SCOUT product demonstration prop building instructions

Many product demonstration items have flotation added, either inside the PVC pipe or externally. Flotation added to a mission prop is intended to make those items easier to carry, keep them upright on the bottom if they are dropped while moving, and/or keep them attached to an object (Velcro to Velcro stick) when released by the ROV.

Regional competitions may build product demonstration props out of materials other than PVC pipe. Your regional coordinator will inform you of any changes to materials for your regional competition. NOTE: Look for a regional information document posted on your regional website. This document will list any changes to the product demonstration props.

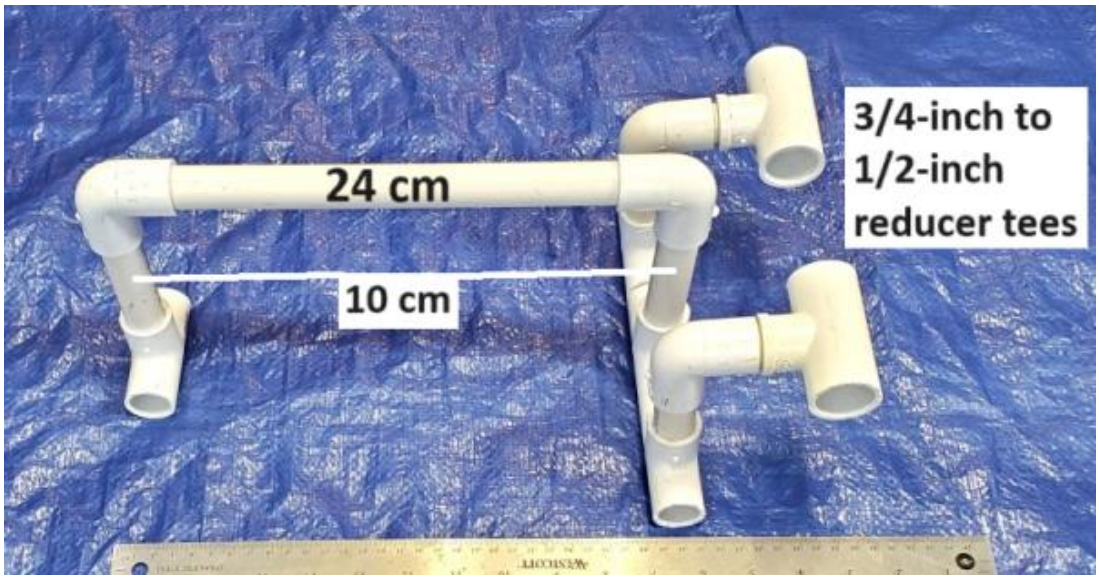
Companies should be aware that tolerances in lengths of cut pipe and length of pipe inserted into joints can change the overall dimensions of product demonstration tasks. Except where noted, companies should expect tolerances in all product demonstration props and should build their ROVs and tools accordingly. In no case should the dimensions given in this document for a product demonstration prop be used to calibrate a measuring device.

Online links and Home Depot part numbers are given for certain construction items. However, some Home Depot stores may not carry the listed items or Home Depot may not be available in your area. MATE recommends checking other local hardware stores or online sources, such as those listed below, for the required component.
https://www.pvcfittingsonline.com/
https://pvcpipesupplies.com/pvc-fittings/schedule-40-pvc-fittings/

See last page for update notes (if any).

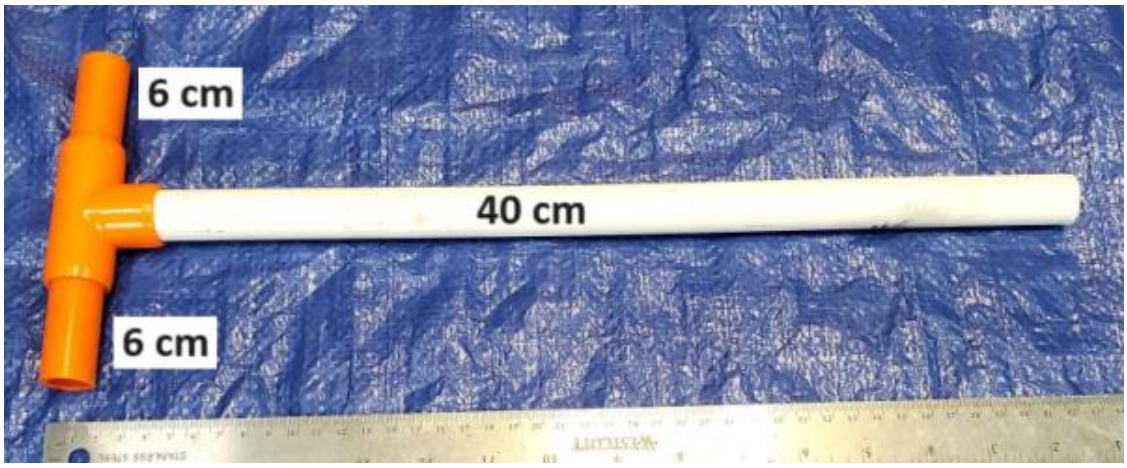
Task 1: OOI Coastal Pioneer Array

Task 1.1 Release the multi-function node

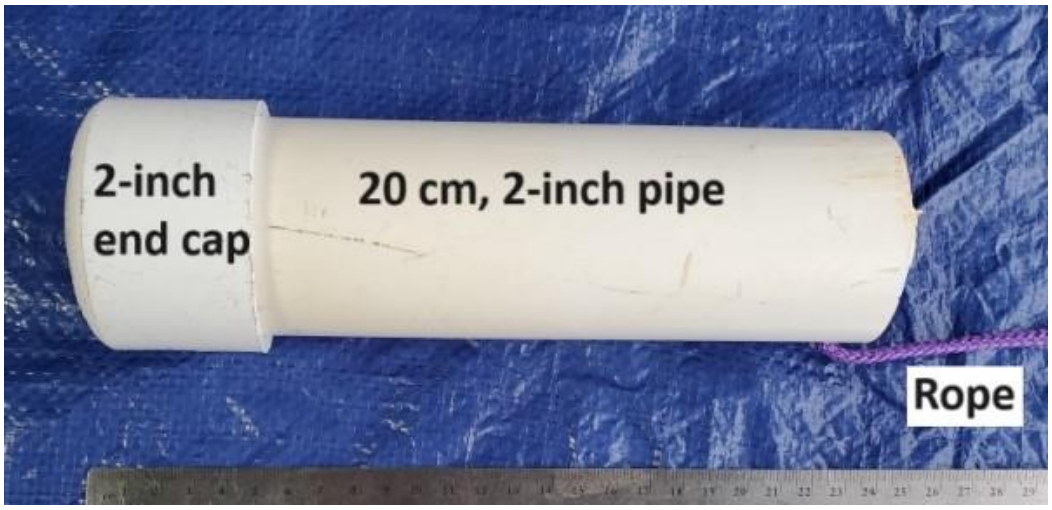


The ½-inch PVC framework for the multi-function node. Two ¾-inch to ½-inch reducing tees hold the acoustic release pin.

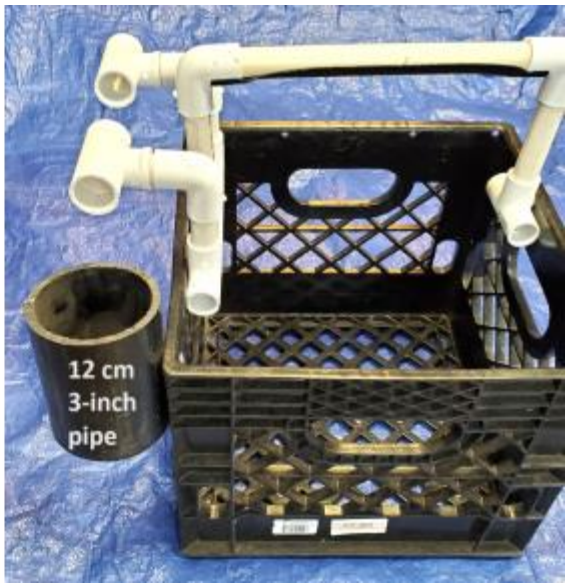
24 cm of Velcro hooks are attached to the bottom side of the ½-inch PVC pipe of the multi-function node framework.



