

## Abstract

The goal of this project is to **design, build and test** a **small scale prototype** of **Clear Blue Sea's Floating Robot for Eliminating Debris (FRED)** which will be used for demonstration purposes. This was achieved through the collaboration of two teams and four subsystems (power, conveyor belt, navigation, and boat). Using engineering techniques this team designed both a conveyor subsystem to pick up the floating debris and a functioning boat to house the other subsystems.

## Context

- Plastics converges in the oceans in expansive areas called Gyres or Garbage Patches; the largest one is between Hawaii and California
- The largest Pacific Gyre has been estimated to be twice the size of Texas



## Requirements

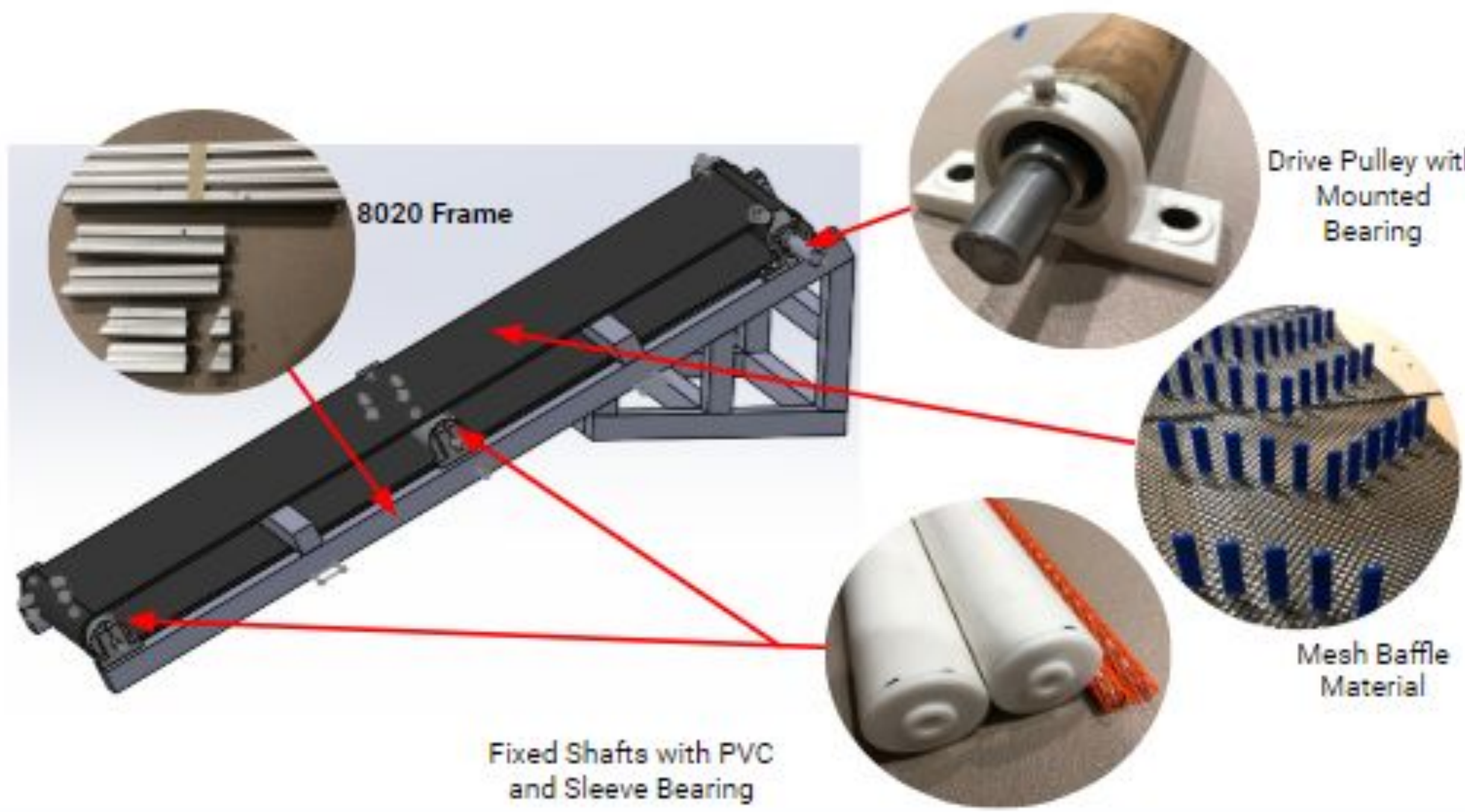
- Must be **transportable**
- Must be **waterproof** (must function in water)
- Must store trash
- Must have a powered motor
- Must be **unmanned**
- Must arrive within 3 feet radius of the target
- Collects floating debris with **70-80% accuracy**

