

# Taking tech to shipping

Singapore's PIER71 explains how it acts as a bridge between start-ups and maritime companies

**P**IER71, or more formally, the Port Innovation Ecosystem Reimagined at BLOCK71, was founded in 2018 through a joint collaboration between the Maritime and Port Authority of Singapore (MPA) and NUS Enterprise, the entrepreneurial arm of the National University of Singapore. Its starting brief was to boost innovation in the industry, specifically by creating opportunities for collaboration between maritime corporates and the start-up community.

To date, PIER71's annual Smart Port Challenge has provided a stage for more than 500 start-ups from around the world who have come forth with proposals to address business challenges faced by the maritime industry at large. To date, close to 60 have completed PIER71 Accelerate, a market validation and customer discovery programme. In addition, 32 of them have received MPA grants to help them embark on pilot projects with maritime corporates in Singapore with tangible results to show.

*Shipping Network* speaks with Brian Koh, director of corporate partnerships, NUS Enterprise, about the start-ups that have passed through its doors.

**Shipping Network:** What two shipping tech products or services are you most excited about in your programme?

**PIER71:** "Two areas that are of particular interest right now. Firstly, automation and robotics. Automation in port and shipping operations has immense potential to enhance efficiency and service levels, improve worker safety and conditions, as well as potentially generate new insights. Some of the focus areas and use cases are as follows:

1) Smart Ship Technologies: As Singapore is home to over 140 international shipping groups and over 5,000 maritime establishments, there is strong demand for smart ship technologies. One example is in vessel inspection and maintenance. The current process relies heavily on skilled manpower working in adverse environments such as confined spaces or murky waters. Recent developments in the use of autonomous and remotely operated robotics can provide accurate assessments of vessel integrity even in areas that are not easily or safely accessible by humans. One example is the use of inspection drones developed by Performance Rotors (Smart Port Challenge

2019 finalist) which reduce the risk of physical inspections in confined spaces such as vessel hulls and ballast tanks. Combined with artificial intelligence (AI), robotics can provide a wealth of data and insight to effectively make recommendations, take preventive or corrective actions.

2) Smart Port Technologies: As Singapore gears up towards our next-generation port at Tuas with a planned capacity of up to 65 million teu, it has also accelerated the development and use of autonomous technologies to enhance operational efficiencies. This includes autonomous guided vehicles and prime movers as well as automated yard cranes, in addition to technologies that ensure more efficient planning and optimisation of port resources. In addition, the use of big data and data analytics is also used to optimise scheduling of port and bunker operations which are subject to disruptions caused by external factors. Having access to real-time predictive visibility on container arrivals through a machine learning platform such as Portcast (Smart Port Challenge 2018 finalist) can improve efficiency of port and global supply chain operations.

"The second area is decarbonisation. With the International Maritime Organization's goal of at least 50% reduction in total annual greenhouse gas (GHG) emissions from international shipping by 2050, compared with 2008 level, there is a huge focus on decarbonisation across the industry. While Singapore works closely across the ecosystem to support the development of new technology and infrastructure for energy sources such as biofuels, hydrogen and ammonia, more immediate technical and operational measures are equally of great importance. Some of the upcoming solutions include AI and analytics that enhance vessel routing and reduce carbon emissions. One of the more exciting technologies we've seen recently is from Smart Port Challenge 2020 runner-up, FUELSAVE, which uses advanced combustion conditioning to tackle inefficiencies in the combustion process to reduce fuel consumption and emissions such as nitrogen oxide (NOx), carbon dioxide (CO<sub>2</sub>) and sulphur oxide (SO<sub>x</sub>)."

**SN:** What's on the horizon for international shipping tech development in the short to medium term?

**PIER71:** "Firstly, supply chain resilience. Recent developments such as Covid-19 and the Suez Canal blockage have highlighted the importance of maritime transport to support more than 80% of global trade, as well as the risks of global supply chain disruptions. This will create greater demand for new technology solutions that increase supply chain visibility, efficiency and resilience. This also includes Additive Manufacturing solutions that facilitate on-demand supply of marine parts.

"Second is seafarer welfare. The pandemic has cast a greater spotlight on seafarers' conditions at sea, and has already accelerated the development of new products and services that enhance seafarer welfare and training. From remote monitoring of their physical and mental health and well-being, to digital documentation and virtual reality based training, these will enable our essential frontline workers to continue to keep our supply chain flowing.



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**PIER71**  
launched its  
**Smart Port**  
**Challenge**  
**2021** in June  
Credit: PIER71

“Third is technical and operational measures for decarbonisation. While longer term alternative energy solutions are being explored and trialled in Singapore, there is scope for more immediate technical and operational measures to enhance maritime sustainability. This could include use of AI, data analytics and other innovative technologies to enhance emissions tracking, increase fuel efficiency, optimise vessel routes, reduce vessel turnaround times and reduce overall carbon footprint.

“Fourth is interoperability and standardisation. As more data platforms and information-exchange occurs between the actors in the global supply chain, interoperability and common data standards are increasingly important. The Maritime and Port Authority of Singapore (MPA) has taken the lead in several such initiatives, such as collaborating with several international partners on developing and adopting common data standards and Application Programming Interface specifications, which will facilitate data exchange for port and maritime services transactions. A successful electronic bill of lading (eBL) trial between Singapore and Rotterdam ports completed in January this year demonstrated the interoperability of electronic title transfer across different trade platforms – dtledgers (Smart Port Challenge 2018 finalist) from Singapore and NaviPorta from the Netherlands. The trial also showed significant time savings by reducing the processing time from six to 10 days when using hard copies, to less than 24 hours when using an eBL. To accelerate adoption of eBLs, MPA has issued a call-for-proposal in April 2021 to bring together industry players and solutions providers to develop and pilot eBL solutions leveraging recent technology and legislation developments.”

**SN:** What challenges do start-ups face in your region?

**PIER71:** “For one, they face industry intricacies. Start-ups that are new to maritime typically face challenges understanding and navigating the industry landscape. The nature of the industry makes it challenging for start-ups to test-bed prototypes, validate proofs of concept and commercialise their products/solutions without access to actual test environments such as ports or onboard vessels. This is where PIER71 comes in to provide mentorship and connections to the industry for a deeper understanding, and opportunities

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to collaborate with maritime corporates or other start-ups to accelerate adoption. As the industry is undergoing a major digital transformation, some innovative solutions may also require changes to current processes or even regulatory intervention. To position Singapore as a hub for innovation and experimentation, MPA, together with PSA and Jurong Port, have established three Living Labs that serve as real world labs with a trial environment for new technologies, whilst also providing a space for regulators to have a better understanding of the tech and its limitations. In particular, the MPA Living Lab comprises the Maritime Innovation Lab, Maritime Data Hub, and Maritime Drone Estate, which have benefited several PIER71 start-ups.

“They also face the challenge of scaling. PIER71 has helped to catalyse successful pilot projects with positive results since the programme started in 2018. The next challenge for start-ups is to gain traction for wider adoption across the maritime industry, get access to the larger regional market outside of Singapore, and find the right funding options for their business. We have a strong and globally connected ecosystem that start-ups can lean on to scale up, including access to talent and technologies through the wider network of NUS. Promising start-ups and scale-ups can also apply for a grant of S\$50,000 or S\$100,000 as part of a new grant scheme called MINT-START-UP announced by MPA in June this year. PIER71’s programme will be further enhanced in the coming years, to focus on helping start-ups to scale, internationalise, and access a wider network of private capital and venture funds.” **SN**

For more information about PIER71 and the start-ups it has supported, go to [www.pier71.sg/](http://www.pier71.sg/).