



Uncharted waters

Are microsups the next big thing in underwater exploration?
BP is about to embark on a mission to find out.

Bigger doesn't necessarily mean better in the underwater world. Small in both size and investment price, microsups are a new class of autonomous underwater vehicle (AUV) that can work collectively in a shoal to record a highly detailed picture of the underwater environment – and fast.

"We're adapting a microsups to perform environmental surveying that would normally be done at considerable cost using large-scale AUVs or remotely-operated vehicles (ROVs)," says Joe Little, technology principal in BP's digital innovation team. These underwater

watchdogs will also frequently patrol subsea infrastructure to provide early warning of any potential problems.

Joe's partner in this ambitious project, global environmental response expert, Peter Collinson, adds: "When you have numerous units working intelligently, the speed of work and the volume of data and information you get is very impressive."

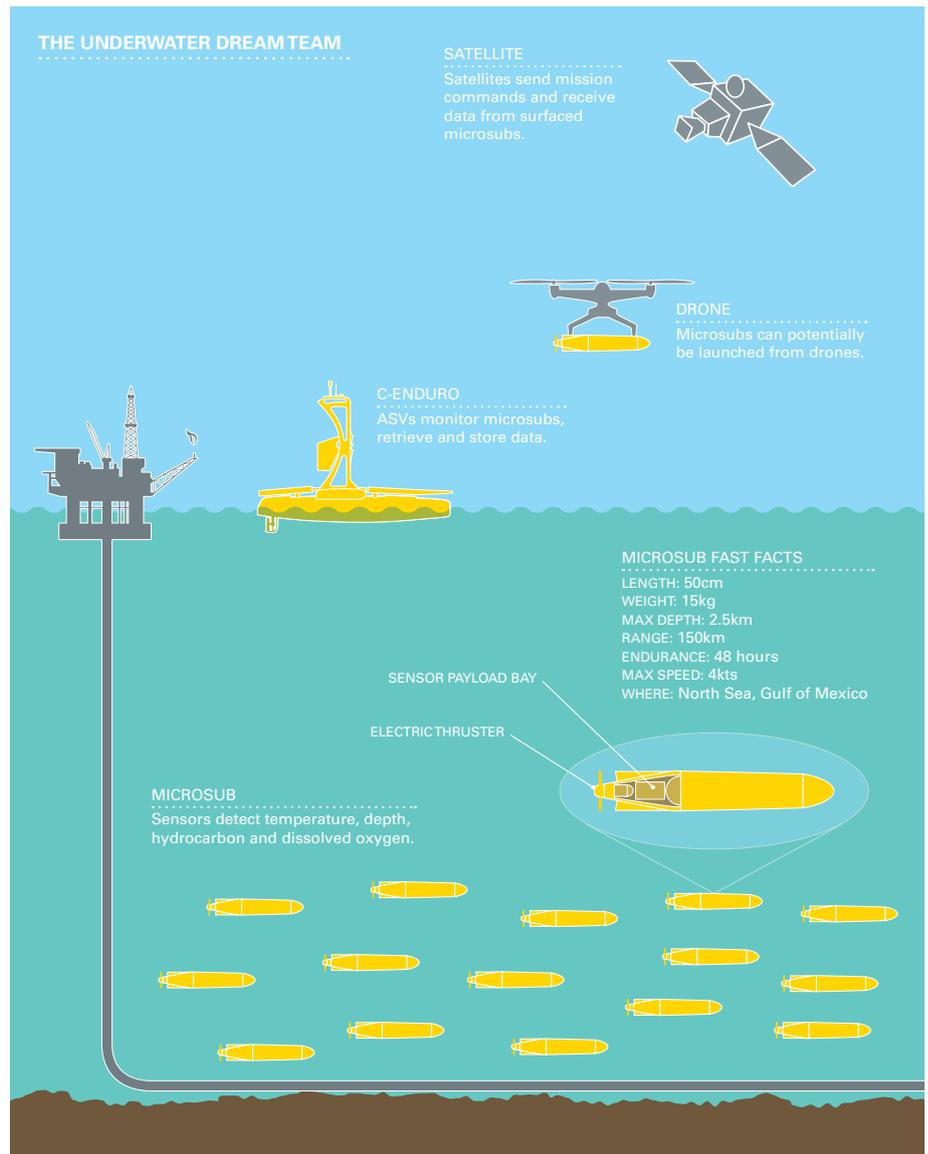
But for the moment this is just theory, to take the next step BP has partnered with manufacturer, Planet Ocean, the Marine Robotics Innovation Centre (MRIC)

50cm long –

microsups are around three times smaller than current AUVs

Range **150kms**

Prices from **£5,000**





at the National Oceanography Centre in Southampton, and the Scottish Association of Marine Science (SAMS) to fine-tune the technology ahead of its first trial in the North Sea in December. If successful, the plan is to roll out a shoal of microsups for environmental and operational monitoring, as well as crisis response planning, as soon as next year.

Strength in numbers

At just 50cm long, microsups are around three times smaller than current AUVs. Their tiny size allows them to explore previously inaccessible areas, such as shallow waters, wrecks and reefs, and makes them ideal for searching for archaeological artefacts and sensitive species. Microsups are also a proactive first line of defense: frequently monitoring infrastructure, such as pipelines for corrosion or potential leaks.

Being small also means they're easy to transport and launch, says Little. "There are a lot of different ways we could deploy them: crates on the seabed, platforms, the shoreline, helicopters – we're even looking into dropping them from drones." Always ready for action, microsups should be an invaluable tool in a crisis, both to provide immediate intelligence and to help minimise environmental damage.

Working together, a shoal of these vehicles can create a far superior 3D map of the underwater environment than a lone AUV. They can survey a large area very quickly, covering a range of 150kms. Paired with complementary technologies, such as autonomous surface vehicles and satellites, you can build a more complete picture of the oceanic environment than ever before.

But the difference from larger AUVs that has really attracted the offshore industry's attention is price. microsups can be bought for as little as \$7000. So, instead of one full-size AUV you could have 50 micro ones, and more eyes in the ocean means earlier warning of environmental or safety issues.

The evolution of marine robotics

Microsups are autonomous by design. Without any direct human control, they cruise underwater on a pre-programmed mission, scanning for information. As with larger AUVs, satellites are used to communicate with the microsup when it surfaces, either to receive data or send navigation commands.

A microsup's expected two-day battery life is enhanced by the ability to go dormant. They are smart enough to switch on when triggered by something, such as the presence of oil in the water, or be programmed to wake up at specific times to take measurements.

While AUVs have already overcome most of the limitations associated with ROVs – from cost to needing to be directly controlled by a large ship and crew – the small size of a microsup does have a downside. With less space for sensors, microsups won't offer the same image quality as larger machines, but should more than make up for that in data quantity.

"As microsups go up and down alongside our pipelines, we won't get high-definition video, but we will get very sensitive hydrocarbon and possible methane readings," says Peter. "We can tell if there's any hydrocarbon in proximity to our pipeline, consistently and at a phenomenally low cost."

Launch it and leave

With the oil prices low and the industry looking for ways to minimise costs while remaining safe and efficient, Collinson says this is the perfect time to trial cheaper alternatives to the equipment currently used for deepwater inspection. "At the moment, we're using the HUGIN AUV, which is essentially a 850kg submarine. While it has an endurance of around 30km and an incredible number of sensors, it does need a ship at the surface to monitor it.

"Microsups are a radical change from anything that's been done before. We don't need ships; we don't need people at sea: we've the ability to launch from almost anywhere. We believe they offer exceptional potential." ■