



28th annual

RoboSub 2025

August 11-17, 2025

Woollett Aquatics Center | Irvina, CA

Primer & Task Ideas

Environmental Monitoring: Protecting the Blue

Sharks are vital to maintaining marine biodiversity, yet their populations are plummeting due to overfishing, habitat destruction, and environmental concerns. RoboSub 2025 challenges teams to harness the power of robotics, developing AUVs with autonomous capabilities and an innovative mission -- to safeguard our oceans and protect these essential predators.

AUV = Autonomous Underwater Vehicle

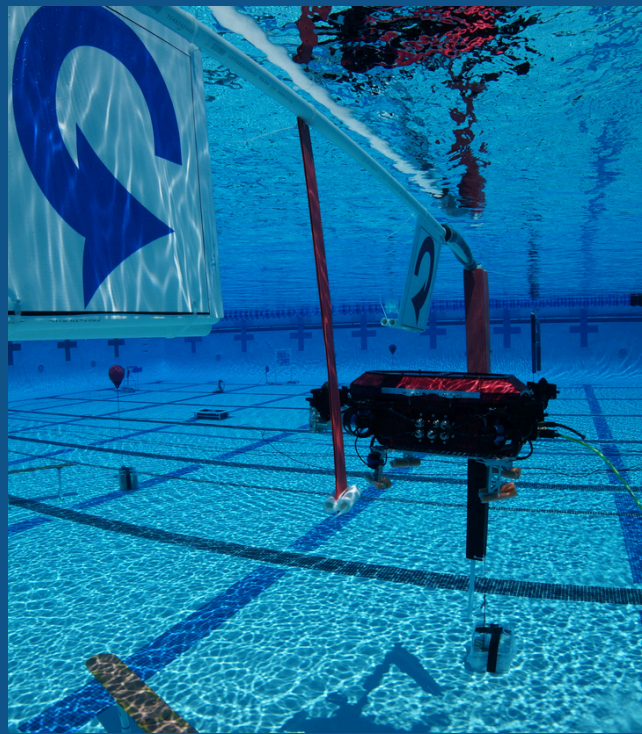




Why RoboSub?

- Increase technical proficiency;
- Establish valuable professional connections; and
- Enjoy sharing knowledge and innovating AUV systems.

The nominal winners are teams that score the most points. The real winners are participants who learn lasting lessons about working together to create an autonomous system to accomplish a challenging mission in a complex environment.



28 YEARS

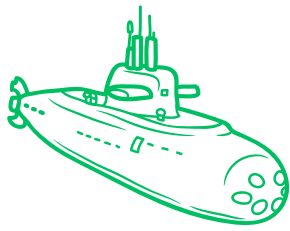
Subsurface Vessel Full Autonomy Acoustic Navigation



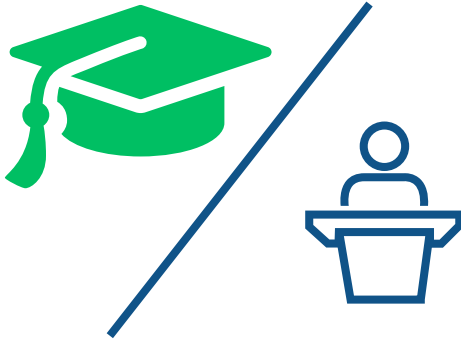
- **Objective:** To provide opportunities for students to experience the challenges of system engineering, to develop skills in accomplishing realistic missions with autonomous vehicles, and to foster relationships between young engineers and the organizations developing and producing autonomous vehicle technologies. The objective is to produce the people who will push the envelope in the future.
- Teams must be comprised of:
 - 75% or more full-time students (college and/or high school)
 - Three (3) team members are required to travel to competition
- Participation in the RoboSub Competition includes:
 - Building an AUV to compete, following RoboSub's vehicle and safety requirements.
 - Providing design documentation discussing the team's technical design and competition strategy.

Find out more.

Contact RoboNation at competitions@robonation.org



All teams must build an AUV to compete; up to two (2) vehicles can be entered into competition.



Teams must be comprised of:

- 75% or more full-time students
- 25% or less alumni

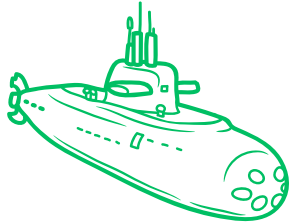


Most team members must be college or high school students. Teams may also include middle school students. Interdisciplinary teams are encouraged.



Minimum of one (1) team member.

COMPETITION



Autonomy Challenge

Build an AUV to showcase autonomous performance.



Design Documentation

Prepare documentation showcasing AUV design and competition strategy.

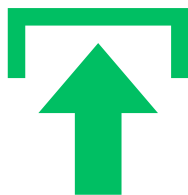
- *Team Website*
- *Technical Design Report*
- *Team Intro Video*
- *Design Presentation (in-person)*
- *System Assessment (in-person)*



What next?

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

Autonomous behaviors evaluated in this year's challenge include...



