated to reach \$17.1 billion in 2021
- We can expect to bring in over \$100K in sales if we can sell at least 1000 units per year

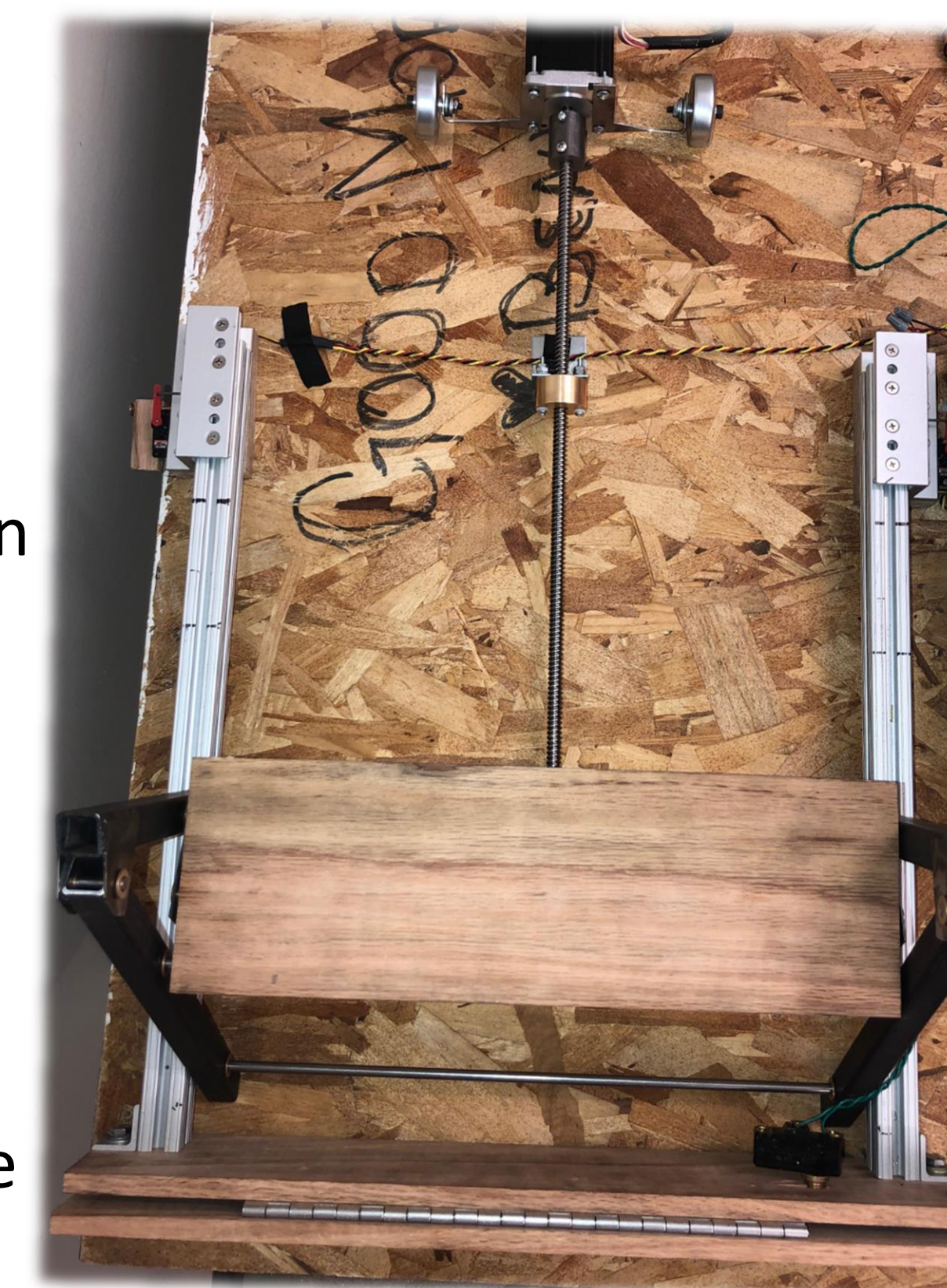
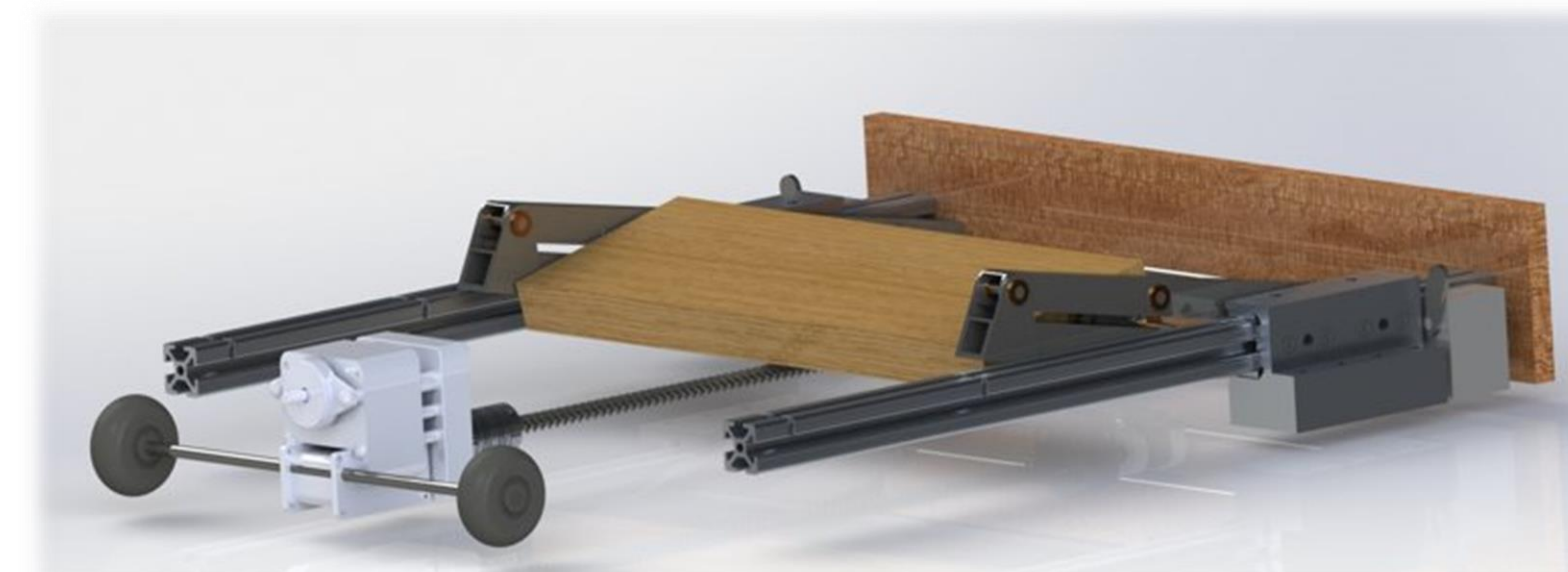
Problem Statement & Goal

