



## BUILD YOUR OWN SIMPLE REMOTELY OPERATED VEHICLE

### Parts List for DIY Remotely Operated Vehicle



2 Submersible pumps  
(Approx. \$2.40 each)  
Available at Amazon.com



At least 10 ft of  
4-conductor wire  
(Approx. \$9 each)  
Available at Amazon.com



Pack of fishing bobbers  
(Approx. \$1.96)  
Available at Walmart.com



2 Push-button switches  
(Approx. \$0.79 each)  
Available at Amazon.com



9V battery  
(Approx. \$1.99)  
Available at most stores



2 brackets, 3/4" 90-degree  
(Approx. \$0.57 each)  
Available at most  
hardware stores



Plastic sandwich  
container  
(Approx. \$1.10)  
Any grocery store



9V battery connector  
(Approx. \$0.79 each)  
Available at Amazon.com



Acrylic sheet  
(Approx. \$3.80)  
Available at  
Homedepot.com



Duct tape  
(Approx. \$5.00)  
Available at Amazon.com



Hot glue and gun  
(Approx. \$4.27 each)  
Available at Amazon.com



Electrical tape  
(Approx. \$1.48)  
Available at Amazon.com

Website: <https://scisat.ll.mit.edu/scisat/web/node/49>

## RoV Build Instructions

### 1. BUILD REMOTE CONTROL

Drill, cut, or melt 2 half-inch diameter holes into sandwich container for the button switches



Insert button switches into the holes

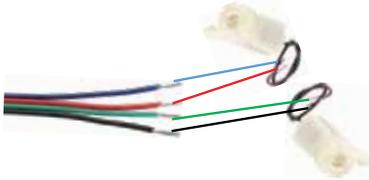


### 2. WIRE THE PUMPS

Strip the ends of the wires



Twist the ends of the wires of pump 1 to two wires, and the ends of the wires from pump 2 to two different wires



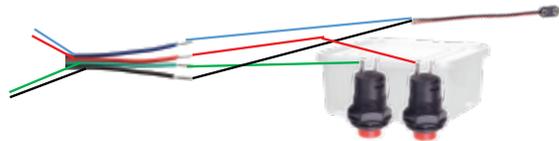
Wrap the ends of the wires in duct tape to ensure contacts don't touch and that the interface is waterproof

### 3. WIRE THE REMOTE CONTROL

Strip the ends of the wires



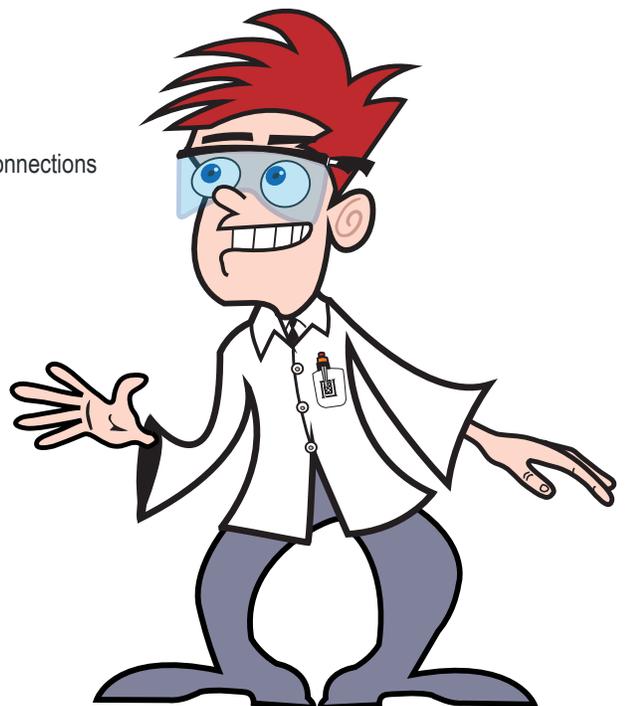
Connect the wires connected to the pump negative terminal (black) to the battery negative terminal (black) for both pumps  
Connect the wires connected to the pump positive terminal (red) to the push button switches (one pump per switch)



Connect the battery positive terminal (red) to the open lead on both switches, cover all wire connections with electrical tape



Connect the battery and determine which motor is connected to the left and right switches



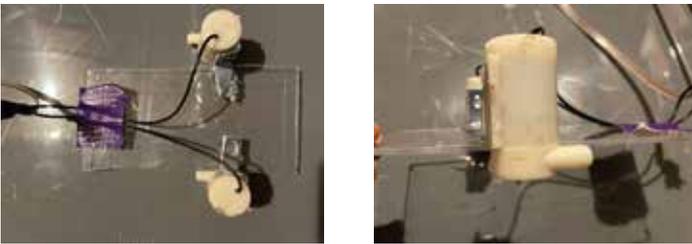
## ROV Build Instructions

### 4. ASSEMBLE THE ROV

Hot glue the brackets onto the pumps, ensure when gluing on the brackets the water jet on the pump points aft when the left motor is on the left side and the right motor is on the right side. The bracket should be above the pump jet, i.e. mounted alongside the mounting face on the pump.



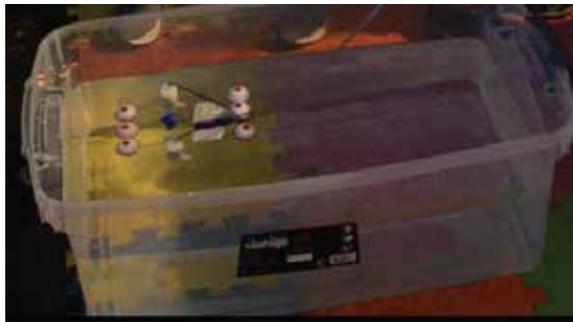
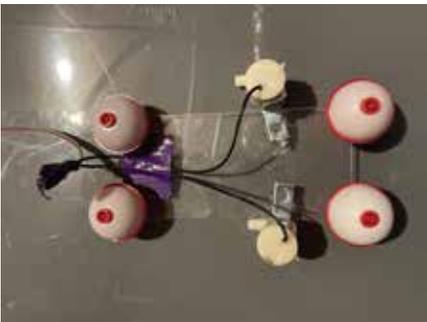
Hot glue the brackets onto the acrylic, right pump on the right side and left pump on the left side.



### 5. ADJUST THE BUOYANCY

Clip 4 fishing bobbers on to the corners of the acrylic sheet.

It will be necessary to adjust the buoyancy by adding, removing, or changing the size of the bobbers. The goal is to make the ROV barely float. The buoyancy is correct when if the ROV is pushed under the water it slowly rises the surface. The front of the ROV should be slightly lower than the back as well. This will ensure the ROV is pushed down when it goes fast and then as it slows down it slowly rises to the surface. The speed provides depth control in this configuration.



### 6. DRIVING THE ROV