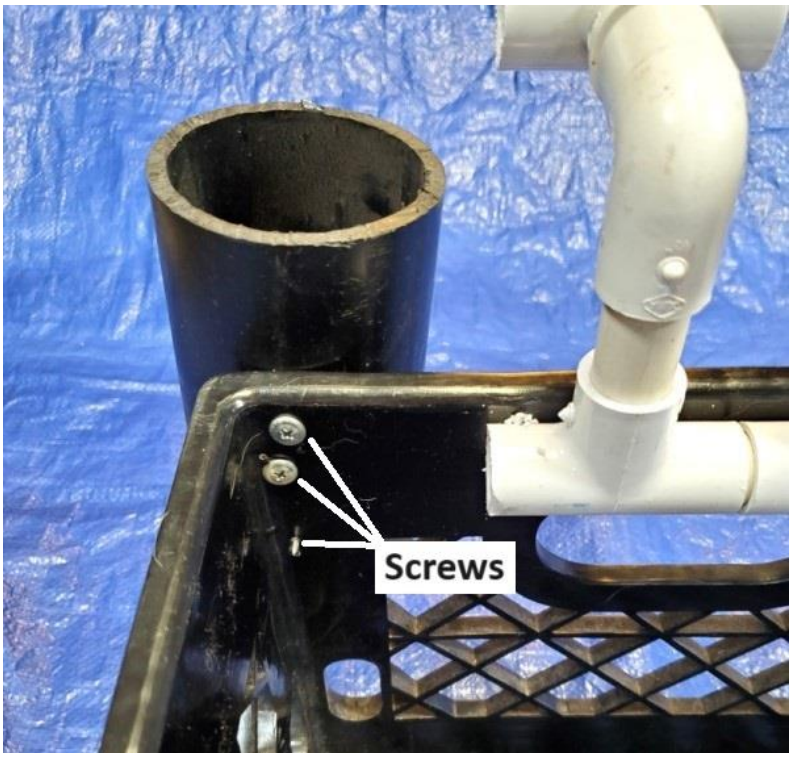
The acoustic release pin on the multi-function node is constructed from ½-inch PVC pipe.



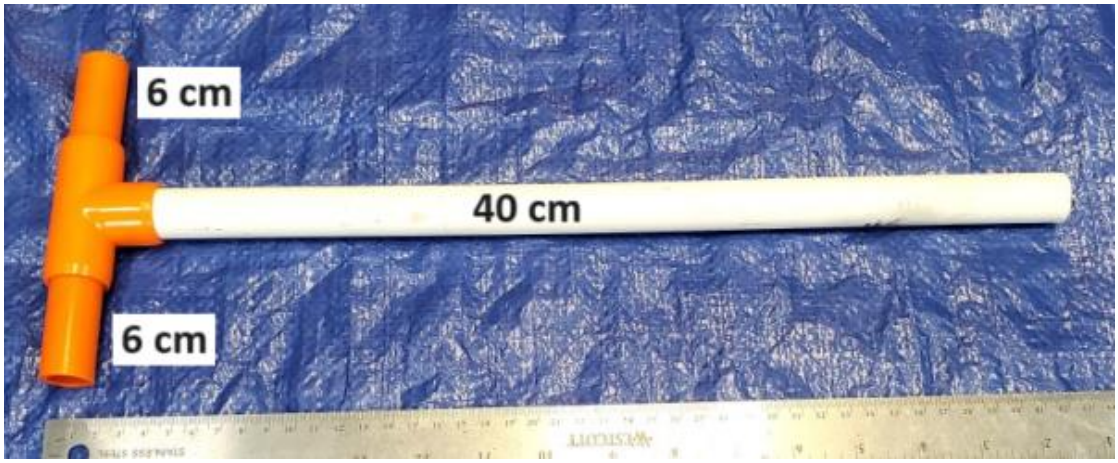
The multi-function nodes' recovery float is constructed from 2-inch PVC pipe. Flotation inside the pipe will cause the recovery float to rise when the acoustic release pin is pulled. The rope should be approximately half the depth of the pool so that when released, it will be "stuck" in mid-water.



The multi-function node is created from a plastic milk crate. The ½-inch PV C framework is screwed into the top of the milk crate. A 12 cm length of 3-inch pipe is screwed into the side of the milk crate to hold the recovery float. A brick (not shown) provides weight for the multi-function node.



Three screws secure the 3-inch pipe in place.

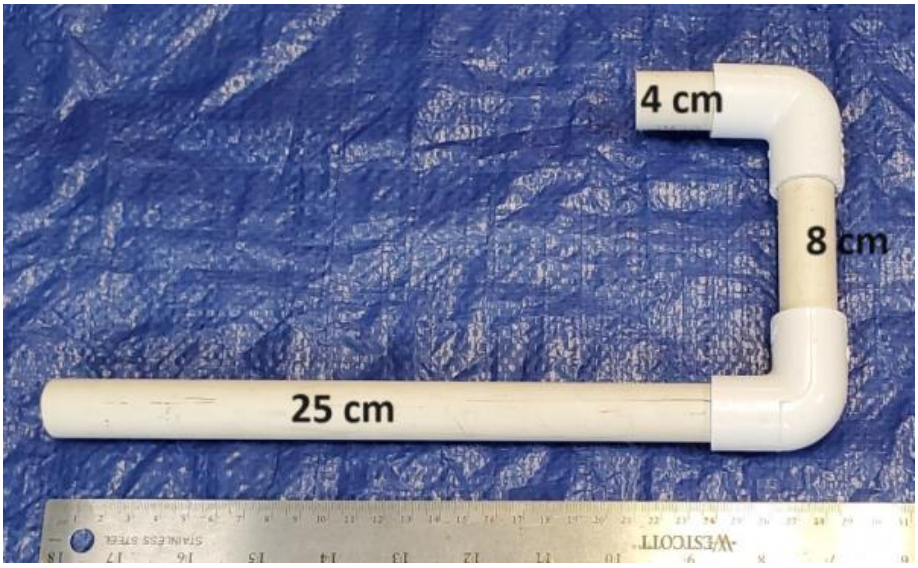


The recovery float pin. Design note: This pin is identical to the acoustic release pin; they are interchangeable.

Left: The pin holding the recovery float. The recovery float rope is stored inside the float, above the pin. The pin passes through a loop in the rope, holding the rope in place until the pin is removed. Right: Alternate view of the pin holding the recovery float.

Milk Crate Design Note: You may find some variability in your milk crate design. The most important factor for the SCOUT class milk crate design is that it has holes on the side, near the bottom, for the pin to pass through. The location of the 3-inch pipe holding the recovery float may be adjusted to ensure the recovery float sits on the pin. If necessary, the pin can pass through the diamond holes (or square holes) in the side of the milk crate.

The multi-function node with the acoustic release pin holding the recovery float in place.



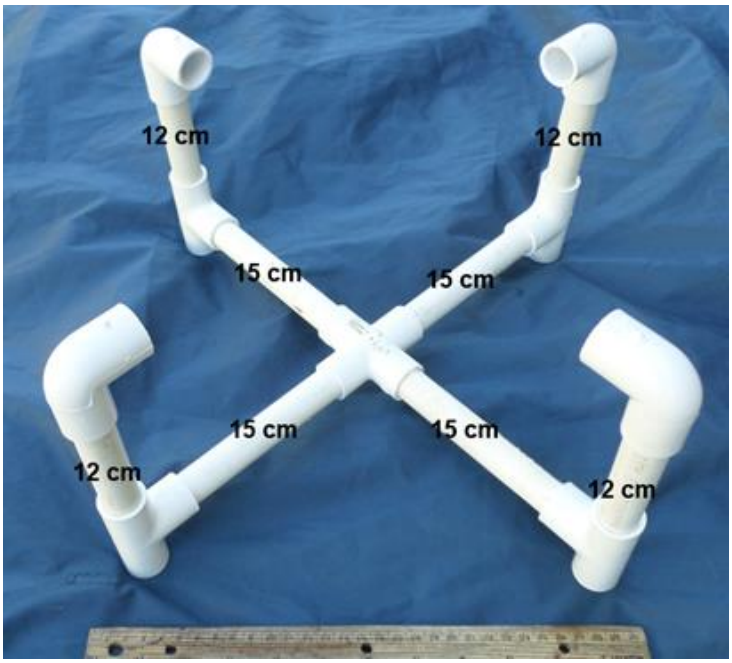
The recovery line.

