



HOW TO SAFELY ASSESS SUSPECT PACKAGES AT SEA

While working remotely has become a relatively new reality for a large workforce used to routinely commuting to an office, remotely operated vehicles have been performing important duties for decades. Operating in depths of the sea too unsafe for direct human intervention, these remote-controlled systems can be found reporting real-time subsea conditions back to their operators in a safe location. Whether part of a continuous monitoring program or during an emergency response, these units

help to quickly identify and assess situations that put people, places, or national security at risk. Albeit getting a visual reference on a potentially dangerous object is valuable, it is only half the battle. When an original equipment manufacturer supplying the security and defense industry was challenged to take their subsea surveillance capabilities a step further, they turned to Eddyfi Technologies.

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THE CHALLENGE

Investigate suspect packages found subsea without putting humans in any potential danger.

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THE SOLUTION

Robust manipulator provides remote handling on established underwater remotely operated vehicles.

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THE BENEFITS

Original equipment manufacturers benefit from increased capabilities with easily integrated, proven modules.

The Challenge

Working with government security and law enforcement departments, military dive teams, and fire and rescue services, the equipment supplier was presented with an opportunity beyond its usual scope. It had to prove that it could successfully pass rigorous testing that included moving and recovering suspect 7-kilogram (15-pound) packages over a distance of 100 meters

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(330 feet) as well as cutting through luggage straps, bungee cords, and 6-millimeter (0.2-inch) thick rope. A challenge for any small underwater remotely operated vehicle, the new application required collaboration with an industry trusted partner who fully understood the associated challenges of operating deep underwater.

As a supplier and strategic development partner with groups like the US Army Corps of Engineers, US Army Robotics Systems Joint Project Office, and Homeland Security Investigations Tunnel Task Force, along with numerous police and fire departments, Eddyfi Technologies' unmanned ground vehicles are utilized by stakeholders worldwide. With an adaptable design approach, they can accommodate different sensors and tooling to perform unique tasks. One example of a remote tooling application is replacing changeable modules on subsea structures, preventing production shutdown, and minimizing product loss. These remote tooling solutions can be used to carry out simple tasks or perform advanced intervention operations for assets found in the energy sector among others with a common goal of improved safety, life extension, cost effectiveness, and mitigating the need for production downtime.

In this scenario, Eddyfi Technologies' fully micro-controlled two-function manipulator arm was identified as the ideal solution that could easily integrate on the client's underwater remotely operated vehicle. Designed as a compact, powerful, and flexible deep-sea gripper, the manipulator successfully retrieves items in confined spaces or hazardous locations; the pressure-compensated housing allows the manipulator to dive to the depths of the ocean, and the anodized aluminum and 316 stainless steel parts allow it to thrive there. This tool is capable of producing high closing forces and provides an additional infinite rotation feature to align the jaws to the work piece. The manipulator has full 360-degree

2 head rotation and five interchangeable jaws for multiple tasks, anything from untangling tether snags to collecting samples to recovering objects up to 22.6 kilograms (50 pounds).

Transporting the 7-kilogram (15-pound) test object would prove difficult for any small remotely operated vehicle as the trim, or center of gravity, is moved outward from the vehicle causing it to pitch nose-down which in turn makes it hard to control. By modifying the tilt motor to mount the manipulator, operators were able to lift the object directly in front of the vehicle, then rotate it under the vehicle to maintain level and fly effortlessly to a safe location. Throughout testing, both the manipulator and this remotely operated vehicle received positive feedback from the operators.

According to another underwater remotely operated vehicle supplier, the search and rescue, military and law enforcement sectors have generated the most demand for Eddyfi Technologies manipulator. The integrated solution can be seen deployed by the Muskegon County Sheriff Team during a search and rescue training session here.

Our equipment continues to help provide security while protecting human environmental safety, and it remains our mandate not to replace people, but instead provide solutions that enable access to areas otherwise too dangerous or remote.



The Benefits

3 Built on a customer-centric adaptable design basis, our robotic systems offer solutions for remote tooling to provide increased value and efficiency through capability expanding equipment. With five available jaw sets, operators can perform more operations through remote control from a safe location.

Cutter: Cut nearly any material including plastic pipes, natural and synthetic ropes, even electrical cables.

Trident: For hard to hold objects, the trident grips the work piece using three fingers equally spaced around the jaw's rotational axis. It is also useful for holding ropes and wires without applying pressure.

V Jaw: With a wide maw, the V Jaw handles large objects with ease and doubles as a T-handle gripper.

Parallel: Knurled, parallel clamping surfaces allow for operation with hard to hold and delicate objects.

Sampler: Take virtually any type of sample from silt and sediment to sea life and flora with this fully enclosed scoop.

Eddyfi Technologies' Center of Excellence for Robotics invites you to explore its standard product offering. Bring your work specified modules or allow our in-house engineering and technical experts to create an OnSpec custom solution for your unique industrial remote inspection, handling, and/or tooling application. Get in touch today.