

# Pool Courses – Overview & Preliminary Rules

2022 SeaPerch Season

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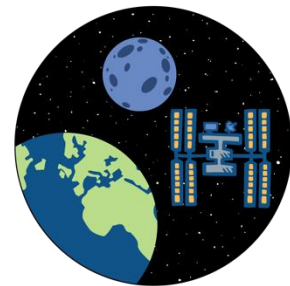
The pool course overview and rules included in this document are for the 2022 International SeaPerch Challenge. Rules, requirements, course set-ups, and tasks for regional qualifying events may vary. Please check with your local regional coordinator for rules related to your local regional competition.

## Pool Course Event Overview

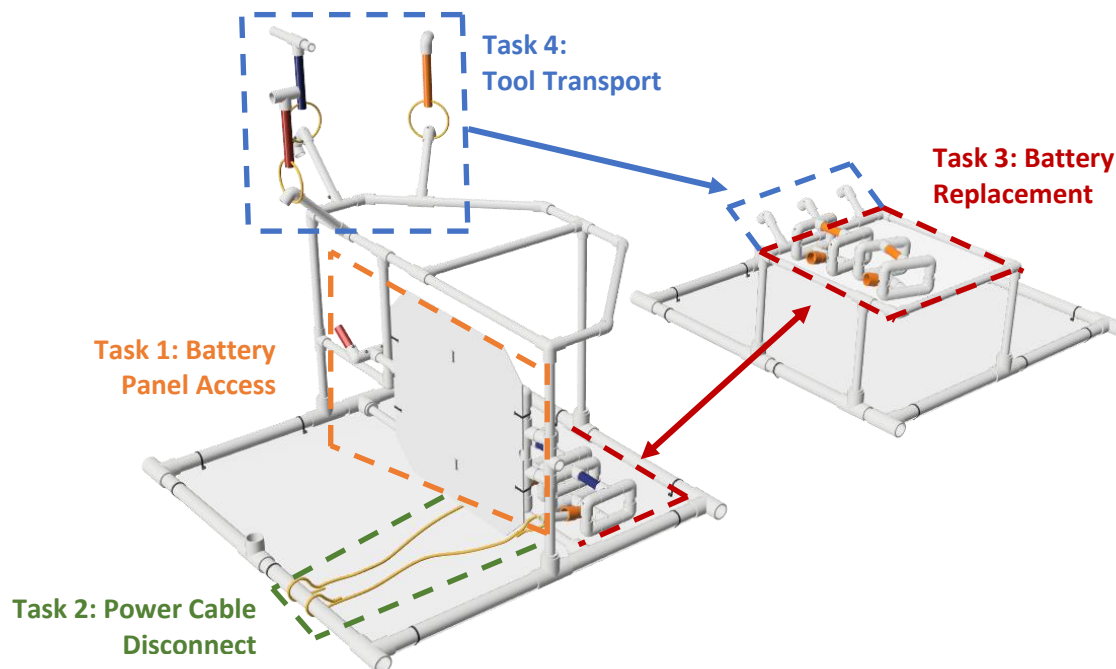
This year's competition will include two in-pool components: an obstacle course and a mission course.

**The Obstacle Course** tests high-speed maneuverability and requires the SeaPerch ROV to navigate the course as quickly as possible.

**The Mission Course** incorporates a mission that teams must complete with their SeaPerch ROV related to Space Exploration. The *International Space Station (ISS) Extravehicular Activity (EVA) Mission* is a simulation of the tasks and environment that an ROV might encounter while assisting astronauts on an EVA outside the ISS. Teams will be tasked with upgrading the ISS's battery system and moving tools for astronauts. Specific tasks include:



1. **Battery Panel Access:** A latch must be rotated to gain access to the battery compartment.
2. **Power Cable Disconnect:** Power cables must be disconnected from batteries.
3. **Battery Replacement:** Used batteries must be replaced with new batteries. This includes:
  - a. **Remove Used Batteries:** Move batteries from the Battery Compartment to the Battery Pallet
  - b. **Position New Batteries:** Move batteries from the Battery Pallet to the Battery Compartment.
4. **Tool Transport:** Tools must be transported from the EVA Tool Tray to the Tool Caddy.



