

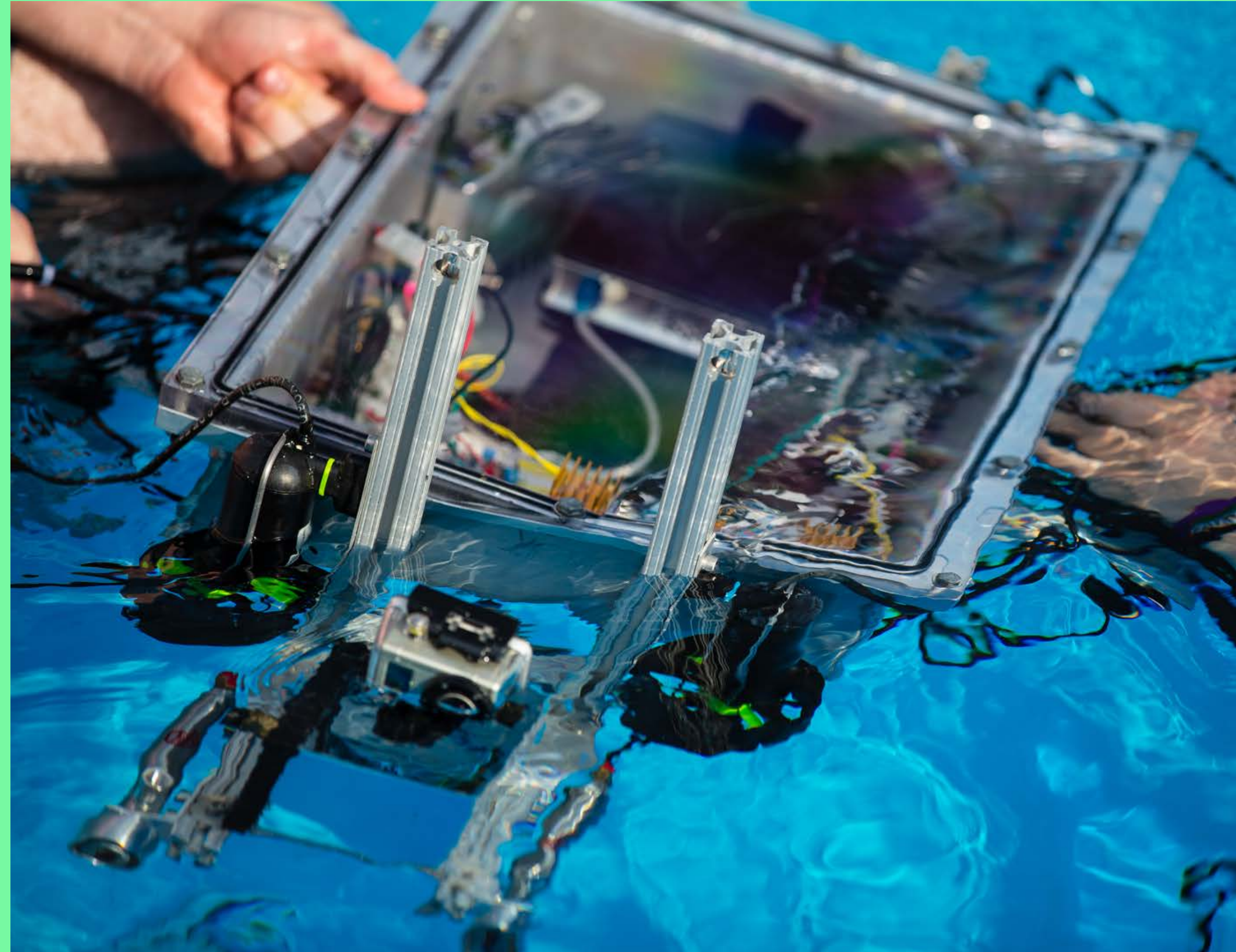
ROBOSUB

AUVSI Competition

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The Sub



Background

- Entering in 16th Annual AUVSI RoboSub Competition on July 22-28, 2013
- Must complete course autonomously within 15 minutes
- 110 lb weight maximum
- Maximum dimensions: 3 ft x 3 ft x 6 ft
- Sub will make use of cameras, a claw, torpedoes, marker dropper, thrusters, various sensors, and computer