Velcro loops on the recovery line.

The recovery line attached to the ½-inch PVC pipe bale on the multi-function node.

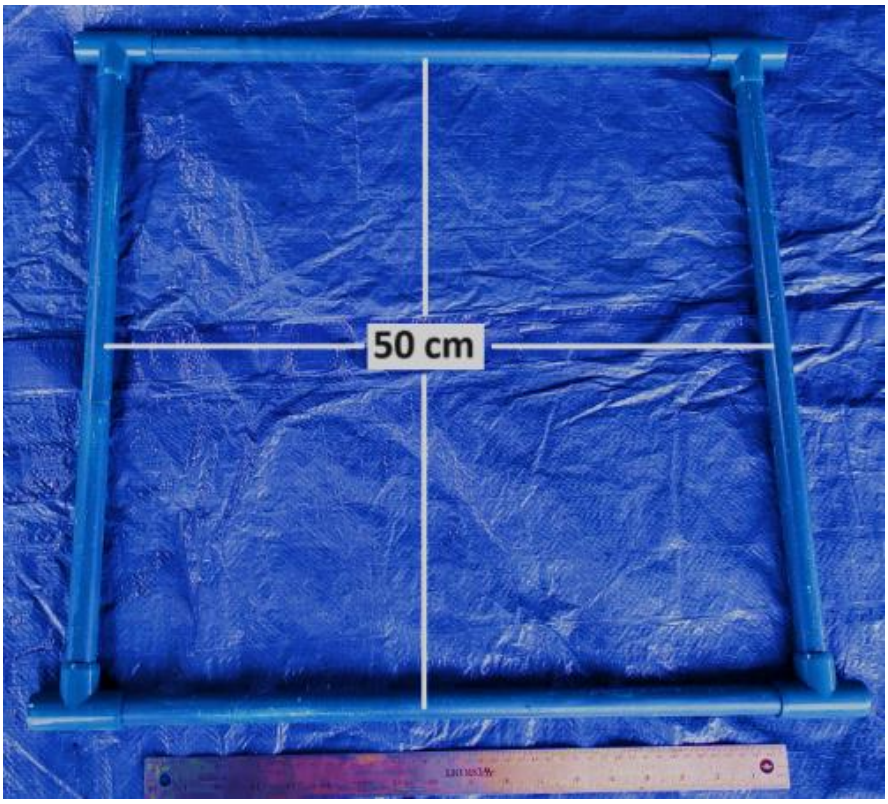
TASK 2: SMART Cables for Ocean Observing

Task 2.1 Deploy SMART cable



A waypoint located on the bottom of the seafloor is constructed from ½-inch PVC pipe.

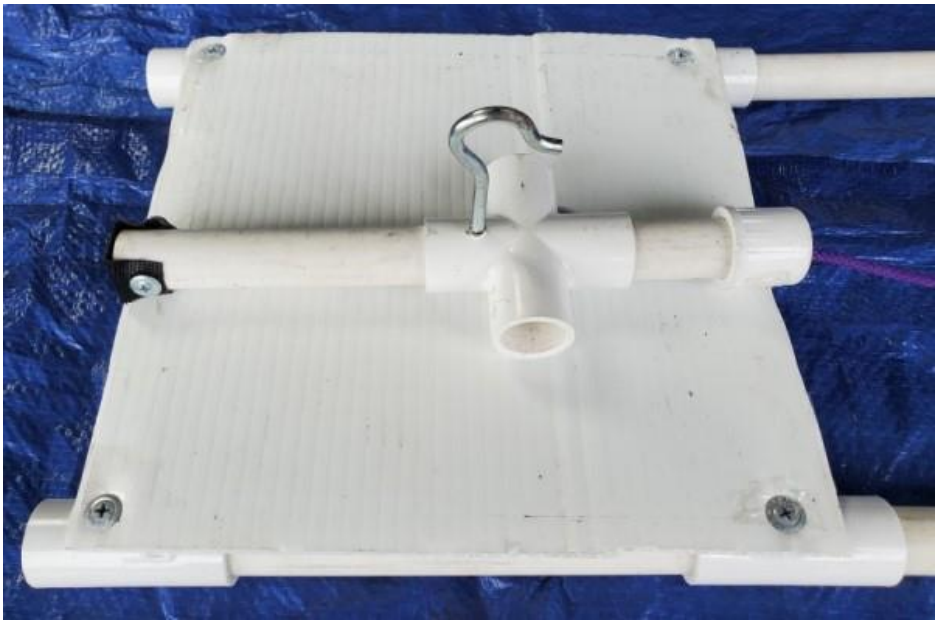
The SMART cable repeater is constructed from 1 ½-inch PVC pipe and two end caps. A #6 screw hook acts as a carrying mechanism for the SMART cable repeater. The cable on both ends should be long enough to reach the furthest waypoint and back to the surface, side of the pool.



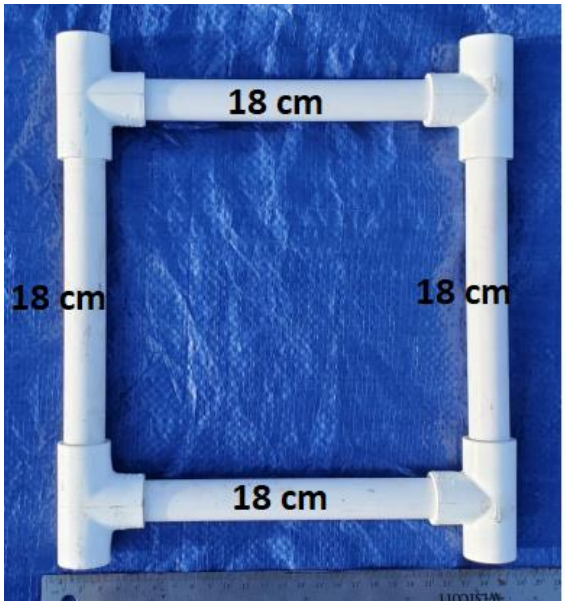
The SMART Cable designated area is a square constructed from PVC pipe painted blue.

The SMART Cable repeater successfully placed in the designated area.

The AUV docking station power connector is constructed from ½-inch PVC pipe. A #6 screw hook can be used to carry the connector. 4 meters of rope connect the power connector to the AUV docking station. A 6 cm x 2.3 cm rectangle of Velcro hooks covers the open end of the 12 cm length of pipe.

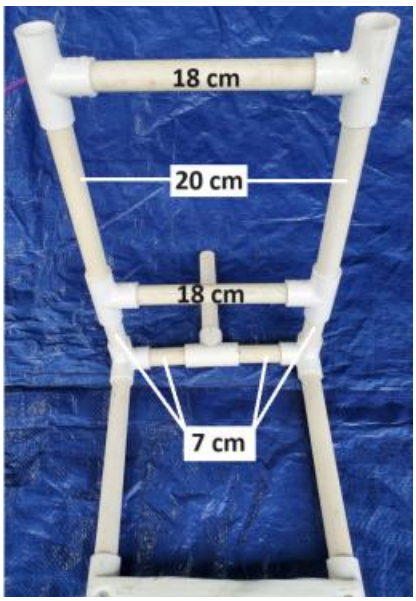


The AUV docking station power connector resting on its platform.

