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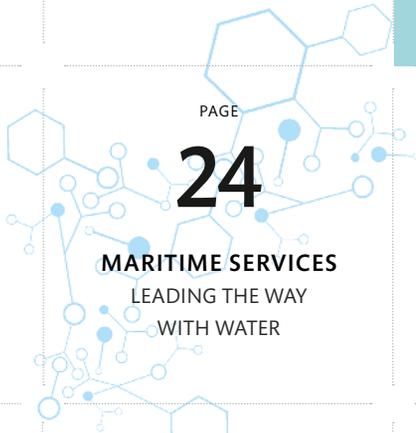
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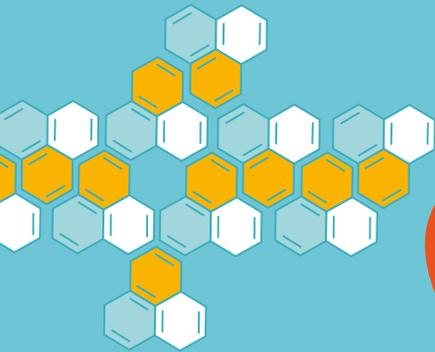
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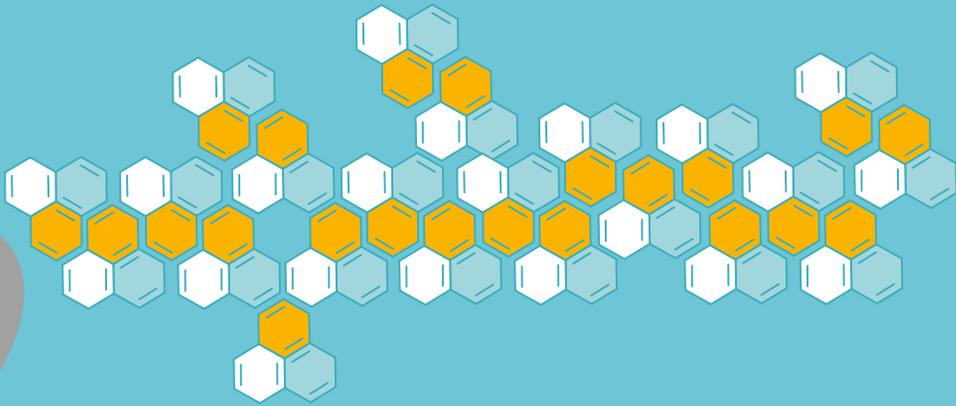
In today's world, it is impossible to ignore the prevalence of technology. It has evolved quickly from a new phenomenon to something indispensable that permeates our lives and habits.

On the business side, industries familiarise themselves with the latest technology to keep up with competitors, using new technology to improve processes, and investing in research & development (R&D) to explore new areas of interest that are, themselves, constantly changing and evolving.

This issue of *Singapore Nautilus* pays tribute to the important role that technology plays in the development and sustainability of

# Forging ahead with technology





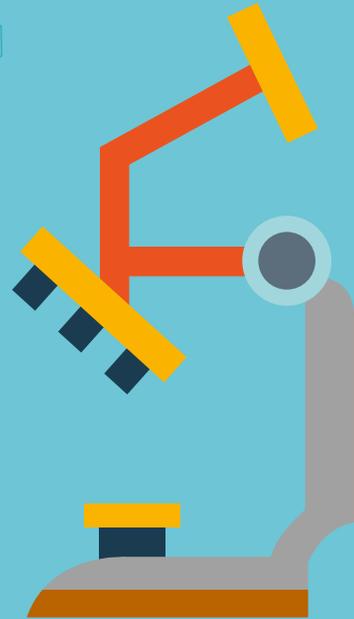
Maritime Singapore. The Maritime and Port Authority of Singapore (MPA) enjoys a close partnership with the maritime industry, other governmental agencies, and educational and training institutes to support and encourage R&D and innovation. Read on to find out more about technology funding, infrastructure, and joint cooperation and initiatives in our Feature article.

In the Port & Starboard section, read about an important milestone for the shipping industry – the maiden voyage of *Maersk Mc-Kinney Moller*, one of Maersk Line's newest container ships. This Triple-E class vessel is not

only the world's largest container ship to hit the seas, but is also one of the world's most energy-efficient vessels.

In this edition, find out also about how panellists at MPA's recent SRS Forum feel about issues pertaining to responsible shipping in Community Talk. Including representatives from APL, DNV GL and Green Marine Capital, the panellists talk about what responsible shipping means to them, key challenges they face, as well as new technologies in the market that have excited them.

On this note, I hope you will enjoy the latest issue of *Singapore Nautilus*.



Shirley Tan  
Executive Editor



## New Chief for MPA



The Maritime and Port Authority of Singapore (MPA) welcomed a new Chief Executive, Mr Andrew Tan Kok Kiong, on New Year's Day.

Prior to taking over this appointment from Mr Lam Yi Young, Mr Tan was the Deputy Secretary (Special Duties) in the Ministry of Transport.

A graduate of King's College, University of London with a first class honours degree in History, and of the Kennedy School of Government, Harvard University with a Masters in Public Administration, Mr Tan, 46, holds a concurrent appointment as a fellow of the Civil Service College.

Mr Tan has extensive experience in the civil service. His first job was with the Singapore Administrative Service in the former Ministry of Information and the Arts. Later roles included stints in the Ministry of Defence, being Principal Private Secretary to Senior Minister/Minister Mentor Mr Lee Kuan Yew from 2002 to 2004, and senior appointments in the Ministry of Foreign Affairs and the Ministry of the Environment and Water Resources. Mr Tan also served as the Director of the Centre for Liveable Cities (2008 to 2010) and the Chief Executive Officer of the National Environment Agency (2009 to 2013).

## Re-election to IMO Council

Singapore had every reason to celebrate at the recent 28th regular session of the International Maritime Organization (IMO) Assembly, held in London on Nov 29, 2013.

The Republic was re-elected to the IMO Council, extending its stay – it was first elected to the Council in 1993.

Singapore is currently serving as the vice-chairman of the IMO's Maritime Safety Committee.

In addition to also holding a position in the Council, Singapore provides technical assistance to developing IMO Member States via a Third Country Training Programme (TCTP).

