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Innovation & Investment

Underwater robot seeks to scale New Zealand mussel farming

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By Responsible Seafood Advocate

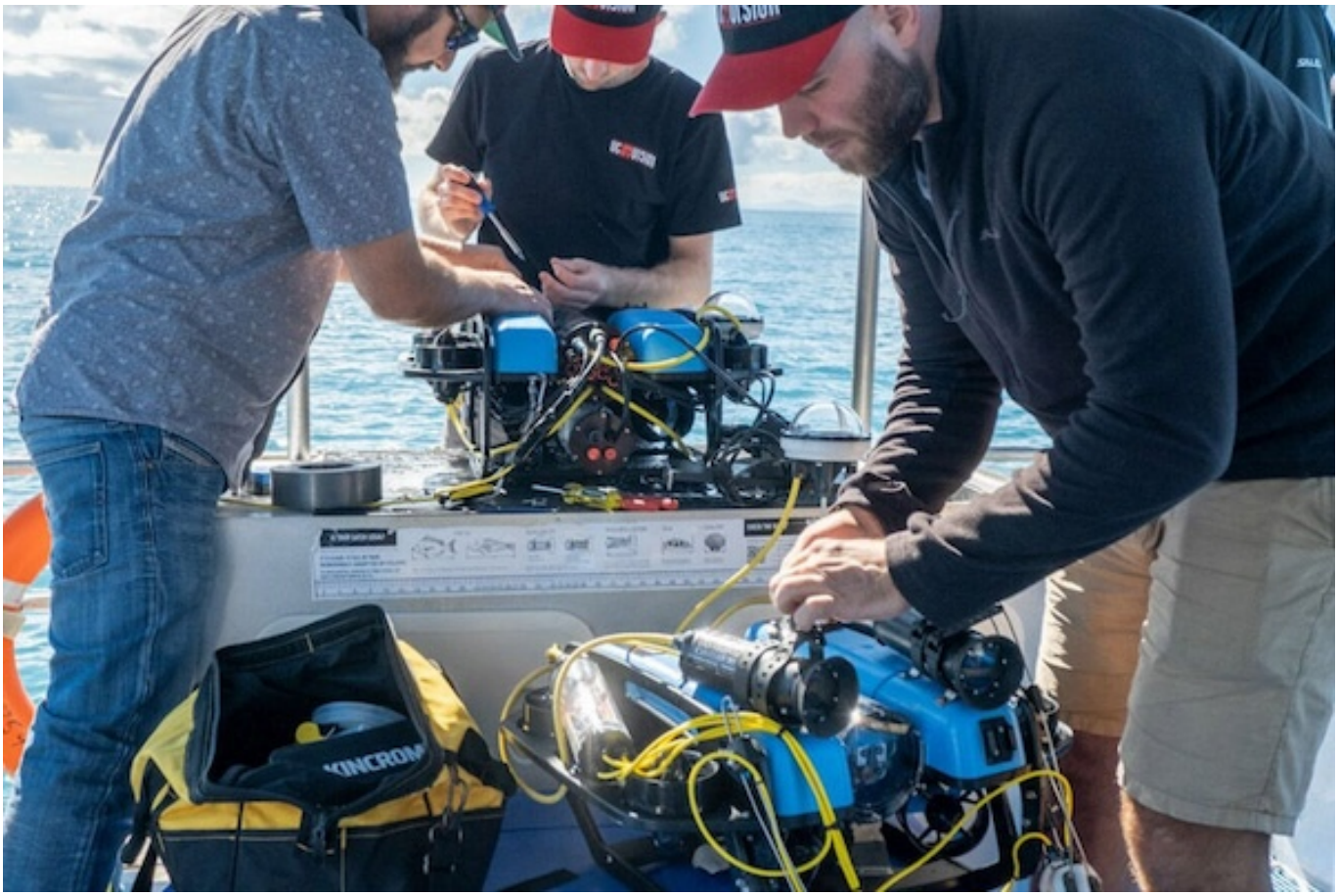
Automation would benefit planning for harvesting, processing

An underwater robot designed to assist New Zealand's mussel farms could offer a low-cost way to monitor growth and improve harvest planning. Developed at Te Whare Wānanga o Waitaha (University of Canterbury), the technology captures data on mussel size and density underwater, helping farmers predict yields and schedule processing more efficiently.

"What we're trying to do is put eyes underwater in a way that's not been possible before," said Tim Rensen, a Ph.D. engineering candidate who developed the innovation.

The autonomous underwater vehicle (AUV) and data-crunching algorithms "take the strain off a human having to drive this thing, day in day out, as well as all the data analysis, which makes it pretty practical," he added.

The AUV helps to de-risk aquaculture by providing key insights, using artificial intelligence (AI) to navigate and recognize species, as well as to perform manual tasks. Rensen is working with early adopters to validate the mussel-farm scanning technology and aims to turn it into a business by the end of the year.



A new underwater robot could help scale New Zealand's mussel farming industry by automating growth tracking and harvest planning. Photo courtesy of Te Whare Wānanga o Waitaha | University of Canterbury.

"Nowhere else is the capability, with so much AI, all integrated. But it's not just the technology, it's finding someone like Tim prepared to go the extra mile," said Professor Richard Green, Rensen's Ph.D. supervisor. "He has the passion but also the motivation to set up a company and understand what's required in order to take this past the research phase."

Moving towards commercialization, Rensen's role has morphed to Chief Technical Operator of a small company of several full-time staff while continuing to manage the research project.

"We are focused on de-risking aquaculture and saving money on large capital investments needed to scale, to allow New Zealand aquaculture exports to become a multi-billion-dollar sector," said Rensen.

New Zealand's expansive shallow continental shelf makes it ideal for establishing large-scale mussel farms as far as 10 kilometers (6 miles) offshore. With the government aiming to triple aquaculture exports over the next decade, the sector is under growing pressure to scale up sustainably. Mussels not only offer a valuable protein source but also help sequester carbon in their shells, adding an environmental benefit to their cultivation.

"With a lower carbon footprint than tofu, we're pleased to be supporting a sustainable food industry which has massive climate change mitigation potential," Rensen said.

Mussels could potentially replace other higher carbon footprint protein sources, "but it's only economically viable if you can automate as much as possible," Professor Green said.

The project team, which has been working closely with industry and iwi, sees other applications for the AI robotics technology, including marine inspections and other types of underwater aquaculture.

"What we're doing will help protect this pristine coastal environment and the values of the kaitiaki (guardians of the environment)," said Rensen. "And that's what drives us, even before we think about commercial success."

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