ROBOSUB

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Project Background

- The RoboSub competition occurs each year at the US Navy TRANSDEC testing pool
- RoboSub has been an ongoing design challenge passed on by previous senior design teams
- Two teams are sent from Cal State LA every year, one associated with the RoboSub Club and the other being that of Senior Design
- Previous senior design teams have yet to be able to create a fully functioning AUV that is competition fit

Project Objective

- The desired outcome from this project of creating an autonomous underwater vehicle is to have a fully functioning AUV that can compete in the 2022 RoboSub Competition, following all guidelines and that could complete any given task given by the competition handbook

System-Level Requirements

Mechanical Systems

- Hull: sealed pressure vessel containing electrical assembly
- Frame: structure for all component connections

Electrical Systems

- Turnigy 20000mAh: 6S LIPO, High capacity 14.8V Battery
- Power Distribution Board: custom pcb used to step down voltages from 14.8V to 12V, 9V, 7V, and 5V

Actuated Systems

- Mechanical Claw: manipulate competition objects
- Dropper: drop projectile into pool floor target
- Torpedo Launcher: fires torpedoes at designated targets

Software Systems

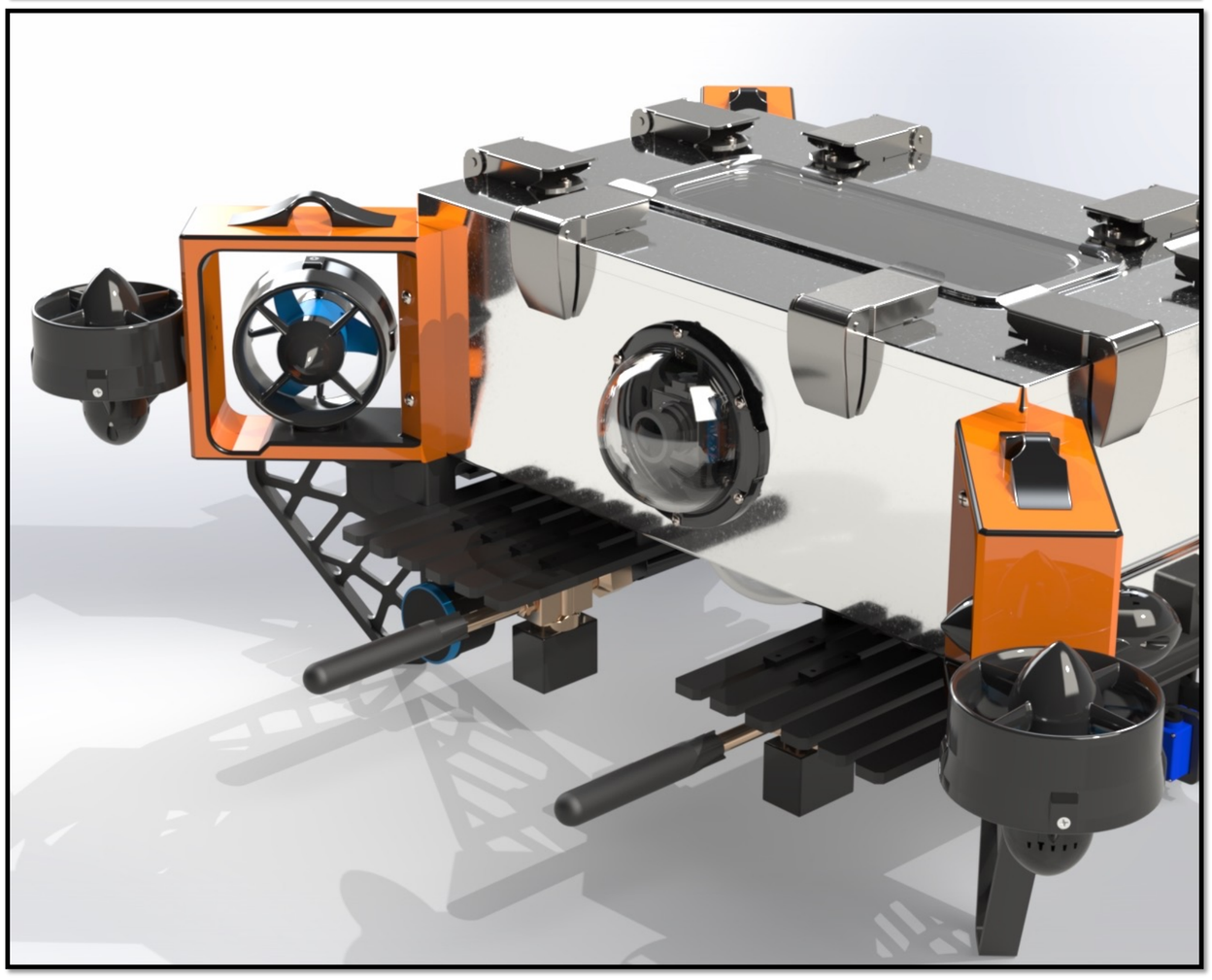
- the Robot Operating System (ROS), OS to interphase with other subsystems