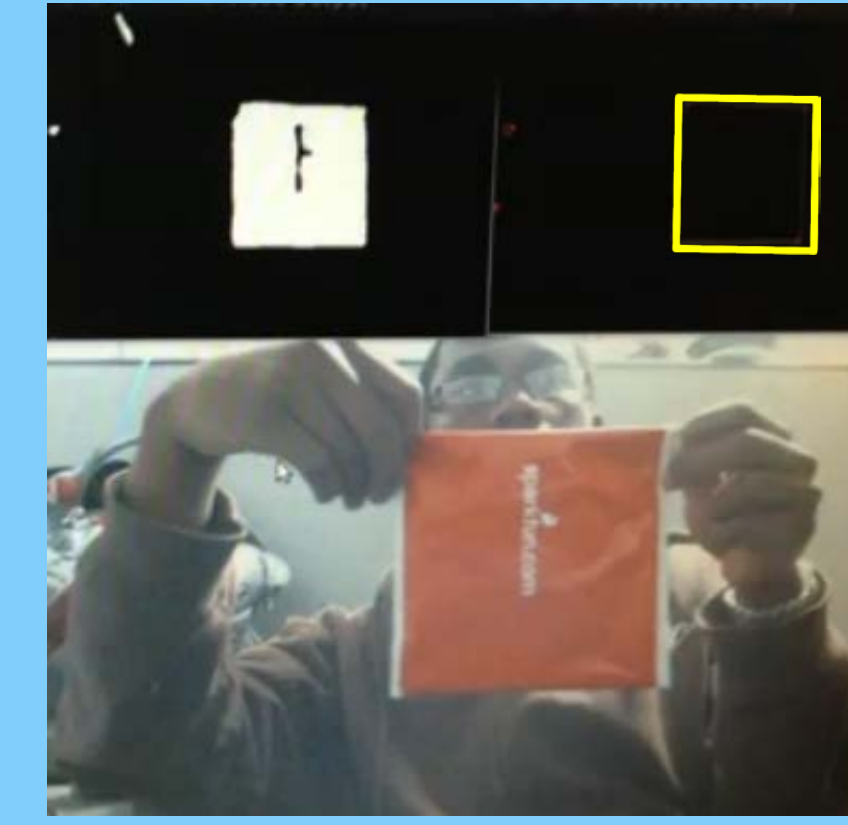
Competition Goals

Competition requires that the Robosub complete several obstacles autonomously:

