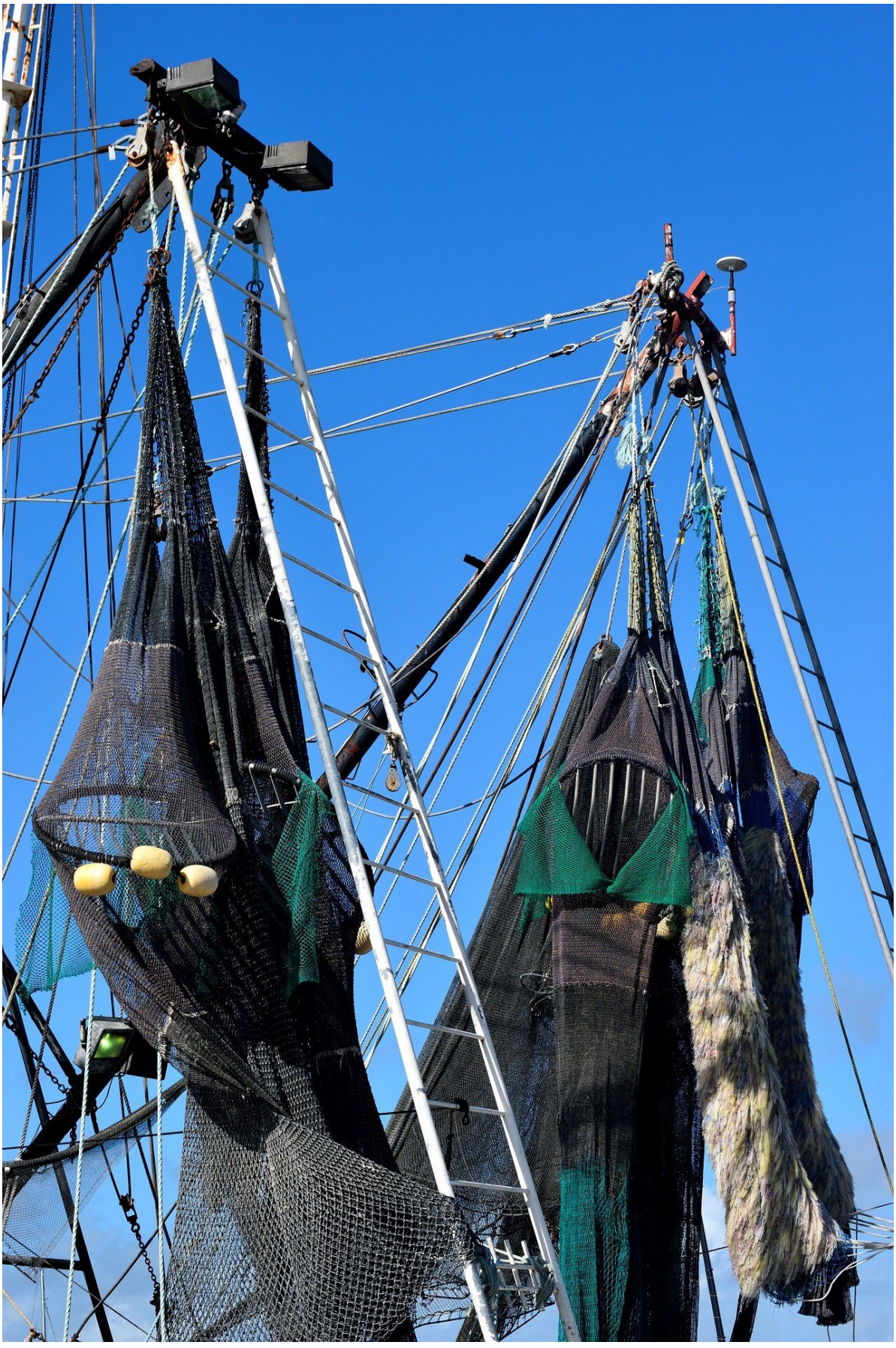
Fishing industry rides tech wave to go green

November 22 2023, by Helen Massy-Beresford



Credit: Pixabay/CC0 Public Domain

Sensors, "smart" buoys and high-tech traps can make fisheries in Europe more sustainable and profitable.

Professor Zigor Uriondo was so keen to make tuna fishing less polluting and more profitable that he refused to let the COVID-19 pandemic in 2020 scuttle a planned research trip to the Seychelles.

Uriondo, a researcher at the University of the Basque Country in Spain, is part of a project to help tuna-fishing vessels reduce fuel use. Called SUSTUNTECH, the four-year initiative runs through April 2024 and harnesses the EU's Copernicus satellite system.

Data magic

In early 2020, Uriondo flew to the Seychelles where two fishing boats involved in SUSTUNTECH were moored. He installed onboard sensors that measure fuel consumption and track the vessels in real time, according to a colleague named Dr. Carlos Groba, who leads the project.

