

**2021 MATE WORLD CHAMPIONSHIP COMPETITION
NOT-SO-SECRET (BONUS!!!) MISSION**



Take Blue Tech to New Depths! banner

In addition to the product demonstration requirements of the MATE ROV Competition, your ROV has been requested to assist on a special project to *Take Blue Tech to New Depths!* The special project involves raising a large banner underwater. For this task, multiple ROVs will be working together, side by side, at the same time.

This is your company's BONUS MISSION, if you choose to accept it...

MISSION NOTES

All the necessary equipment for the bonus mission will be provided to you at the mission station. This will include a manual air pump on the surface, and a lift bag secured underwater near the worksite.

Companies must attach and fill a lift bag to raise their section of the *Take Blue Tech to New Depths!* MATE ROV Competition banner. The bottom of the banner will be secured to the bottom of the pool with weight. In addition, four 2-lb dive weights will hold the top of the banner on the bottom of the pool. Each 2-lb weight will be attached to the banner via a rope loop. Companies must retrieve a lift bag from a designated location on the bottom of the pool and attach it to the rope loop of their section. Once secured, teams will use the manual pump on the surface to fill the lift bag. When full, the lift bag will float the 2-lb dive weight, lifting that section of the banner off of the bottom and revealing the MATE ROV Competition's new tagline, *Take Blue Tech to New Depths!*

On Saturday morning, each company will receive one attempt to attach the lift bag to their section of the banner and fill the lift bag with air. Up to four companies (a mix of RANGER and EXPLORER classes) will attempt to attach and fill their lift bags simultaneously. Companies will have 10 minutes to retrieve their lift bag from the bottom, attach it to the proper segment of the banner, and fill it with air. Companies will have 5 minutes to set up and 3 minutes to demobilize their ROV.

Companies may only attach and fill their own lift bag; they cannot attach or fill another company's lift bag. However, companies may assist other companies by providing directions and guidance, returning a

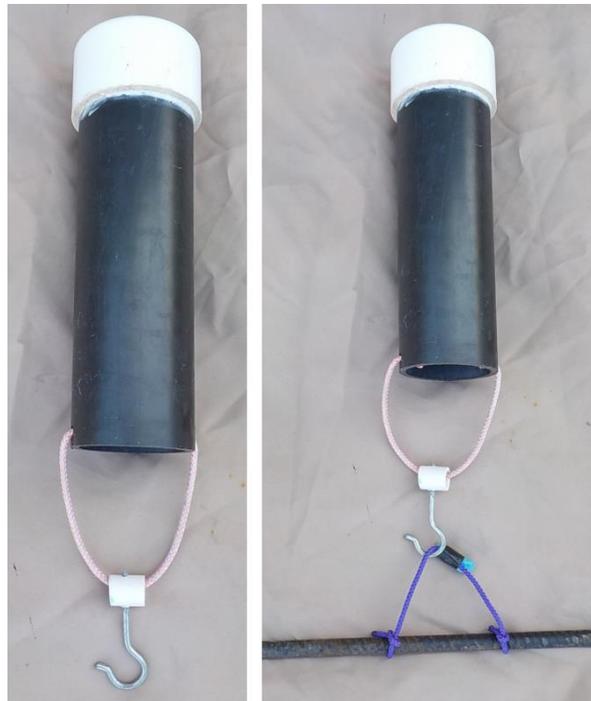
dropped lift bag to the side of the pool to resecure it to the ROV (only if asked), or allowing another company to operate their vehicle to attach and fill their lift bag. Note that companies should not interfere with another company attaching or filling their lift bag.

