

16th annual

RoboBoat 2023

Week of March 13, 2023 | Nathan Benderson Park | Sarasota, FL

Primer & Task Ideas

Ocean Exploration Theme

Through exciting engagement with the US Navy and NOAA, we're looking forward to tying history, ecology, and marine biology to the tasks your boats will be challenged with this year.



Glossary:

ASV = Autonomous Surface Vehicle





Why RoboBoat?

- Increase technical proficiency;
- Establish valuable professional connections; and
- Enjoy the satisfaction of learning and collaborating while advancing the technology of ASV systems.

The nominal winners are those teams that have scored the most points. The real winners are all those participants who have learned something lasting about working together to create an autonomous system that accomplished a challenging mission in a complex environment.



16 years

Surface Vessel
Full Autonomy
Acoustic Navigation



- The objective is to build an international community of innovators – ranging from high school to higher education, capable of making substantive contributions to the maritime field and pushing development of small-scale (X-Class) Autonomous Surface Vehicles (ASV).
- Teams must be comprised of:
 - 75% or more full-time students (college and/or high school)
 - Three (3) team members required to travel to competition
- Participation in the RoboBoat Competition includes:
 - Teams build an ASV to compete, following RoboBoat’s vehicle and safety requirements.
 - Teams provide a variety of design documentation covering their technical design and competition strategy.

Find out more.

Contact RoboNation at autonomy@robonation.org



"RoboNation gave us
confidence and we feel
ready to enter the world
of engineering."

Eric Nieves,
2017-2020 RobotX/RoboBoat Student, FAU
CURRENT Staff Engineer, Booz Allen Hamilton



What next?

Continue reading through the **CHALLENGE** presented to RoboBoat teams this season.

Autonomous behaviors include...



Navigation



Detection



Object
Delivery



Object
Avoidance



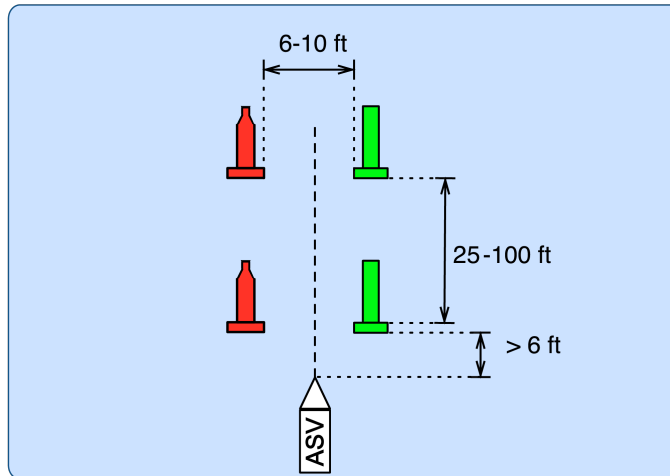
Station
Keeping



Two-step
Behaviors

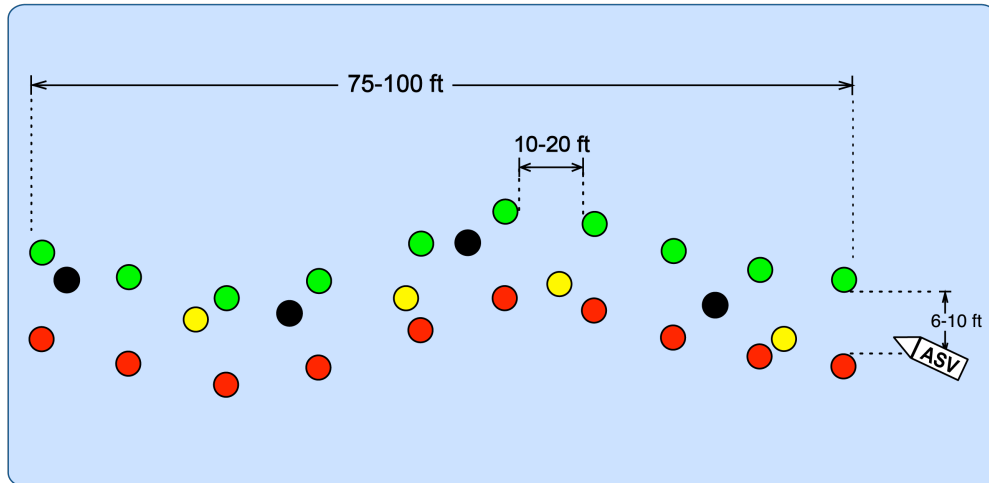
Task 1: Navigate the Panama Canal

- Mandatory before attempting other tasks.
- ASV passes through two sets of gates.
 - Gate: pair of red and green buoys
 - ASV starts autonomous navigation at a minimum of 6 ft. before the set of gates.



