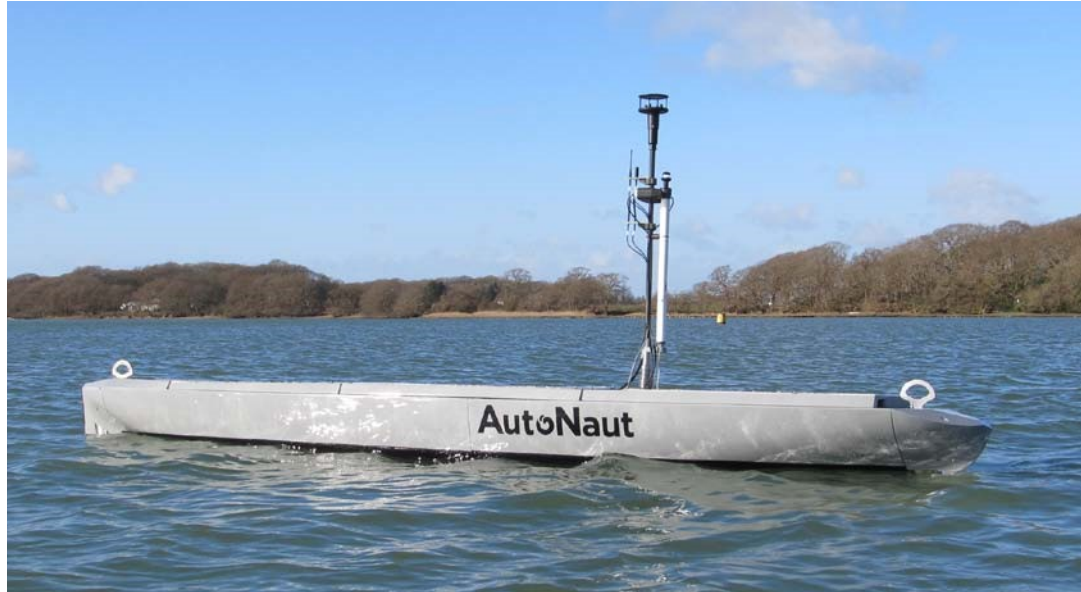


case study | QUANTIFY AND MONITOR FISH STOCKS

AUTONAUT'S ALMOST SILENT CAPABILITIES ARE IDEAL FOR MONITORING FISH.

With minimal disturbance to the environment, AutoNaut can be deployed in an incognito way and deliver the customer real-time data in order to quantify and monitor fish stocks.



In June 2017 AutoNaut deployed their wave-powered unmanned surface vessel (USV) "Islay" around the Swedish Island of Gotland. Islay is a 5-metre AutoNaut and this vessel enabled the Swedish University of Agriculture and Sciences, Department of Aquatic Resources, to fit the sensors they required to monitor fish stocks in the North Atlantic and Baltic Seas.

The AutoNaut is powered by 3 solar panels on the deck of the vessel. This allows the USV to be deployed for long periods of time without the need for carbon fuel. The AutoNaut provided data totally uninterrupted by noise pollution or human intervention.

As the AutoNaut is run on totally renewable energy it can be at sea for extensive periods and can retrieve true data of fish population sizes.



A highly successful data collection was achieved and, Jonas Hentatit-Sundberg from the Swedish University of Agricultural Science stated: "The data retrieved by the AutoNaut indicated high presence of pelagic fish in the area, probably a mix of Sprat (*Sprattus*) and Atlantic Herring (*Clupea Harengus*). We found that the AutoNaut as an autonomous platform complemented our existing ship based set up for hydro-acoustic surveying."

The ten-day survey took place near the largest seabird colony - the island of Stora Karlsö in the Baltic Sea is inhabited by approximately 80,000 birds. The unobtrusive nature of the AutoNaut was clear as the images of diving birds could be picked up on the fish finding sonar fitted to the USV; proving that the AutoNaut had little if any impact on the surrounding environment.

Using an AutoNaut for tracking tagged fish

AutoNaut provides the perfect platform for monitoring fish tagging. This can be achieved by fitting a sensor such as the VEMCO VR2C sensor which integrates perfectly on either the 3.5-metre or 5-metre vessel. This data can then be delivered back to the operator via the Iridium system on board. Alternatively, the information can be stored on the onboard computer and data retrieved once the AutoNaut has returned to shore or to the survey vessel. >>>

AutoNaut

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The National Oceanography Centre (NOC) took part in Europe's largest single deployment of surface and submarine autonomous vehicles for the first MASSMO (Marine Autonomous Systems in Support of Marine Observations) project. The NOC's AutoNaut effectively weathered several Atlantic storms while successfully collecting a range of oceanography and acoustic data, while tracking birds and fish with cameras and hydrophones.

Professor Russell Wynn, Chief Scientist of the MASSMO programme commented: *"AutoNaut is a great addition to the NOC fleet bringing with it unique capabilities, and we will continue to use the vessel for forthcoming science missions."*



The NOC scientist selected a 3-metre AutoNaut as it could fit the sensors required for deployment in Plymouth. The USV was fitted with fish tag hydrophones, tracking tagged fish in the Marine Protected Area (MPA) outside Plymouth Sound. 85 fish were tagged and released by the Marine Biological Association of Plymouth (MBA) prior to the deployment.

The use of an AutoNaut allowed the NOC scientists to gather a huge amount of valuable scientific and engineering data and harnessed the potential for unique scientific research throughout the world's oceans.

Available sensors

- **SIMRAD EK80 dual channel high precision scientific echo sounder with transducer**

The Simrad EK80 can operate many frequencies simultaneously ranging from 10 to 500 kHz. A wide selection of high quality accurate transducers are available. This sensor can operate with single and/or split beam transducers and provide the customer with a dedicated built-in application for calibration. The EK80 is specifically suited for permanent installation onboard a research vessel. It is very compact and a natural choice for portable use. The Simrad WBT Mini is specifically suited to installations on small autonomous vessels such as AutoNaut and will log data onboard whilst outputting limited statistical density figures for return over Iridium.

- **Vemco VR2C cabled receiver**

The VR2C cabled receiver enables researchers to have a permanent, real-time communication path to the receiver allowing them to easily check on the status of the receiver in the field and upload data at any time. The cabled receiver can be powered externally or internally via a backup battery. When external power has been disconnected, the backup internal battery provides power for approximately 10 months for 69 kHz option and 6 months for 180 kHz option and includes a battery life indicator.

- **EXO2 water quality monitor**

Multiparameter 6-port water quality sonde with anti-fouling wiper. The EXO advanced water quality monitoring platform includes the versatile multiparameter EXO2 sonde for oceanographic, estuarine or surface water applications.

- High-accuracy sensors with onboard memory
- Wireless communications
- Seamless integration into marine, estuarine, fresh water and ground water monitoring systems

It is an extremely versatile instrument, allowing the users to automatically configure a sonde with different sensor for different applications in minutes.

- **Cameras**

Multiple standard HD cameras can be mounted on the mast or on underwater fins to record video or stills. Images are stored onboard and some data can be sent back over satellite.

- **Thermal Imaging - in development**

Recent developments in marine thermal camera systems will upgrade the AN-Cam 360° to 24-hour capability.

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