

UWinROV

HOSTED BY: Faculty of Engineering, University of Windsor

COMPETITION OVERVIEW

Faculty of Engineering at The University of Windsor coordinates a Remotely Operated Underwater Vehicle (ROV) competition. The competition is open to all students and recent graduates ranging from high schools to colleges and universities all around Canada.

This competition is designed to involve students in an advanced field of science, technology, and engineering, helping them to learn more about the practical applications of ROVs, ocean science, robotics, and mechatronics.

COMPETITION GOALS

UWinRov goals include:

- ✓ Introduce Marine Technical challenges to the students.
- ✓ Encourage students to join marine-related research fields.
- ✓ Collaboration of different disciplines including Electrical, Mechanical and Computer.
- ✓ Provide students with the necessary skills to pursue a career in the marine robotic field.
- ✓ Create a network between industry and students.
- ✓ Increase students' awareness of ROVs role in marine science and related industry.

ROV Requirements

The designed and built ROV should fulfill the following requirements

- **Weight limit:**
Maximum weight of ROV should be less than 22 lbs.
- **Size limit:**
Overall dimensions of the ROV should be 2'×2'×2'.
- **Number of propellers:**
ROV should have a maximum of four number of propeller (provided by the university). At most two propellers for heave motion.
- **Body material:**
Body of the ROV can be made of materials such as pipes, fiberglass, plexiglass, aluminum or it can be 3D printed.
- **Power source:**
As the power source teams can use batteries or a DC power supply. As for batteries, there is no limit on the size of the battery; however, the weight limit of the ROV will force a limit on the weight of batteries.

Competition requirements

- Each team should include 4 to 5 students.
- In addition to designing an ROV, participants should prepare a technical report, a poster, and power point presentation for competition judges.
- The technical report should include ROV's Weight, Dimensions, Volume, Position of center of gravity, buoyancy, Number of propellers, types, and size of the battery. Moreover, participant's poster should include team members name, major of study, institutions, picture of their ROV and its given name.



Competition Tasks

UWinRov competition aims to design and build ROVs capable of completing tasks modeled after real industrial ROV missions.

Here are three examples of industrial ROV missions and task lists designed for the participants.

- **Underwater inspection:**
To do this task, an ROV should reach the required depth, maintaining its level for a specified duration of time. Moreover, it should be able to maneuver around an object to maintain a close distance to its intended target.
Based on this task, in UWinRov student's ROVs should perform the following:
 1. ROV should descend to a specific depth and remain there without any movements for 1-2 mins.
 2. While staying buoyant in the specified depth, The ROV should turn 90, 180 and 270 degrees for 30 seconds.
 3. There will be floating balloons in the water and students should blow them using a needle placed at the front of their ROV.
 4. Teams should finish the mentioned tasks in a specific time (for example 10 min.).
- **Industrial ROVs sometimes enter a pipe to inspect corrosion, souring or depth of debris buildup in a pipe.**
UWinRov student's ROVs should:
 5. pass through a specified opening with given dimensions without any contact with edges of the opening.
- **After inspection, ROV should re-surface.**
 6. ROV should stay calm on the surface for some specific time.

Educational Activities

UWinRov educational events include:

- Workshop on Underwater Robotics (UWindsor ROV Workshop)
- Microcontrollers for thrusters and sensors



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