

Charting multiple pathways to one green future

p2

Arbitration
in the age of
disruption

p5

Collaborate,
not compete to
get solutions

p7

\$120m fund to support Singapore's vision of a green maritime future

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Singapore is pushing ahead with its goal to position the maritime industry for a decarbonised future with a \$120 million war chest that will support key projects, promote collaboration, and develop new technologies.

The Maritime and Port Authority of Singapore (MPA) signed a Memorandum of Cooperation with BW Group, Sembcorp Marine, Eastern Pacific Shipping, Ocean Network Express, Foundation Det Norske Veritas and BHP yesterday – marking a milestone in the industry's collective push towards decarbonisation.

Under the agreement, each private sector partner will put in \$10 million to support the building of the decarbonisation centre, fund maritime decarbonisation-related research and technology development projects, and collaborate with institutes of higher learning and research institutes.

MPA, for its part, will contribute \$60 million in research and development funding, bringing the fund to a total of \$120 million.

The maritime decarbonisation centre stems from a recommendation made by the International Advisory Panel on Maritime Decarbonisation (IAP), which comprises 30 global leaders, including from Singapore, representing industry, academia and government.

The signing was one of two agreements inked yesterday, witnessed by Mr Chee Hong Tat, Senior Minister of State for Foreign Affairs and Transport.

The other was a Memorandum of Understanding with Singapore-headquartered investment company Temasek to collaborate on the decarbonisation of port operations and the development and use of low-carbon and/or alternative marine energy sources. Both parties will also look into the decarbonisation of the other parts of the global and regional maritime supply chain.

"Maritime decarbonisation is a global challenge requiring a collective responsibility from all stakeholders involved," said MPA Chief Executive Quah Ley Hoon. "The agreements signed today are two initial steps, which we hope will catalyse a larger, much needed momentum to make international shipping more sustainable."

At the event, the IAP also submitted its recommendations to the Singapore government. It was set up in July 2020 by the Singapore Maritime Foundation (SMF) to develop a strategy for the industry to



Mr Wong Weng Sun, President and CEO of Sembcorp Marine, and Mr Andreas Sohmen-Pao, Chairman of BW Group and the Singapore Maritime Foundation, are Co-Chairs of the International Advisory Panel on Maritime Decarbonisation (IAP), which unveiled its strategy for the industry to achieve its decarbonisation goals yesterday.

achieve its decarbonisation goals.

"The IAP's vision is for Maritime Singapore to support the decarbonisation of the industry to meet or exceed the IMO goals for 2030 and 2050, and to do so by shaping carbon measures, setting standards, piloting innovations, building infrastructure, deploying incentives, and connecting stakeholders," said IAP Co-Chair Andreas Sohmen-Pao. He is also Chairman of the SMF and global shipping group BW Group.

The International Maritime Organization (IMO) has set targets to reduce carbon emissions per transport work by at least 40 per cent in 2030, compared with 2008 levels, and is pursuing efforts towards 70 per cent by 2050. It also aims to halve total annual greenhouse gas emissions from international shipping by 2050.

To achieve its vision, the IAP has recommended focusing on four strategic objectives: harmonise standards; implement new solutions; finance projects; and collaborate with partners.

It has identified nine pathways to maritime decarbonisation, including policy options to accelerate the transition and ways in which Maritime Singapore can support the industry's decarbonisation. They include shaping common metrics for carbon accounting, building flexible ship capabilities

and relevant infrastructure, and developing green financing mechanisms, among others.

Drilling down further on the importance of collaborations and taking action, it also identified a range of joint projects to embark on. These projects include conducting fuel and electrification trials for vessels, exploring carbon capture technology on vessels, and experimenting with fuel cell technology.

Chairman of the Board and Governing Council of the Singapore Maritime Institute Wong Weng Sun, the other Co-Chair of IAP, said it would be important to keep up the momentum in the journey towards maritime decarbonisation. Mr Wong, who is also Sembcorp Marine President and Chief Executive Officer, added that the joint projects IAP has identified will bring about concrete action.

Mr Chee, noted that the IAP's recommendations will be taken into account when developing the Maritime Singapore Decarbonisation Blueprint 2050, which will outline long-term strategies for a sustainable Maritime Singapore.

