Exclusive

Meet the company seeking to take the surface vessel out of subsea

Texas-based Terradepth is developing a new autonomous underwater vehicle that it believes could reduce or even eradicate the need for surface vessels

Terradepth's large unmanned underwater vehicle prototype. (Photo: TERRADEPTH)

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Fresh from winning a key offshore energy contract, autonomous underwater vehicle and data specialist Terradepth is targeting the world's largest oil and gas companies with technology that it says can dramatically cut costs and reduce mission time compared to traditional subsea data gathering methods.

The Texas-headquartered company announced in May that it had won a five-year Master Services Agreement (MSA) with a major offshore energy company to deliver hydrographic survey and data services, with the first project being a liquefied natural gas export terminal in the Asia Pacific region.

While he will not disclose the name of the company — “they’re probably top two in the world” — Terradepth chief operating officer Kris Rydberg expects the agreement to unlock future business within the sector.

“The MSA we just got with a large oil and gas provider, that's got to turn heads,” he tells Upstream.

Founded in 2018 by former US Navy Seals Joe Wolfel and Judson Kauffman, Terradepth uses autonomous underwater vehicles (AUVs) and cloud infrastructure to acquire and analyse subsea data.

According to the company, its AUV technology and Absolute Ocean cloud-native platform can speed up open-ocean searches. Instead of one survey vessel with one sensor acquiring data, Terradepth says it can operate many autonomous vehicles at the same time, allowing it to cover larger survey areas in shorter periods.

While time and cost savings vary depending on the project, the company says that typical survey efficiency improvements start at around 10%, with some cases reaching up to 55% or more.

The company's AUVs can also operate in areas and conditions where traditional vessels cannot, meaning that delays — and the associated costs — due to issues such as adverse weather or challenging environments can be mitigated. And by being able to direct the AUVs close to the seabed, the vehicles can collect higher quality data, it claims.

“Instead of your traditional method of running a surface boat with a towed sensor of some type to get geophysical data, flying the robot as close as possible to the geophysical subsea floor or the infrastructure you're looking for is really going to get you better data,” says Rydberg.

> **“Our ultimate goal... is to reduce or eliminate the surface vessel completely**
>
> – Kris Rydberg, Terradepth chief operating officer

The company’s battery-powered AUVs are currently launched from a surface vessel close to the sites where they are deployed. However, plans are already underway to increase the autonomy of its AUVs, and further lower the costs of carrying out subsea surveys.

“Our ultimate goal, and this is what we're building right now, is to reduce or eliminate the surface vessel completely,” Rydberg says.

“If you have a robot that can be launched from a port or a terminal location or a boat or a ramp, then go out, mobilise to the location, and then actually run the survey, then come back with that information without having a surface vessel, that is the gold standard that we're shooting for.”

Terradepth is currently developing a large unmanned underwater vehicle (LUUV) with a range of up to 1000 nautical miles (around 1800 kilometres) and the ability to operate at a water depth of 1000 metres.

According to Rydberg, the vessel will be equipped with a hybrid power plant that can recharge itself while in operation, allowing the vehicle to stay at the survey site for longer.

“Once [the LUUV] realises that the batteries are depleting, it'll actually come to the surface, a snorkel will come up, it'll kick on a diesel genset, it'll recharge the batteries, and then it'll go back down underwater again.”

Terradepth's large unmanned underwater vehicle (LUUV) prototype in preparation for testing and development (Photo: TERRADEPTH)

While charging, the vehicle can also relay data back to shore from the surface, as well as provide operational updates on critical equipment such as the vehicle’s sensors.

With the company targeting 30-day deployments — dependent on factors including currents, weather, and how many sensors are being used — the cost savings compared to using a fully-crewed surface vessel for the same task are significant, according to Rydberg. How significant?

“Millions and millions,” he estimates.

The cost factor also frees up companies to collect new data more frequently to ensure they are working with the latest information, rather than relying on data that may have been collected potentially years before, he says (although the AO platform also stores past survey details allowing companies to review historical information).

With the AUVs able to relay their data to the AO platform for review while still at the survey site, the vehicles can be immediately sent to fill in any gaps in the data if needed.

Currently undergoing trials, Rydberg says that the company anticipates the LUUV will enter commercial operations in 2027. The company is also exploring using hydrogen-cell technology to eventually replace the diesel generator units, he adds.

Major opportunities

Rydberg says that being able to demonstrate the suitability of Terradepth's technology to the client was critical to securing the MSA.

Terradepth chief operating officer Kris Rydberg (Photo: TERRADEPTH)

"We had to go prove it," he says. "So that's what we did — they were able to do basically a bake-off, a comparison of the geophysical through a traditional method and the geophysical through your autonomous method. The fact we were able to process that data, get it back up in the cloud, share it with all the stakeholders in, you know, 10 times [faster] in terms of speed. They were all just blown away.

“I was told by the champion inside of the company that we have our MSA with that it typically takes five years to go through an MSA process from start to finish, because there's a lot of vetting, there's risk assessment, all those things. We did it in 18 months.”

With the MSA under its belt, the company is now looking to secure more business with some of the largest companies in the oil and gas sector, Rydberg says.

“Getting folks like industry majors interested in the value is what we're doing right now,” Rydberg says. “We're dialoguing directly with the top five oil and gas companies in the world. And so we're getting directly from them what they're looking for.”

Underwater security

In addition to oil and gas operations, the company is also having more conversations around issues of subsea infrastructure security, Rydberg says.

Given the cost and limitations of using surface vessels and other existing military hardware, smaller remote-operated or autonomous vehicles are a potential solution to combatting threats to critical seabed infrastructure such as oil and gas pipelines, electricity interconnectors and fibre optic cables.

A surge in sabotage attacks and threats against subsea infrastructure following the outbreak of the Ukraine war has prompted some European governments to step up monitoring of critical subsea infrastructure.

A number of Europe's armed forces have started to deploy hardware such as uncrewed surface vessels (USVs) or remote-operated vehicles (ROVs) to boost maritime surveillance. The UK's Royal Navy last month revealed it has **trialled an ROV** to clear unexploded ordnance and tackle sabotage threats against subsea pipelines and cables.

“We have those conversations happening quite frequently in multiple countries all at the same time,” Rydberg says. “Because they're all trying to overcome some of the challenges that they're seeing in what's going on in the state of affairs globally.”

He says that Terradepth’s AUVs could be used to monitor subsea infrastructure, with its technology allowing multiple vessels to take turns to surface and recharge so as to ensure continuous surveillance of key sites.

“There's definitely more of an interest in subsea autonomy for defence of countries and their critical infrastructure,” he says.

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