## Architecture

- Catamaran Body
  - Two pontoons from Venture Out
  - 80/20 Frame and connectors
- Safely carries 375 lbs
  - Weighted
- Housing of all other subsystems
  - Conveyor Belt
  - Power
  - Navigation

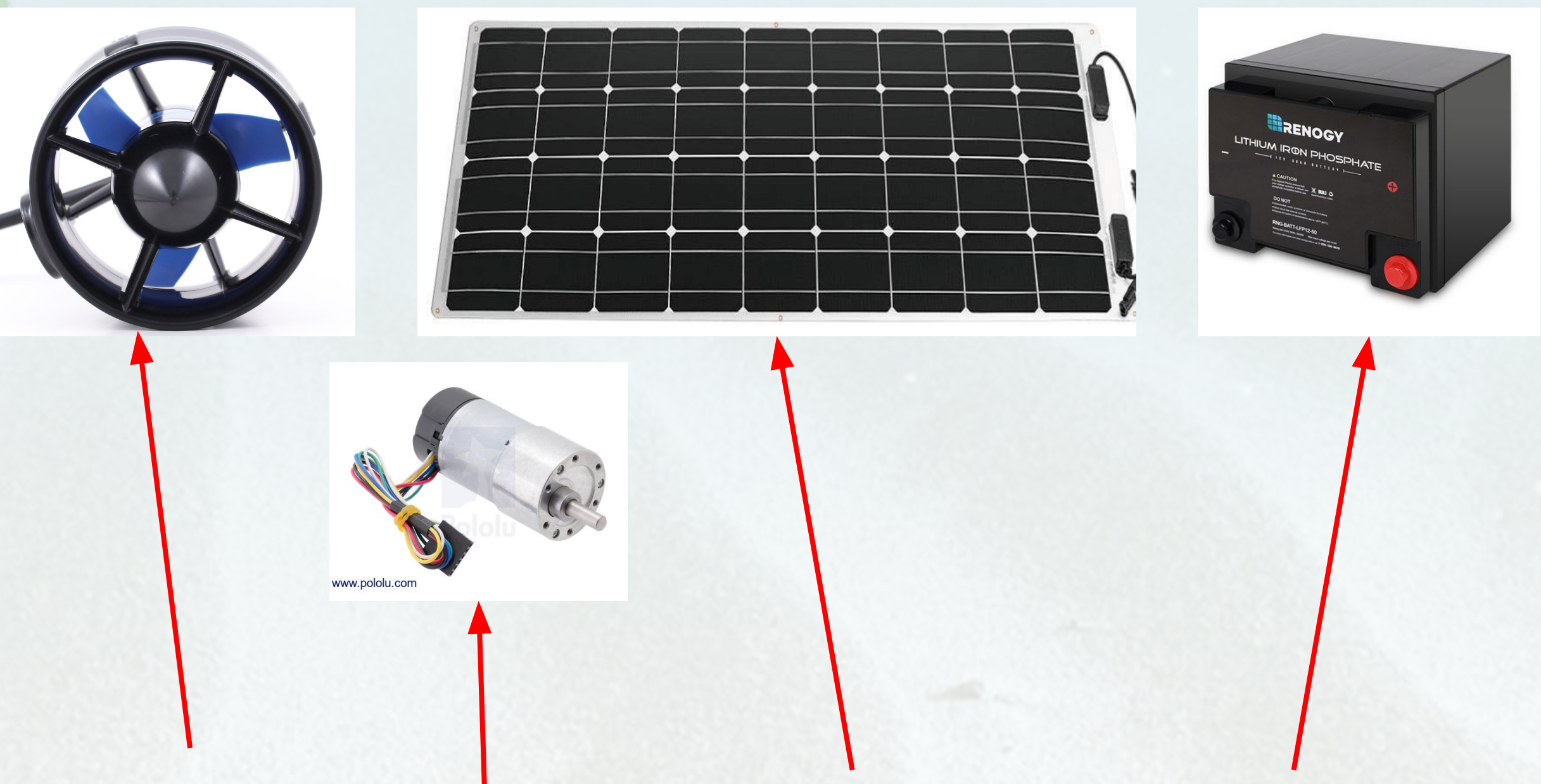


## Debris Collection System



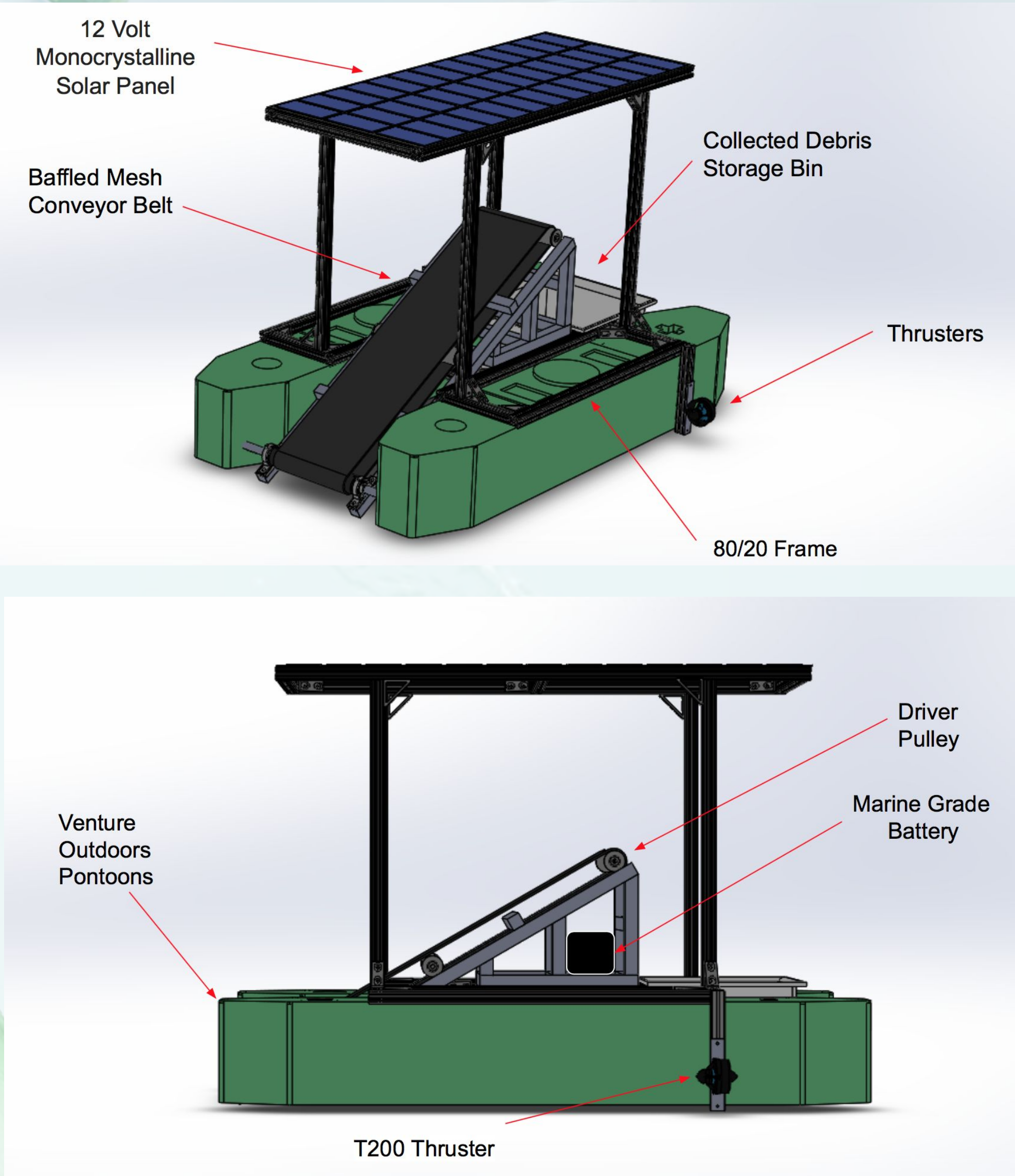
This image shows a completed SolidWorks model of the **conveyor belt subsystem** with all of the components.

