

Embracing Modular Design to Revolutionize the ROV for Industry

by Joshua Gillingham

Like the marine environments in which our remotely operated vehicles (ROVs) (Figure 1) operate, the field of commercial ROV design is a dynamic and ever-changing design space. Constant adaptation, innovation, and improvement are all essential to thrive in a market that is constantly on the move. Delivering reliable and more affordable client solutions while maintaining an unwavering commitment to quality has become a guiding principle at SEAMOR Marine.

A recent example of that very process in motion is the new modular flotation system designed by our team of engineers. Historically, the most iconic – and expensive – component of our ROVs has been the float: a custom cut, painted, and sealed syntactic foam block with an aesthetic hydrodynamic design. Unlike commercial Styrofoam, syntactic foam is composed of small glass spheres encased in a polymer resin that offers unparalleled structural resilience at depths of up to 700 metres. The manufacturing process is expensive and machining the material quickly wears down tools. Further, a critical scalability issue arises when manufacturing floats for larger ROV models. The original process, known for its superior final product, served as a catalyst for our team to explore new possibilities and find innovative ways to enhance it. We were inspired by the production costs, design limitations, and associated delays related to custom machining and painting, which led us to embark on a journey of improvement.

Managing floats on any ROV is challenging from the outset. More mass provides stability but also increases the momentum, which affects acceleration and manoeuvrability. Additional costs for shipping and servicing