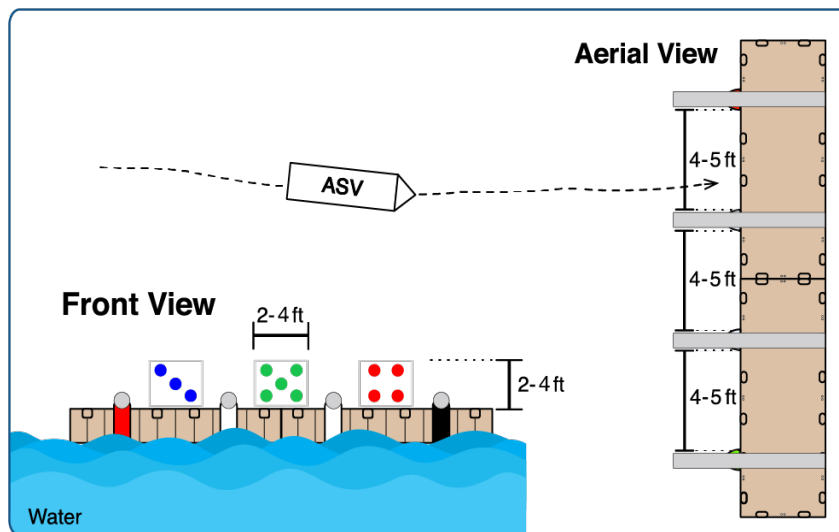
Task 2: Magellan's Route / Count the Manatees & Jellyfish

- ASV passes through a pathway between multiple sets of gates and avoids intermittent yellow and black buoys.
 - Gate: pair of red and green buoys
 - Count and report sightings of jelly fish (yellow buoys) and manatees (black buoys)



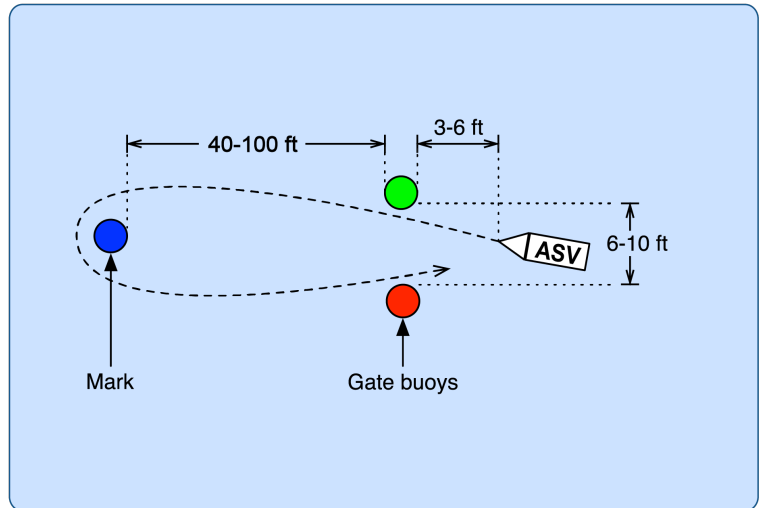
Task 3: Beaching & Inspecting Turtle Nests

- Teams are given a “nest” of the day to “beach” or dock in.
- ASV detects and enters the docking bay corresponding to the color of the day.
- ASV reports number of eggs in the nest.



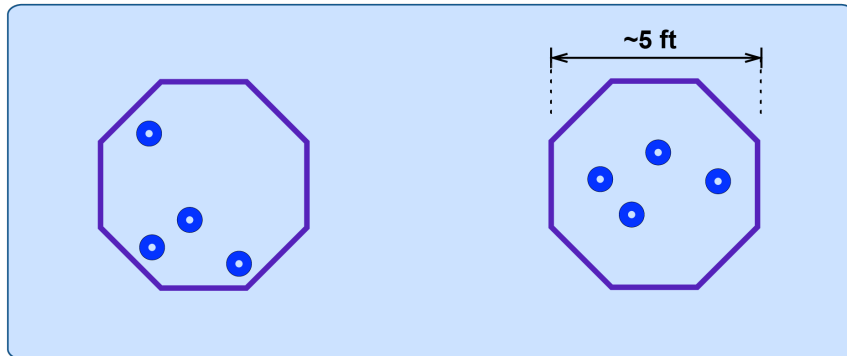
Task 4: Northern Passage Challenge

- ASV enters the gate buoys, maneuvers around the marker buoy, and exits through the same gate buoys, as quickly as possible.
- The timer starts when the bow (front) crosses the gate buoys and stops when the bow (front) crosses the gate buoys.
 - Gate buoys: 6-10 ft apart
 - Marker buoy: 40-100 ft from gate buoys



Task 5: Ocean Cleanup

- ASV detects active underwater pinger which designates the correct area of the ocean from which to collect debris.
- The ASV may then use the collected debris to Feed the Fish extra pellets.
- Active pinger is determined randomly at the start of each run.
- Collection areas are approximately 5 feet in diameter.