## Power & Propulsion



The **thrusters, conveyor motors, solar panel** and **battery** are needed in order to power and steer the boat and conveyor belt.

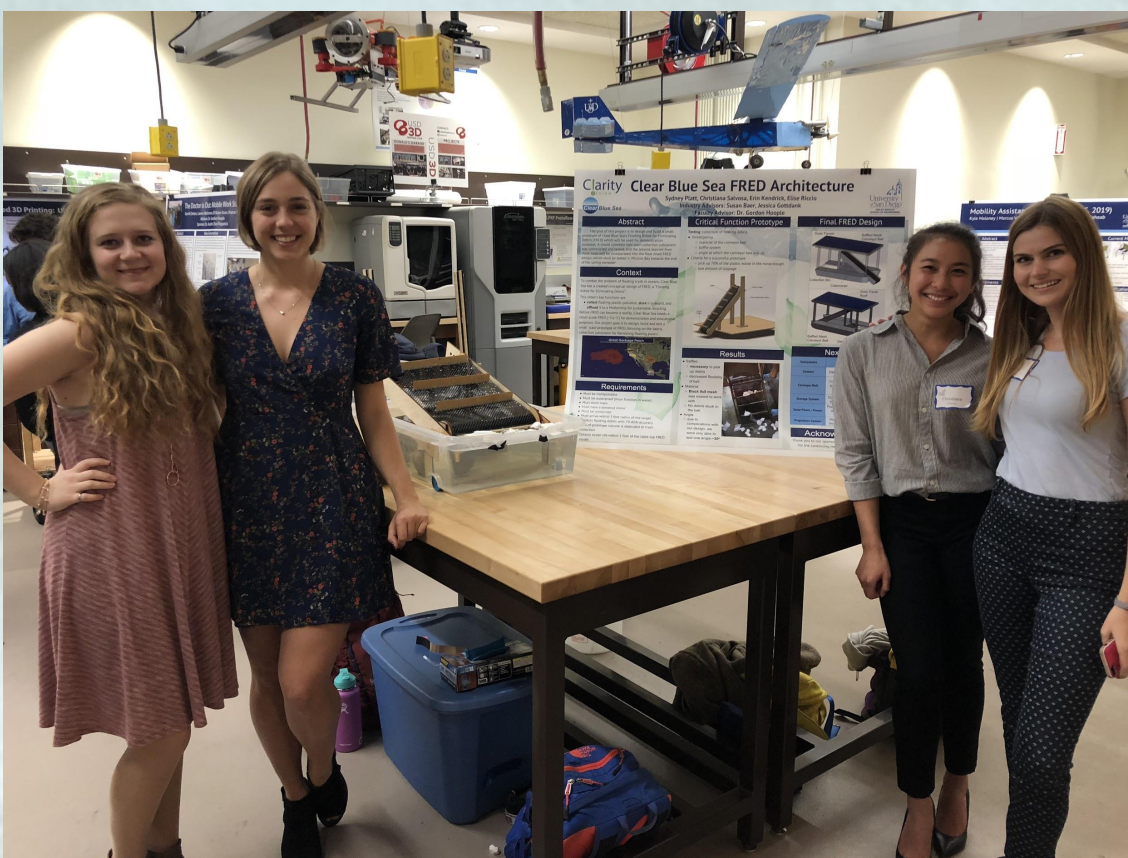
## Final Mini FRED Design



## Upcoming Testing

subsystem	quality	test criteria	test date
Power/Boat	Power	thrusters are operational	Done
Boat	Bouyancy	pontoons do not sink below 55% submerged	04/11/19
Power	Propulsion	FRED moves straight at 2 knots	04/23/19
Conveyor/Power	Power	Motors provide adequate power	04/14/19
Conveyor	Collection	Collects 80% of assigned trash in horse trough	4/23/19

## Acknowledgements



Thank you to our sponsors Clarity Design and Clear Blue Sea for the continuing mentorship throughout this process.