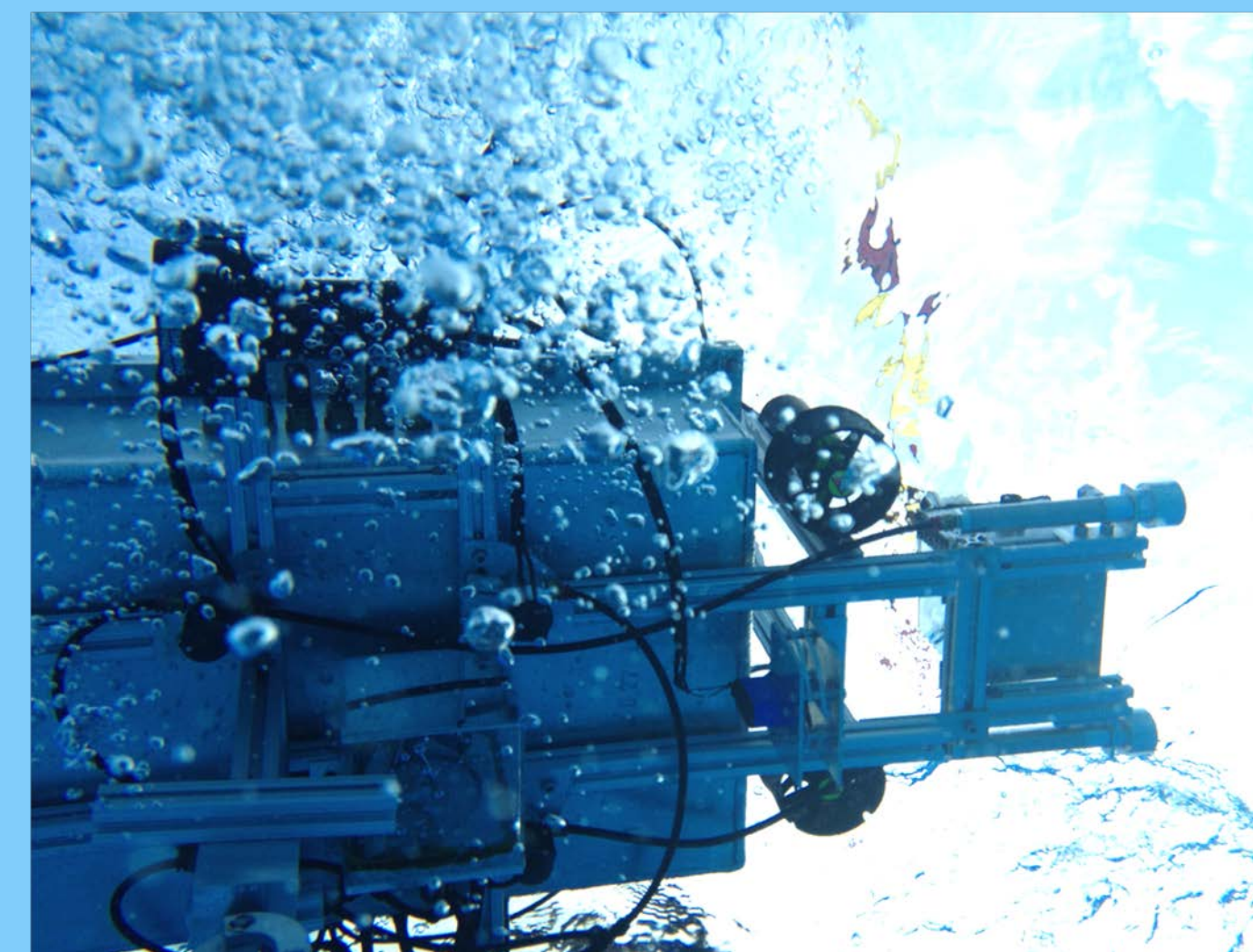
- Pass through gate
- Ram buoys
- Navigate obstacle course
- Drop marker
- Manipulate wheel/lever
- Follow pinger
- Pick up object
- Surface with object
- Drop object
- Surface again

Vision System

- Logitech webcams
- Real-time video analysis
- OpenCV image processing library
- Recognizes shapes and colors
- Distance calculation in progress



