



1000-m depth rated SEAmagine 3-person Aurora submersible diving in French Polynesia recorded the first-ever sighting of a "Prickly" Shark in that part of the world. (Photo credit: SEAmagine)

FEATURE

## THE KEY BENEFITS OF MANNED UNDERWATER VEHICLES FOR SOLVING SUBSEA CHALLENGES



By Charles Kohnen,  
Co-Founder & Chairman, SEAmagine  
HydroSpace Corporation



The argument can be made that the only truly "intelligent" autonomous underwater vehicle today is still an HOV (Human Occupied Vehicle), or manned submersible.

As we continue to make technological strides in robotics and autonomous vehicles, there are industries that envisage a future in which crewed vehicles become increasingly redundant. For many industries, including the subsea sector, autonomous vehicle technology has a promising future, but it

would be a mistake to suggest that it is the only path forward in addressing some of the more complex challenges the marine sector will likely face in the years ahead.

The simplicity, practicality, and low operating costs that some of today's new manned submersibles offer the marine sector, even for shallow water, is remarkable. Manned subs are independent from their surface support ships and they incorporate human know-how and real-time decision-making ability to the underwater work site.

These vehicles are competitive in their capital expenditures requirements and offer clear benefits in operating costs, operational efficiencies, the quality of recorded data, the quality of the situational understanding, and on the performance of complex underwater intervention tasks. These points can make the manned submersible the better solution, depending on a project's specific context and prime objectives, no matter whether the goals are scientific, industrial, or defense and security.

### ENGINEERED FOR EFFICIENCIES

SEAmagine HydroSpace Corporation is a California manufacturer of manned submersibles since 1995 and it has seen its own sector's technology evolve over the years, many of which the company pioneered. SEAmagine itself has numerous examples of accomplishing difficult subsea objectives with its manned subs using modest infrastructure. The company's subs offer significant benefits to an industry that is constantly seeking new efficiencies and asked to provide more affordable solutions.

For example, SEAmagine delivered one of its manned submersibles to the Argentinian Coast Guard's search and rescue department to help them locate, investigate, and recover victims from drowning accidents in the deep lakes located high in the Andes. The lakes in the Patagonia region are up to 500 m deep and much of the area has limited infrastructure. Mobilizing large surface ships and setting up a work class ROV operation in the lakes is simply not possible. With the SEAmagine subs, that country's coast guard's search and rescue team can now simply launch their SEAmagine sub from its boat trailer and let it float off, and thereby not require any launch and recovery system that are almost non-existent in the area. Then, using a surface tender, the sub is towed to the diving area and the team can readily do its diving mission to a 500 m depth. The rapid deployment ability, and the ease of deep-water access in a one atmosphere vehicle without requiring any large infrastructure topside are key ingredients.

The sheer simplicity of the operation with its inexpensive setup, its low running costs, and the efficiency with which the search and rescue officers can rapidly access a deep-water site and gain a full situational understanding of the underwater accident area as they investigate and locate the bodies, represents a powerful, practical, and effective solution. The manned subs have the same impressive subsea tools as work class ROVs and can execute equivalent tasks but without the umbilical and without the dynamic positioned (DP) surface ship requirement. This autonomy from the mother ship reduces the operational infrastructure, and their associated complexities, and costs.

### IDENTIFYING SEABED TARGETS

The true difference between an AUV and a manned sub was well illustrated by the late Dr. George Bass, founder of the Institute of Nautical Archaeology (INA), who demonstrated how his SEAmagine sub was instrumental in impressive archaeological survey finds with modest operational budgets and complexity.



SEAmagine 3-person submersible discovers ancient Roman amphora at a depth of 150 m near the Aeolian Islands in Italy. (Photo credit: SEAmagine)

During his survey for ancient shipwrecks in the Mediterranean, the challenge was not detecting shipwrecks—there are plenty—but rather locating and identifying ancient wrecks worthy of excavation. This process of elimination can be exhaustive and time consuming. Dr. Bass mentioned that, in one month alone, the survey team with the SEAmagine sub discovered 14 wrecks and 10 possible targets; on previous surveys, by comparison, weeks would pass without a single find.

*The reason the manned sub proved so successful was the team's ability to make in situ, real-time decisions about the wreck's worthiness of excavation.* This efficiency of identifying targets and determining their value is invaluable during underwater archaeology campaigns, search and rescue missions, and other underwater target search efforts.

SEAmagine produced two of its manned submersibles for the U.S. Navy's Naval Sea Systems Command (NAVSEA), delivered to the Azerbaijan Coast Guard to help them perform underwater counter terrorism inspections in



Two SEAmagine submersibles delivered in 2021 to the U.S. Navy's NAVSEA and operated by the Azerbaijan Coast Guard in the Caspian Sea. (Photo credit: SEAmagine)

the Caspian Sea. Again, the objectives were to keep operations simple with a manageable level of technology for the dive teams to be capable of handling the vehicles themselves. During the training phase, the subs performed 80 dives in 20 days, mostly in poor water visibility, and they were successful in all the drills that planted fake bombs for the crew to discover. The officers said that they felt safer performing the tasks in poor water visibility aboard their SEAmagine sub instead of wet diving the sites because, from inside the sub, they had access to subsea imaging screens giving them superior appreciation of the underwater structures' layout and gave them awareness of the debris littering a site's area.

The value of having people dive in one atmosphere vehicles and be on site underwater can have valuable benefits in making new discoveries that were unplanned and unexpected. For instance, in 2021, the crew aboard a SEAmagine sub made the first ever sighting of a prickly shark at a depth of 500 m in French Polynesia, and this discovery resulted in the publication of a peer reviewed scientific paper, something that would not have happened if the vehicle was simply preprogrammed and unmanned.

The manned submersible sector has evolved over the years and the technologies they represent today are remarkable, and the crew aboard them have extremely powerful subsea tools at their fingertips. The operational benefits of these vehicles being autonomous from the surface ship are augmented by the operator's powerful ability of real time *in situ* decision making. These are all important points that should not be overlooked by the marine sector, especially when seeking new solutions to new challenges.

For more information, visit:  
[www.seamagine.com](http://www.seamagine.com).