## General Pool Event Rules

### ROV, Spare Parts, and Adjustments

1. The team must use the same ROV that was presented at compliance for both pool events.
2. Each team must have their own ROV – teams are not allowed to share an ROV.
3. Teams are not allowed to share ROV attachments or devices.
4. Spare parts are allowed; however, spare ROVs are not allowed.
5. Any design or structural modifications made to the ROV must be made before the team's first pool event and the ROV must be re-submitted for a compliance check.
6. No parts or materials, except as noted in this section, may be added to or removed from the ROV between pool events. The ROV must compete in both pool events with the same attachments and parts connected. Violations will result in disqualification.
7. Attachments and parts may be repositioned between the two pool events.
8. The ROV may be worked on or adjusted during competition. This may include adjusting buoyancy, adding or removing buoyancy materials, or adding materials like tape or cable ties necessary to secure parts. However, the run timer will continue.
9. Replacement of failed or damaged parts is permitted. Teams replacing failed or damaged parts must re-submit their ROV for a compliance check conducted by staff at the Triage or Field First Aid Station.
10. Passing compliance checks does not guarantee the right to compete. Lead judges in the competition area have the final say on safety and compliance issues and may require teams that have already passed the compliance check to fix issues prior to competing.

### Auxiliary Equipment, Batteries, and Power Supplies

*Note: These rules are specific to the 2022 International SeaPerch Challenge. Teams should verify power requirements, allowable power sources, and set-ups with their local regional coordinator.*

1. 12-volt direct current (VDC) power connections for the standard SeaPerch power cable alligator clips will be supplied for each competition lane. This power connection is for the ROV only; no auxiliary equipment may be connected to this power connection.
2. Teams may provide their own battery for the ROV.
3. Teams may provide an additional battery for auxiliary equipment such as cameras, advanced controllers, and electromechanical ROV attachments.
4. Team supplied batteries must not be larger than 6.5" long x 3" wide x 4" high and must be 12 VDC with a maximum of 9-amp hour rating.
5. Teams may not bring anything to the pool deck that requires 110-volt power.

### Diver Assistance and ROV Tether Handling

1. The ROV must move only under its own power. Teams will incur a two-minute penalty if they pull or otherwise maneuver the ROV by the tether.
2. If the ROV or tether becomes tangled on the course structure or is otherwise unable to move on its own power, a team member must notify the judge that they would like to try to free the ROV, or request diver assistance to free or retrieve the ROV. Under this circumstance teams may pull on the tether; however, the run timer will continue, and a two-minute penalty will be added to the elapsed time. If the ROV is pulled by the tether or moved by a diver, the ROV must be returned to the location that it was moved from before it may continue competing.

### On Deck

1. Only two student team members are allowed on the pool deck in the competition area during an event. No teachers, coaches, parents, mentors, or others are allowed in the competition

area unless prior arrangements have been made to accommodate special needs.

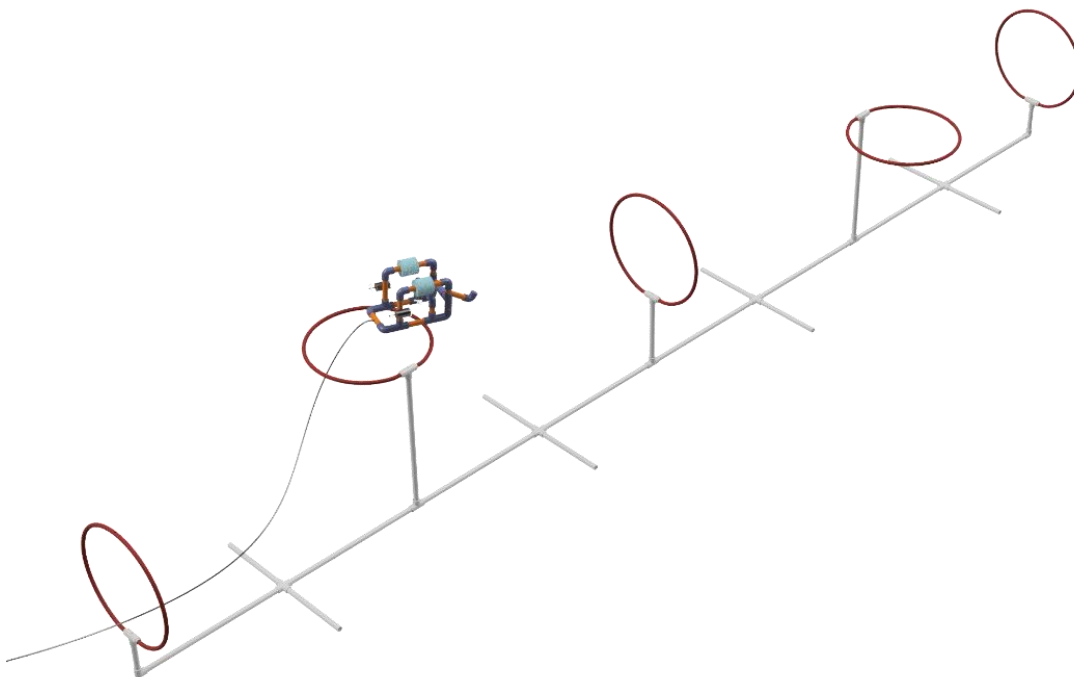
2. The on-deck team members may switch drivers at any time and as many times as they choose.
3. All team members must wear shoes with rubber soles while on the pool deck.
4. Teams will be given a two -minute set-up period after arriving at the competition lane. During this set-up period, teams should adjust the ROV's buoyancy and make any other necessary adjustments. The lane judges will start the run timer at the end of the set-up period.