Intelligent Thruster Control

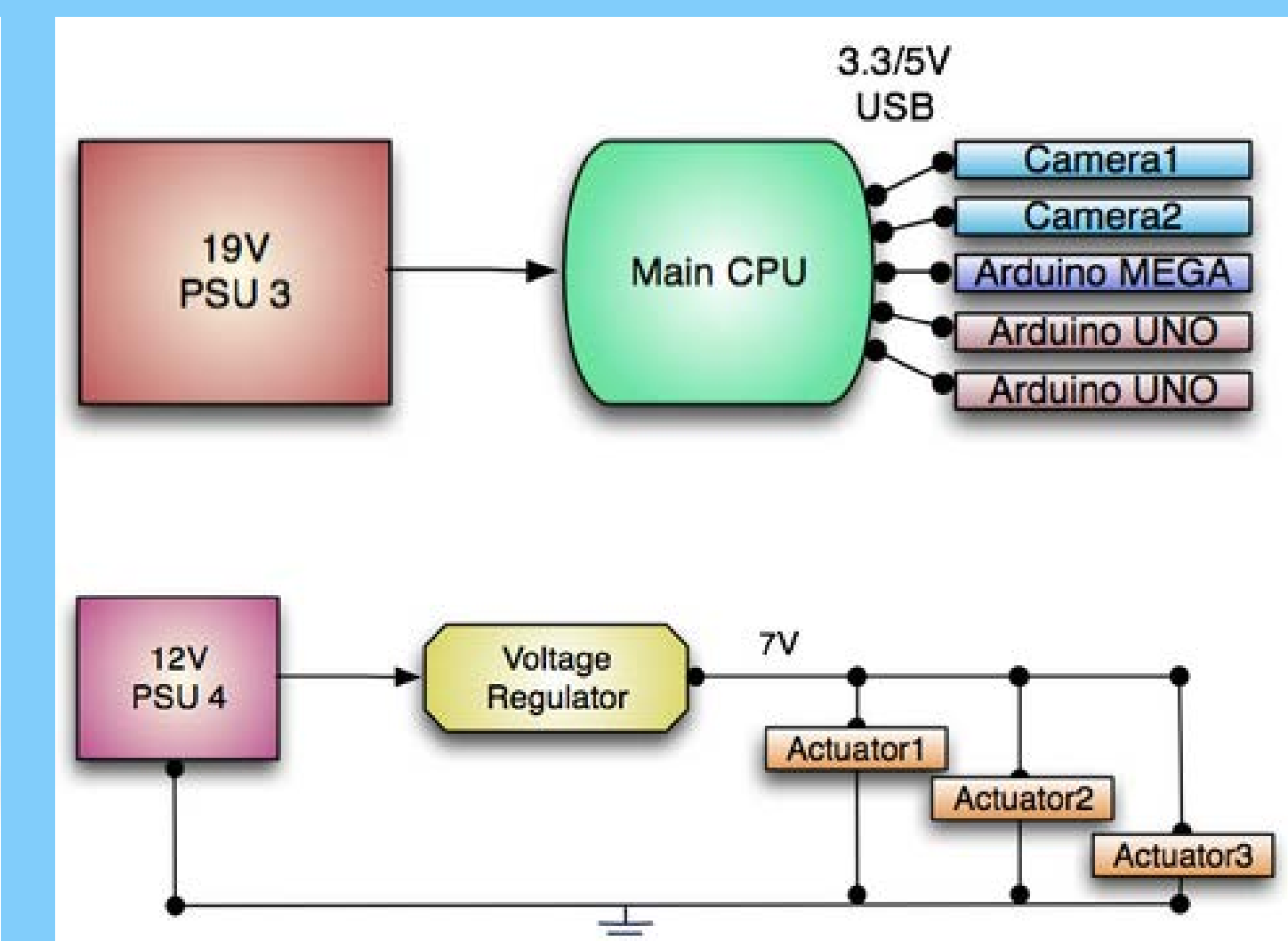