"The fight against climate change is a global ambition and a collective responsibility. Singapore is committed to do our part to support the IMO and the international maritime community in climate action," he said. ■

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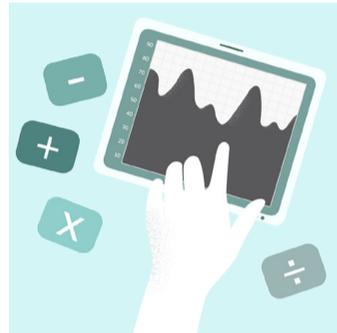
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PROJECT DECARBONISATION

The International Advisory Panel on Maritime Decarbonisation has suggested several areas and projects for collaboration that would accelerate efforts towards the industry's decarbonisation goals. Here's a quick look at the key areas outlined in their report "Decarbonisation Pathways for the Global Maritime Industry."

9 roads to one objective

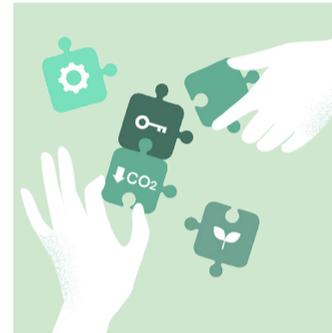
1. Shape common metrics for carbon accounting



2. Set standards for new technologies and solutions



3. Pilot trials and deploy solutions



4. Build flexible ship capabilities and relevant infrastructure



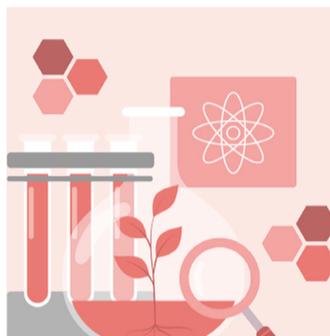
5. Develop green financing mechanisms



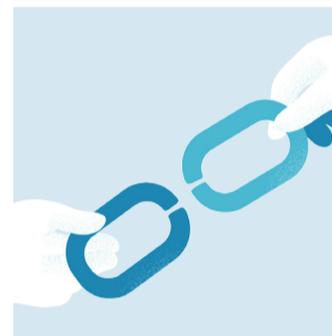
6. Develop mechanisms that could support carbon pricing



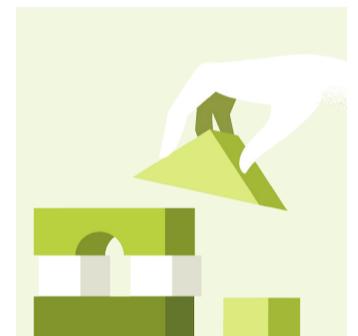
7. Act as custodian for and deploy research and development funds and grants



8. Multiply local, regional and global collaboration across stakeholders



9. Set up a decarbonisation centre



GRAPHICS COURTESY OF IAP / SMF

The IAP also highlighted several projects that could push the industry forward towards reducing its carbon footprint.

COLLABORATIVE ECOSYSTEM

- Establish a Decarbonisation Centre, in partnership with the private sector, to spearhead decarbonisation efforts. This centre will also team up with other global centres, such as the Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping.
- Publish carbon footprint measurements for commonly-plied maritime trade routes.
- Develop a voluntary carbon market that trades in maritime offset credits.

FUTURE FUELS

- Embark on trials for future fuels, such as biofuel for tramp services and fuels for regional container feeder vessels.
- Retrofit and construct newbuild vessels to use methanol and ammonia as marine fuels, and raise awareness of ammonia as a zero-emission fuel, such as through workshops.
- Carry out studies on green ammonia bunkering in Singapore and the subsea storage of green ammonia.
- Push frontiers in alternative fuels by testing hydrogen and solid oxide fuel cells with cross-industry players.

INNOVATIVE TECHNOLOGY

- Shell Eastern Trading is looking at the electrification of ferries calling at Pulau Bukom.
- Explore carbon capture technology onboard vessels.
- Develop "just-in-time" operations with digitalPORT@SG™ at the Port of Singapore.





More captains and cooperation needed for maritime decarbonisation

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As the global maritime industry embarks on its mission to decarbonise, leadership and collaboration will be the two key drivers for success.

“Given that climate change is a global challenge, we need to now come together to resolve this,” said Ms Quah Ley Hoon, Chief Executive of the Maritime and Port Authority of Singapore (MPA). “We need players to come together and make the first step forward.”