Minister for Transport Mr Lui Tuck Yew, who led the Singapore delegation to the IMO Assembly, said: "Singapore is honoured to be re-elected to the IMO Council and appreciates the support of our fellow IMO Member States."

"Singapore takes our responsibility as a Council member seriously and will continue to contribute actively towards the IMO's goal of safe, secure and efficient shipping on clean oceans."

## More support for the Maritime Singapore Green Pledge

Another 20 companies pledged their commitment towards promoting clean and green shipping when they signed the Maritime Singapore Green Pledge on Dec 3, 2013:

- Asian Lift Pte Ltd
- Boskalis International (S) Pte Ltd
- Celeste Holding Pte Ltd
- Eastern Navigation Pte Ltd
- Ezra Holdings Ltd
- J. Lauritzen Singapore Pte Ltd
- Keppel Smit Towage Pte Ltd
- Maersk Tankers Singapore Pte Ltd
- Maju Maritime Pte Ltd
- Oil Spill Response Limited
- Orient Express Lines
- Pacific Radiance Ltd
- POSH Semco Pte Ltd
- PSA Marine (Pte) Ltd
- Singapore Cruise Centre Pte Ltd
- SMIT Singapore Pte Ltd
- Stolt-Nielsen Singapore
- Swire Pacific Offshore Operations (Pte) Ltd
- The China Navigation Co Pte Ltd
- Western Shipping Pte Ltd

Held at the Singapore Registry of Ships' forum on responsible shipping, this latest signing brings the total number of committed companies to 60. The forum was organised by MPA for owners and operators of Singapore-registered ships to exchange views and insights on the challenges of ensuring safe, secure and efficient global shipping activities. More than 200 senior maritime executives attended the forum.

The Maritime Singapore Green Pledge was launched in 2011 as part of the Maritime Singapore Green Initiative, which comprises the Green Ship Programme, the Green Port Programme and the Green Technology Programme.

At the end of November 2013, 96 Singapore-flagged ships had been recognised by the Green Ship programme. To date, more than 1,900 vessel calls have enjoyed port dues concessions under the Green Port Programme, and S\$12 million of co-funding has been approved under the Green Technology Programme.



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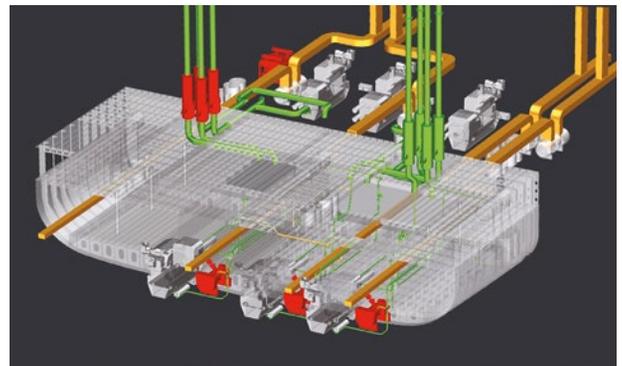
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Siemens PLM Software provides a common platform linking shipbuilders with partners and suppliers in the development and production of vessels.

## BV to set up Deepwater Technology Research Centre in Singapore

► Bureau Veritas (BV), one of the biggest players in conformity assessment and certification services, is setting up its Deepwater Technology Research Centre (DTRC) in Singapore to provide advanced technical solutions to clients in the Asia-Pacific region.

Supported by the Maritime and Port Authority of Singapore's (MPA) Maritime Cluster Fund (MCF), the centre will also be equipped for research in hydrodynamics, hydro-structures, mooring and riser systems, computational fluid dynamics, and renewable energy.

BV's Vice-President for Marine & Offshore, South Asia Zone, Mr Matthieu de Tugny said Singapore was chosen as the site for the DTRC because of its strategic geographical location and its current position as a leading hub for the building and conversion of offshore units. "It is very well served by quality institutions and higher education establishments, and has world-class infrastructural links and a well-established and widely respected R&D strategy."

BV expects over S\$7 million to be invested in up to 10 R&D projects over five years. The company is also exploring collaborations with local stakeholders. Former MPA Chief Executive Mr Lam Yi Young said: "The setup of R&D and Test Centres will develop Singapore's capabilities in maritime R&D and technology."

## MPA concludes study on LNG bunkering operations

► Singapore has taken a significant step forward in the development of Liquefied Natural Gas (LNG) bunkering operations, following a study conducted by the Maritime and Port Authority of Singapore (MPA) and its appointed consultant, Lloyd's Register.

The study consolidated information that needs to be addressed before LNG bunkering can take place into five key areas:

- LNG bunkering standards and procedures within the port's limits;
- Technical requirements and specifications for LNG bunker tankers and receiving vessels with regard to transfer system, fittings and safety equipment;
- Safety standards for LNG bunkering operations;
- Identification of safety exclusion zones and emergency procedures;
- Competency standards for personnel handling LNG bunkering.

MPA will share the findings from the study and collect feedback from the industry before finalising the LNG bunkering standards here.

MPA's Assistant Chief Executive (Operations) Captain M Segar said there is an increasing need for the shipping industry to look at alternative sources of fuel.

"LNG is a promising option that we should consider. The completion of the study is an

important milestone in the development of LNG bunkering in the Port of Singapore and we would like to share this significant progress with the industry," he said.

Singapore is widely recognised for its strong emphasis on the quality of bunkering services and safety standards. In 2012, its port recorded a bunker sales volume of 42.7 million tonnes, with which it retained its position as the world's top bunkering port.

The country's strong performance in bunker sales is due to its strategic location at the crossroads of international trade, and its industry structure which allows for competitive bunker prices and assured quality and safety standards.

BELOW: Associate Professor Annie Koh and Mr Lam Yi Young at the MOU signing ceremony



## MPA and SMU sign MOU to support Maritime course

► The Maritime and Port Authority of Singapore (MPA) and Singapore Management University (SMU) have signed a Memorandum of Understanding to co-fund and support the university's Maritime Economics Concentration (MEC).

This collaboration is aimed at grooming local talent for the maritime and related sectors in Singapore. SMU's International Trading Institute (ITI@SMU) has already garnered the support of seven industry partners. The institute is also working to provide students with a chance to experience the maritime sector in Denmark via an exchange programme with the Copenhagen Business School.