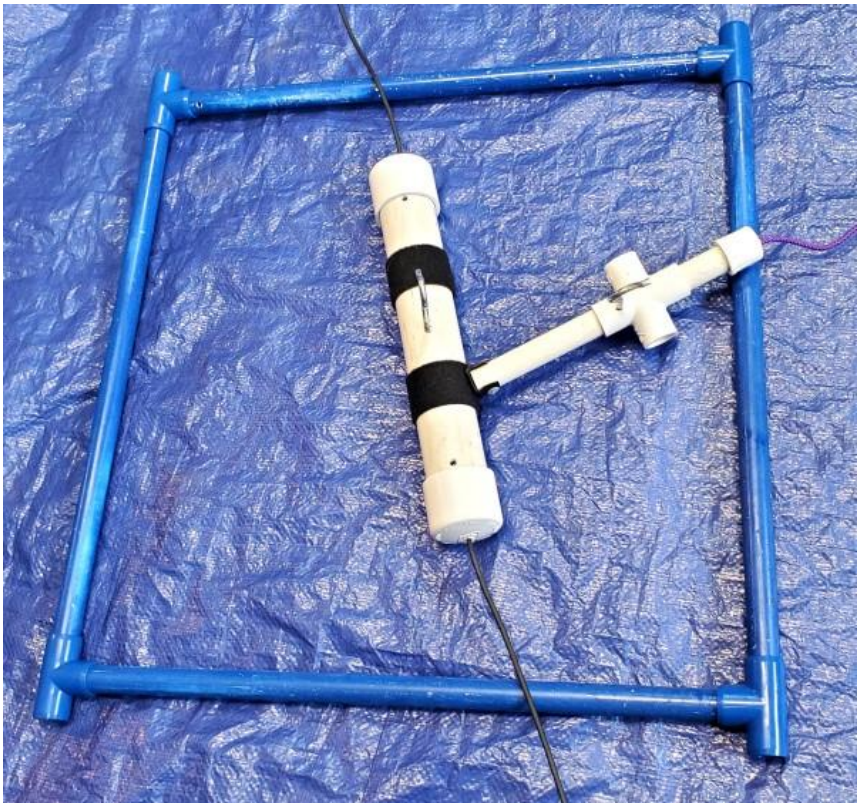


Left: The framework for the AUV docking station power connector platform is constructed from ½-inch PVC pipe. Right: A 23 cm x 22 cm rectangle of corrugated plastic sheeting is attached to the framework.

Design note: The AUV docking station power connector platform is identical to the seagrass platform from the 2023 mission.



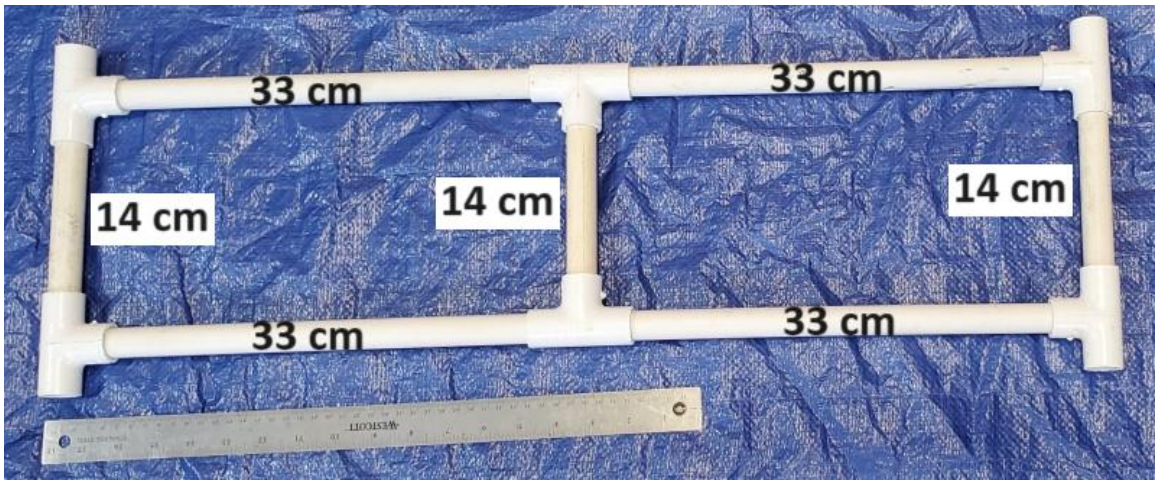
The AUV docking station is constructed from ½-inch PVC pipe. The 4 meters of rope are coiled up between the AUV docking station and the AUV docking station connector platform.



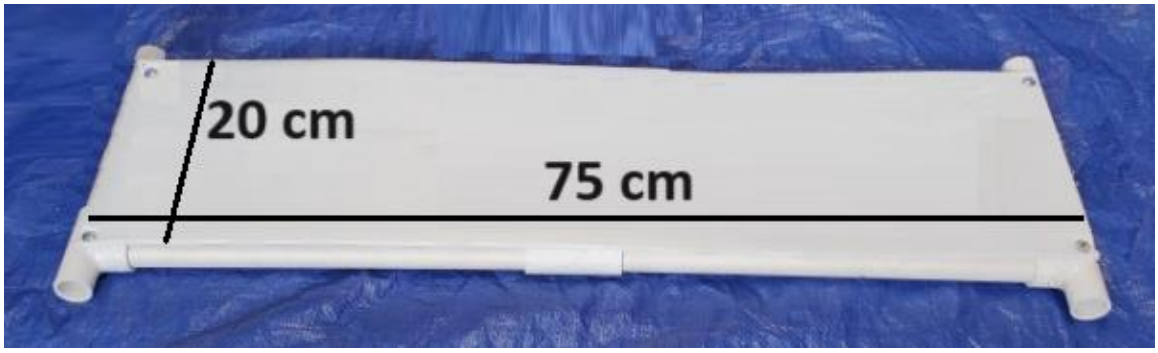
The power connector inserted onto the SMART repeater.

Task 3: From the Red Sea to Tennessee

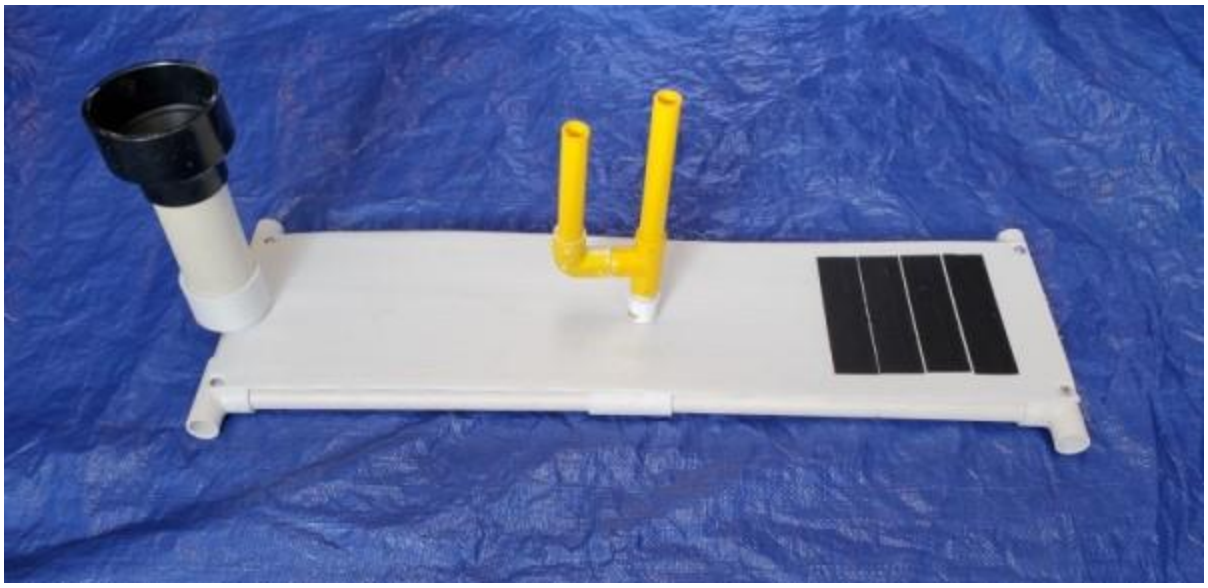
SMART Reefs



The framework of the coral restoration area is constructed from ½-inch PVC pipe.