## Obstacle Course Task Description & Preliminary Rules

The Obstacle Course consists of five 18" hoops oriented at different angles. Please note there is no guarantee of the position of the obstacle course hoops at competitions, so operators should not try to memorize actions such as in playing a video game but should instead practice a variety of general high-speed maneuvers. Time allotted for the obstacle course run is dependent on venue, number of teams, and other factors and will be released with final rules.

### Obstacle Course Navigation & Rules:

1. *Start of run:* The ROV must be surfaced, within six inches (6") of the wall, and under its own power. Team members are not allowed to touch the ROV after the lane judge begins the countdown to start the run.
2. The ROV is required to pass through each of the five obstacle course hoops in order starting at the hoop closest to the pool wall.
3. The ROV must surface after clearing the hoop furthest from the pool wall. Surfacing is considered complete when any part of the ROV breaks the surface of the water.
4. The ROV must re-submerge and head back to the pool wall by passing through each of the five hoops in reverse order.
5. *End of run:* The run is complete when the ROV touches the pool wall while surfaced (any part of the ROV breaks the surface of the water). The run will be aborted if the allotted time expires even if the ROV has not completed the course.



## Mission Course Task Description & Preliminary Rules

The Mission Course consists of four tasks across two task frames. Tasks may be completed in any order with the exceptions noted in individual tasks.

### Mission Course Navigation & Rules:

1. *Start of run:* The ROV must be surfaced, within six inches (6") of the wall, and under its own power. Team members are not allowed to touch the ROV after the lane judge begins the countdown to start the run.
2. Batteries may be transported in any order.
3. Multiple objects may be transported at the same time.
4. Once a used battery has been removed from the battery compartment (Task 3), points will not be awarded for opening the battery panel (Task 1).
5. Points will not be awarded for disconnecting power cables (Task 2) if the disconnection occurs due to used batteries being moved.
6. Points will not be awarded for multiple tools left on a single hook in the tool caddy (Task 4).
7. *End of Run:* The timer will be stopped when the ROV touches the pool wall while surfaced (any part of the ROV breaks the surface of the water). Teams will receive points for all tasks completed during the run and bonus points will be awarded to teams to complete their run prior to the maximum allotted time.

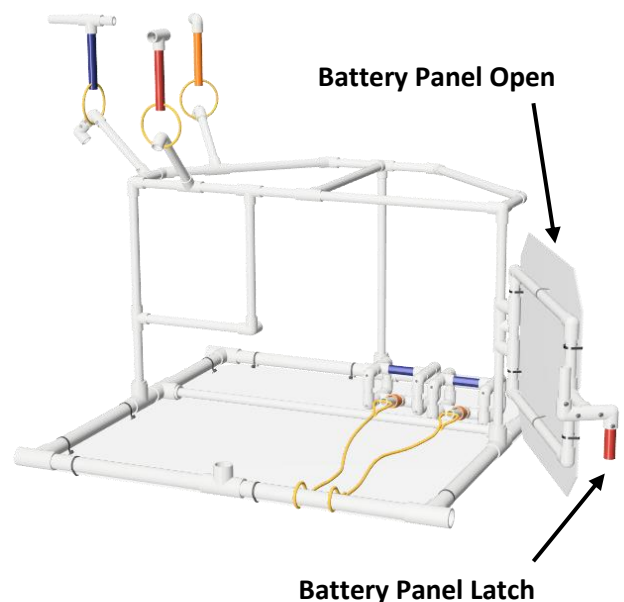
Time allotted for the mission course run is dependent on venue, number of teams, and other factors and will be released with final rules.

### Task 1: Battery Panel Access

This task includes two subtasks: 1) unlatching the panel and 2) opening the panel to gain access to the batteries.

To unlatch the panel, the latch must be rotated counterclockwise approximately 120° to unlatch the battery panel. The panel will not open automatically upon unlatching. The battery panel must be pulled or pushed to any position that will allow the batteries to be retrieved.