When the current academic year began in August 2013, ITI@SMU welcomed its first cohort of 24 students.

The MEC features an effective mix of classroom sessions, that will be helmed by industry experts, and other activities. The curriculum also includes local and overseas industry study missions, site visits, and practiced learning through internships with companies in the maritime industry.

## An excellent third run of Maritime Public Leaders' Programme

## Singapore still a top port



► Senior maritime officials and executives from 17 countries were in Singapore for the third edition of the Maritime Public Leaders' Programme (MPLP) in September 2013.

The MPLP is a six-day programme organised by the Maritime and Port Authority of Singapore (MPA) in partnership with Nanyang Technological University (NTU), and is supported by the Ministry of Foreign Affairs (MFA) under the Singapore Cooperation Programme. It provides an opportunity for delegates to come together to learn and share maritime knowledge via various functions and seminars.

The programme covers topics such as contemporary port planning and management, as well as shipping economics and maritime law. Participants also visited some of Singapore's

maritime attractions, such as the Singapore River and Singapore Maritime Gallery, to gain valuable insights into the country's maritime history, as well as the policies and processes that have enabled Singapore to grow into a global hub port.

Academic staff from different schools and institutes, such as NTU's School of Civil & Environmental Engineering and the National University of Singapore's Lee Kuan Yew School of Public Policy, also took part in the programme.

Acting Chair of NTU's School of Civil & Environmental Engineering Professor Soh Chee Kiong said that he is confident this programme will add value to the knowledge of all maritime leaders.

"As the only university in Singapore offering Maritime Studies degree programmes

at both undergraduate and postgraduate levels, we are well-established and have the expertise to contribute greatly to the MPLP," Mr Soh said.

MPA's former Chief Executive, Mr Lam Yi Young, said that the MPLP underscores the MPA's commitment to share knowledge.

He said: "Although the MPLP is only in its third year, we have received very encouraging feedback from past participants thus far. This year, we are encouraged that the programme also attracted maritime executives from organisations such as Intertanko, the ReCAAP Information Sharing Centre, Jurong Port, and PSA.

"I'm confident that this year's participants will continue to find the programme line-up enriching and thought-provoking."

► The Port of Singapore ushered in the New Year with good news after Minister for Transport Mr Lui Tuck Yew, announced the Maritime and Port Authority of Singapore's (MPA) advance estimates of port indicators on Jan 7.

Despite slow growth in the global economy, Singapore retained its position as the world's top bunkering port last year. It also continued to rank among the world's top 10 ship registries. Singapore is home to about 130 shipping groups.

- Annual vessel arrival tonnage reached 2.33 billion gross tons (GT) in 2013, an increase of 3.2 per cent from the 2.25 billion GT achieved in 2012.
- Container throughput hit 32.6 million TEUs in 2013, a 2.9 per cent increase from the 31.6 million TEUs achieved in 2012.
- Total cargo tonnage handled last year rose 3.6 per cent over 2012 figures to reach 557.5 million tonnes.
- The total volume of bunkers sold in the Port of Singapore in 2013 was 42.5 million tonnes, compared to 42.7 million tonnes in 2012.
- The total tonnage of ships grew by 13.2 per cent, or 8.6 million GT, in 2013.
- As of end December 2013, the total tonnage of ships under the Singapore flag was 73.6 million GT.

## Ferry Rescue Exercise 2013



The Maritime and Port Authority of Singapore (MPA) carried out a full deployment Ferry Rescue Exercise (FEREX 2013), which involved over 300 personnel from nine organisations. Ferry rescue exercises are held by MPA annually, as part of its ongoing efforts to validate and update emergency preparedness plans and operations.

## Visit by Singapore Scouts Association



The Maritime and Port Authority hosted a visit by the Singapore Scouts Association to the Singapore Maritime Gallery in October 2013.

## Talk by Dr Martin Stopford



Dr Martin Stopford, President, Clarkson Research Services Limited, delivered a talk entitled Five Challenges Facing The Shipping Industry Today in October 2013. More than 130 polytechnic and university students, as well as MaritimeONE partners, attended the talk.

## World Maritime Day 2013



Singapore celebrated the 11th World Maritime Day in September 2013. The annual World Maritime Day celebrates the service and contributions of seafarers from all over the world. The event saw the Maritime and Port Authority of Singapore, the Singapore Maritime Officers' Union, and the Singapore Organisation of Seamen coming together to distribute hampers to approximately 600 ships.

## Visit by NIMASA



A delegation from the Nigerian Maritime Administration and Safety Agency (NIMASA), led by Abdulsalam Suleman Audu, Registrar of Ships, paid a visit to the Maritime and Port Authority of Singapore.

# BIG SHIPS BIG SAVINGS



THE MAERSK MC-KINNEY MOLLER IS THE WORLD'S LARGEST SHIP, BUT IT IS ALSO THE MOST ENERGY EFFICIENT. JAMIE EE FINDS OUT WHAT IS NEEDED TO MOVE THIS COLOSSAL VESSEL.

One of Maersk Line's latest container ships, the *Maersk Mc-Kinney Moller*, is pushing the limits of how supertanker ships can go.

At 400m long, 59m wide and 73m tall, it is the world's largest and most energy efficient container ship. With features such as an expanded cavity and an energy-saving propulsion system, the Triple-E class ship is designed to deliver more goods while using less fuel – minimising her impact on the environment.

In a single trip, the vessel can hold up to 18,000 20-foot containers (TEUs) – the equivalent of 144 million pairs of sneakers – while using 35 per cent less fuel per container than traditional container ships.

Already, its capacity and efficiency far surpasses that of Maersk's E-class vessels, which previously held the title

of the world's largest ships; the Triple-E class carries 2,500 containers more than the E-class, but uses 20 per cent less fuel and emits 20 per cent less carbon dioxide.

Since July 2013, Maersk Line, the world's largest container company, has deployed the 55,000-tonne *Maersk Mc-Kinney Moller* to plying the Asia-Europe route, where container trade is busiest. The service makes up one quarter of Maersk Line's business.