She was one of four panelists speaking at a panel debate at the “Towards Zero Emissions – Sharing the Norwegian Experience” special insights panel, which focused on the decarbonisation issue in the maritime industry.

Held in conjunction with the Singapore Maritime Week, it was organised by the Norwegian Business Association Singapore in partnership with MPA, the Royal Norwegian Embassy in Singapore and Innovation Norway.

But plenty of obstacles stand in the industry’s efforts to decarbonise, said Heron Advisory’s Managing Partner Ronny Waage, who moderated the session. Among them were the steep infrastructure costs needed for alternative fuels like ammonia, and the overall investments required globally.

For instance, he noted that an estimated US\$1 to US\$1.4 trillion will be needed to be spent on infrastructure alone. Such enormous sums will not only require the shipping industry, but the entire value chain to work together.

“We have to come together with the renewable energy players, whether it is solar power or hydro power,” said Mr Narsimha Rao, Senior Vice President of Production, Supply Chain and Operational Excellence at Norwegian chemicals giant Yara.

“Singapore is the bridge between East and West in the world. We really need your voice to drum up support for aggressive regulations on carbon in Asia. I challenge Singapore to take a leadership role in this.”

For now, he said that ammonia currently has the biggest potential to be shipping’s newest alternative fuel. The compound is comparatively easier to store than liquid hydrogen, and has a high energy density by volume. This makes it more efficient as a fuel source.

But the efforts will take time to bear fruit. Ms Quah said that ports will need time to prepare for its infrastructure and regulatory standards to meet the changing landscape.

She pointed out that it took eight years for international bunkering standards to be established for liquefied natural gas (LNG), the only alternative fuel currently in use now.

“We’re pragmatic about it,” she said. “We’ll need a lot of work in the next five to 10 years with other port authorities to come up with bunkering for alternative fuels.”

Singapore is working together with Japan and the Port of Rotterdam Authority to establish the Future Fuels Network, which will look to develop a road map for the adoption of clean fuels.

It is also still uncertain which alternative fuel will be the solution to solving the carbon conundrum. But companies should already start taking steps to prepare for the future, said Dr Sharin Osman, DNV’s Regional Head of Maritime Advisory and Director at its Maritime Decarbonisation and Autonomy Centre of Excellence.

“We do not know yet what that silver bullet is,” he said. “It will take a while – we won’t expect it to start in a couple of years. We have to start somewhere, recognising

the ability to need it, and create and build momentum.”

But the hard truth is that renewable fuels will never be competitive, said Chief Executive Officer of Torvald Klaveness, Mr Lasse Kristoffersen.

“It’s simply too cheap to dig out oil from the ground and convert it for a ship’s engine,” he said, adding that one solution is to put a price on carbon. On that note, leading maritime hubs like Singapore will also need to take charge in driving progress towards a sustainable industry. “Singapore is the bridge between East and West in the world,” said Mr Kristoffersen.

“We really need your voice to drum up support for aggressive regulations on carbon in Asia. I challenge Singapore to take a leadership role in this.” ■

Mr Lasse Kristoffersen

Arbitration in an age of digitalisation and the new normal



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Emerging trends such as digitalisation, accelerated by the COVID-19 pandemic, will shift the frontiers of maritime arbitration.

This was the key message at yesterday's webinar organised by the Singapore Chamber of Maritime Arbitration (SCMA), which also featured a panel discussion that touched on the changing nature of disputes and practical challenges caused by the pandemic.

Arbitration is the essential "PIN" when it comes to sewing the pieces together, said Ms Quah Ley Hoon, Chief Executive of Maritime and Port Authority of Singapore.

She explained that "P" stands for pragmatism – arbitration should be the primary option to settle disputes to preserve trust and relationship; "I" represents industry – SCMA needs to stay close to the industry to cater to its needs; and "N" stands for new offerings – arbitration institutions must tap on new trends such as digitalisation and decarbonisation to offer greater value.

"We are now seeing technological tools being incorporated into various aspects of the arbitration process such as virtual hearings," she said at the webinar titled Arbitration's Role in Dispute Resolution and The New Normal: Enhancing SCMA's Relevance.

"SCMA must position itself to meet the industry's emerging needs," Ms Quah added.