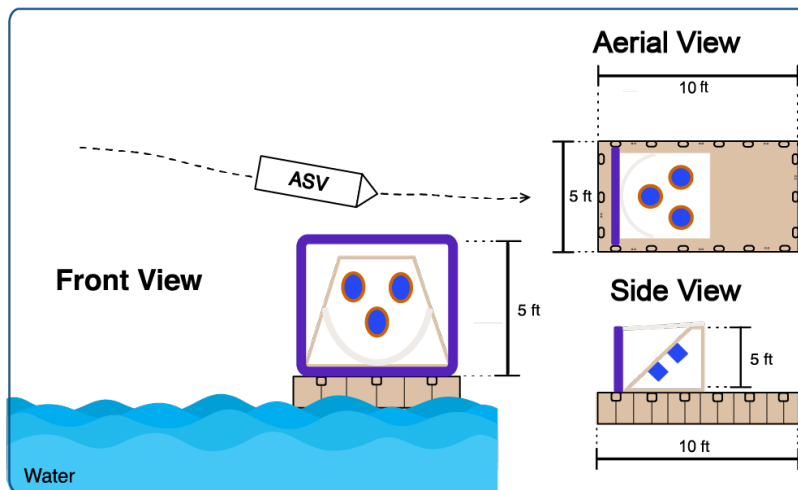


Acoustic Signal

The acoustic signal for this task is still being determined.

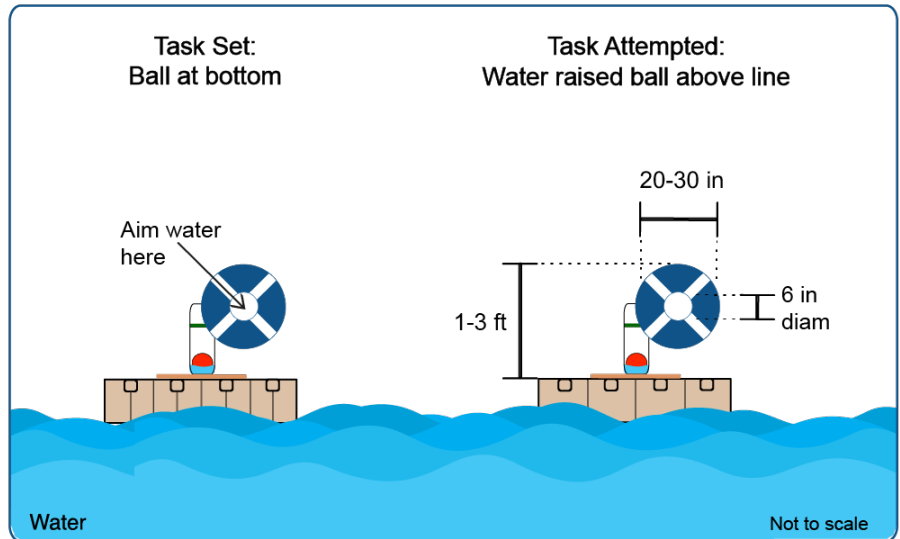
Task 6: Feed the Fish

- ASV detects purple frame.
- Lines up and delivers/shoots balls.
- More points if “fish food” (ball) is sunk in one of the buckets.
- Some points for getting ball on deck or net surrounding frame.



Task 7: Ponce de Leon / Fountain of Youth

- ASV detects blue and white target face.
- Shoot water through the target, raising the ball in the pipe.
 - Goal: shoot enough water in the target to raise the ball above the green line.
- Target: 1-3 feet above the surface of the dock
- Target face: blue/white striped



Task 8: Explore the Coral Reef

- ASV returns to start of course in autonomous mode.
- ASV maneuvers through a pair of black buoys, designated the coral reef, positioned near the start of the course.



robonation



seaperch



seaglide



gosense



roboboat



robosub



robotx



RoboNation is a 501c3 nonprofit organization whose mission is to provide a pathway of hands-on educational experiences that empower students to find innovative solutions to global challenges. Working together with the industry, research and educators, we have grown to include over nine student competitions and programs and engage more than 250,000 students per year.

For more information contact autonomy@robonation.org