Companies will receive 10 points for successfully filling their lift bag and lifting their section of the banner off the bottom. Companies will receive additional points depending on how many total sections of the banner have been raised by all the companies involved. Points will be awarded as follows:

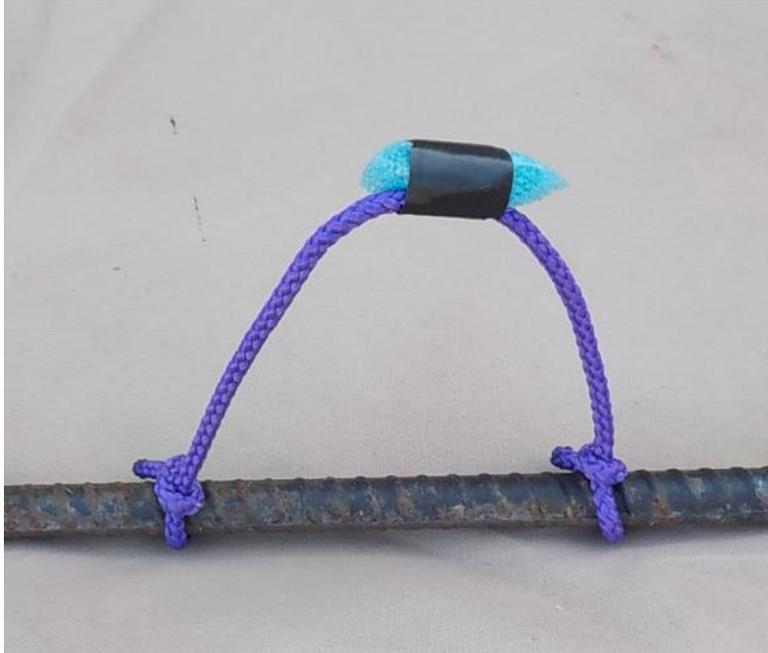
- 0 to 5 sections raised: 0 points
- 6 to 15 sections raised: 5 points
- 16 to 24 sections raised: 10 points
- 25 to 30 sections raised: 15 points

In summary, each company can receive up to a total of 25 bonus points. These points will be added to each company's total, overall score.

