

The Structure of the Event

Round 1: Maneuvering

The first requirement of an underwater remotely operated vehicle is that it be able to maneuver successfully under its own power. If a vehicle cannot maneuver to the appropriate location to perform its task, the vehicle is of no use. Thus, the first round challenge is maneuvering.

This round will consist of a submerged obstacle course involving large rings through which the vehicles must travel. Consideration towards optimal maneuverability, control, and speed should be given when constructing the Sea-Perch (motor placement and orientation, tether attachment, buoyancy and ballast, etc.) and your control box. This round will be scored based on who can successfully navigate the course the fastest.

Any team unable to complete Round 1 will not advance to Round 2.

Round 2: Recovery

Many times underwater vehicles are used to retrieve things from the sea floor, or the floor of a harbor or port. The ability to recover objects off the sea floor depends on the vehicle's ability to grasp or manipulate the object, and also to lift or carry it to some destination. If the object is too heavy, or it unbalances the craft, or the craft cannot get control of the object, the vehicle cannot successfully perform its mission.

For this round, the Sea-Perch teams must have a rod or hook of some sort fitted to their vehicle in order to retrieve objects off the bottom of the pool. The objects will have a loop by which they can be picked up and will be of varying mass. Once picked up, the objects must be dropped into the team's submerged collection bucket. This round will be scored based on the total mass of objects retrieved within the time limit. Considerations of buoyancy, thrust, hook placement and attachment, and ballasting become more important in this round. The objects, rings, are color-coded based on their weights. The heavier objects are worth more points since the team will be required to do more extensive engineering calculations to retrieve the heavier weights.

The scoring will be as follows:

<u>Ring Color</u>	<u>Weight</u>	<u>(oz)</u>	<u>Points</u>
Blue	1	1	
Light Green	2	2	
Orange	3	3	3
Dark Green	4	5	

The scores from Rounds 1 and 2 will be averaged and the top 50% of teams will move forward to Round 3. In the case of a tie, the time from Round 1 will be the deciding factor.

Finals: Advanced Recovery

Remotely operated underwater vehicles rarely perform their duties within direct sight of the operators. Instead, they rely on remote sensors such as video cameras to enable them to achieve their goals. This can introduce difficulties though, as cameras can only reveal a portion of the vehicle's surroundings. Care must be taken in design and operation of the vehicles such that the vehicle has the sufficient vision to complete its task, and that the vehicle is operated within the limits imposed by the restricted situational awareness.

For the final round, cameras will be introduced to the remaining competitor's vehicles, in addition to the apparatus needed in Round 2 for object recovery. The same objects will once again need to be recovered, but this time, the operators will be unable to see their Sea Perch. Successful camera integration and vehicle operation will play key roles in this challenge. Teams should plan where and how the camera will be attached to their Sea Perch.

This round will also be scored on the basis of mass retrieved within a time limit, and will yield the Sea Perch Performance Challenge Champions.