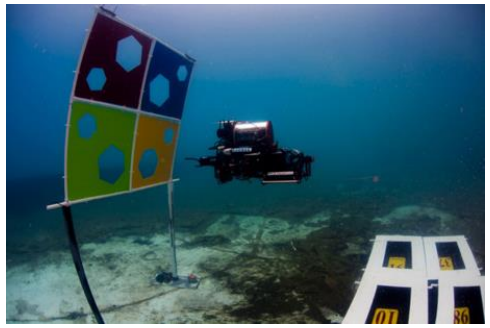
Design and Development of an Autonomous Underwater Vehicle

Team 23: Corey Cavalli, John Nicholson, Jordan Clein, Max Austin, Ross Richardson, Erik Olson
Advisor: Dr. Clark, Dr. Hooker, Dr. Gupta

Background

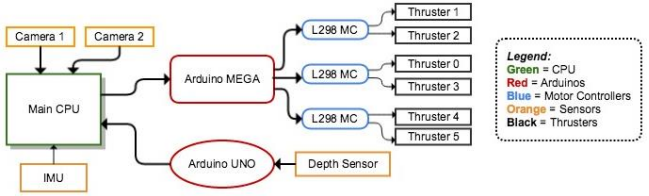
- Competition hosted by AUVSI in San Diego, CA (July 2016)
- Competition tasks: color/shape recognition, change depth/direction and speed, ability to grab/place items with object detection



Obstacles at the 2015 Robosub Competition

Electrical Design

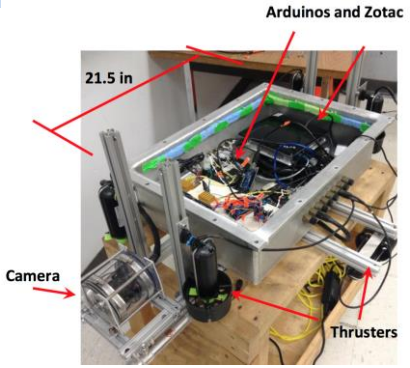
- New motor controller implemented making all thrusters functional
- Cameras: able to detect colors and orientation as well as track location of the objects
- Stabilization: Inertial Measurement Unit (IMU) able to output orientation data based off of its position
- Movement: done by programming the thrusters through the Arduino Mega
- Arduino UNO to control air actuation for torpedoes and gripper



Electrical Organization

Mechanical Design Specifications

- Weigh less than 125 lbs
- Smaller than 6’ x 3’ x 3’
- Buoyant to 0.5% of weight when kill switch is pressed



Current Submersible

Testing

Water Tests
- Pool testing of hull was successful, no leaks and stable
- Overbuoyant by 16.5 lbs

Out of Water Testing
- Thrusters spin and change speed with input data
- Cameras detect orange objects and relative orientation to sub

Buoyancy and Leak Testing at Morcom Pool

Awaiting Testing

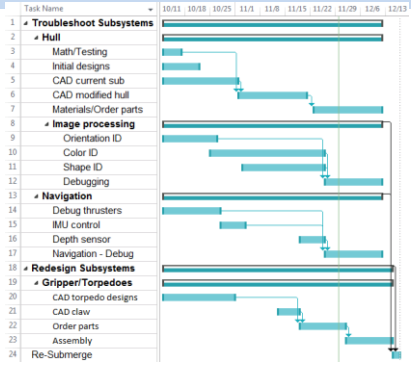
- Pneumatic actuator
  - Gripper
  - Torpedoes

Pneumatic Actuator

Marker Dropper

- Repaired Zotac computer
- Marker dropper

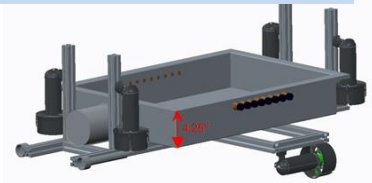
Fall Schedule



Organization of Tasks and Allocation of Time

Hardware Design

- Hull modification to achieve neutral buoyancy
- Torpedoes 3D printed then casted



Proposed Redesign of the Hull

3-D printed torpedo

- Implementing a pneumatic gripper with detachable arms
- Improved thruster orientation allows for better movement

Future Objectives

- Complete Hull Modification
- Design and implement task specific subsystems
- Integrate existing sub
- Test and debug navigation using object visualization