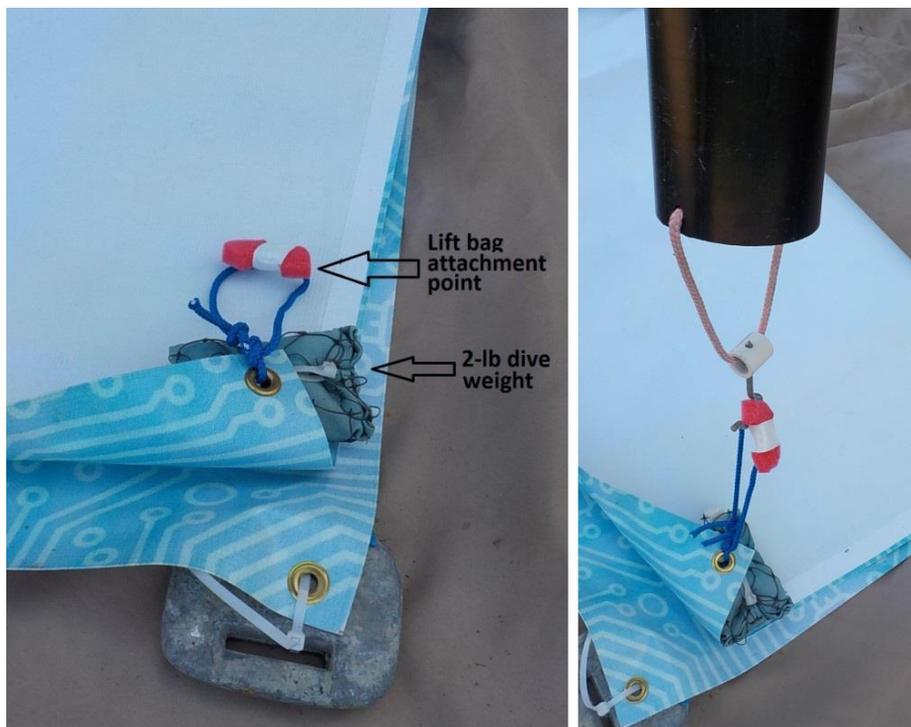
PHOTOS AND BUILD SPECIFICATIONS



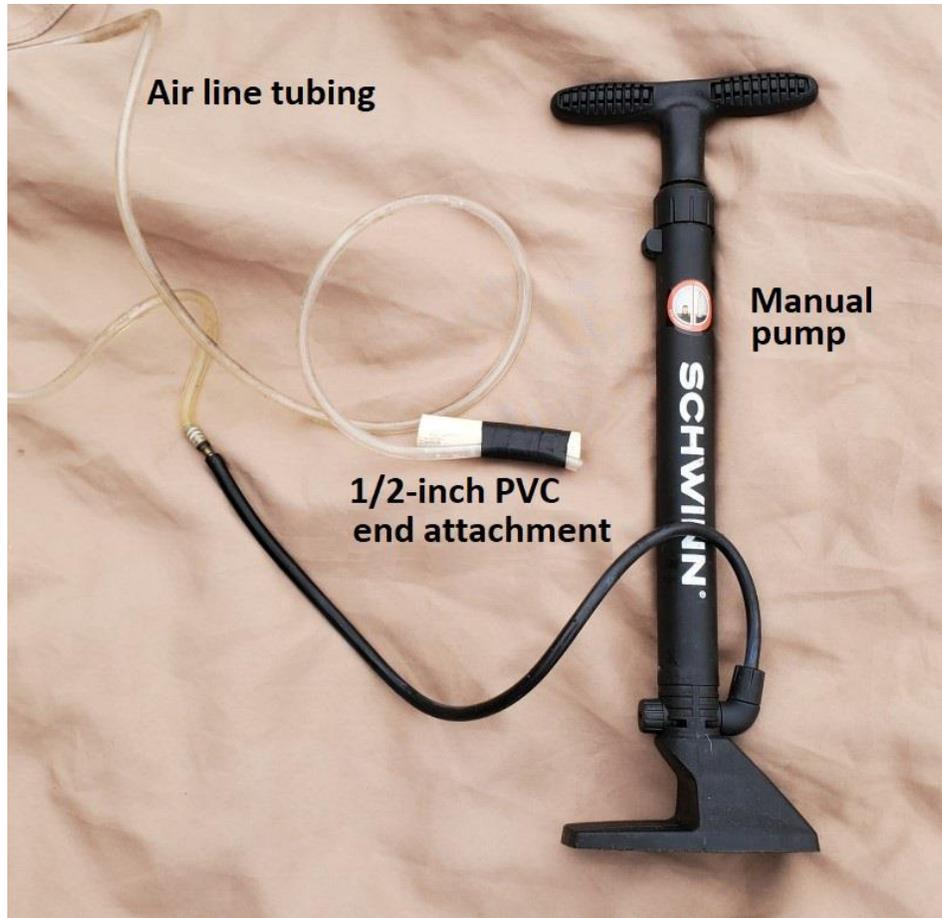
Left: Float bag constructed from 3-inch ABS pipe and a #6 screw hook. Right: Float bag secured at a designated location at the start of the bonus mission.



The designated location of the lift bag at the start of the mission is ½-inch rebar with a rope loop.



Left: The bottom of the banner will be secured with a heavy weight. The lift bag does not have enough volume to lift this weight. A 2-lb dive weight will be secured to the top of the banner. Right: When filled with air, the lift bag will lift the 2-lb dive weight and banner off the bottom of the pool.



The manual pump with airline tubing. A ½-inch length of PVC pipe at the end of the tubing can be used as a grab point.

Collaborative Bonus Mission Schedule

	Station 1	Station 2	Station 3	Station 4
8:40 AM	RNG 4	EX 1	EX 2	RNG 14
9:00 AM	RNG 8	EX 3	EX 4	RNG 15
9:20 AM	RNG 9	EX 5	EX 7	RNG 16
9:40 AM	RNG 10	EX 8	EX 9	RNG 21
10:00 AM	RNG 11	RNG 1	EX 6	RNG 18
10:20 AM	RNG 12	RNG 2	RNG 5	RNG 19
10:40 AM	RNG 13	RNG 3		RNG 7
11:00 AM	RNG 17	RNG 6		RNG 20