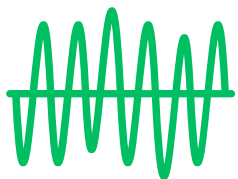
Maintain
Heading /
Depth



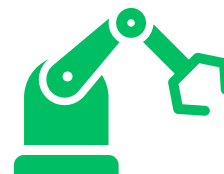
Attitude
Control



Navigation



Acoustic
Detection



Object
Delivery



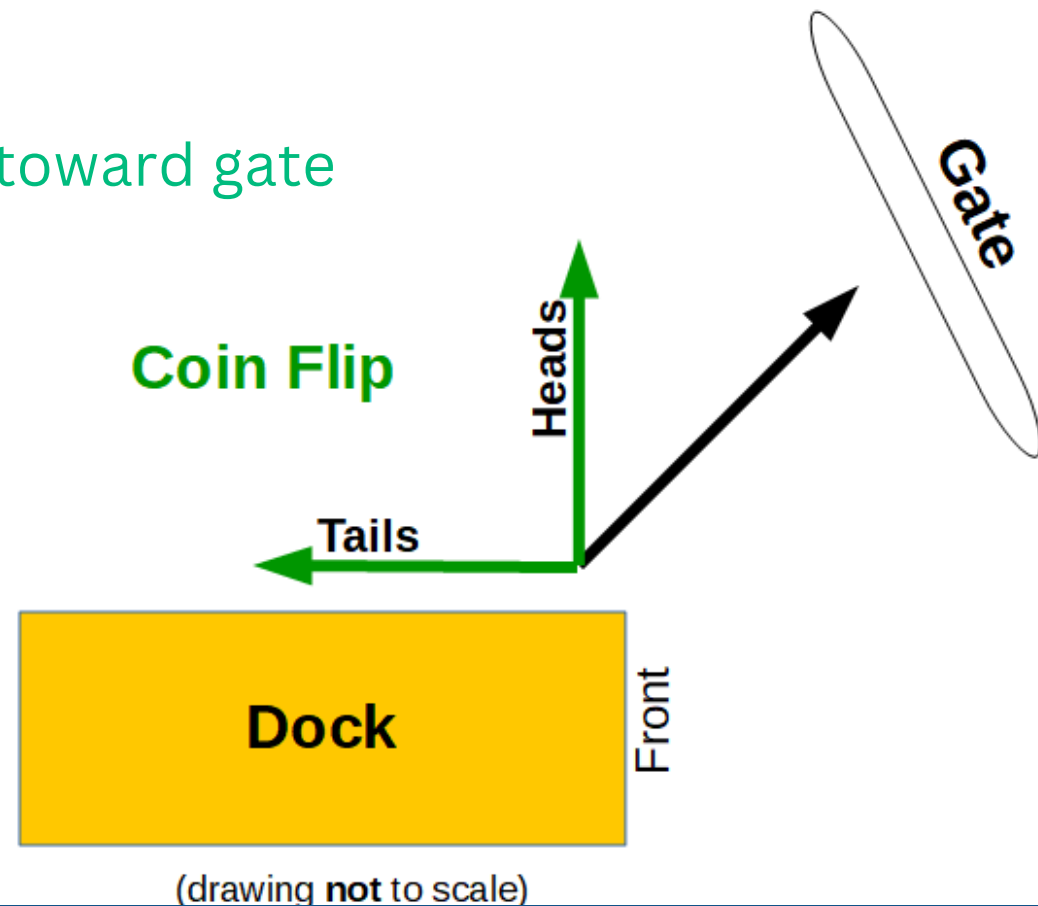
Two-step
Behaviors

What's New for RoboSub 2025

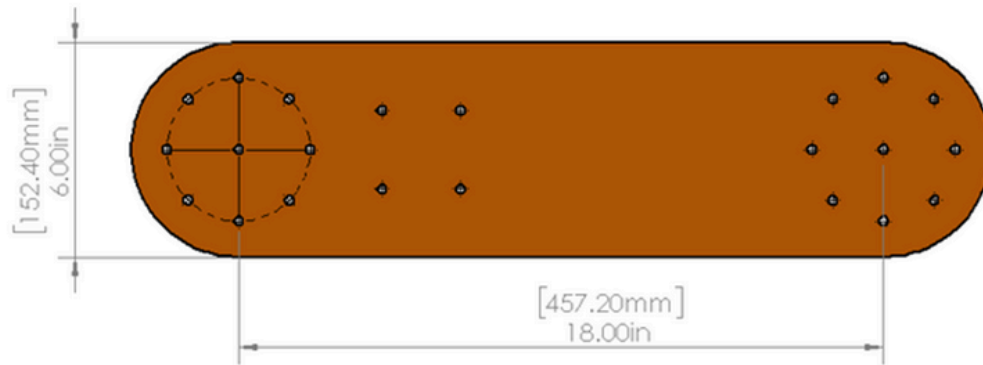
- Task 2 challenges the AUV to navigate the channel in a slalom maneuver. This has taken the place of the buoy task from last year's competition.
- More points can be earned in Task 6, if the AUV rotates the same number of turns as the trash collected in the baskets.
 - Three items in the bins? Rotate three times.
- At the end of the run, the AUV may return back to the start of the course and pass through the gate.