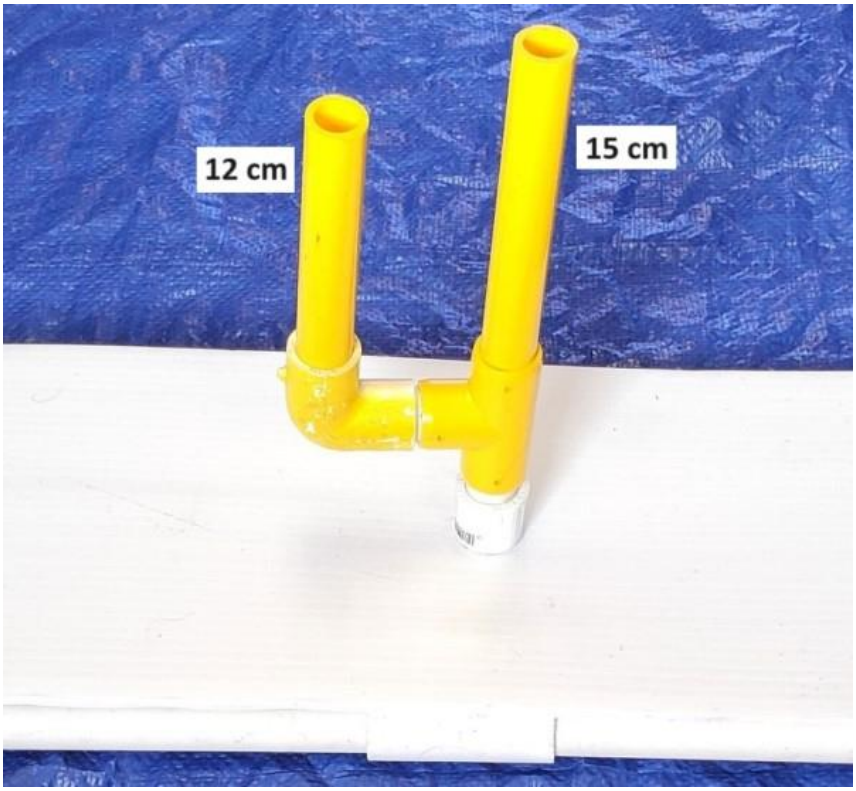


The coral restoration area is covered by a 75 cm x 20 cm sheet of corrugated plastic.



The coral restoration area with the branching coral transplant area (left), the Elkhorn coral (center), and the brain coral transplant area (right) .

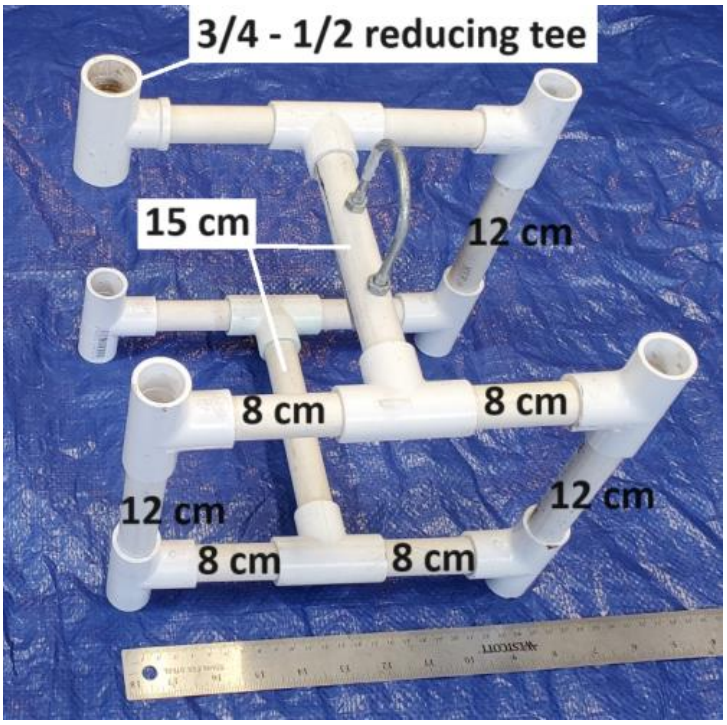
The transplant location for the branching coral is constructed from 15 cm of 2-inch PVC pipe inserted into a 2-inch end cap with a 3-inch to 2-inch reducer attached to the top.



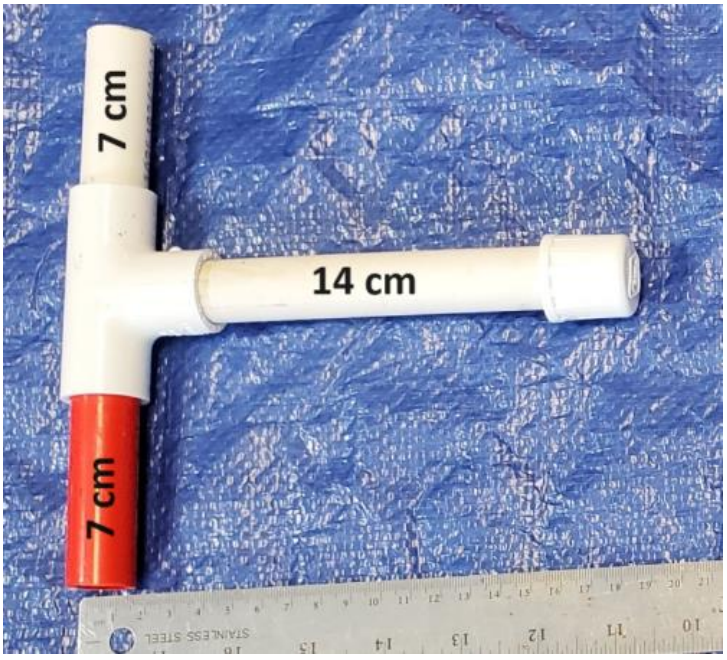
The Elkhorn coral at the top of the coral restoration area is constructed from ½-inch PVC pipe painted yellow.

The transplant location for the brain coral is a 15 cm x 15 cm square of Velcro hooks.

Task 3.1 Probiotics

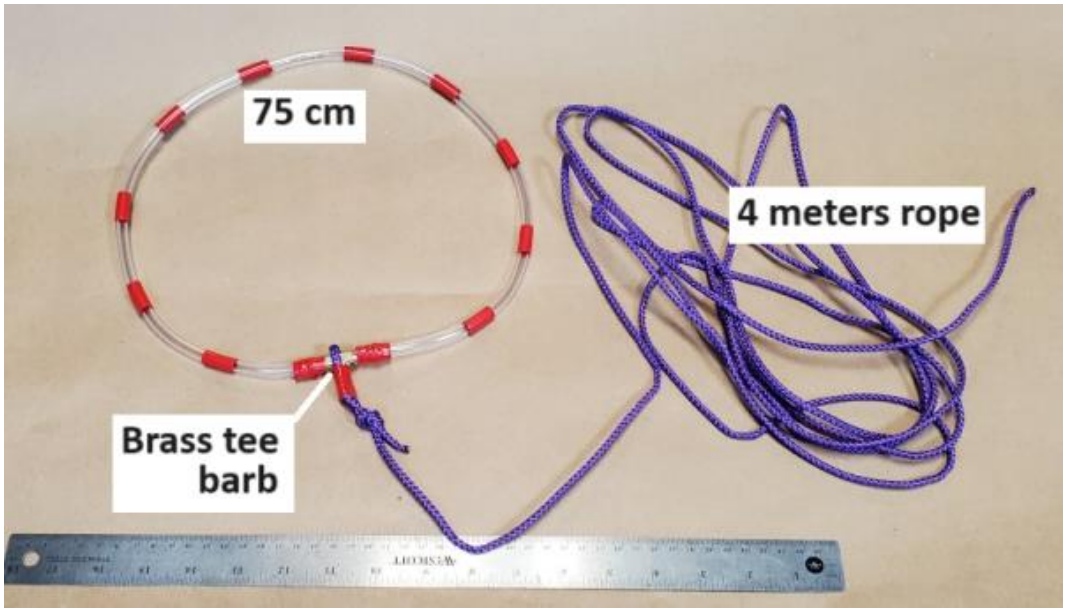


The irrigation system framework is constructed from ½-inch PVC pipe. A #310 U-bolt acts as a carrying mechanism for the irrigation system.



