

RoboSub Subteams

Frame & Hull

Team Lead: Joseph Iorio (jiorio@calstatela.edu)

The sub design team will be responsible for coming up with concepts for the sub design, creating the full CAD of the sub, performing all necessary buoyancy, stress, & fluid flow analyses, and getting the parts manufactured. We have available to us several different services at low prices (previous team members have connections + Blake can lathe and waterjet for us if we ask him nicely). This is the most arduous task, as it requires the most amount of work in a very short timespan. Anyone looking to be part of the sub design team must be dedicated to putting forth their best work and dedication. If you're interested in working on this portion of the project, you should have a decent foundation in SolidWorks or a similar CAD software. Other software such as ANSYS may be used for analysis of fluid flow when designing the sub.

Weapons Systems

Team Lead: Andrew Lopez (alope293@calstatela.edu)

The weapons systems team will be required to design, prototype, and manufacture a mechanical arm, torpedoes, and a dropper system. Each of these systems has specific requirements listed in the official RoboSub rules and will be discussed in further detail during team meetings. Members selecting the weapons systems team may choose to focus solely on one of the systems, which is a more reasonable amount of work, or they can choose to work on 2 or all 3 of these projects, which is a much greater workload. These projects are good for member who are less familiar with CAD software and for those who would like to learn some coding as well, since the weapons systems will likely be servo controlled by an Arduino microcontroller.

Power Management

Team Lead: Jesus Ramirez (jrami331@calstatela.edu)

The power management team will be required to determine the voltage and current levels required for each component on the sub and will determine how to distribute power from the batteries to these components in the most effective way. This team will also be required to design the power distribution board, which will be done in Eagle CAD or a similar PCB design software. This team is best for members looking to go into the power field and have some experience with stepping up/down voltage using transformers.

Servo Control: Jimmy Lopez (jlope690@calstatela.edu)

The servo control team is required to program the servos for the weapons systems and design the circuit board that will contain and execute this program. This can be done with an Arduino or similar microcontroller that is compatible with ROS. This team is best for members who have little to no experience in programming or electrical engineering but would like an introduction. The board design will be relatively simple and the programming is simple Arduino

programming. This team will have to collaborate with the power distribution team and weapons systems team to determine how many servos their board needs to be able to handle, what each servo must be programmed to do, and how much power is required for a board with a certain amount of servos.

Hydrophone Board + Algorithms

Team Lead: Sidra Gibeault (sidra.gibeault@gmail.com)

The hydrophone team is tasked with one of the most difficult problems in need of a solution. Last year, we were able to figure out the hydrophone algorithms for sound detection and location, but the underwater filtering did not work even after 2 years of attempting to get it working. This year, we hope to start fresh and come up with solutions to the issues with underwater sound detection. This team will need someone who wants to design the circuit board to control the hydrophones, which is a very simple project for someone looking to learn how to use a PCB design software, and one or more people who would like to work on the algorithms. This will require continual testing and consists of mostly mathematical algorithms and sound filtering techniques underwater.

Computer Vision

Team Lead: Sidra Gibeault (sidra.gibeault@gmail.com)

The computer vision team will be tasked with creating an architecture for interfacing every component on the sub that has an input dependent on the computer vision as well as programming the object and color detection algorithms. The club's sub will not have the same motherboard as the main sub. Instead, it will either have a LattePanda development board or a Raspberry Pi for computer vision and object detection. This computer vision system is simple compared to that of the main sub, but it is still a great opportunity to get familiar with computer vision. Some basic understanding of Linux is helpful, but not required, to be on the CV team.

Everyone, remember to ask for help if you need help learning something! There are many members who can help with different software and skills that you may need for the team you get assigned to. Don't be afraid to ask if you need anything, and remember that we are always here to help if you feel stuck. ☺