In September 2013, during its maiden voyage, the ship stopped over in Singapore – its first port of call in Asia. To mark the milestone, a small celebratory event and a vessel tour were organised for personnel from the Maritime and Port Authority of Singapore (MPA), PSA and Maersk Line.

Thomas Riber Knudsen,

CEO, Maersk Line, Asia Pacific region, said: "We are excited to welcome the *Maersk Mc-Kinney Moller* as she makes her maiden call in Singapore, the busiest trans-shipment port in the world, and one of the main hub ports we use in South-east Asia."

### Triple-E features

The Triple-E class of ship is named after its three design characteristics – economy of scale, energy efficiency and environmentally-improved.

Built in South Korea, the *Maersk Mc-Kinney Moller* was designed with a wider, U-like hull form that gives it an extra row of containers compared to the V-shaped E-class ships. More container space is also created with a "two island" design, by moving the navigation bridge and accommodations further





towards the bow and engine room, and the chimney six bays back.

Despite its colossal size, the ship is able to achieve greater energy efficiency by traveling at lower speeds and using a custom-designed twin-skeg propulsion system – a combination of two slow-running engines and two propellers.

With a lower maximum speed of 23 knots, the ship can be fitted with two ultra-long stroke engines, which operate at slower revolutions

and use less fuel. Combined with two four-blade propellers that lower resistance, they cut energy use by more than 10 per cent.

Triple-Es are also fitted with a waste heat recovery system, similar to those in Maersk's E-class ships, which converts heat from the engines into electricity. This saves each ship up to 10 per cent in main engine power.

Besides these innovative design features, the Triple-E class is also setting a new standard in ship recycling. It is the first to implement Maersk Line's new cradle to cradle passport programme, which allows the company to better recycle parts and materials used in the construction of the ship. The passport is a database listing the material compositions of the main parts of the vessel, kept updated throughout the life of the ship.

#### Worth the cost

Over the next two years, a total of 20 Triple-E ships will be delivered to Maersk Line at a price tag of US\$190 million per ship. Despite the hefty investment, the company

believes it can reap long-term savings, particularly on fuel, which currently makes up a large part of its expenses.

Despite the excess supply in capacity in the shipping industry, the company does not think that launching the Triple-E is a risk. Responding to the fact that the seaborne freight business may remain depressed, Maersk Line says that it can reduce capacity elsewhere to ensure that its fleet will only grow in line with the market.

Knudsen is also optimistic that the ship will fit well into its service network. "We estimate growth of two to three per cent on Asia-Europe trade this year, led by a stronger rebound of volumes in the Mediterranean," he says.

"The second half of the year is clearly looking better than the first, driven by positive momentum in the Eurozone."

Meanwhile, Singapore is ready to meet the needs of such big ships. Tan Puay Hin, Regional CEO Southeast Asia, PSA International, says: "Our continual investment in best-in-class berth infrastructure, equipment, port technology and operating systems has levelled up our readiness to manage the high volumes and complex hubbing operations these ships will bring."



ABOVE: Captain Niels Vestergaard Pedersen of the Maersk Mc-Kinney Moller

## TRIPLE-E IN NUMBERS

**73**  
METRES  
HEIGHT

**400**  
METRES  
LENGTH

**59**  
METRES  
BEAM

**22**  
CREW  
MEMBERS

**192,800**  
TONNES  
DEADWEIGHT  
(scantling draft)

**23**  
KNOTS  
MAXIMUM  
SPEED



# A HIGH-TECH

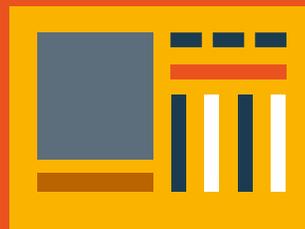
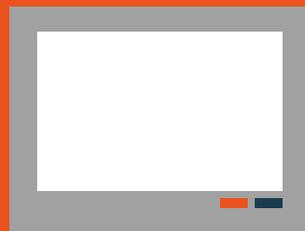
# EDGE



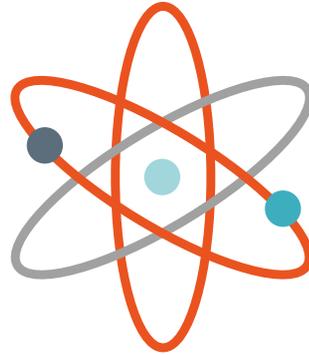
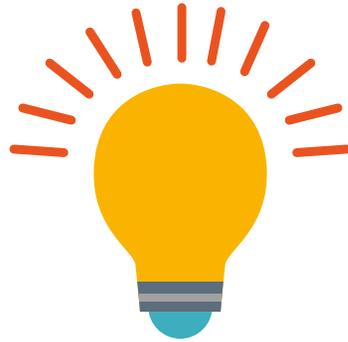
► The possibilities are endless in this age of digital technology. From using automated systems to perform menial tasks to being able to explore the depths of space and the ocean floor on a computer screen at home, the evolution of technology has greatly influenced the way the world works today.

Staying on top of any business thus involves staying on top of technology's constant evolution. As with many other industries, technology plays a key role in enhancing the competitiveness and efficiency of Singapore's maritime sector. Shipowners, port operators and many other maritime service providers are exploring myriad innovations that have the potential to be force multipliers for their businesses.

Singapore's maritime industry harnesses technology in order to better itself, focusing on sectors in which research and development (R&D) has received investment and support from the industry, government agencies and educational institutes. This helps to ensure that players in Maritime Singapore have the tools and technology to keep pace with current and future challenges from the global economy and competition.



FRANCIS KAN EXPLORES HOW TECHNOLOGY IS INTEGRATED INTO MARITIME SINGAPORE'S DEVELOPMENT AS A WORLD-CLASS MARITIME KNOWLEDGE HUB.



## RECENT TECHNOLOGY-RELATED MILESTONES IN SINGAPORE'S MARITIME SECTOR

### JANUARY 2011

- The Singapore Maritime Institute (SMI), a joint effort by the Maritime and Port Authority of Singapore (MPA), the Agency For Science, Technology And Research and the Economic Development Board, in partnership with local Institutes of Higher Learning, is incorporated with the aim of developing strategies related to the academic, policy and R&D aspects of the maritime industry.

### APRIL 2011

- The Maritime Singapore Green Initiative is launched to reduce the environmental impact of maritime activities. It comprises the Green Ship Programme, the Green Port Programme, and the Green Technology Programme.