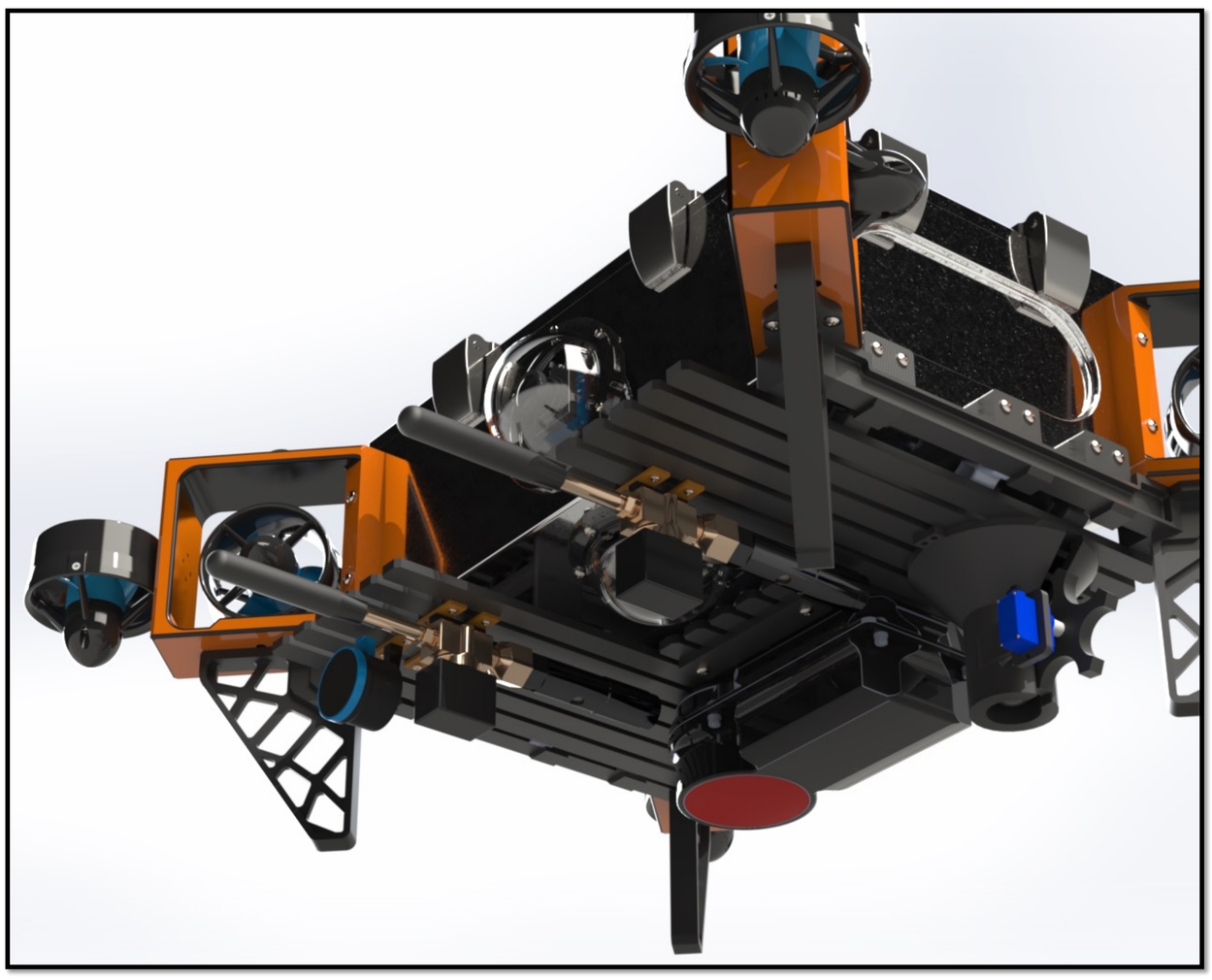
Navigation Systems

- Inertial measurement unit (IMU), 4 hydrophones, a Sonar and a doppler velocity logger (DVL), all used for positioning

Design Approach

- Mechanical design consists of aluminum 6061 T6 hull that has been milled out of a block.
- The frame is 3d printed out of PETG material for water resistance and high load capacity
- Pneumatic system used for torpedo launcher which uses PETG material printed torpedoes and CO2 canisters.

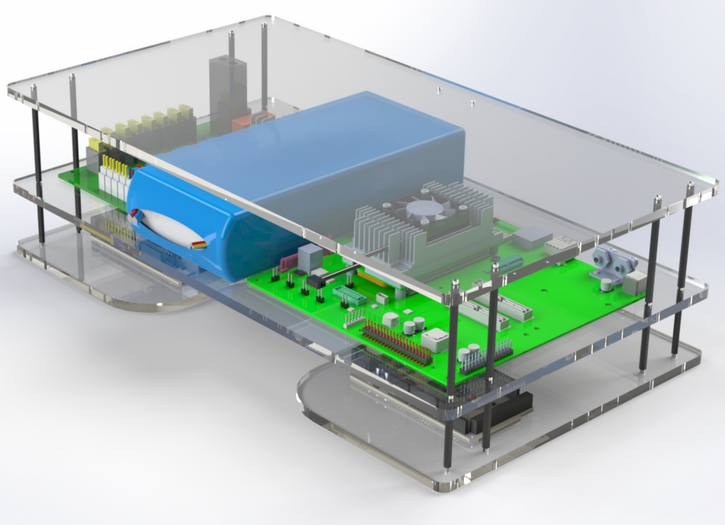




Results

- Hull redesigned to cut weight and costs, while still maintaining previous rectangular concept from previous teams
- Modular design so that parts can be easily removed or replaced
- Actuated systems include torpedo system, mechanical arm with attached claw, and dropper system
- Power distribution board designed and in process of being tested
- IMU, sonar, and barometer tested to ensure functionality with more work to be done testing the DVL and the hydrophones

Electrical Assembly



Torpedo Launcher