Heading Out (Coin Flip)

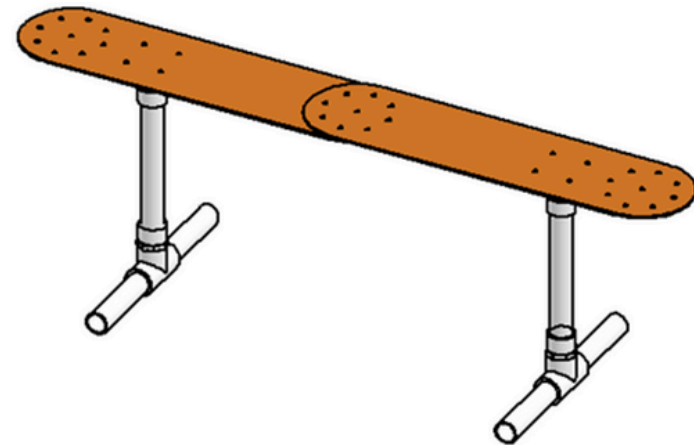
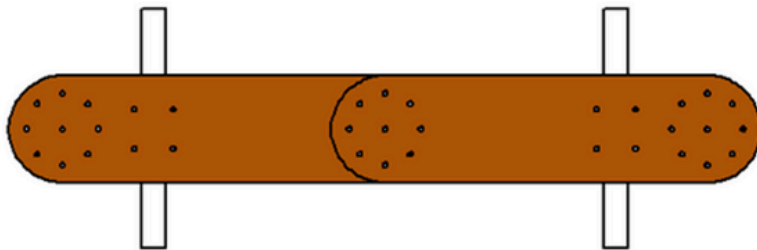
- Teams have the option to start their run with a coin flip to determine the direction of their AUV.
- Coin lands on Heads: 90°
 - AUV ~parallel to gate
- Coin lands on Tails: 180°
 - Tail of AUV is ~pointed toward gate (AUV is backward)



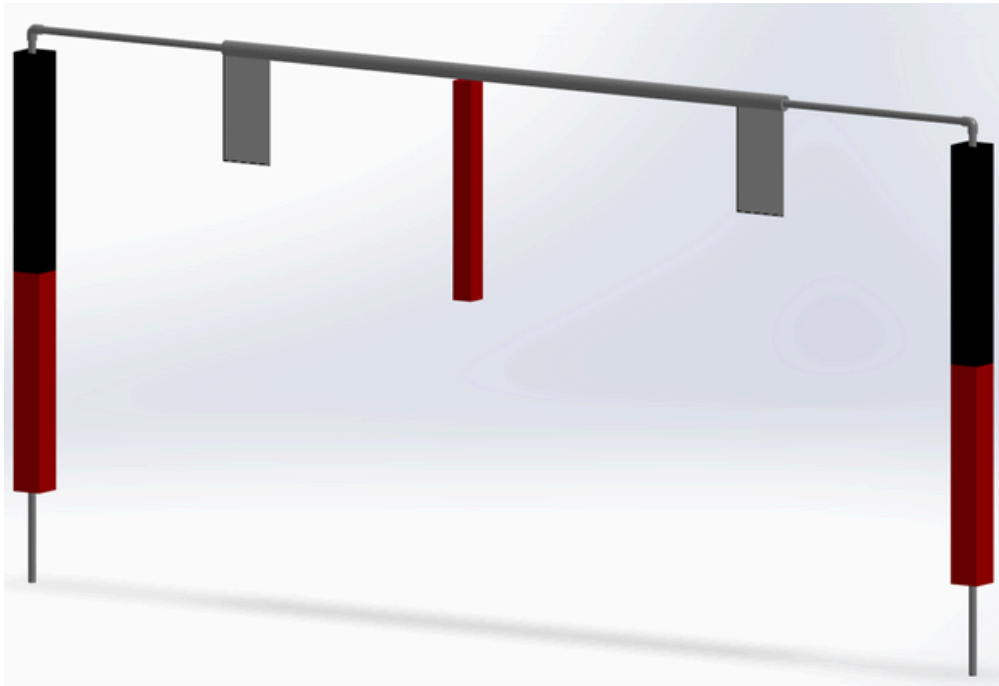
Path



- Two path markers are placed to aid navigation through the course.



Task 1: Collecting Data (Gate)



- The AUV navigates through the gate, and chooses a marine animal:
 - Reef shark
 - Sawfish
- Extra points awarded for AUV staying with the choice for the remainder of the tasks
- With Style
 - 10 ft (3m) before/after gate
 - Extra points: Yaw, Roll/Pitch
 - Every 90° change in orientation
 - Yaw +100
 - Roll/Pitch +200
 - Up to 720° (8x)