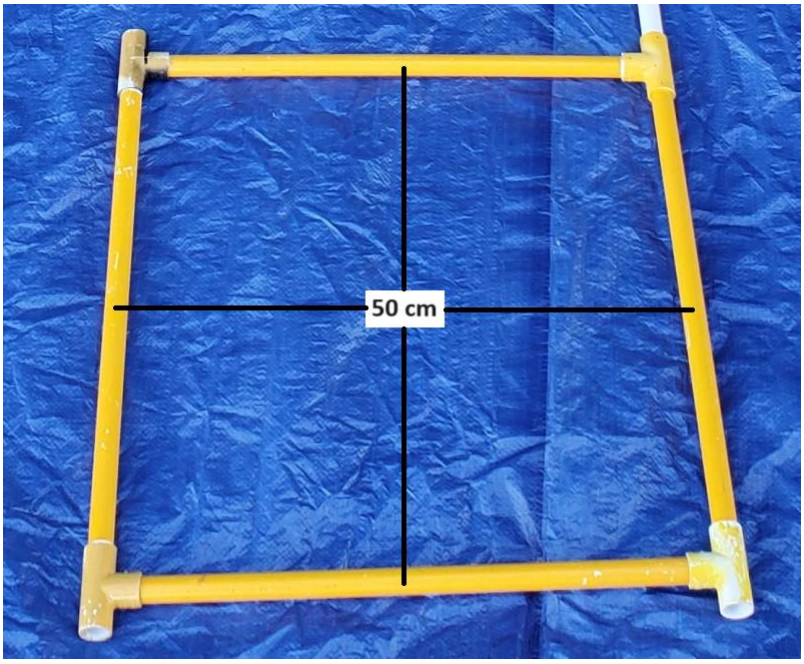
The handle for the irrigation system is constructed from ½-inch PVC.

The irrigation system with the handle inserted through the ¾-inch by ½-inch PVC tee.

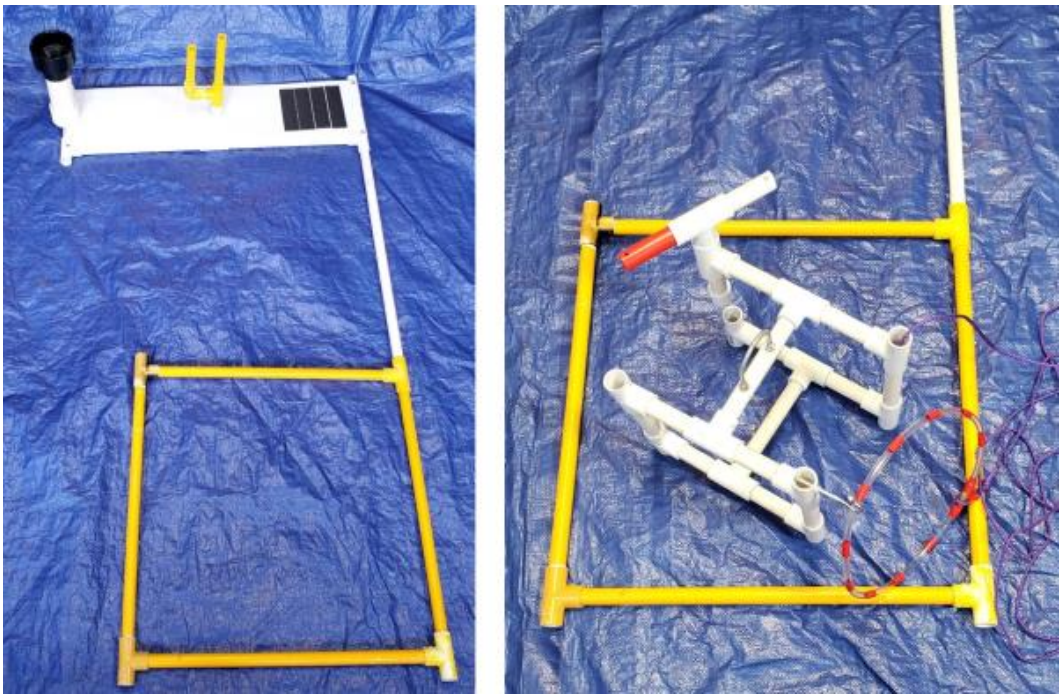


The sprinkler system is constructed from clear vinyl tubing with red tape. 75 cm makes the loop that goes over the Elkhorn coral. The ends are inserted into a brass tee barb. 4 meters of rope loop around the tee barb to connect the sprinkler to the irrigation system.

The sprinkler system hanging from a #6 screw hook inserted into the irrigation system.



The irrigation system designated area is constructed from ½-inch PVC pipe painted yellow.

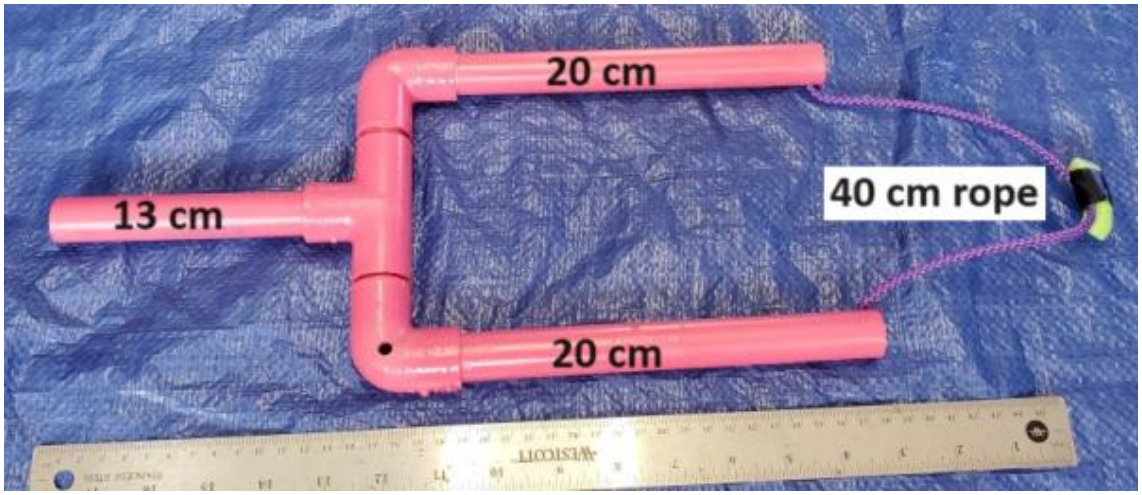


Left: The coral restoration area with the irrigation system designated area attached. Right: The irrigation system successfully deployed in the designated area.

The sprinkler system successfully deployed over the Elkhorn coral.

Task 3.2 Coral Restoration

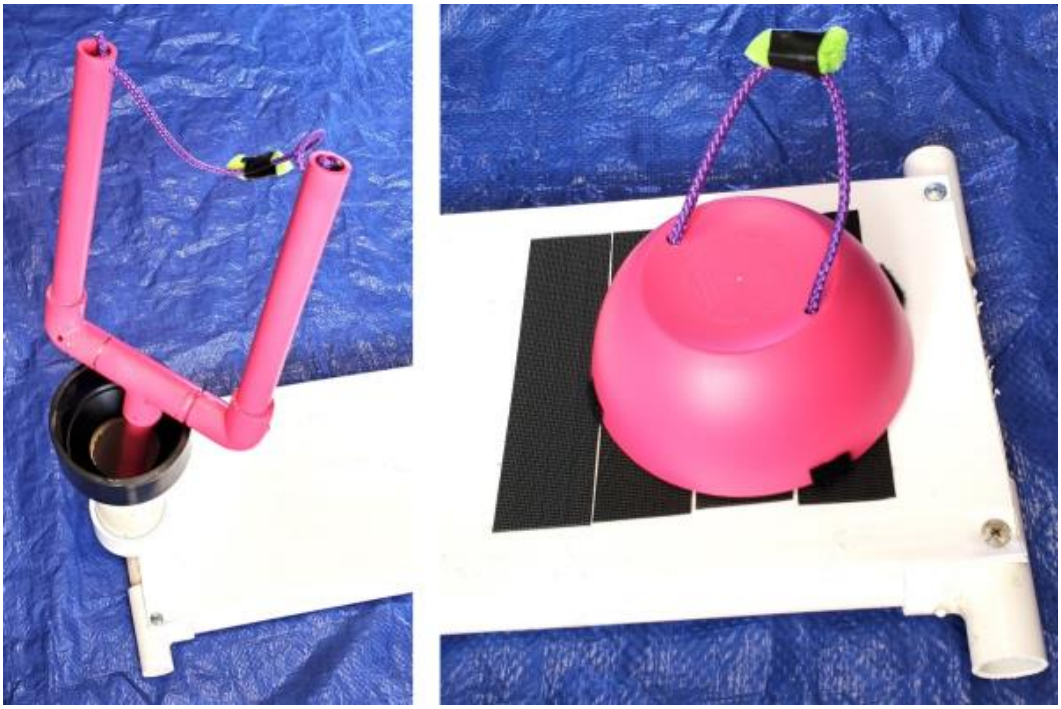
Branching coral



The branching coral is constructed out of ½-inch PVC pipe.

