

Information Sheet on Levels of Challenge

BIOS Beginner: Beginner teams will be eligible to receive a kit for construction of their ROV. ROVs will not need cameras and the Challenge course will consist of basic maneuvering through rings, pick up of rings and tasks based on the 2020 local theme. If any students competed in the 2019 Beginner competition, this course will be of a similar challenge level. Kit will come with $\frac{1}{2}$ " PVC and $\frac{1}{2}$ " T's and elbow connections, 3 bilge pump motors and floatation. Ballast tanks like those pictured in Figure 2 can be used for buoyancy control in any size PVC. Propellers should be shrouded to receive all safety inspection points and maximum bilge pump usage is 4 motors.

Requirements:

- Product Demonstration and Timing
- Safety Inspection
- Marketing Display/Poster
- Engineering Interview (may bring poster to interview)



Figure 1: An example Beginner ROV, formed of the basic ROV kit with $\frac{1}{2}$ " PVC only alongside floatation.



Figure 2: An example Beginner ROV that uses airtight ballast tanks in lieu of floatation for buoyancy. ROVs must pass safety inspection.

MATE Scout: At this stage of the competition, students will need to work on building their own design for an ROV that is able to maneuver around given challenges. Students may use parts of previous ROV kits, but to meet the challenges of the course, design will be at the decision of the team and coaches.

Requirements:

- Company Spec Sheet
- Systems Integration Diagram (SID)
- Product Demonstration and Timing
- Safety Inspection
- Marketing Display/Poster
- Engineering Interview (may bring poster to interview)

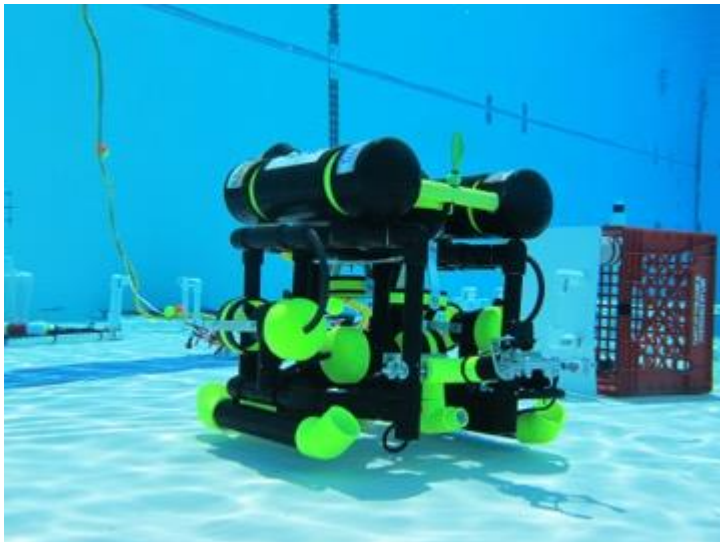


Figure 3: Intermediate ROVs can be in any design with up to 6 motors. Any material and form of ballasting can be used in the design of this ROV. ROVs must pass safety inspection.

MATE Navigator: Recommended only for students who have competed at the Scout level at least in the 2019 competition. Students may use parts of previous ROV kits, but to meet the challenges of the MATE course, design will be at the decision of the team and coaches.

Requirements:

- Company Spec Sheet
- Systems Integration Diagram (SID)
- Safety Inspection
- Must pass Fluid Power Quiz if planning to use Fluid Power
- Product Demonstration and Timing
- Technical Document (examples will be provided)
- Marketing Display/Poster
- Engineering Interview (may bring poster to interview)

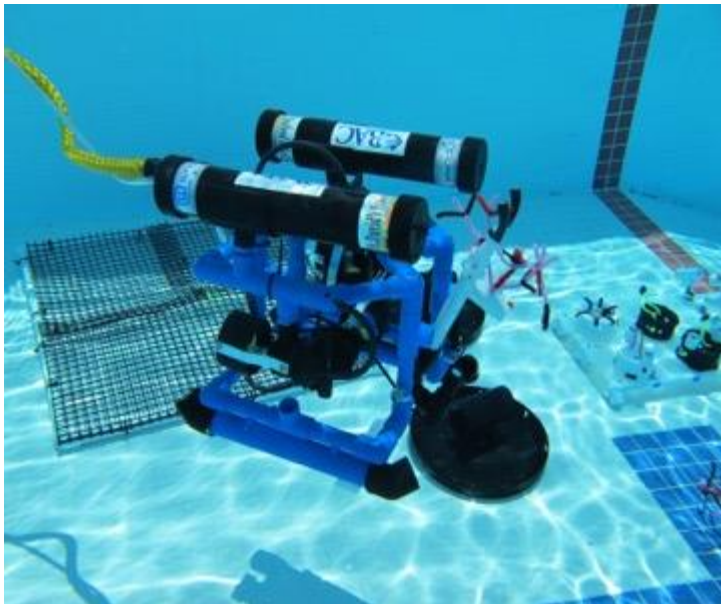


Figure 4: Navigator ROVs can be in any design with up to 6 motors. Any material and form of ballasting can be used in design of this ROV. ROVs must pass safety inspection. Students may not look into the pool but instead ROVs will need a camera to complete the product demonstration. Cameras must be mounted to the ROV and cannot be mounted in the pool.

For relevant kit, groups can consider the purchase of a TriggerFish kit found here:
<http://www.marinetech.org/how-to-build-the-triggerfish-rov-2/>