One of the ways SCMA has done so is by publishing the Specimen Directions for Virtual Hearings in October last year to provide guidance on the new practice.

This has helped arbitration veterans such as Mr Prem Gurbani, who has been in practice

for more than 40 years, to adapt to the virtual hearings. The panel arbitrator of SCMA shared during the panel discussion about how judges used to discuss the physical hearings across the panel as they went on. Now, these private discussions are held on WhatsApp instead.

During virtual hearings, Mr Gurbani has four computer screens before him, and said with a smile that digitalisation can be challenging for those who are "long in the tooth". He added: "We are getting there but it is a learning process."

The pandemic also brought about obstacles of an entirely different nature. Mr Alvin Looi, Director (FD&D) Singapore of global marine insurer The North of England P&I Association, mentioned how gathering evidence and information from ships – when claims are filed, for instance – remains an "ongoing challenge" when experts and surveyors are unable to board ships due to pandemic restrictions.

Besides posing practical challenges, the pandemic has also significantly changed the nature of disputes in the past year by opening up a "pandora's box", said panel moderator Mr Punit Oza, Executive Director, SCMA.

This was especially the case when the pandemic ground economies to a halt and se-

verely impeded global supply chains, resulting in delays and diversions. An audience survey during the webinar showed that 58 per cent of participants saw their organisations facing

legal disputes related to delays and breach of contract, and 46 per cent saw force majeure cases.

Mr Chong Ik Wei, Partner and Managing Director, Asia, for law firm Clyde & Co, said that the period between January and May last year was a peak in terms of clients asking for force majeure advice, which pertains to an inability to fulfil a contract due to unexpected circumstances.

He said: "Clients were asking, 'Could we get out of contractual performance? There was quite a lot of uncertainty back then before the World Health Organization declared what was happening as a pandemic on March 11.'"

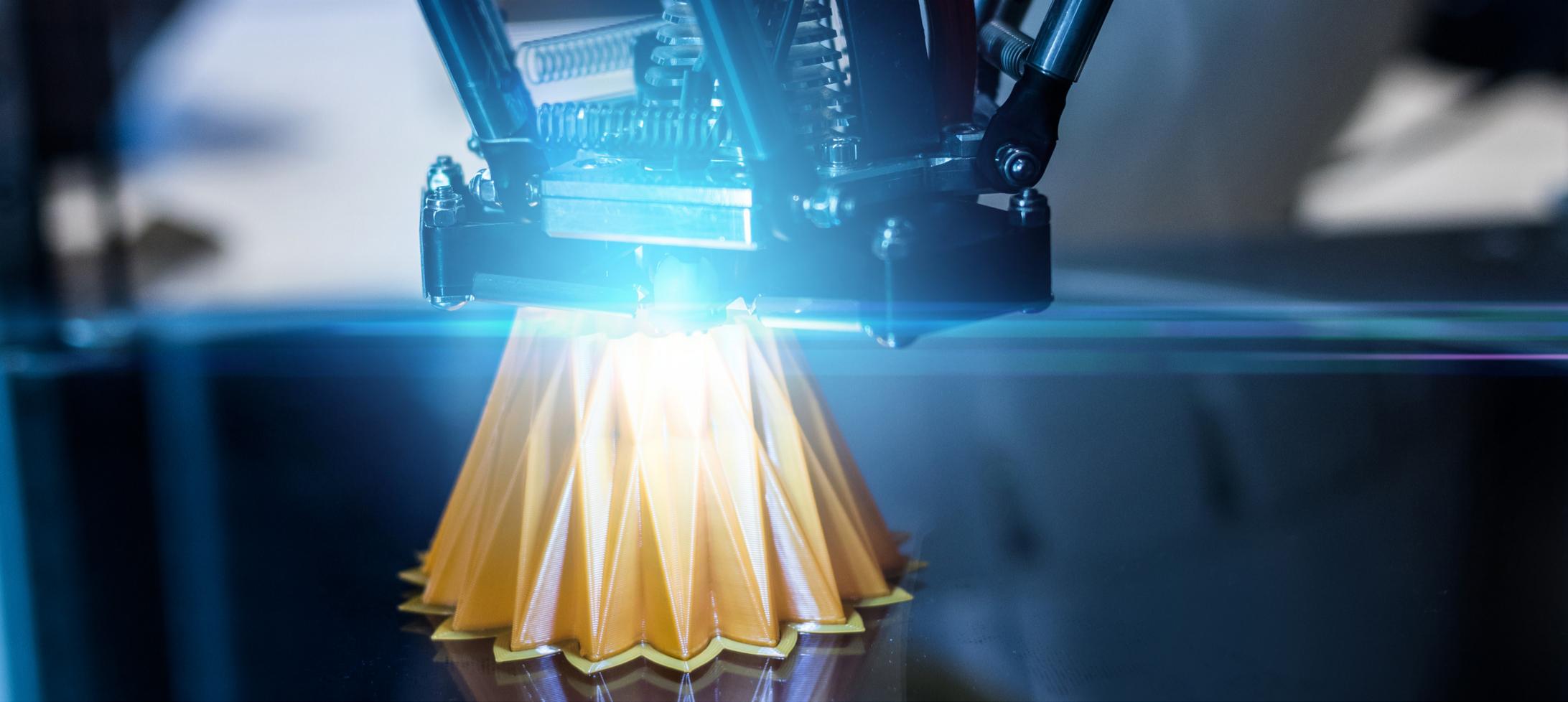
Complications still exist, especially when it comes to crew changes and vessel diversions. Mr Julius Posselt, Senior Claims Manager, Operations, at dry bulk shipping company OI-dendorff Carriers, said that having a positive COVID-19 case onboard a ship would have a "massive impact" as the ship would have to change the whole crew.