"Once you have the data, then comes the magic," said Groba, research and development co-director of Marine Instruments, a Spanish electronic-equipment company.

The onboard sensors are needed to assess the potential for a 20% to 25% reduction in greenhouse-gas emissions from vessels. They're used in combination with "smart" buoys in the water that feature their own sensors to supply additional data such as water temperature.

The sensor information is then beamed every night to the Marine Instruments server, where artificial intelligence and machine learning crunch it—along with the real-time data from the buoys—into route guidance sent back to the vessels.

These insights make it possible to predict vessel-maintenance needs, avoiding engine failures at sea. They can also generate maps of where tuna fish are located, shortening fishing routes.

Fuel focus

In 2020, the EU had a fishing fleet of 73,716 vessels that landed 3.9 million tons of seafood worth €5.8 billion, according to official data.

Fuel costs are a top concern for the European industry, which has been hit by energy-price increases following Russia's 2022 invasion of Ukraine.

Europe's fishing fleet consumes almost 2 billion liters of fuel a year—roughly equivalent to the annual emissions from 1 million cars.

Fuel savings are good for both the environmental footprint and the bottom line of the sector.

"It's useful to see these vessels as data platforms that can improve fishing activity," said Groba.

With SUSTUNTECH in its final six months, Groba says Europe's fishing vessels can cut emissions significantly, but only if onboard sensors are installed on a broad scale.

Greening the fishing sector is an EU priority.

In February 2023, the European Commission outlined a range of steps for the industry to achieve net-zero emissions by 2050—when the EU as a whole aims to become climate-neutral.

Sea menaces

Seas and oceans are crucial planetary life-support systems. The EU is committed to protecting 30% of oceans by 2030.

Research helps to make fisheries more sustainable also by protecting seabeds, tackling overfishing, preventing sealife from being inadvertently caught and reducing plastic waste from nets and buoys.

Overfishing can endanger fish populations, including the tuna, several species of which—including the Atlantic bluefin tuna—are endangered. By-catch is the accidental trapping during fishing of unwanted fish or marine mammals, and "ghost fishing" occurs when lost or abandoned fishing nets get stuck on rocks or reefs and trap sealife.

The SUNFISH project, which ended in August 2022 after two years, started off with the idea of helping fishing companies find a profitable alternative to bottom trawling because it contributes to seabed damage, by-catch, ghost fishing, and in regions that—unlike Europe—lack quotas, overfishing.

By dragging across the seabed weighted nets and heavy plate-shaped devices that control the nets, trawling uses more fuel, releases stored carbon from marine sediments and harms natural habitats such as coral reefs and rock gardens.

Back to the future

The researchers found that the answer they came up with—a high-tech version of a traditional fish trap—would be useful in tackling by-catch, ghost fishing and seabed damage.

The cylindrical, netting-covered traps can be equipped with a transducer to monitor the catch.

The traps measure about 120 centimeters in diameter and can be deployed widely. If fitted with the right handling unit, even a small fishing boat could set as many as 200 of the traps a day, according to Tore Halvorsen, chief executive officer of Smart Ocean, a Norwegian fisheries-technology company that emerged from SUNFISH.

This modern take on an ancient method catches fish that are the right size, can use light as bait, and avoids accidental capture of—for example—larger sea mammals.

It can also reveal the volume of the catch, avoiding the need for manual checks and saving time and fuel.

"With a fish trap you have targeted fishing," said Halvorsen. "It's good news for the environment as well as for the value proposition as the fish are of better quality."

Let's hear it for the buoys

The SUNFISH researchers also developed GPS-equipped buoys that can be tracked via an app or directly from the vessel's sea map.

They bob on the surface of the water attached to the traps or nets below. The buoys can be equipped with sensors able to transmit images and data such as temperature or oxygen levels that offer valuable clues about conditions in the water.

Vessels can find smart buoys more easily in harsh weather and avoid the risk of losing expensive nets and other fishing gear.

About 640,000 tons of fishing gear enter the ocean every year—equivalent in weight to more than 50 000 double-decker buses, according to a Greenpeace report about ghost fishing.

"Ghost fishing is a big problem," Halvorsen said.

The high-tech buoys are also less likely than traditional ones to end up on beaches as plastic waste.

A little more than a year after the project wrapped up, its participants are taking the work forward by focusing on commercialization. They have already tested the buoy technology extensively in waters around Norway and are rolling it out in the North Atlantic region.

The feedback so far from fishing companies has been positive, according to Halvorsen.

"When it comes to a technology that can save money in fuel consumption, in loss of expensive gear, they're very keen on spending money on that," he said.

More information:

- SUSTUNTECH
- SUNFISH

Provided by Horizon: The EU Research & Innovation Magazine