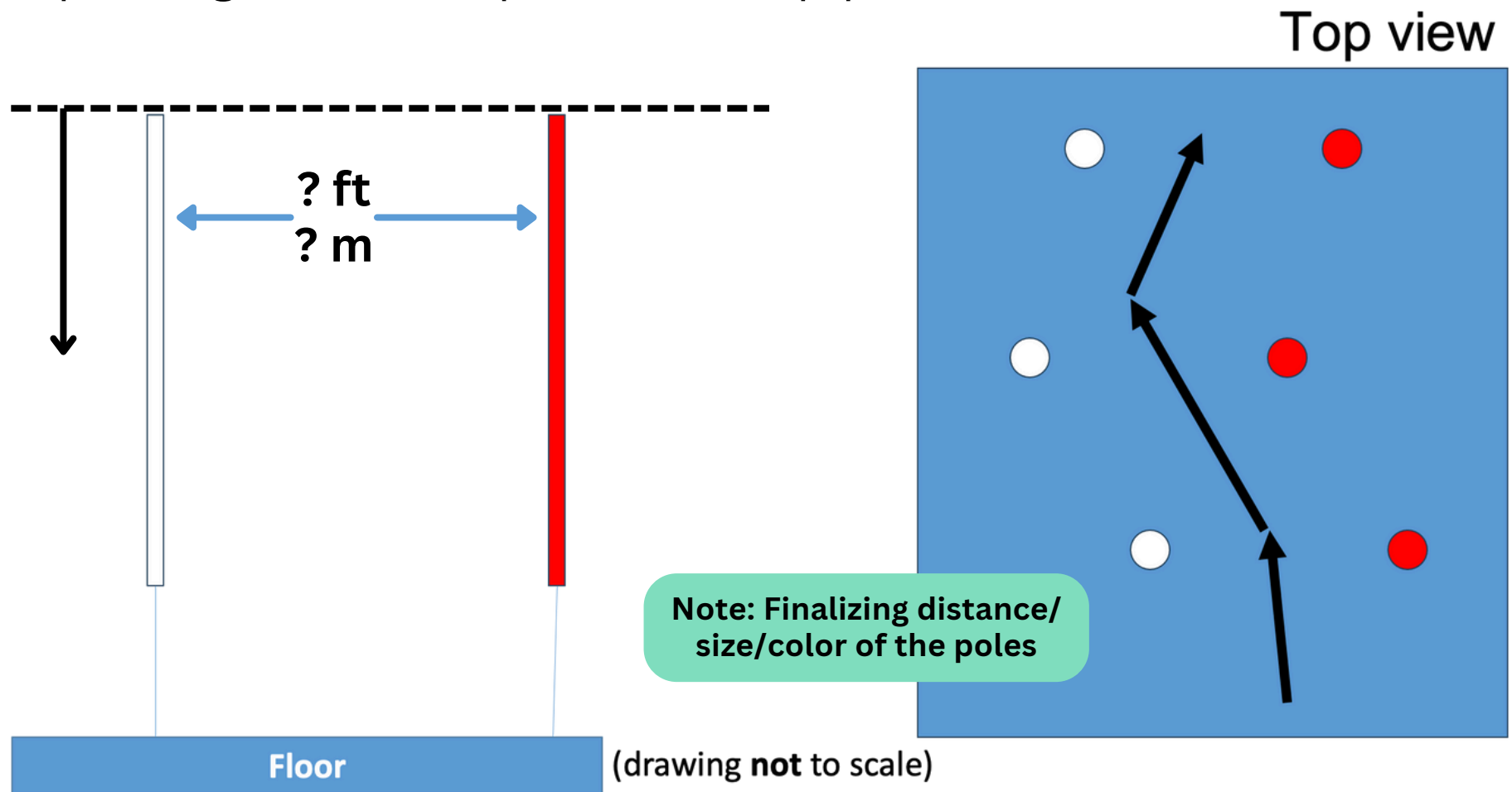
Reef shark

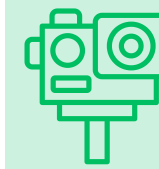


Sawfish

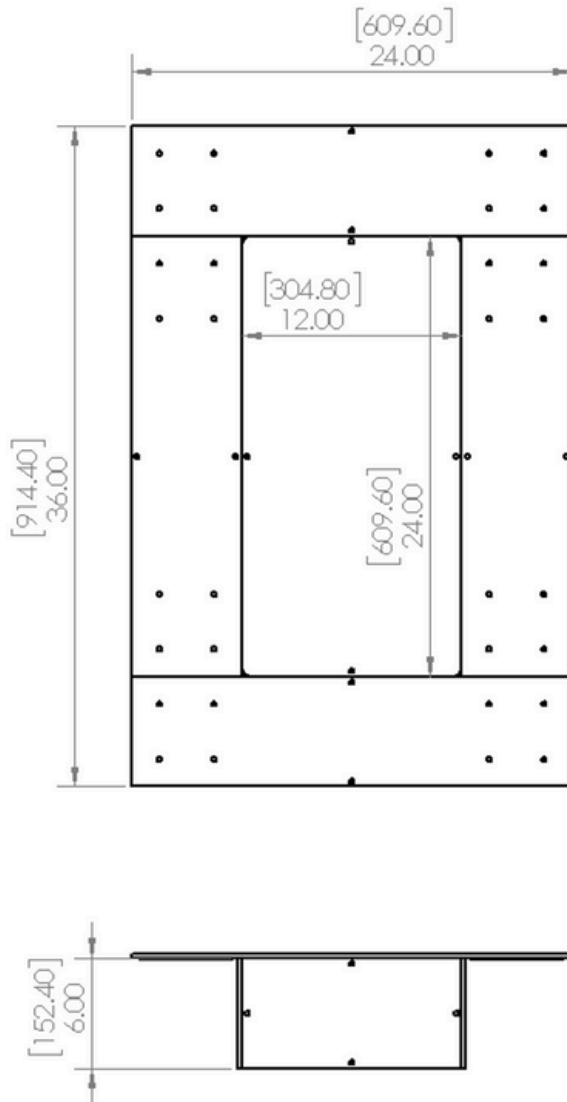
Task 2: Navigate the Channel (Slalom)

- (**NEW**) The AUV navigates the channel of white and red vertical PVC pipes, in a slalom maneuver. More points for passing below the plane of the pipes.