"Some owners have to divert their ships in circumstances where there are a lot of restrictions in changing the crew. Is the deviation a breach or was there a right to deviate? Who's taking up the bill? That will remain (the key question) until regulations

change in various countries to offer the industry more opportunities to do crew changes at the chartered ports of call." ■

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Mr Julius Posselt



Sea-ing in 3D: How additive manufacturing will mould the future of the maritime sector

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It is only a matter of time before 3D printing becomes a mainstay in the maritime sector, with the technology gaining traction among industry players.

But before it can be widely accepted across the industry, it has to first address performance-related concerns and establish benchmarks for seamless implementation.

This was the view of experts and industry leaders at a technology pre-conference on Monday.

Held in conjunction with Singapore Maritime Week 2021, the “3D Printing and Digital Spare Parts” Singapore Maritime Technology Conference (SMTC) TechTalk Theatre digital event helped shed insights into how industry players can leverage shared opportunities in 3D printing.

The argument for Additive Manufacturing (AM) is clear. In a world of ageing global container fleets, it helps meet the need to replace obsolete parts, in a more efficient manner compared to traditional methods.

It also offers a greener, stronger and more resilient maritime spare parts supply chain, which can address key challenges like high transportation and inventory costs and a long lead time for delivery, said panellists.

One panellist, Mr Atsushi Ogura, Leader of Additive Manufacturing Project for Marine Machinery at Kawasaki Heavy Industries, noted how AM expedites the delivery process for emergency replacement operations.

While traditional supply chains require dispatching heavy parts by air freight, which can be expensive, AM allows companies to produce parts in-house or closer to the site of the incident.

This helps to save on customs and delivery costs. “Due to (the) COVID-19 (pandemic), there is a shortage of cargo space. It is difficult to dispatch spare parts by air quickly,” he said, adding that AM has helped his organisation speedily manufacture different ship parts that required long lead times or those that had become obsolete.

But as Mr Paolo Tonon, Technical Director at Berge Bulk, pointed out, consumers are still wary about implementing AM-manufactured products.

“The other big questions that we are asking ourselves as end-users – the moment I am receiving a part that is 3D printed, do I have exactly the same quality that I am used to receiving with the original part? How is the quality assurance process taking place? How do we really make sure that the part will have the stress and strength functionalities and characteristics that we used to have when they were milled out from a concrete piece of steel?”

In particular, he highlighted the maritime sector’s growing shift from producing static to more dynamic ship components, which demands even more stringent quality control.

For example, beyond screw packs and wing nuts, companies are increasingly looking towards manufacturing engine-related components using AM.

“(These are) the components that undergo heavy wear and tear and on which the performance of the entire engine depends upon,” he said, reiterating safety concerns about AM-made parts.