- MPA and PSA launch the five-year Port Technology Research and Development Programme, focusing on automated container port systems, advanced container port optimisation techniques, and green port technologies.

### SEPTEMBER 2011

- MPA establishes the S\$100 million Maritime Innovation & Technology Fund to support development programmes for the maritime technology cluster.

### JUNE 2012

- SMI launches the Maritime Energy Systems R&D Programme which seeks proposals on the research on and development of innovative technologies capable of providing new solutions for energy usage.

### OCTOBER 2012

- The Government announces plans to consolidate all container port operations at Tuas Port, which will begin operations in about 10 years' time. The new

terminal will feature more advanced technology and processes.

### MAY 2013

- FutureShip, a subsidiary of Germanischer Lloyd, unveils its ECO Research Centre in Singapore, supported by MPA's Maritime Cluster Fund (MCF).
- SMI launches the Deepwater Technology R&D Programme to meet industry needs in working towards the development of innovative solutions for deepwater oil and gas exploration and production activities.

### OCTOBER 2013

- Bureau Veritas sets up its Deepwater Technology Research Centre in Singapore, with support from the MCF.
- It is announced that the Maritime Energy Test Bed facility will open in 2015.

### NOVEMBER 2013

- MPA completes its study on the Technical Standards and Procedures for LNG Bunkering in the Port of Singapore.



### Funding

The Maritime and Port Authority of Singapore's (MPA) technology framework aims to foster an exchange of ideas and information that will aid Singapore's development as a maritime knowledge hub.

To support development programmes under the framework, MPA has a S\$150 million Maritime Innovation & Technology (MINT) Fund.

The fund, which finances up to 50 per cent of an approved project's costs, is aimed at encouraging companies with a local presence to undertake maritime-related R&D, using Singapore's port and maritime facilities as the test bed for their innovations.

The MINT Fund has co-funded several initiatives, including the Port Technology Research and Development Programme in which MPA and PSA International (PSA) are collaborating to conduct research and test bed new technologies for future container terminals.

The five-year programme focuses on three broad areas: automated container port systems, advanced container port optimisation techniques and technologies, and green port technologies.

MPA is funding the programme with up to S\$10 million over five years, from the MINT Fund. PSA, together with local tertiary and research institutions (TRIs) and other industry partners, will provide co-funding and in-kind resources of up to S\$10 million in value over the same period.

"With keen support from MPA, PSA has rolled out key innovative projects that are strategic to enhancing the

competitiveness of the hub port of Singapore and people productivity at our terminals, at existing facilities as well as for the future Tuas Port terminals," says Tan Puay Hin, Regional CEO, South-east Asia, PSA International.

He adds: "We are adapting and testing automated guided vehicle (AGV) systems and the automation of wharf-side operations. We are also implementing a fully automated yard crane system at Pasir Panjang Terminal Phase 3.

"Through MPA and other government agencies, we have been working with local Institutes of Higher Learning (IHLs) and research institutes to tap on relevant automation technologies and systems that are in place in other domains for effective application in the port environment.

"At the same time, PSA is also continuing its close collaboration with industry partners to develop commercially viable and environmentally sustainable equipment systems."

Meanwhile, Jurong Port (JP) is working with MPA in the Green Port and Productivity Solutions Programme. Co-funded by MPA's MINT Fund and JP, the programme will see both organisations commit S\$6 million each, over five years, to embark on green technology and productivity projects in the port.

### Industry Research

MPA has in recent years supported the establishment of two research centres. The Deepwater Technology Research Centre (DTRC) was set up in 2013 by Bureau Veritas, a recognised leader in testing, inspection and certification

services, to provide advanced technical solutions to its clients in the Asia-Pacific region.

Working with universities in Singapore and local industry leaders, Bureau Veritas hopes to generate joint work projects and perform R&D activities.

The set-up of the DTRC is supported by MPA's Maritime Cluster Fund (MCF), which helps fund the industry's manpower and business development needs.

"Singapore was chosen as the site for the DTRC because of its strategic geographical location and its current position as a leading hub for the building and conversion of offshore units," says Matthieu de Tugny, Bureau Veritas's Vice-President for Marine & Offshore, South Asia Zone.

Meanwhile, the ECO Research Centre, set up by FutureShip – the maritime engineering and consultancy arm of Germanischer Lloyd (GL) – was established to conduct research towards strengthening the company's energy efficiency solutions for its Asian clients. It will be the first R&D centre to benefit from the MCF enhancement – the fund was recently expanded to cover the setting up of R&D and test centres.

"With a variety of initiatives to promote sustainable shipping and energy-efficient ship designs, Singapore is developing into a centre of excellence for maritime research and development," says Albrecht Grell, Senior Executive Vice President, GL.

"This provides us with an ideal operating environment, and it fits well with our long-term strategy to maintain our leading-edge position in maritime consulting services."

**"With a variety of initiatives to promote sustainable shipping... Singapore is developing into a centre of excellence for maritime R&D."**

Albrecht Grell, Senior Executive Vice President, Germanischer Lloyd





### Academic Support

Apart from research centres, partnerships with tertiary institutions are also a key part of Singapore's strategy to help its maritime industry maintain a technological edge. To strengthen these links, the Singapore Maritime Institute (SMI) was set up three years ago. SMI – a joint effort by MPA, the Agency for Science, Technology and Research (A\*STAR) and the Economic Development Board (EDB) in partnership with IHLs – aims to develop strategies and programmes related to the academic, policy and R&D aspects of the maritime industry. Key focus areas of the SMI include sectors such as shipping, port and maritime services, as well as offshore and marine engineering.

SMI works towards attracting renowned academics and researchers to Singapore, to groom the next generation of local maritime talent. It also aims to increase the pool of maritime-trained students and professionals, and

encourage the undertaking of more industry R&D projects here. Various government agencies have committed a total of S\$350 million to fund initiatives through the SMI.

As part of this initiative, four organisations known as Maritime Institutes @ Institutes of Higher Learning (MI@IHLs) were formed to drive maritime research and education initiatives.

