

Motivation, Goal, Impact

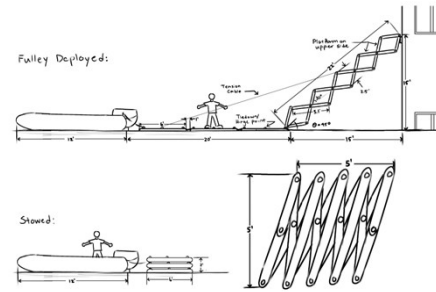
Design a compact, minimally operable bridging device for first responders that enables the rapid and safe rescue of stranded civilians on top of flooded infrastructure



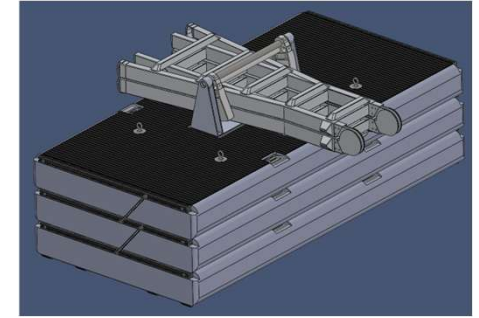
Requirements

- Supports a 375 lb. load
- Capable of bridging gaps of 4 to 20 feet in flood water
- System must obey government regulations

Final Design



Concept Sketch

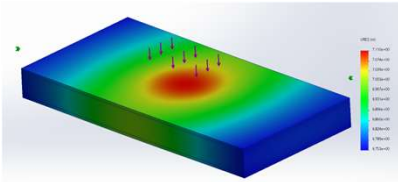


Final Design Model

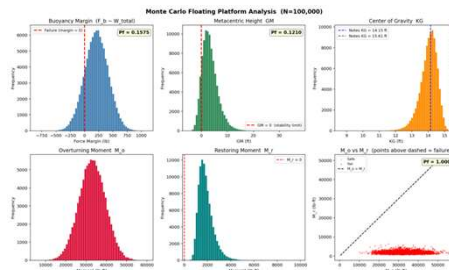
Three towable floating platforms integrated to fold within each other, attached to an adapter that fits an extension ladder.

Design Calculations & Decisions

- **Material Selection:** Utilizing carbon fiber, EPP foam core resulted in a light platform weight (appx.45lbs)
- **Buoyancy & Sizing:** Static analysis determined that a max load of 1,316 lbs results in a platform thickness made to 8 inches to stay above the water line
- **Simulating Failure:** Tension cord system needed distribute overturning moment



Global Deflection Plot



Monte Carlo Simulation

Prototype & Test Results

- System was able to float with a scaled down - load (appx. 20lbs)
- System was stable even when load was applied to gaps
- Folding mechanism performed well and quickly (<10s)
- Cord system to be later implemented to prevent capsizing