Mr Ong Ken Lip, Head of Additive Manufacturing Asia Pacific at ThyssenKrupp, believes a two-pronged strategy is the way forward. First, AM-manufactured components should adhere to the performance regulations of different prod-

uct categories. Next, they must also fulfil the AM guidelines as well as the recommendations and rules for the individual shipping classes involved.

“If we are able to address both the safety risk factors to class and also the performance envelope requirements, then we will have a more holistic approach to quality assurance and testing,” he added.

On a local scale, these standards are achieved through the Additive Manufacturing Centre.

A joint collaboration between Maritime and Port Authority of Singapore, PSA Corporation, the National Additive Manufacturing Innovation Cluster and 3D MetalForge, the world’s first onsite AM facility at Pasir Panjang Terminal features state-of-the-art printers to enhance capabilities for on-demand spare parts manufacturing.

The facility also uses specialised maritime digital cloud supported by blockchain technology for more secure file transfers.

Ultimately, key stakeholders must come together for the idea of 3D printing to truly take flight across the sector.

“AM requires an ecosystem approach where stakeholders are working in close partnerships. An end-user alone cannot ensure that AM will get traction in the market,” said Mr Hakon Ellekjaer, Head of Venture of 3D Printing at Wilhelmsen.

“We need to work together – among the end-users, shipping companies and the original equipment manufacturers, classification societies and manufacturing partners – to provide assurance and reliability to the products and service.” ■

To solve maritime issues, collaborate instead of compete: Panellists

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For technology to take off in the maritime sector, it needs a collaborative ecosystem where different companies view one another as partners instead of rivals.

This will prevent companies from working in silos, which can result in duplicative efforts, said Mr Kenneth Lim, Assistant Chief Executive (Industry) of the Maritime and Port Authority of Singapore (MPA) yesterday.

Citing the maritime industry's decarbonisation challenge, he noted: "It is a classic example (where) nobody has a concrete answer."

In this instance, companies can either tackle the problem alone and try to build their own solutions, or they can "come together to collaborate and find the pathway," he said at a panel that discussed how Singapore can be a hub for maritime technology innovation.

This is why Singapore is setting up a global maritime decarbonisation centre, which was announced earlier this week by Transport Minister Ong Ye Kung. The centre aims to gather like-minded stakeholders to coordinate and drive maritime decarbonisation solutions.

"Companies can come together in a neutral platform and chart out the journey together... and decide how they can take on the decarbonisation agenda," said Mr Lim.

Such a collaborative environment will also attract talent, including those from other industries. He pointed out that some of the technological tools the maritime industry is using now had originated from other sectors. One example is telemedicine, a healthcare development that is currently used on vessels.

MPA is also building a talent pipeline by supporting maritime research, running accelerator programmes to nurture start-ups, and working with the private sector to offer internships to students. These initiatives "will lay down the foundation to attract talent into maritime", he added.

Other panellists agreed with his assessment. Mr



Mr Kenneth Lim, Assistant Chief Executive (Industry) of the Maritime and Port Authority of Singapore, said the industry can work together to tackle the challenges of decarbonisation.

Steen Lund, Chief Executive Officer of maritime due diligence company RightShip, said Singapore's foresight in solving maritime issues is a key reason why the company expanded to the city-state last year.

"Singapore is alert to the fact that it needs to build on its ecosystem" to look at how companies can collaborate to solve the challenges surrounding decarbonisation, he said.

Mr Chakib Abi-Saab, Chief Technology Officer of Saudi Arabian shipping company Bahri, added that Singapore has built an ecosystem that allows solution providers to clearly understand the pain points of the industry and work on resolving them.

Such vibrancy in the ecosystem also helps organisations work better and become more profitable, and at the same time, draws more companies to set up shop in Singapore, he said.

As more solutions are developed and more data is shared, he noted that the ecosystem will need a "data orchestration platform, or a highway, to

ensure all the data are able to properly communicate with each other."

His organisation is now developing a new technology that can connect different data sources across different maritime pillars, such as logistics and shipping.

With more technology being developed here, it is also attracting investors and venture capital firms to fund promising innovation in the maritime industry. This, said Mr Lim, is a healthy sign that the ecosystem is growing and doing well.

The next step, he added, is for the industry to look at the available technology, such as autonomous vessels, 3D printing, and drones, and work out new and viable business models.

