FIRST Lego League Challenge Team Innovation Project: Marine Optical Modem
FLL Challenge Team B.U.I.L.D. 44199

Elizabeth B., Levi D., Saranya B., Siddarth V., Sullivan K., Vedant S., Vidyut N.

ABSTRACT

ROV tethers are damaged by boat propellers, causing the ROV to get lost or lose communication. Existing solutions include using alternate cable or clump weight methods, using currents to advantage, and more recently, using wireless technology underwater.

These methods have their own advantages and issues. The clump weight makes it dangerous for both marine life and humans by dragging up dust that can obscure their vision. Wireless technology in high turbidity waters only has a range of 50 meters. Acoustic technology can negatively impact wildlife.

Our solution is the Marine Optical Modem system or MOM, which consists of a repeater, and 2 Luma™ devices attached to the user's boat and ROV. First, the research vessel sends signals through its Luma™ device to the MOM repeater. Then the MOM repeater catches the signal with its top Luma™, which is then processed by amplifying and cleaning it up, and sends it to the ROV through its bottom Luma™. The reverse happens when the ROV sends data back to the boat. The communication is improved to 100 meters.

This solution removes the need for the large ROV umbilical winch, which improves safety and saves money ($60k). Plus, there is no yearly replacement of the tether ($1.4k) or a lost ROV($10k-$50k).