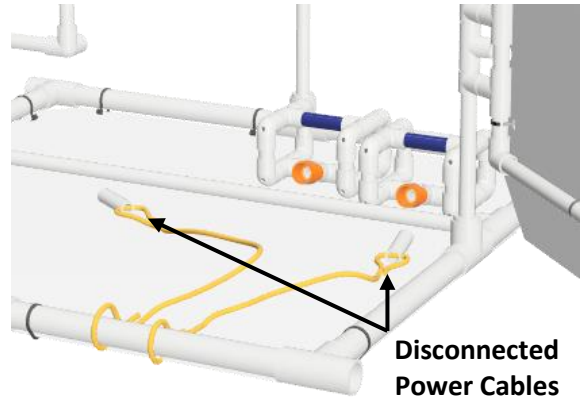
If a team is unable to open the battery panel, they may request diver assistance to open it, but a time penalty will be assessed and points will not be awarded for Task 1. If the team fails to open the battery panel, they may still transport the batteries as described in Task 3.



### Task 2: Disconnect Power Cables

This task requires teams to disconnect the power cables that are magnetically connected to batteries located in the battery compartment behind the battery panel.

The power cables are magnetically connected to the batteries and require minimal force to unplug. To receive points for disconnecting the power cables force must be applied to the cables, not the batteries.

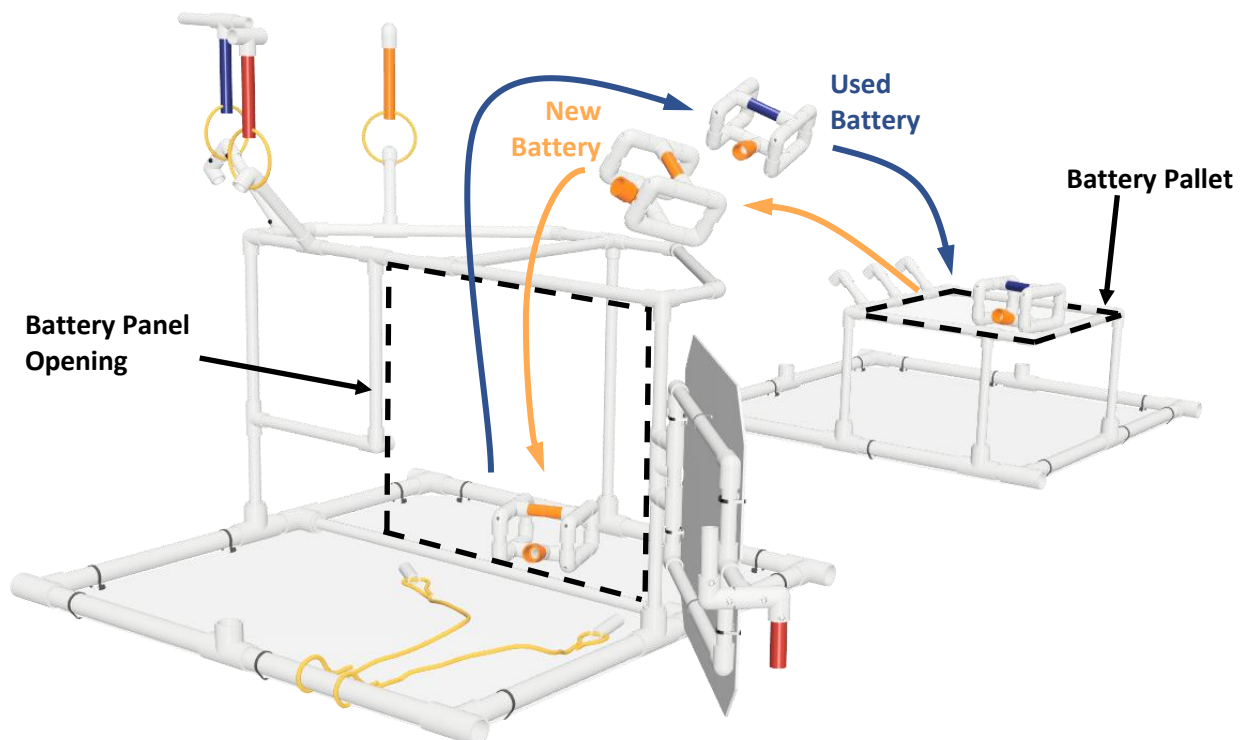


### Task 3: Battery Replacement

This task includes two subtasks 1) moving used batteries from the battery compartment to the battery pallet and 2) moving new batteries from the battery pallet to the battery compartment. The batteries are slightly negatively buoyant at a depth of five feet (5') but are neutrally to positively buoyant at shallower depths and may float away during transport.

In order to score points for this task, batteries must be transported through the battery panel opening.

If the team fails to open the battery panel (Task 1), they may still transport the batteries by going down through the top of the battery compartment structure, retrieving the batteries and exiting through the top of the battery compartment structure.



**Task 4: Tool Transport**

This task requires teams to move three (3) tools from the EVA tool tray on the front task frame to the tool caddy on the back task frame. The tools are slightly positively buoyant and may float away during transport.

Tools may be transported in any order and may be placed on any open hook on the tool caddy. Only one tool may be placed on each hook.