Nanyang Technological University's (NTU) MI@NTU, for instance, will champion maritime science and technology development, by leveraging NTU's established interdisciplinary strengths in this broad field. The institute will draw on the many active partnerships that the university has formed with leading maritime companies to develop innovative technologies.

SMI's efforts to support the offshore industry in Singapore recently culminated in the establishing of the Deepwater Technology R&D Programme in 2013, which serves to develop innovative solutions for deepwater oil and gas

exploration and production activities. A grant, amounting to a total of S\$5 million over three years, has been allocated to promote research in this area.

Another recent exploration of how technology can impact the future of Maritime Singapore is a joint initiative between SMI and NTU – the Maritime Energy Test Bed (METB) R&D facility. A first in South-east Asia, the test bed facility is open to use by scientists and engineers from both academia and the industry, to conduct R&D work in green ship and port technologies.

"The establishment of the METB will help in the translation of innovative technologies from lab-scale to large-scale applications, in

which new technologies will be tested prior to sea trials. The METB is a significant component in demonstrating and raising Singapore's maritime R&D capabilities and expertise," says Teo Siong Seng, Chairman of SMI.

### Green Technology Programme

To foster a greener maritime cluster, MPA introduced the Green Technology Programme (GTP) in 2011 to encourage local maritime companies to develop and adopt environmentally-friendly technologies. The initiative provides grants of up to 50 per cent of total qualifying costs, capped at S\$2 million per project (with an increased cap of S\$3 million per project for



solutions or systems that can achieve more than a 10 per cent reduction in emission levels) to co-fund the development and adoption of existing green technological solutions.

One of the projects supported by the programme included the adoption of a trim (the angle to which the ship tilts towards the bow or stern) optimisation software by local shipping firm Masterbulk. The software automatically calculates the

optimum trim for the particular given operating condition, to minimise hull resistance. When installed on bulk carriers, the system achieved a 4 to 6 per cent reduction in fuel consumption over the vessel's baseline performance, with a corresponding reduction in emission levels.

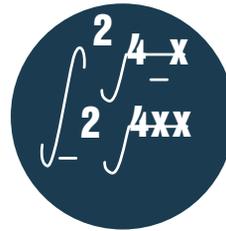
Masterbulk has trained its staff to use the software effectively on eight of its vessels to date, and plans to implement it on another eight in 2014.

"(This) GTP initiative by MPA is a very commendable effort to encourage the shipping industry in Singapore for a noble cause to promote various technologies which would reduce greenhouse gas emissions. We are in the process of implementing this technology on eight more vessels in 2014," says Sanjeev Samel, Fleet Manager of Masterbulk.

Another project, by APL, involved dosing fuel oil with small quantities of water in a

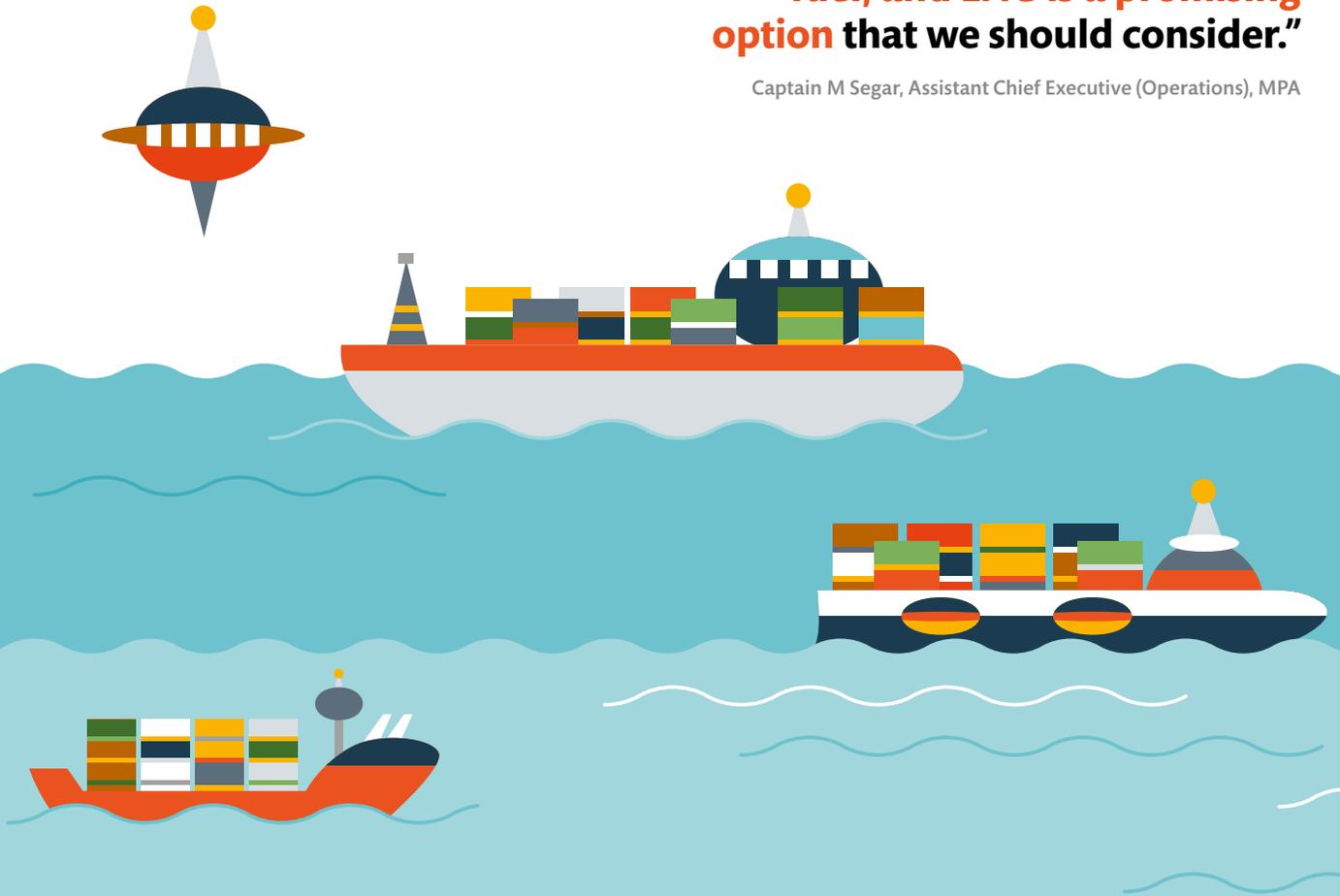
controlled manner to achieve better combustion in marine diesel engines, leading to reduced fuel consumption and emissions.