Brain Coral

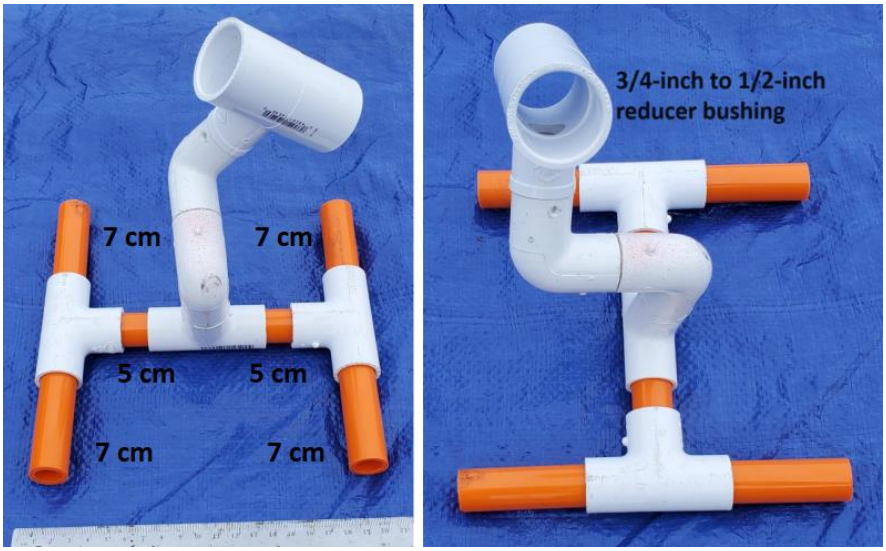
Left: The brain coral is constructed from a plastic bowl. A 30 cm length of rope is used as a carrying mechanism for the brain coral. Four 2 cm x 2 cm Velcro loops around the bottom edge will secure the brain coral in the coral restoration area. The bowl is 14 cm in diameter and 5.5 cm tall. Right: A large Mexican Beach Pebble rock is secured to the inside of the brain coral with Velcro to provide weight.



Left: The branching coral transplanted into the coral restoration area. Right: The brain coral transplanted into the coral restoration area.

Tennessee Lakes and Rivers

Task 3.4 Determine the location of sturgeon spawning grounds

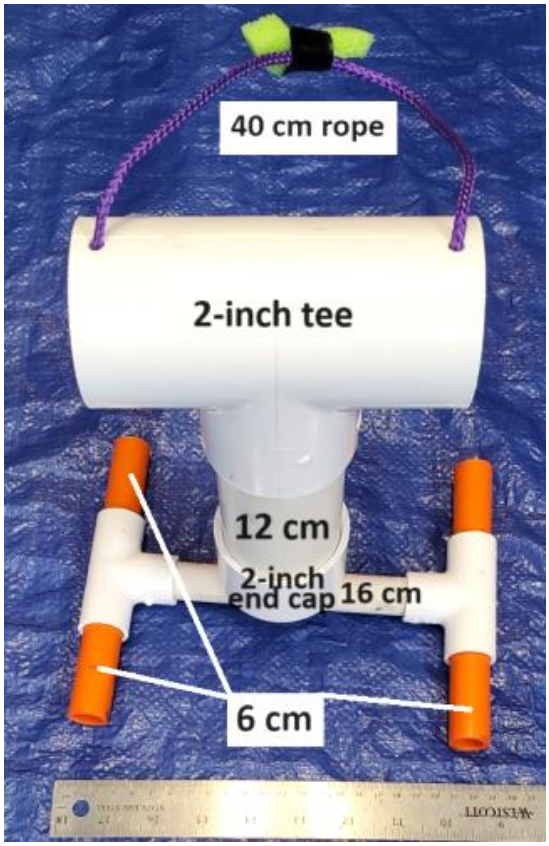


Left: Acoustic receiver front view constructed from ½-inch PVC pipe. Right: Acoustic receiver side view.

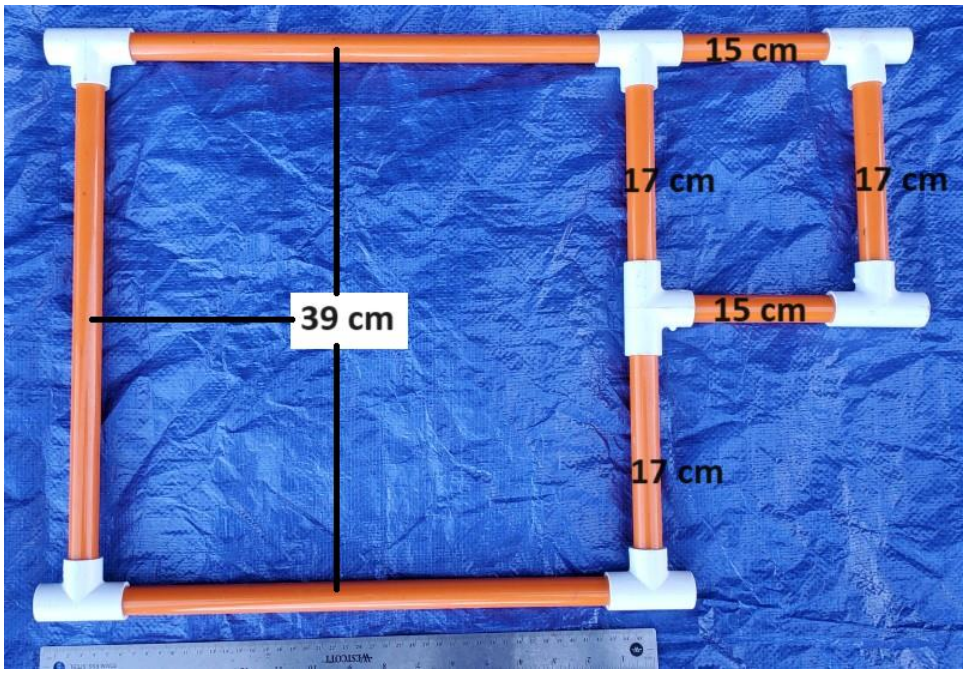
Design Note:

- The acoustic receiver is the camera from the 2023 task. A ¾-inch to ½-inch reducer tee replaces the 1-inch to ½-inch reducer tee on the 2023 mission prop.
- Colors will vary between the three acoustic receivers at each station.

