



2025 MATE World Championship Competition Bonus Collaborative Mission

In addition to the requirements in the competition manual, the Thunder Bay National Marine Sanctuary has requested that multiple ROVs assist with locating and revealing a hidden message concealed within containers aboard a newly discovered shipwreck. To expedite the reveal, multiple ROVs will be operating simultaneously and in collaboration with a Blue Robotics BlueBoat to achieve the objective. In short, companies will gather and transmit data to the BlueBoat, which will then transfer the data to the shore.



Blue Robotics Blueboat

[Blue Robotics - Underwater ROVs, USVs, Thrusters and Sonars!](#)

Companies will be assigned to work in groups of four. One ROV from the group will remove a length of PVC pipe that locks the lids of the containers. Once unlocked, each ROV will remove the lid of a cargo container, revealing a four-letter sequence inside. Once the four-letter message is revealed,

companies have two options. They can approach the BlueBoat and use a light source to flash the letters of the sequence in morse code to a camera on the BlueBoat. Alternatively, companies may retrieve and hold the plastic sheet containing the four letters in front of a BlueBoat camera. Meanwhile, one member from each company will be stationed at the BlueBoat shore station on the pool deck to receive the transmission (morse code or video) and to input the letters into the overall, unknown message.

MISSION NOTES

The four cargo containers will be identical to the cargo containers from Task 1.1 Shipwrecks, but will not contain colored tees or elbows. A length of ½-inch PVC with a tee on one end will extend through all four handles on the lids of the cargo containers. One ROV from the group must remove this length of PVC pipe locking the lids in place. Any ROV may remove this PVC pipe; companies can decide in advance which ROV will tackle this task. Once the pipe is removed, each company must remove the lid of their assigned container. The lid may be left on the bottom of the pool, or it may be returned to the surface, side of the pool. The lid is not considered debris. Each company will receive 5 points for removing the lid of its assigned cargo container.

Once the lid is removed from the cargo container, companies will have access to the four-letter sequence. The sequence will consist of a piece of plastic sheeting screwed to a length of ½-inch PVC pipe, and a 40 cm rope. The plastic sheeting will have four letters on it. Companies are not required to pick up or retrieve the plastic sheeting message board. Once they see their four letters, companies may move their ROV underneath the BlueBoat and transmit, in morse code, the four letters using a flashing light. The BlueBoat's camera will be facing straight downwards.

Companies that successfully transmit their letters via morse code will receive 10 points. Successfully transmitting the letters via morse code is defined as showing a judge at the BlueBoat surface station that 1) the company's ROV is in the camera view (82-degree angle) and 2) the flashing light. A company member must translate the blinking light to the judge at the BlueBoat station. Companies will receive an additional 10 points for successfully translating the blinking light into four letters. Successfully translating the blinking light is defined as verbally communicating to the judge at the BlueBoat station the four letters.

A morse code data sheet will also be available at the BlueBoat surface station, one for each company. Companies may try as many times as needed to translate the blinking light into letters. Company members at the BlueBoat surface station may communicate with the ROV pilot to attempt the blinking transmission as many times as needed.

Alternatively, companies may choose to hold the message containing the four letters underneath the BlueBoat in view of the BlueBoat's camera. If using this option, it is up to the company to retrieve the message board from the cargo container and maneuver it underneath the BlueBoat camera (82-degree angle) so that the letters are visible to the judge and company member at the BlueBoat surface station.

Companies will receive 10 points if they successfully hold their message board in front of the BlueBoat camera. Successfully holding their message board in front of the camera is defined as showing a judge at the BlueBoat surface station that your ROV, with the message, is in view of the BlueBoat camera, and that the four letters of the sequence are visible to the BlueBoat camera. Company members must verbally communicate the four letter sequence to the judge.

Companies will only receive points for one method of relaying the four-letter of the sequence. Companies cannot get points for both flashing the letters in morse code and holding the sequence in front of the camera.

In total, companies can receive 25 points in the collaborative bonus mission if they successfully remove their lid, transmit their four letters to the BlueBoat using a flashing light and morse code, and verbally communicate the four letters to the judge.

Companies are limited to six company members total and must send at least one of their six company members to the BlueBoat surface station to A) identify their vehicle when it comes into view of the BlueBoat, and B) to translate the morse code for the judge at the BlueBoat surface station. This company member(s) must also provide the four-letter sequence to a member of the Livestream crew at the BlueBoat surface station so their letters can be added to the overall message.

Companies are responsible for constructing and bringing their own light source capable of flashing on and off. This light source can be incorporated into the ROV, or it can operate as an independent sensor. A flashing light source operating as an independent sensor must follow the independent sensor rules outlined in the competition manual. A 12-volt power supply will be available at every station for powering an independent sensor. Companies may connect to this power source by red/black Anderson powerpoles.

Companies will have 10 minutes to complete their bonus collaborative mission.

Companies whose ROV is unable to open their cargo container, or unable to provide their four-letter sequence to the BlueBoat may use another company's ROV to complete their task. This ROV may be a company that is currently in the water or a company could pre-arrange to use another ROV from a company that is not competing simultaneously. In this case, two members from the ROV's company may accompany the six company members (for a total of eight) to instruct them on setting up and operating their ROV.

COLLABORATIVE BONUS MISSION BUILDING NOTES



The cargo container will be constructed from a [Sterlite 6 qt plastic container](#) with a lid. The handle for the lid is constructed from ½-inch PVC pipe. The cargo container will be exactly the same as the cargo container for **Task 1.1, Shipwrecks**.



The four letter sequence is constructed from [2-inch lettering](#) on a 15 cm x 7 cm corrugated plastic sheet. A 60 cm length of rope acts a carrying mechanism if companies elect to maneuver the message board into the BlueBoat camera view.



The four letter sequence inside the cargo container.

A ● —	J ● — — —	S ● ● ●
B — ● ● ●	K — ● —	T —
C — ● — ●	L ● — ● ●	U ● ● —
D — ● ●	M — —	V ● ● ● —
E ●	N — ●	W ● — —
F ● ● — ●	O — — —	X — ● ● —
G — — ●	P ● — — ●	Y — ● — —
H ● ● ● ●	Q — — ● —	Z — — ● ●
I ● ●	R ● — ●	

Morse code alphabet.

<https://inside.mines.edu/~coulston/courses/EENG383/lab/lab02/lab02.html>

THEM would be transmitted as: — —

	2025 World Championship <i>UN Decade of the Oceans, MATE Year of the Great Lakes</i> Bonus Collaborative Mission ALL CLASSES	Class: EX PN RN
		Company Number:
		Company Name:
		Judge Name:

Collaborative Bonus Mission task (up to 25 points)

5 points - remove the lid of the assigned cargo container	0	5
Up to 20 points		
10 points - transmit the four-letter sequence via morse code	0	10
10 points - translate the blinking light into four letters	0	10
or		
10 points - hold the message board in front of the camera	0	10

Total Collaborative Bonus (out of 25 points)

Official's initials: _____

Company CEO's initials: _____