Says Shaj Thayil, Vice President, Technical Services & Ship Management, APL: "The GTP offers financial support to Singapore-registered ships in the development and adoption of green solutions. APL tapped on this programme to determine the feasibility of fuel emulsion technology in reducing ship emissions."



**“There is an increasing need for the shipping industry to look at alternative sources of fuel, and LNG is a promising option that we should consider.”**

Captain M Segar, Assistant Chief Executive (Operations), MPA



### Challenges Ahead

Among the many interesting developments on the technological front, the emergence of liquefied natural gas (LNG) as an alternative fuel for ships is probably one of the most anticipated. Singapore sells more marine fuel than any other port in the world, and it recently took a significant step forward in this area after MPA and its appointed consultant, Lloyd's Register, completed its study on the Technical Standards and Procedures for LNG Bunkering in the Port of Singapore.

Following the completion of the study, MPA will be sharing the results of the study with industry players and seeking their feedback. MPA will then work towards finalising the LNG bunkering standards for the Port of Singapore.

“There is an increasing need for the shipping industry to look at alternative sources of fuel, and LNG is a promising option that we should consider. The completion of the study is an important milestone in the development of LNG bunkering in the Port of Singapore, and we would like to share this

significant progress with the industry,” says Captain M Segar, Assistant Chief Executive (Operations), MPA.

In the area of further optimising port operations, MPA and PSA are also collaborating to conduct research on new technologies for future container terminals. One key project is the development of AGVs, which will help reduce manpower and improve port productivity.

These are just some of the many developments that are taking place to boost the maritime cluster's

technological advantage. This will undoubtedly help to prepare industry players for the challenges that lie ahead.

### Port Of The Future

Singapore's long-term plan is to consolidate all its container operations at one terminal in Tuas, which will free up the prime land currently occupied by the terminals in the city area for redevelopment, and bring about more efficient port operations. Among other things, Tuas Port will also be equipped to handle the future generations of larger and more



complex container vessels which are likely to emerge in the coming years. Some of these technologies and processes, such as automated container port systems, optimisation techniques and technologies, and green port technologies, are already being tested under the Port Technology Research and Development Programme.

The first set of berths at Tuas Port will begin operations in about 10 years' time. When it is fully operational, the terminal will have the capacity to handle up to 65 million TEUs per year.

# FULL STEAM AHEAD

THE CHINA NAVIGATION COMPANY TELLS **NICHOLAS YONG** THEY ARE CONFIDENT THAT SUSTAINABLE SHIPPING PROTOCOLS WILL KEEP THEM IN GOOD STEAD.

► The China Navigation Company (CNCo) was founded by British trader John Swire in 1872, and its first vessels were Mississippi-style paddle steamers that sailed the Yangtze River in China.

Today, some 142 years later, CNCo is the deep sea shipping arm of the multinational Swire group, and the wholly owned subsidiary offers shipping links between more than 130 ports worldwide. Headquartered in Singapore, CNCo's core



business is shipowning and ship management, along with three operational divisions – namely Swire Shipping, Swire Bulk and Swire Bulk Logistics.

### Presence in Singapore

The company relocated its headquarters to Singapore in 2009. CNCo's managing director, Tim Blackburn, explains that this was because the country's central location made the new headquarters an excellent consolidation

point for the company's shipowning, operating and ship management activities, which were previously located in Hong Kong and Sydney. Blackburn says: "As we've seen over the last 10 years, the maritime cluster in Singapore has created an extraordinarily successful ecosystem for shipowners and ship operators. We have the banks, the lawyers, the cargo interests and the shipbrokers all co-located here in Singapore."

### Ambition

There are currently plans to double the number of CNCo's seafarers in support of the company's growth strategy, and orders for 36 new vessels and three second-hand vessels have been placed over the last few years. Blackburn also reveals that the company is looking to expand and further develop its activities in the handysize sector as well. CNCo has been experiencing steady growth in recent years, with its liner shipping business developing new services and increasing capacity in historical trade lanes. Its foray into the handysize market, which started in 2011, has also proved to be a positive development – business has doubled year-on-year, fulfilling growth targets in 2012 and 2013.

Says Blackburn of the company's mission: "We are committed to operational excellence and endeavour to exceed our customers' expectations. Our vision is to be the leading provider of sustainable shipping solutions and our customers' partner of choice. Over the

long term this approach has kept us in good stead."

Since 2011, CNCo has been building 12 multi-purpose general cargo ships and 24 handysize bulk carriers in China, all built to Singapore registry rules and intended for registration in Singapore. Ten vessels have been delivered so far. Also, as a result of its training programmes and safety initiatives – delivered centrally at the Swire Marine Training Centre in Loyang – the total number of Lost Time Incidents has been successfully reduced by about 70 per cent since 2011.

### Sustainability

CNCo is one of the founding members of the Sustainable Shipping Initiative (SSI) – the brainchild of UK-based NGO Forum For The Future – which brings various stakeholders together to tackle key sustainability issues in the shipping industry. Some of these issues include emissions standards and the green recycling of ships. "The SSI is an opportunity to work together with stakeholders such as shipowners, cargo users and shipyards, to effect change. As a group, we believe we can be more effective in driving change than we can be as individuals," notes Blackburn.

On its part, CNCo has green recycled five ships in the last 18 months, working to meet the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, which sets the benchmark for clean and green shipping. In time, all of its ships will also be equipped with a "green passport". This will help



with the closed loop recycling of these vessels, a production process where waste materials are used to make new products.

Going forward, Blackburn says, the shipping industry remains "severely challenged" by excess capacity and high fuel prices. "While we've seen an acceleration in scrapping in the last couple of years, we think that the market is going to remain relatively depressed for the foreseeable future," he says.

Blackburn adds that fuel efficiency is one of the key factors to overcoming the challenges, saying: "Our ability to succeed and operate a sustainable business in this market relies on our ability to secure and operate fuel-efficient tonnage.