Photo: Three acoustic receivers with different colors (orange, blue and purple)

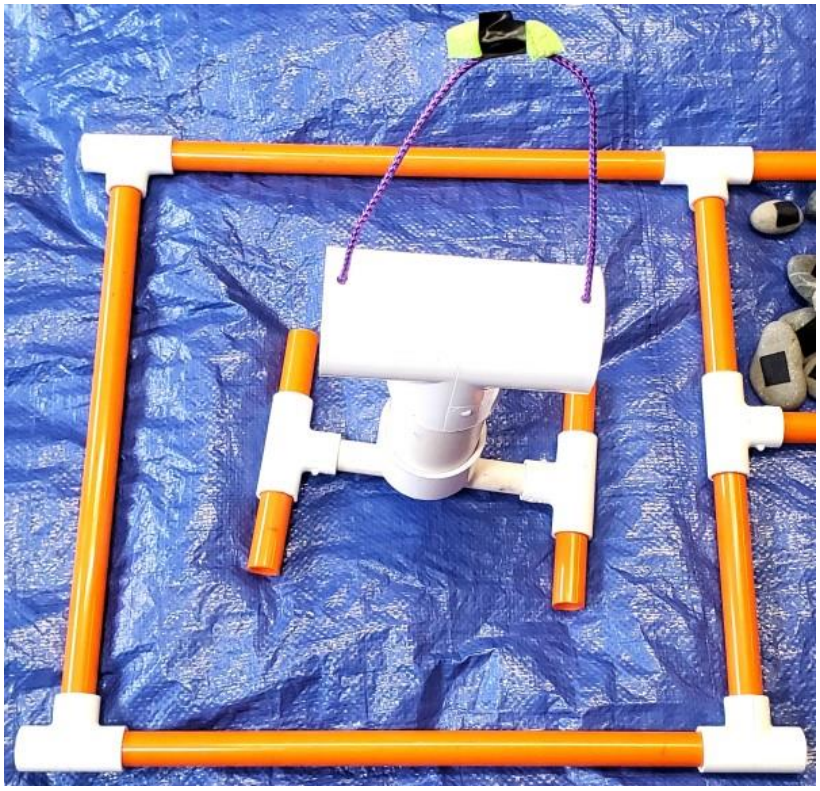


The Acoustic Doppler Current Profiler (ADCP) is constructed from 2-inch PVC pipe with a ½-inch PVC base. A 40 cm length of rope acts as the carrying mechanism for the ADCP.



The designated area for the ADCP with the sediment area attached. The designated area is constructed from ½-inch PVC pipe.

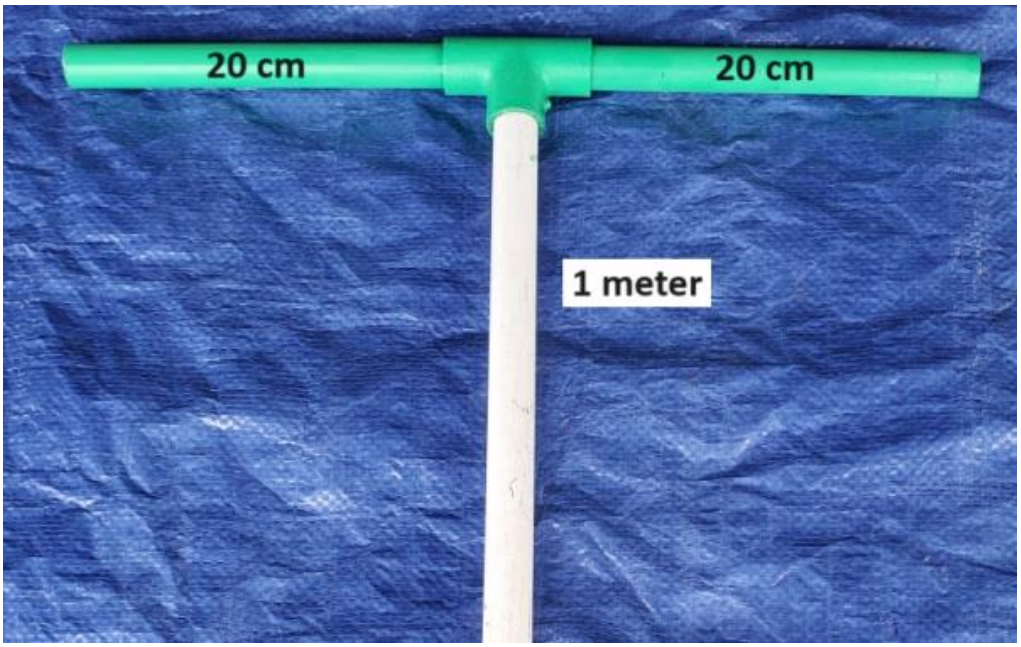

The sediment sample consists of Mexican Beach Pebbles with Velcro hooks attached.



The ADCP deployed in the designated area.

Task 4: *MATE Floats!*

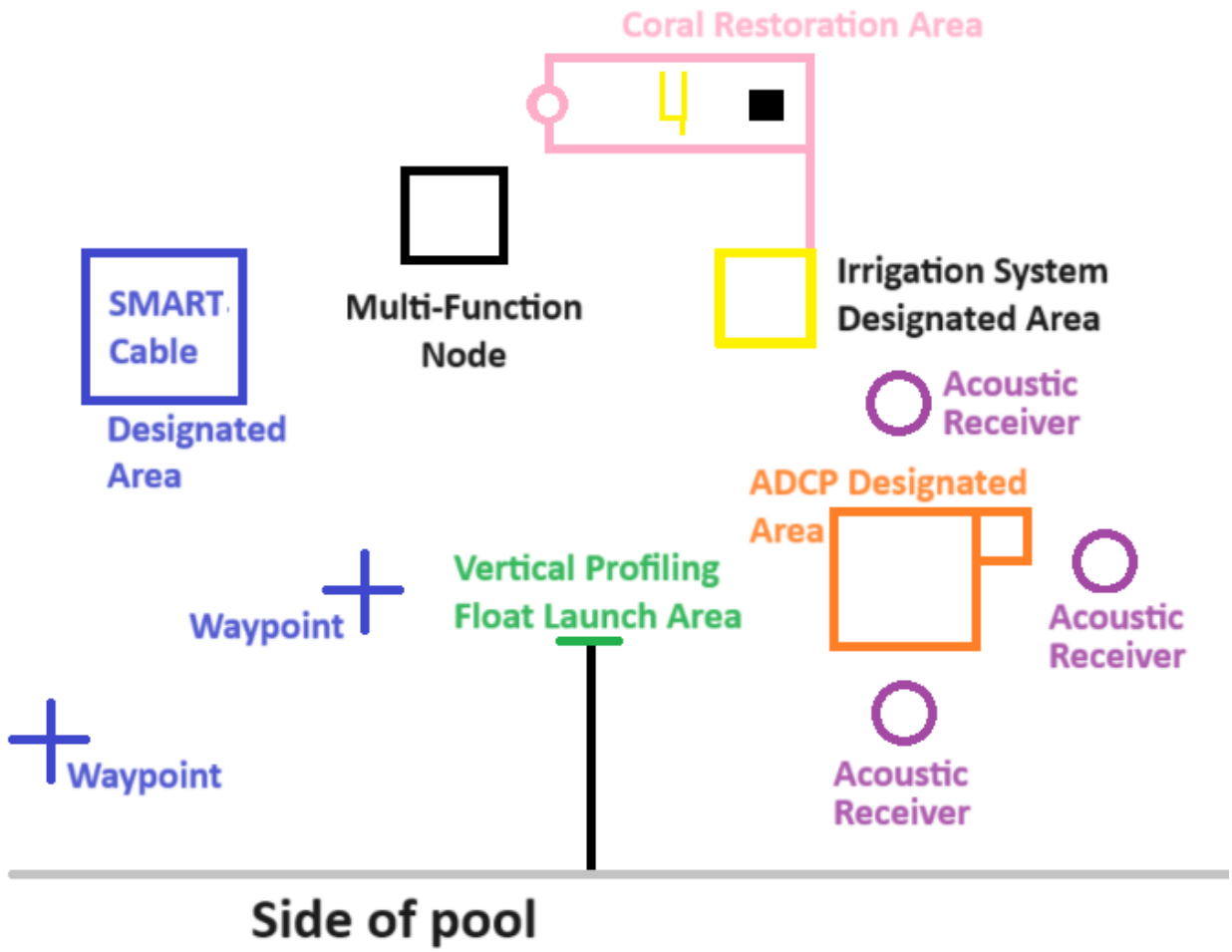
Task 4.1 Design and construct an operational vertical profiling float



Companies must deploy their vertical profilers anywhere beyond the green mark, which is constructed from ½-inch PVC pipe and set 1 meter out from the side of the pool.

SCOUT class product demonstration set up:

The following is a possible underwater set up for the SCOUT class product demonstration. The set up at regional events may vary.



Update Notes:
Updates are highlighted in yellow.

SCOUT prop building instructions.
None