

# XOCEAN<sup>®</sup>

## FAQs



XOCEAN'S XO-450 USV AT SEA

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## USV

### What is an unmanned surface vessel (USV)?

An Unmanned Surface Vessel (USV) is a marine craft that operates on the surface of the water without a crew physically on board. XOCEAN's USVs are operated remotely by human USV Pilots in our Operations Centre via satellite communications.

### What are USVs used for?

XOCEAN's USVs are designed for the efficient and cost-effective collection of commercial ocean data such as fish stock analysis, seabed mapping (bathymetry), data harvesting and environmental monitoring.

### How big is it?

XOCEAN's USVs are small, around the size of an average car and half the weight.

- Length: 4.5m
- Width: 2.2m
- Height: 2.2m
- Weight 750kg

### What's the difference between Unmanned and Autonomous?

XOCEAN's system is an Unmanned Surface Vessel (USV). At all times a Human Operator is monitoring the USV and making decisions, for example on collision avoidance. Autonomous Surface Vessels (ASVs) do not require a Human Operator and instead rely on sensors and algorithms to make decisions.

### Over the Horizon operations?

XOCEAN's USVs offer full unmanned 'Over-The-Horizon' operations. Using satellite communications, each USV sends real time situational awareness data (including images) to XOCEAN's Operations Centre where a team of qualified USV Pilots keep watch and control the vessels 24/7. XOCEAN's USV Pilots are responsible for collision avoidance. The system works globally and does not need to be near land or a mother ship.

### How is it powered?

XOCEAN's USVs feature a fully automated hybrid power plant consisting of a solar deck, lithium-ion battery, intelligent control system and auxiliary micro diesel generator. Continuous electrical load capacity of 1,050W is available to power the vessel systems and sensor payload for up to 18 days.

### Is it stable?

A programme of wave tank testing has been performed at the Lir National Ocean Test Facility (Cork). This testing has shown the vessel to be highly stable in extreme wave conditions.

### What about pollution & emissions?

XOCEAN's hybrid power system results in 1,000 times lower CO2 emissions than conventional survey vessels and 1,300 times reduction in the carbon footprint.

### How do you steer the USV?

An XOCEAN USV Pilot in a control room defines a route consisting of a series of waypoints, this is uploaded to the USV over a satellite link. Once satisfied that it is safe to do so, the Pilot engages the proprietary autopilot and the USV tracks the selected route. The USV tracks to a high degree of precision, typically +/-0.6m. At any time, the USV Pilot can alter course using the XOCEAN CyberDeck.

### How do you manage collision risk?

The USV is monitored 24/7 by a team of USV Pilots located in XOCEAN's Operations Centre. The USV Pilots receive a constant stream of real time images and situational awareness data allowing them to change course as necessary. The USV is also equipped with several features making it visible to other marine users including navigation lights, sound signals, an active radar target enhancer and an Automatic Identification System (AIS).

### How do you monitor & control the USV?

XOCEAN's CyberDeck provides a highly secure cloud-based environment to monitor and control each USV. While at sea, each USV is monitored 24/7 by a human operator. The CyberDeck allows XOCEAN to monitor the quality of the data being collected and to adjust both the USV and sensor parameters as required. Through our mobile application, we provide customers real-time view access of the USV at sea including live images, position reports and weather data.

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## Missions & Sensors

### What type of sensors can the USV carry?

With a payload capacity of 100kg, XOCEAN USVs can carry a range of sensor equipment including multibeam bathymetry, fisheries research sonars, acoustic modems and environmental sensors.

### How do you manage data quality without a surveyor on board?

XOCEAN's CyberDeck provides a highly secure cloud-based environment to monitor and control each USV. This includes monitoring the quality of the data being collected in real time and providing an environment where sensor parameters can be adjusted as required.

### How does a typical mission work?

Transport to site is via road trailer (or shipping container) facilitating fast mobilisation. The USV is designed to be slipway launched from its road trailer. Once launched the USV is typically escorted out of the harbour environment by a safety boat. Once in clear water, control is handed over to XOCEAN's USV Pilots in our Operations Centre. Throughout the mission, the USV Pilots oversee the operation of the USV 24/7.

### How do you get the data ashore?

During the survey, the quality of the data collected is monitored in real time over the satellite connection. Where applicable, XOCEAN's strategy is for data to be processed offshore with only results files transmitted over the satellite connection. At the end of the mission, a hard drive with the full mission data is removed and delivered to the customer.

### Can different sensors be added?

XOCEAN's USVs allow rapid integration of multiple standard survey systems to meet client requirements. The onboard computing power facilitates installation of acquisition software and the satellite data connection allows that software to be operated remotely.

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## Commercial

### What is your business model?

XOCEAN's business model is unique by offering ocean data collection as a turnkey service to surveyors, companies and agencies. We manage everything from mobilisation right up to the delivery of data to our customers.

### Do you sell USVs?

XOCEAN's core business is the provision of ocean data collection as a turnkey service. We do sell USVs to universities and research institutions. If you are interested in purchasing an XOCEAN USV or collaborating on a data collection project, please contact us.

### How much does it cost?

XOCEAN's USVs operate 24/7, accelerating project delivery at typically one third of the cost of conventional manned survey methods. We offer fixed price, turnkey data with a no data, no fee guarantee. If you have a project in mind, please contact us and we would be happy to provide a quotation.

### Which regions are you operating in?

We are currently focused on delivering services in Europe and expanding into other markets from 2019.

**What makes you different to others?**

Using USVs, XOCEAN offers turnkey data collection services to surveyors, companies and agencies. Our platform operates 24/7, accelerating project delivery. We guarantee our service with both a 'no data, no fee' and a 'data quality' commitment.

**Are you a survey company?**

We are not a survey company, we are a data collection service provider to surveyors, companies and agencies.