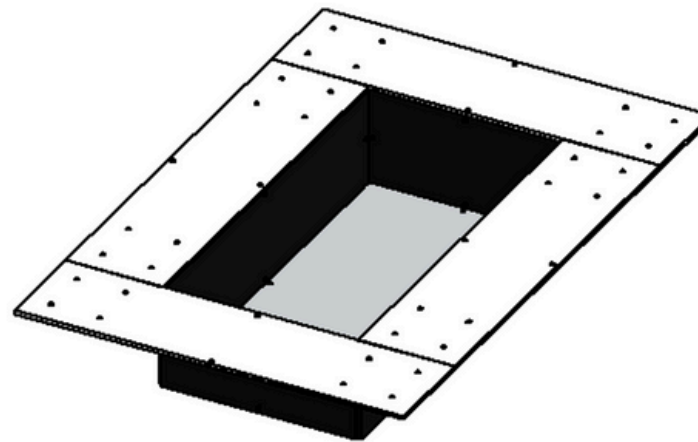




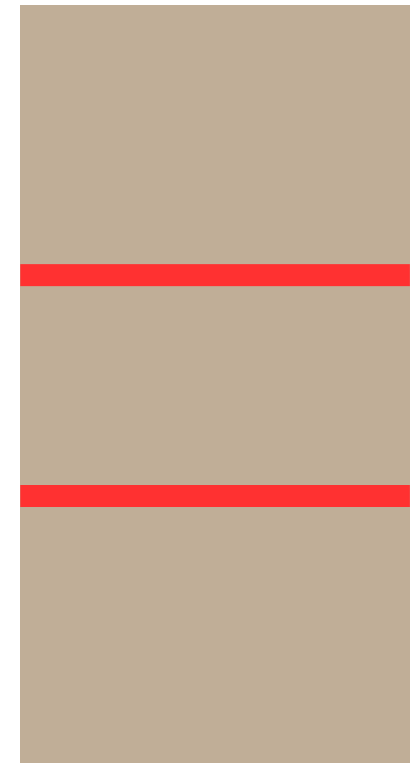
Task 3: Drop a BRUV (Bin)



- AUV drops up to two (2) markers into the bin. More points awarded for dropping the marker in the center of the bin.



Note: Finalizing the image at the bottom of the bins



Task 4: Tagging (Torpedoes)



Floor

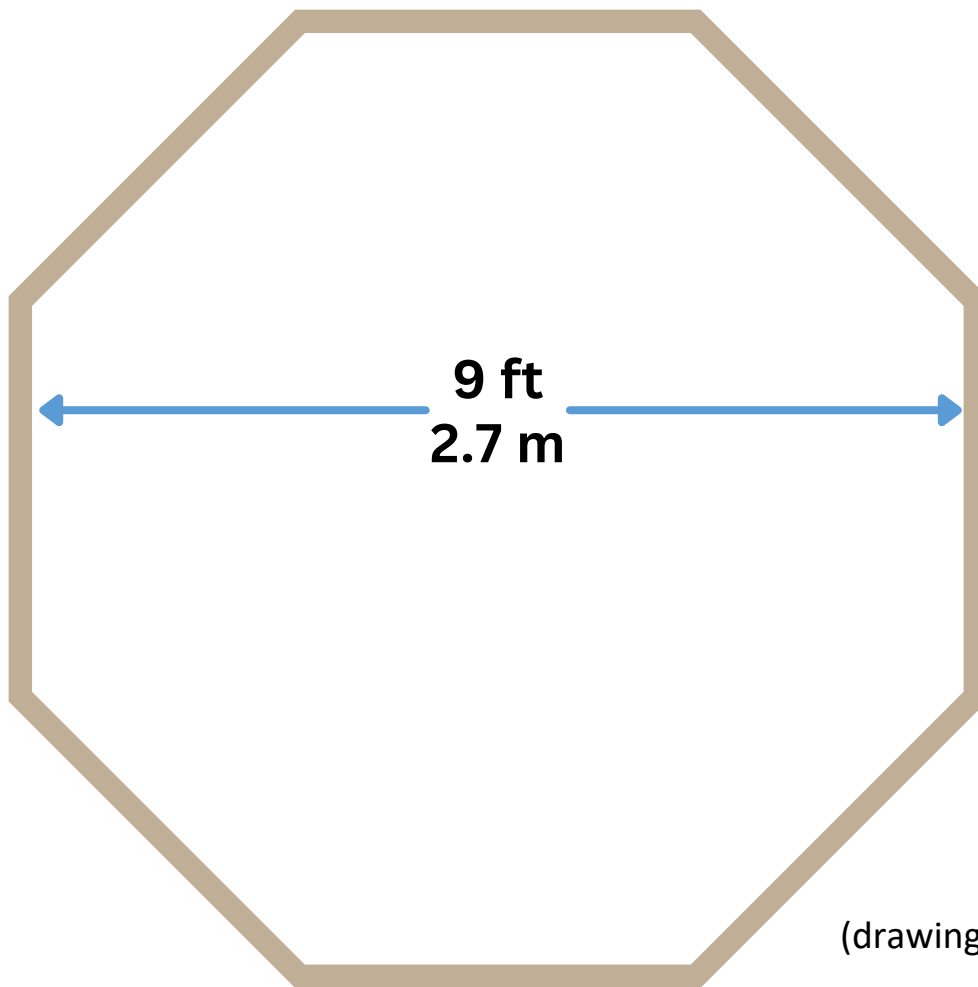
(drawing **not** to scale)