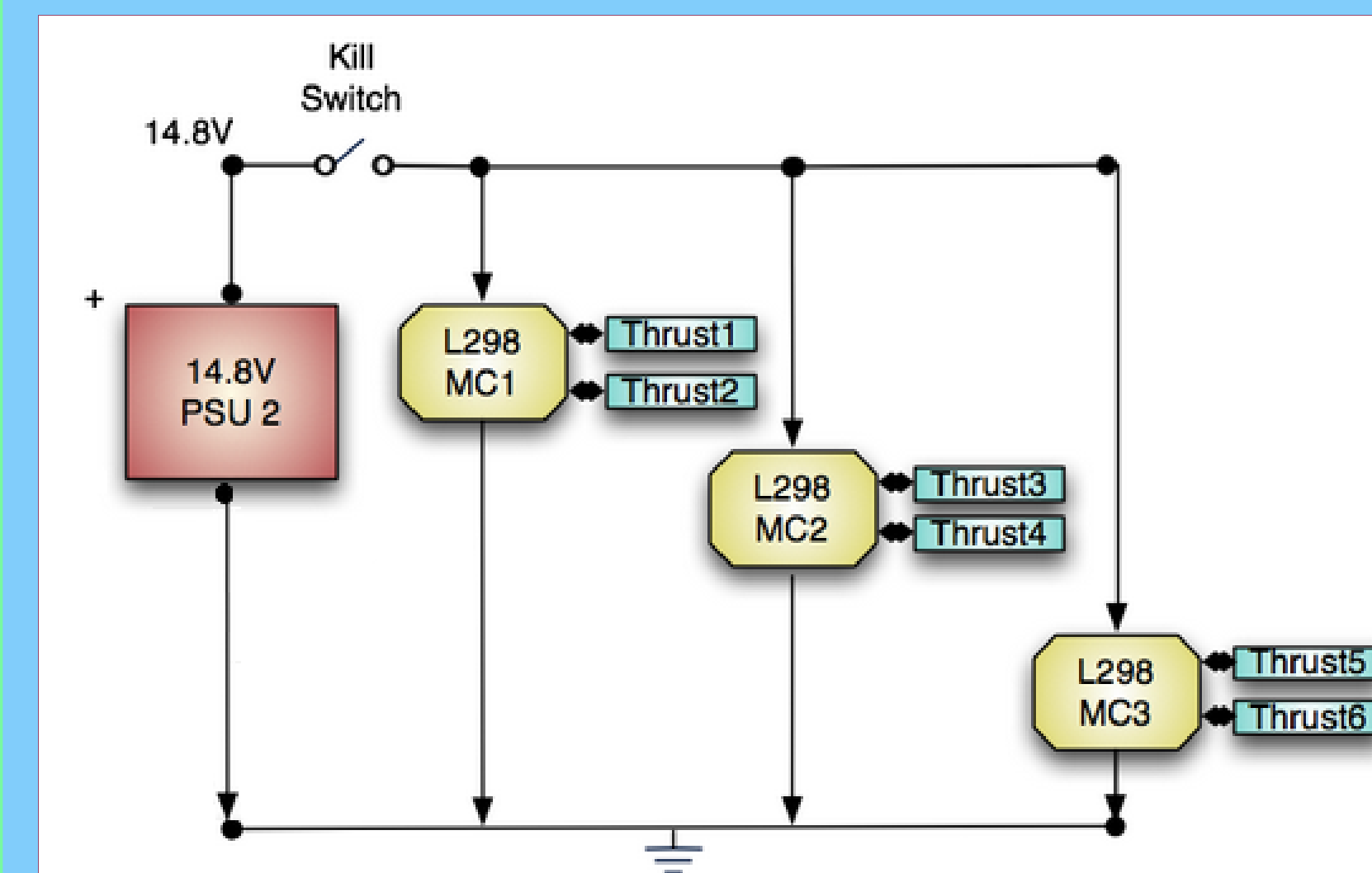