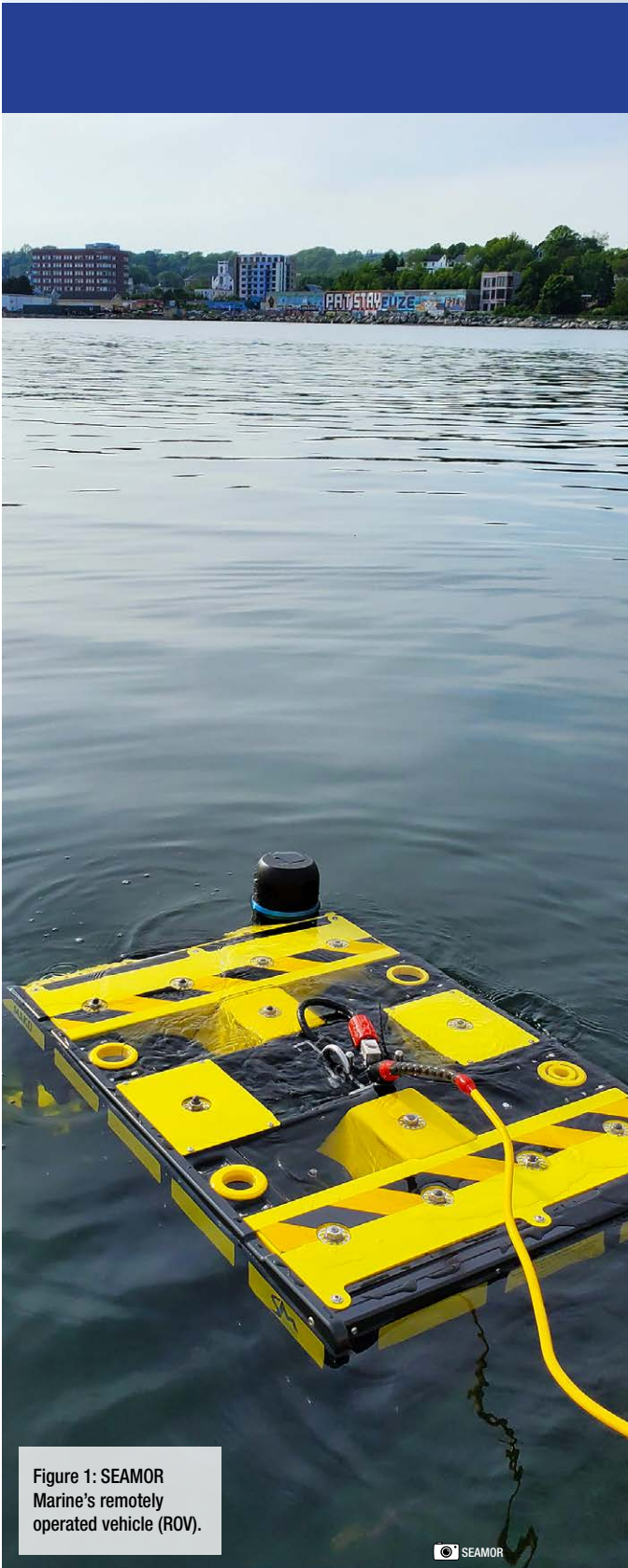


Figure 1: SEAMOR Marine's remotely operated vehicle (ROV).

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also impact client decisions as heavier units are more difficult to transport and more expensive to ship out for servicing. Less mass will offer the ROV pilot greater manoeuvrability in the water while also increasing the ease of transportation and deployment; however, a lighter float limits the pilot in terms of the instrumentation and payload. The original float design, which included custom-cut ports for thrusters, allowed pilots to fly well as trimmed, but limited their ability to adapt to different environments and payloads.

Rather than choosing either option, SEAMOR Marine engineers opted for both with a new modular flotation block system that would not only increase the adaptability of our ROVs but economize the production pathway, a decision that will pay dividends to the end user through lower production costs overall. Instead of working with custom-made syntactic foam floats, the team chose instead to adapt the design to use removable rectangular float blocks produced directly by the manufacturer with no post-processing required. These were housed high on the unit to maximize stability and make float block alterations as easy as possible for the pilot.

The aesthetic of the float, while less closely related to the technical details of the design, was also an important feature to maintain with this new modular float block system. SEAMOR Marine ROV owners take pride in their vehicles, both because of their superior performance in the water and the impressive display they make when out of the water. To sustain the SEAMOR Marine aesthetic, an elegant custom cowl was designed to house the float blocks and provide essential hydrodynamics to the unit. This preserved the exterior look of our ROVs while providing every advantage to the user offered by the modular float blocks.

The result of this innovative undertaking is a beautifully designed ROV with exceptional

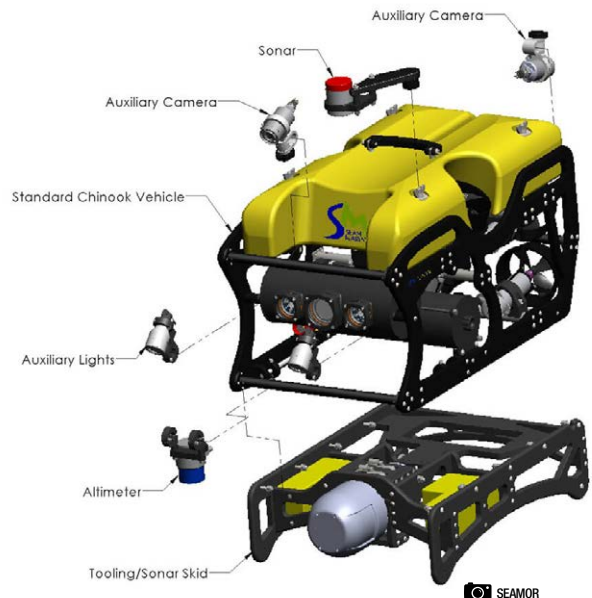


Figure 2: SEAMOR Marine offers remotely operated vehicles (ROVs) that have exceptional modular capabilities and can be adapted for a wide array of marine applications.

modular capabilities that allow users to adapt to a wide array of marine applications (Figure 2). Streamlining the production process ultimately pays dividends to the customer as it relates to overall unit cost. Inspired by this success, our team embraces a philosophy of modularity as we look to revolutionize our production process at SEAMOR Marine and optimize customization of each of our ROV units.

Every factor is a consideration in our design process, from production costs, to shipping weight, to stability, to performance, to ease of deployability and servicing. It is an intricate and ever-shifting puzzle but lead engineer Chris Parker believes that our new modular float block design addresses key end-user needs and adds immense value to our existing design.

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