- Tag the Sawfish and/or the Reef Shark with a projectile.
- Most points are awarded for tagging the chosen animal from the Gate (Task 1) first, then the other.

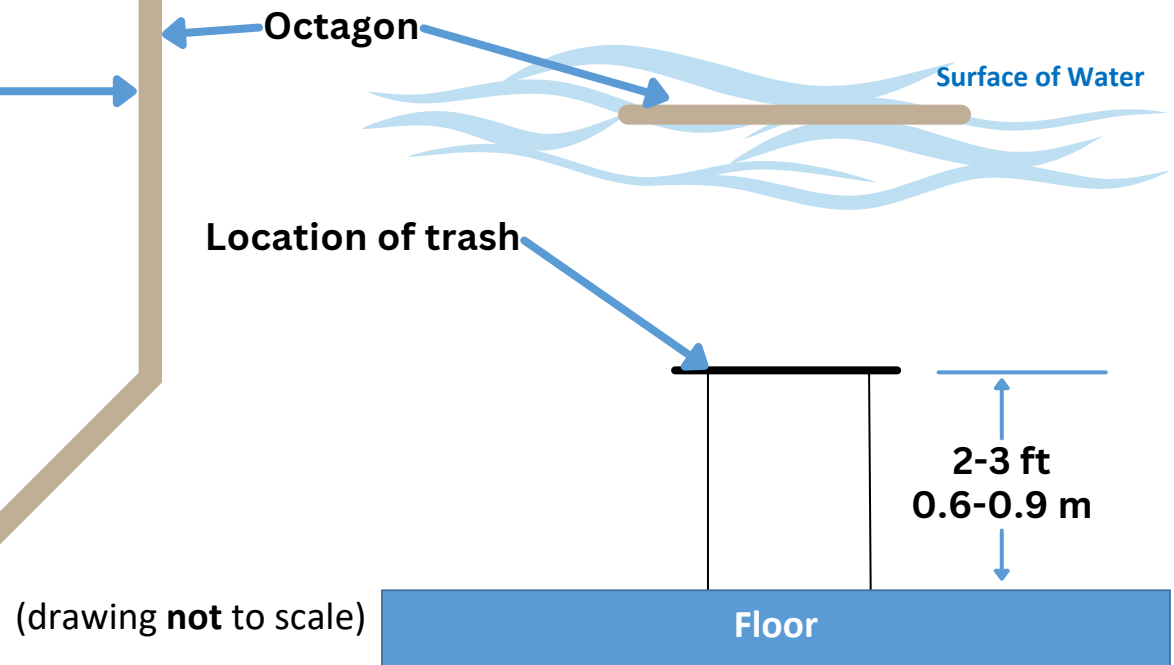
Note: Finalizing the shape/
size/color of the opening



Task 5: Ocean Cleanup (Octagon)

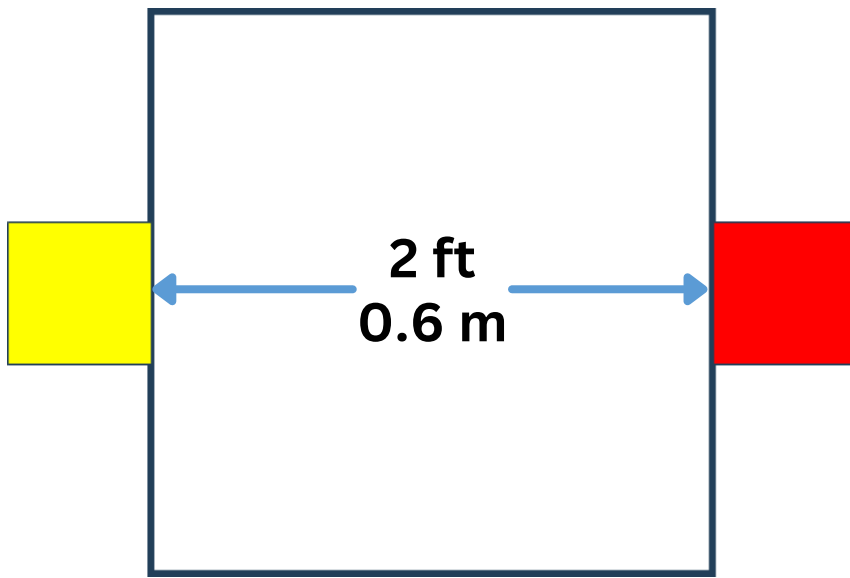


- The acoustic pinger, located on the floor near the center of the octagon, guides the AUV to the task.
- Below the octagon is a table



continued

Task 5: Ocean Cleanup (Octagon)