"What we need now are attractive business models that can change the industry... How do you manage ships, or do compliance and standards (using) new business models? We can now start to have these discussions, because we have built up the foundation," he said. ■

Future of Shipping Conference to tackle key questions in maritime industry

Justin Kor

How will the industry hit its decarbonisation targets? And what role will technology play in maritime?

Tomorrow's IMO-Singapore Future of Shipping Conference aims to tackle the industry's key challenges – not through predictions but by steering the conversation towards potential solutions.

Singapore's Minister of Transport Ong Ye Kung and Mr Kitack Lim, Secretary-General of the International Maritime Organization (IMO), will be kicking off the conference with keynote speeches. In addition, speakers from the United Nations, var-

ious port authorities, and maritime companies will present insights and hold panel discussions.

"To keep pace with the demands of the global economy and the expectations for sustainable growth, the maritime world needs to be at the forefront of transformational change," said Mr Lim. "We need to facilitate decarbonisation and enhance digitalisation for a safer, more environmentally-friendly and efficient shipping."

The maritime sector's digitalisation journey is set to be a key focus at the conference. Going digital will help the industry achieve its decarbonisation goals by providing the necessary data and information. But as technology continues to advance, there

is also a need for the IMO's regulatory system to adapt accordingly.

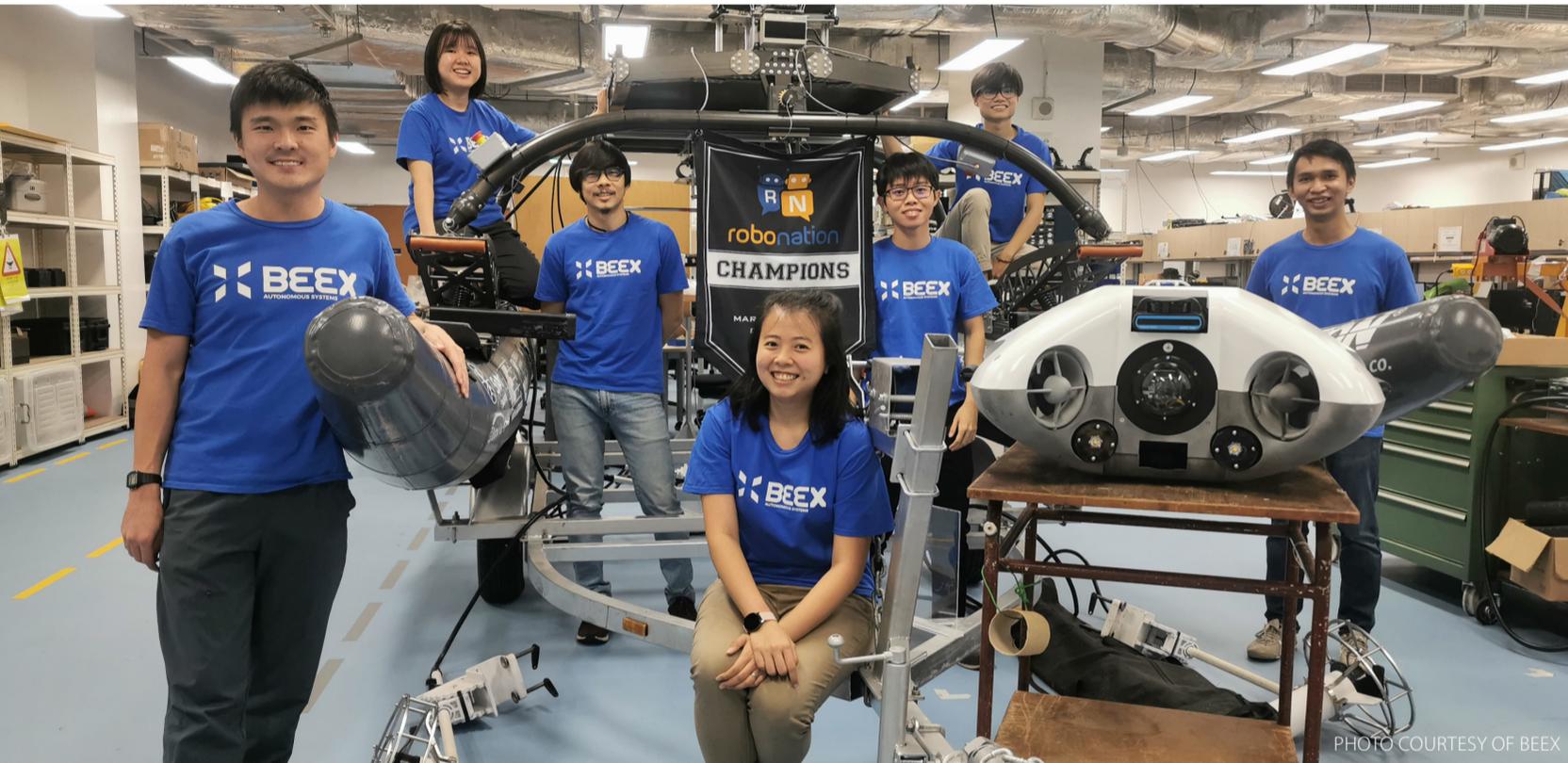
The conference will help companies explore collaborations to decarbonise. It is hosting the inaugural meeting of the NextGEN stakeholders – an initiative to help companies go green by sharing best practices and strengthen the industry's networks.