- Modern kitchen layouts do not cater to people under 6 feet tall
- Upper cabinets can prove impossible to reach without fetching a step stool
 - When cooking, busy hands make retrieving a step stool cumbersome



- Goal:** Create convenience in accessing hard to reach spaces via a hands-free deployable step stool that resides under the cabinet and out of sight when not in use

Prototype/Final Solution

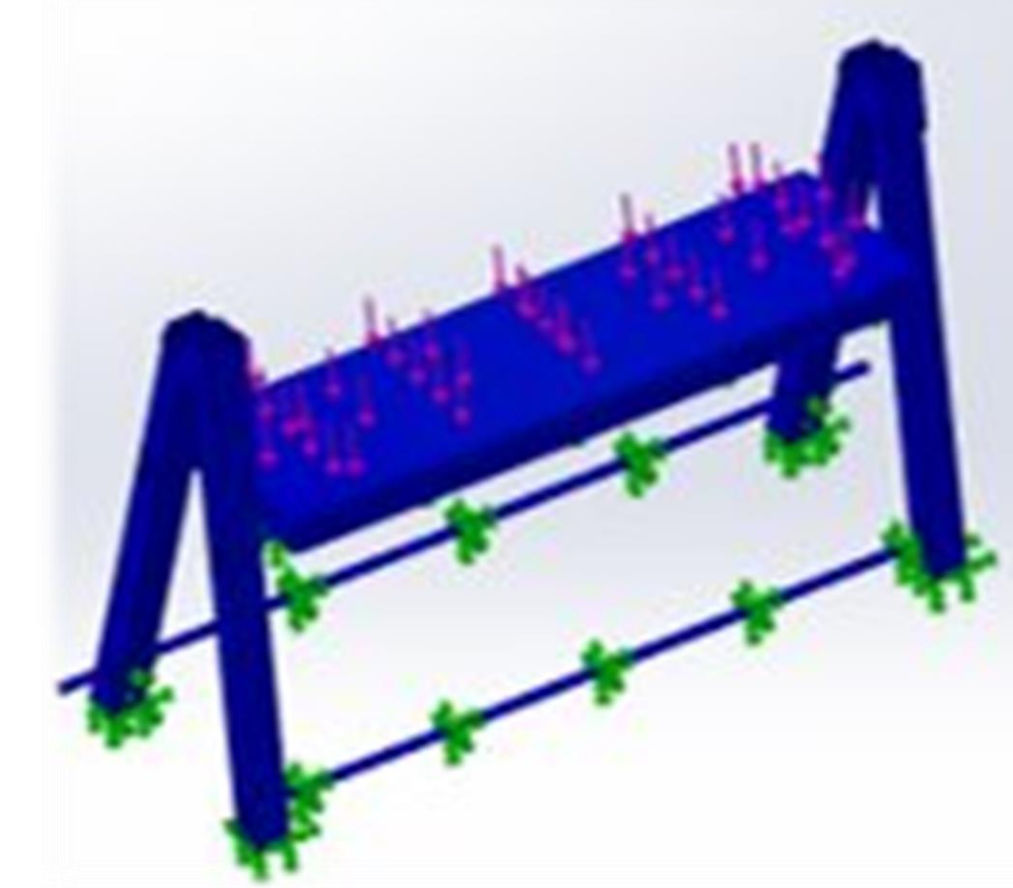
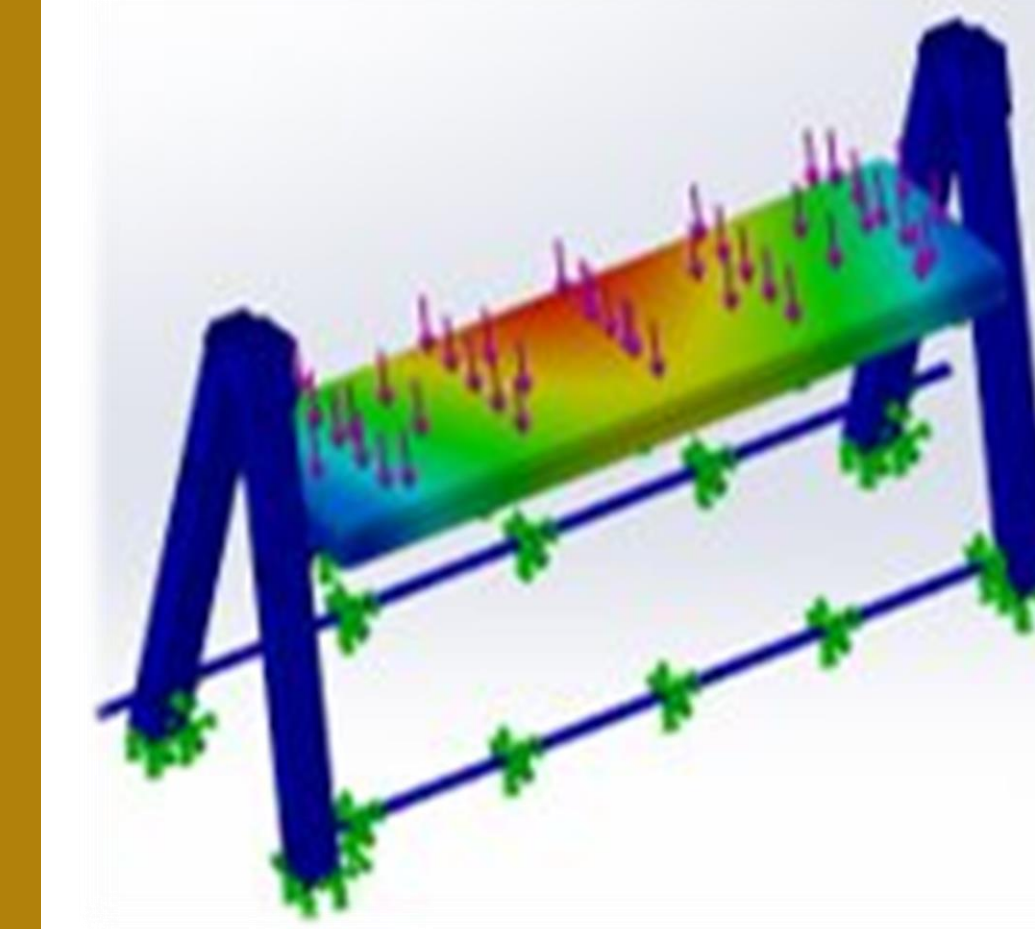


- Initiated by kicking the toe kick of the cabinet in its stowed position
- Creates 8 additional inches of elevation in its upright position
- Motion facilitated by a nut and lead screw coupled to an electric motor guided by wheels
- Under 19 seconds to deploy
- Servo motors and Arduino lock toe kick in place while lead screw changes direction, raising the step



Testing

Test 1: Finite Element Analysis



- Deflection: maximum of 0.5mm at center of step
- Stress: nearly zero on step and 88.45 MPa at hinges attached to steps

Test 2: Sustained Load



Using the weights available, 285 lbs. of force sustained for 5+ minutes

Future Improvements

- Additional Safety Features
 - Side Guards
 - Structural Reinforcement
 - Safety Labeling
- Software development to prevent unwanted deployment
- Faster, smoother deployment/stowing