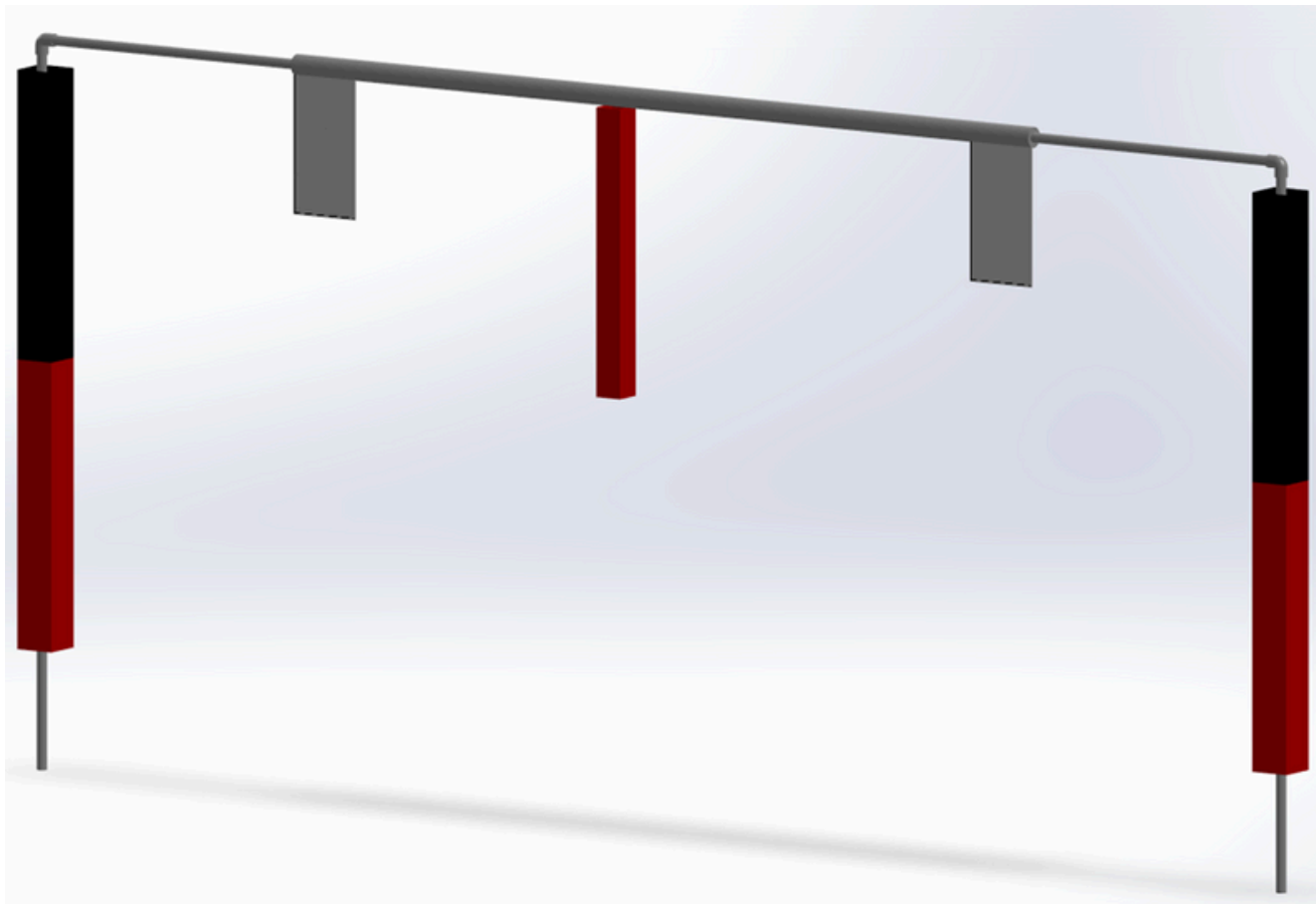


example objects

- A table with trash and two collection baskets is centered and below the octagon:
 - Most points for sorting the trash (2 of each)
- (NEW) Extra points for the vehicle rotating the same number of turns as the trash collected in the baskets
 - Three items in the bins? Rotate three times.