"Meeting these ambitious goals will require cooperation and collaboration of all maritime stakeholders so that we can develop innovative solutions together," said Mr Lim. ■

*The Future of Shipping Conference is happening on Friday, 23 April, 4:00pm - 6:50pm

How A.IKANBILIS is making waves in underwater inspection

An ikan bilis, or anchovy, is literally a small fry in the sea - but not this autonomous underwater drone, which is transforming traditional inspection methods that require on-site human intervention. BeeX Co-Founder Grace Chia tells Samantha Boh how her team is making work safer under the sea.



Ms Grace Chia (middle) is the Co-Founder of BeeX, a deep tech engineering spin-off from NUS, which designs and builds vehicles to redefine how underwater work can be done.

PHOTO COURTESY OF BEE X

What is the story behind BeeX?

BeeX spun off from the National University of Singapore (NUS) undergraduate competitive robotics team BumbleBee, where students use their engineering skills to build impactful technology.

Transiting from research to commercialisation was difficult but made possible with a good team. Starting up is never easy because you have to figure out how to carve out a space in the sector for the company. Failure is also common because there is no right answer.

We are very fortunate to have the support of early adopters such as AI and Robotics Ventures (ARV Thailand), G8 Subsea, HydROV Singapore and Jurong Town Corporation, and partners such as NUS and Enterprise Singapore.

Tell us about your core product.

Our vision is to be a trailblazer in a new era of underwater inspections and interventions. Our core product is A.IKANBILIS, an intelligent and self-thinking underwater drone that allows service providers to break free from traditional limitations of underwater work.

The way underwater operations are conducted has

not changed in the last 50 years. It is expensive and risky, conducted off work boats, requiring people to be on-site and in dangerous situations, where there is low visibility, strong current and rough winds. The reason is even robots today still require humans to attend to them and are connected via a tether from topside structures.

How does A.IKANBILIS overcome these limitations?

A.IKANBILIS leverages the best of research and development in self-driving technologies to operate under low visibility and strong currents.

The vehicle is self-sufficient and intelligent, which allows it to complete the job without heavy reliance on boats and/or personnel on-site. This results in massive cost savings but without compromising on safety.

The resources normally used for underwater operations can then be redirected to other jobs. It is just like how we have shifted from using handheld vacuum cleaners to autonomous robotic vacuum cleaners.

What attracted you to the maritime industry, which tends to be male-dominated?

The maritime industry is very much unseen despite its great importance to our day-to-day lives. Our

robots have helped people in the industry do their jobs better and this opportunity to create impact with the products my team builds is what I look forward to everyday.

From my perspective, we all have our part to play in the workplace. There are always generalisations that women are more meticulous, carry less physical load or do less strenuous tasks.

But what matters more at BeeX is the willingness to fail and try again, being curious, and having a strong ownership of work and mistakes.

How will BeeX become a game changer?

In general, technology is creating a lot more transparency and efficiency. But I'm personally most interested in how technology can be used to make significant reductions in personnel safety risk because no one should have to sacrifice their lives for their jobs.

At BeeX, we will double down on our core capabilities in subsea autonomy. Our vision for the next five years is to see autonomous marine vehicles conducting jobs off ports, windfarms and oil fields.