

Decade-old autonomous underwater robot by undergraduates finds legs in high-tech world

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ENGINEERS Grace Chia and Goh Eng Wei were part of an 8-person undergraduate team that built an autonomous underwater robot nearly 10 years ago, at a time when interest in autonomous vehicles was still nascent.

Their project shone at local and international competitions and was kept alive even after the founding team graduated from the National University of Singapore (NUS). In late 2018, it was spun off as a commercial entity called BeeX after winning consultancy and project contracts for oil and gas clients.

The startup now has its eye on further expansion after scoring a 7-digit seed funding round led by Cap Vista, the strategic investment arm of Singapore's Defence Science and Technology Agency.

Cap Vista, an early-stage backer of tech like artificial intelligence and quantum sciences, saw the potential of BeeX for both defence and commercial applications. Its investment comes as governments around the world increasingly lean on the private sector for research and innovation, an area once led by government expenditure in key sectors such as military enforcements and space exploration.

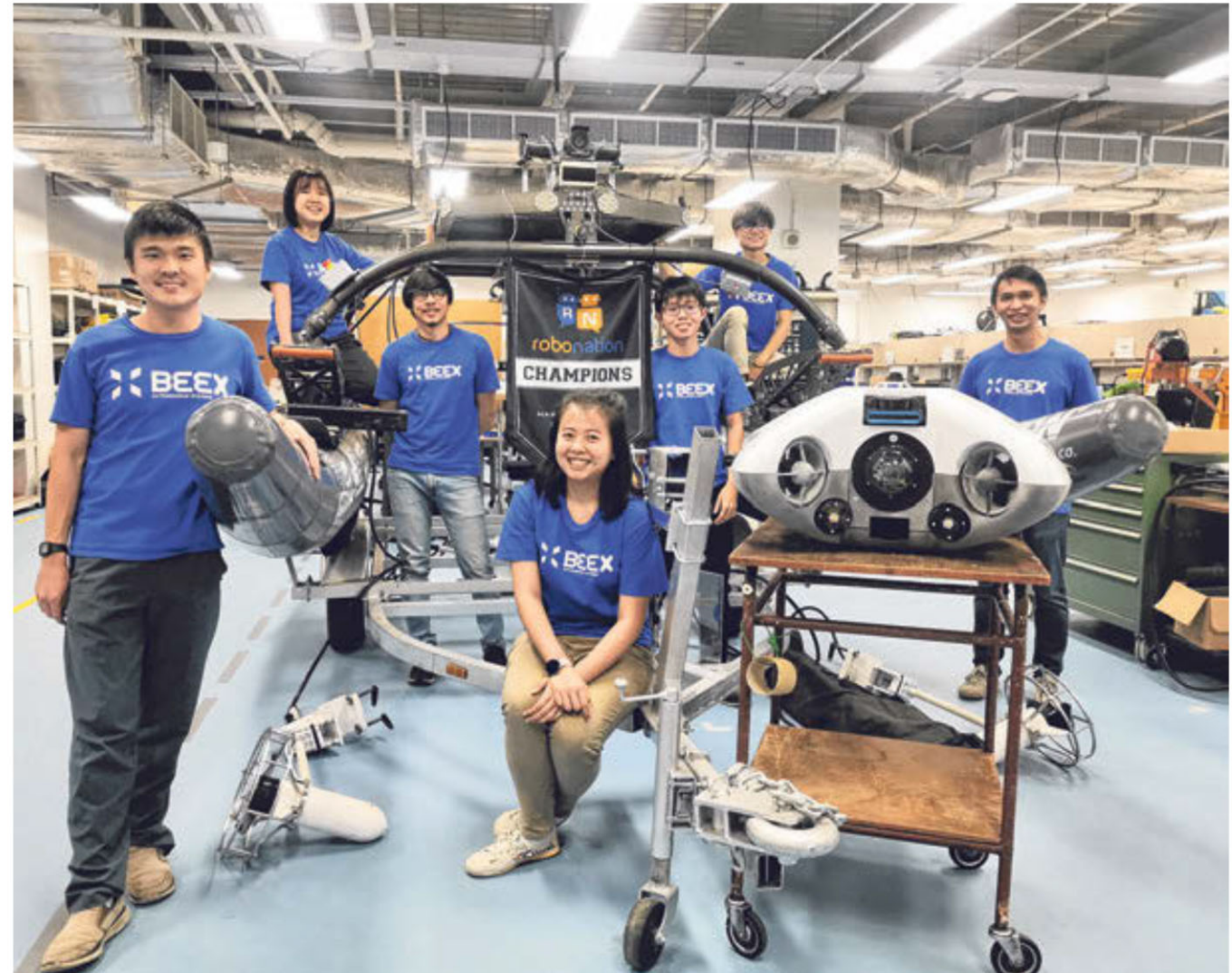
In the US, for instance, the private sector's share of research and development more than doubled from 33 per cent to 71 per cent between 1960 and 2019.

BeeX's product is essentially a self-driving car, but works underwater, said Chia, the chief executive of the startup. "The problem we're trying to solve is how to keep marine infrastructure safe without risking human lives out at sea."

Large-scale underwater inspections are often done in dangerous conditions. People either physically dive in, or are mobilised on large vessels to deploy human-controlled robots.

BeeX's flagship hovering autonomous underwater vehicle (HAUV), AIKANBILIS, runs on years of research and development in underwater self-driving technology to minimise the need for human involvement.

The team is starting with the



Autonomous underwater vehicle startup BeeX was co-founded by Goh Eng Wei (far left) and Grace Chia (centre), who worked on the early iteration of the technology together as undergraduates. PHOTO: BEE X

design and manufacturing of vehicles that can operate in low visibility and high currents.

Where most robots depend only on human pilots, cameras and post-processing, BeeX deploys real-time deep-learning algorithms using both optics and sound to adapt to changing conditions underwater, said Chia.

Two government agencies are using this technology to pre-emptively detect anomalies and adverse changes in their underwater infrastructure. Owners of floating solar farms, coastal jetties and refinery plants are also clients of BeeX.

Cap Vista's chief executive Chng Zhen Hao believes the startup's autonomous vehicle can be used for Singapore's mine counter-measure operations, which ensure that the Re-

public's sea lanes are mine-free.

With fresh funding, the startup plans to expand its software team, developing autonomous capabilities across more diverse and critical environments such as ports, vessels and anchorages.

Other investors in the company's seed round include the maritime fund of ShipsFocus-Quest Ventures, Enterprise Singapore's SEEDS Capital, and NUS. BeeX is also the maiden portfolio company of IMC Ventures, the corporate venture capital arm of the Tsao family's shipping business IMC Group.

The seed investment round is the first institutional backing for co-founders Chia and Goh, who spent time outside of their full-time jobs over the years to work on their project with an ever-expanding NUS

team.

The pair sees opportunities to further grow BeeX as more companies focus on sustainability. The company's hardware team plans to commission a larger and more powerful HAUV for harsher conditions – in wind farms located over shallow open water.

"With the climate crisis, people started investing a lot more in renewable energy... this has actually increased the amount of infrastructure on water that needs to be inspected," said Chia. "It's becoming an urgent problem and if we continue to do things the same way, a lot of these new technologies won't be well protected."

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