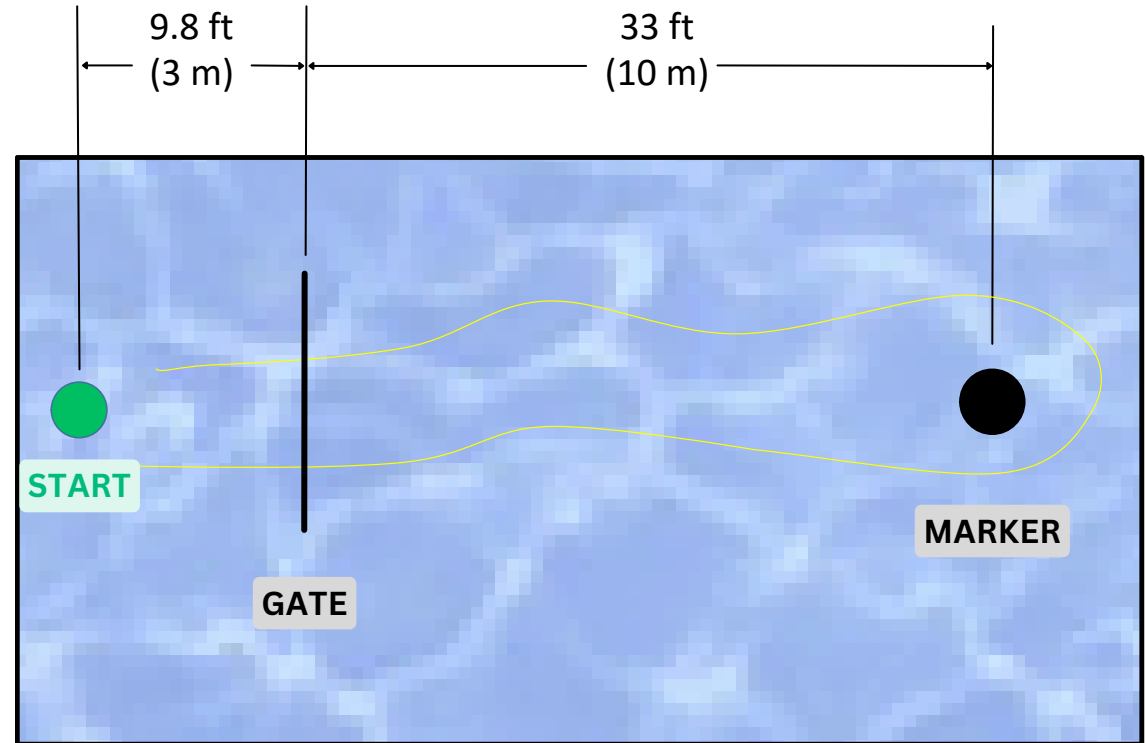
Task 6: Return Home

- (**NEW**) At the end of the run, the AUV passes back through the start gate.

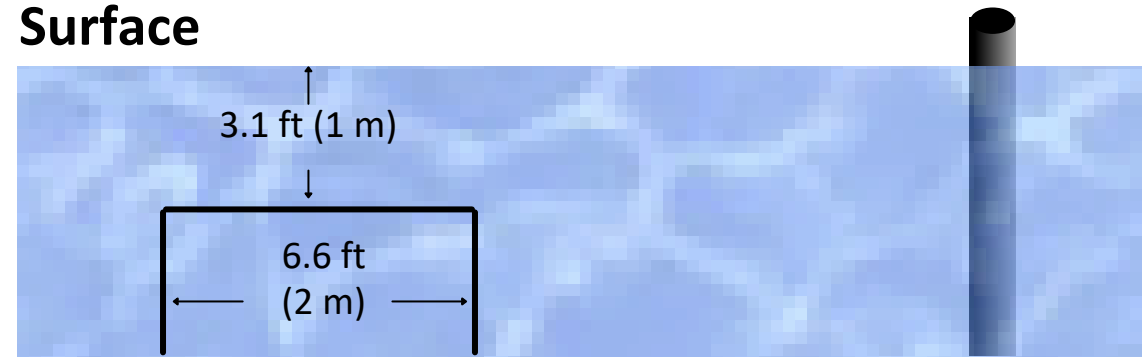


Pre-Qualification

- Optional opportunity to pre-qualify before traveling to competition.
- Specific instructions on the pre-qualifying maneuver is available in the Team Handbook (also available in previous handbooks).



Surface



(drawing **not** to scale)

Preliminary Schedule

JUN 2025	AUG 11 MON	AUG 12 TUE	AUG 13 WED	AUG 14 THU	AUG 15 FRI	AUG 16 SAT	AUG 17 SUN	
Pre-Competition Submission Deadlines	Team Check-in 3:00 pm	Lottery (optional) 6:45 am				Third-Chance 8:00 am		
JUL 2025		Practice & Qualifications 7:00 pm – 6:00 pm			Semi-Finals 7:00 pm – 6:00 pm			
		Design Presentations & System Assessments 8:00 pm – 4:00 pm						
		Team Orientation (mandatory)	Team Meeting (mandatory) 6:30 pm				Finals 1:00 pm	
			Team Networking Event	Overnight Pool Testing (@ Hotel) 10:00 pm – 2:00 am				Awards 6:00 pm
Pre-Competition Evaluation (Online Judges)								

Stay Updated

ALL THINGS ROBOSUB

For all the latest information and updates for the competitions season, visit the RoboSub website!



robosub.org

DISCORD

Stay connected and updated with the RoboSub Discord. Scan the QR code to get started!



robonation.org/discord



JOIN TODAY!

- Scan the QR code
- Select the RoboSub role
- Turn on notifications!



robonation



seaperch



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roboboat



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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 competitions@robonation.org