

Amphibious Arctic Lifeboat

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Problem Statement

Vessel traffic is increasing in the Arctic, and traditional lifeboats are no longer adequate to evacuate personnel through or over ice during emergency situations. An alternatively designed lifeboat is needed that is able to propel itself through water, over ice, and transition between the two.

Major Constraints and Objectives

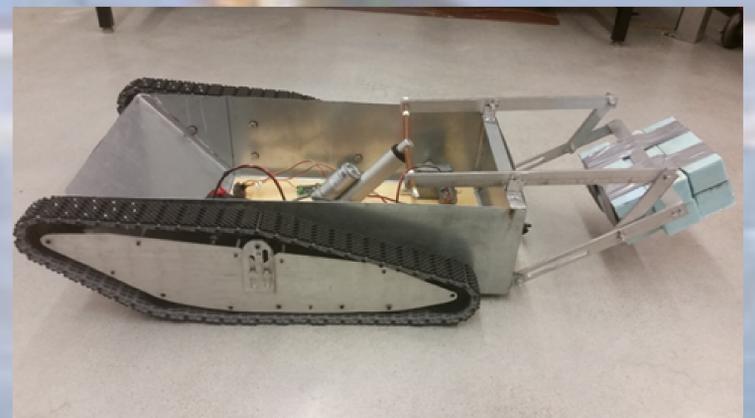
Constraints

- Transitions between water and ice
- Watertight below waterlevel
- Build under \$2000

Objectives

- Single Unit
- Able to climb 2cm of ice(above water)
- Minimize thru-hull holes

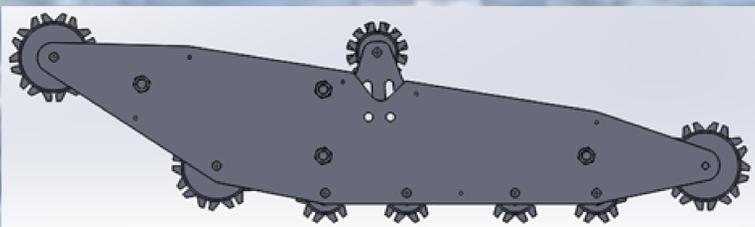
Final Design Solution



Unique Features

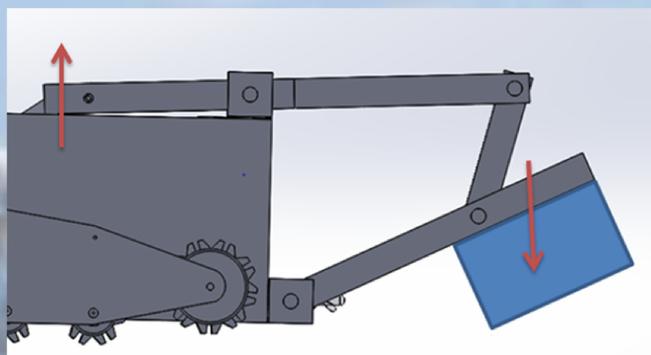
Propulsion System

Unlike a normal lifeboat which only has a propellor to propel itself, the prototype has treads with spikes attached to it's sides to enable the lifeboat to travel over ice and transition between water onto ice.



Buoyancy Box System

The buoyancy box provides a buoyant force that raises the stern of the hull. This adds buoyancy in the system to prevent the boat from stalling or possibly flipping over by maintaining a safer angle while ascending the ice out of the water. A linear actuator pushes up one end, and the buoyancy box lowers on the other end of the 4 bar mechanism.



Performance

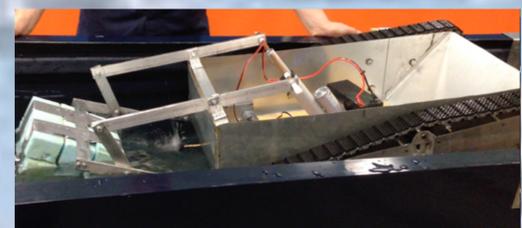


Approaches ice using propellor

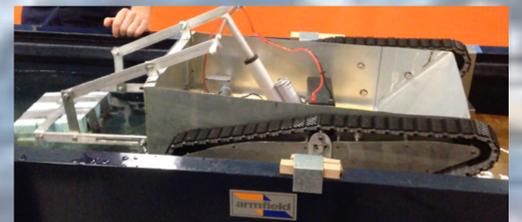


Climbs up ice using treads

Lowers buoyancy box to raise stern



Retracts buoyancy box and continues on tracks on top of ice



Meets Customer Needs?

The prototype is able to climb up the 2cm minimum height ice sheet and complete the transition from water onto ice, proving that it is a viable upgrade from the traditional lifeboat for Arctic transits.