- Controls 6 thrusters
- 4 controllable degrees of freedom
- Running on Arduino Mega microprocessor
- Inertial measurement unit used to maintain balance

Power System

Making use of three batteries to power the system estimated to last 3.5 hours

- 1 19 V laptop battery for main computer
 - Computer powers Arduinos via USB
- 1 12 V battery for actuation system
- 1 14.8 V battery pack for the 6 thrusters

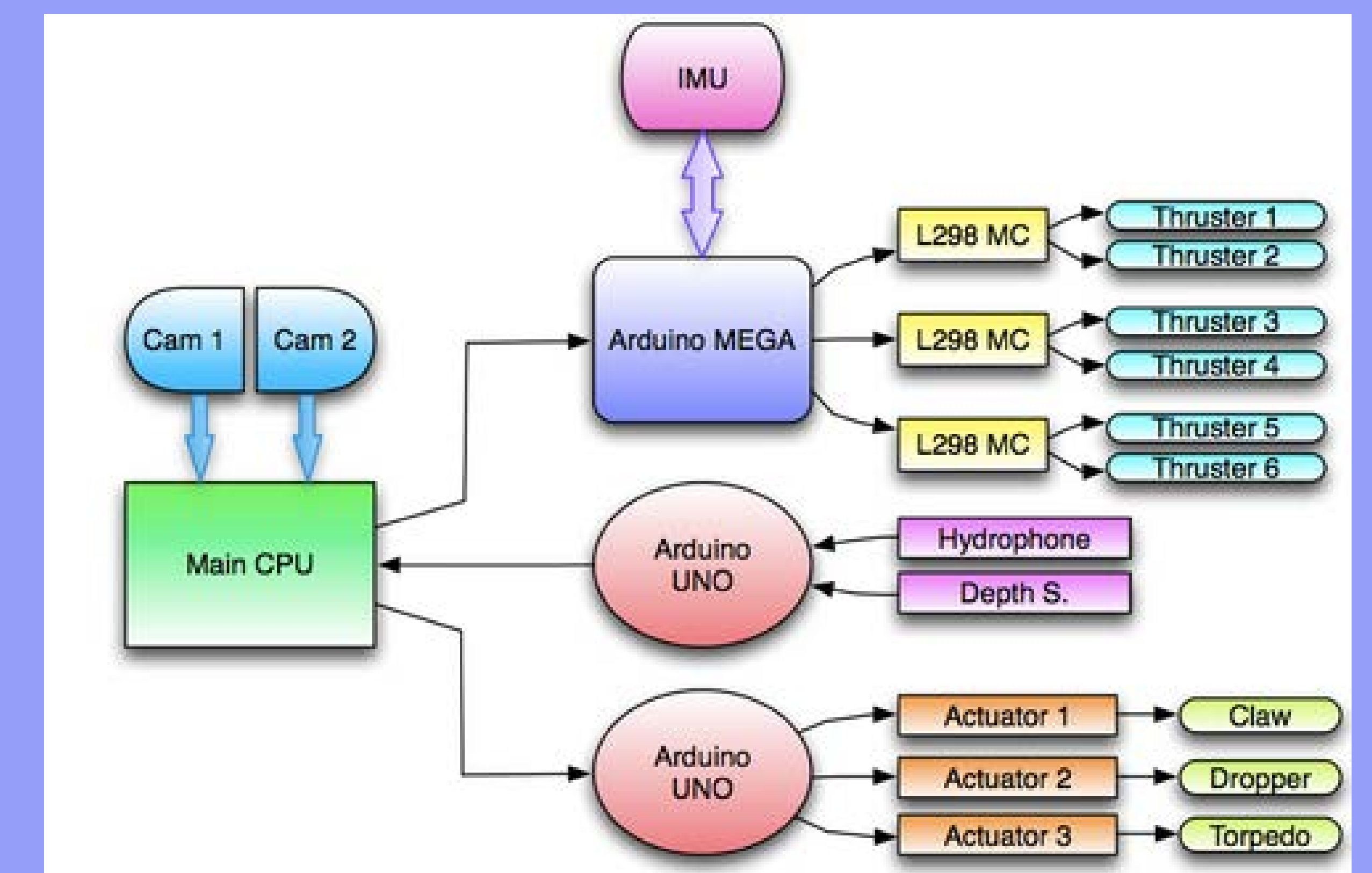


Design Concept

- Easy-access hull with large surface area for better heat transfer and easy placement of electronics
- 80/20 aluminum frame for light weight and ease of rearranging external components
- Main CPU to control Robosub through the course

Communication

- All sub-processors communicate with central computer
- Arduino microprocessors interface with devices and sensors



Future Work

- Adapt gate recognition software for other tasks
- Integrate remaining sensors
- Develop task management for competition
- Integrate thruster, camera, sensors, actuation system, and intelligence
- Waterproof cameras
- Redesign hull for better hydrodynamics and decrease in size to decrease buoyancy

Conclusion

- Currently on pace to produce a sub ready for competition
- Developed solid platform for future development

Sponsors



Mechanical System