"That explains why we've focused on designing and building next generation vessels, because we believe that having the most fuel-efficient tonnage, and therefore the lowest operating costs, is the most sustainable and environmentally responsible way to run our business."





As an international consulting and research firm specialising in coast, marine and water resources, DHI promises to use its knowledge, expertise and power of technology to help clients overcome challenges.

The company even goes a step further by reinvesting a significant portion of its operating profits in research and development (R&D).

In Singapore, about 70 per cent of DHI's profit goes back into R&D. The firm also sells the technology it develops to other consultancies (which are essentially its competitors), although Tom Foster, DHI's executive vice president and regional director for Asia Pacific, prefers to see them as collaborators.

According to Foster, 19 of the world's top 20 consultancy firms in water and environment, such as AECOM and Halcrow, use DHI's software. The profits then go back into more R&D work.

But it is precisely this pursuit of innovation that differentiates DHI from the rest in the field, and allows it to be at the cutting edge of technology.

Says Foster: "The fact that DHI is a not-for-profit organisation does present its challenges. Our economics are never as stable as we would like for long-term planning because we're always ploughing that money back into technology development, but it keeps us at the forefront of innovation.

"It keeps us relevant in a market where a typical consultancy now employs 5,000 to 10,000 people. As a company of just 1,000 people,

we can survive because we make this investment."

### Humble beginnings

Headquartered in Denmark, DHI has offices in 30 countries around the globe and has worked on projects in over 140 countries. Its clients include international developmental and governmental agencies, industries, as well as contractors and consulting firms.

The organisation has come a long way since it was formed as a spin-off from the Technical University of Denmark in 1964.

DHI cut its teeth in port layout optimisation in Denmark, a country with a rich seafaring tradition. But when the company started developing numerical modelling tools, it quickly realised it could also contribute to solving river problems. Then, amid population growth and rapid urbanisation, DHI realised there was a gap it could fill in solving hydraulic problems in cities. Subsequent mergers with other organisations led to its present corporate structure.

Today, on top of providing consultancy services and selling its advanced technologies, DHI also has a strong focus on field surveys and monitoring programmes for coastal and marine infrastructure developments.

### Milestones

Last year marked the 10th year of DHI's foray into Singapore. It set up a Singapore office in 2003 because it was then the independent consultant appointed to study the environmental impacts of Singapore land reclamation

for the International Tribunal for the Law of the Sea. Since then, DHI has clocked many milestones in local and regional projects. One of them was the Pulau Ular reclamation project in Singapore between 2005 and 2006, which marked the first time that international best practice feedback environmental management was applied in Singapore.

DHI was hired by JTC Corporation to carry out studies on the impact the project would have on marine life. The company also helped to put in place a rigorous Environmental Monitoring & Management Plan (EMMP), based on international best practices, to ensure that the reclamation works would not result in any adverse impacts on the environment.

The project was challenging as the techniques for environmental management had to be taken from European practices and transferred to a tropical context, which had never been done on such a large scale before. It also took place in a challenging location – right next to an oil refinery – that was not only a sensitive security area, but also one that was highly reliant on water for cooling and processing. If environmental management was not performed properly, sediments could get into the refinery's water intake, with serious consequences.

As part of the reclamation project, DHI was also involved in the world's third largest coral relocation exercise at the time, to preserve corals before the reclamation works began. DHI completed the

project successfully and a paper written on the project also won the 2007 International Association of Dredging Companies Young Author Award for Best Paper.

### Demand and outlook

Currently, DHI's main business in the Asia Pacific is in port development. Over 50 per cent of its work in Singapore, Malaysia and Australia is port or marine-related. Globally, about 40 per cent of its projects are in the port, marine or offshore sectors, with another 40 per cent in rivers and water resources. The rest of its businesses are urban-related.

Looking ahead, Foster says that there is unlikely to be any significant change in demand for its services in the port, marine and offshore sectors, as DHI already enjoys a high market share in the Asia Pacific.

However, the company has identified growth areas such as water resource and flood management. Increasingly drastic weather conditions, coupled with growing public awareness and pressure, have led to greater demand for DHI's services in countries such as Brunei, Indonesia and the Philippines.

"The other growth area for us is in water use optimisation, as big industries are becoming increasingly aware that water is a scarce resource," says Foster.

"DHI helps such industries evaluate how optimising their water usage can lead to significantly higher savings beyond just the water they pay for."

# AT THE HELM

JOHN NELSON, CHAIRMAN OF LLOYD'S OF LONDON, TELLS JAMIE EE THAT HE SEES GREAT OPPORTUNITIES FOR THE INSURANCE MARKET DESPITE MORE CHALLENGES AHEAD.

► Even after a 40-year career in investment banking, which has seen him take on various directorships, John Nelson shows no signs of slowing down.

After all, it was only two years ago that Nelson took on one of the biggest roles of his career by becoming the chairman of Lloyd's of London, the world's oldest and largest insurance market.

It thus comes as little surprise that the 66-year-old says he has "not enough spare time" for his interests.

Nevertheless, he is relishing the challenge of helming the 325-year-old market, which provides insurance services to businesses in more than 200 countries and territories.

"It has been absolutely fascinating," he told *Singapore Nautilus* in an interview at the Lloyd's Asia office in Asia Square. "The insurance industry is entirely global, and operating on a global platform is very stimulating as well as challenging."

Nelson was invited to Singapore in November 2013 for a three-day visit under the Maritime and Port Authority of Singapore's (MPA) Distinguished Visitors Programme. During his stay, he called on Minister for Transport Lui Tuck Yew, and met with MPA's then Chief Executive Lam Yi Young as well as MPA's senior management staff.

He also shared his insights on risk management with Singapore-based shipping companies and the Singapore Shipping Association during a breakfast networking reception, and toured MPA's Port Operations Control Centre at PSA Vista.

High on his trip's agenda was a visit to Lloyd's Asia, Lloyd's Asia-Pacific hub in Singapore and its biggest market outside London, to strengthen the market's relationship with its brokers.

## Risk in marine insurance

Lloyd's began as a marine insurance provider, but has over the years diversified into other businesses which include property and aviation. Marine insurance now makes up only 8 per cent of its business, although it remains significant for its Asia market at 40 per cent.

When asked about the challenges facing marine insurance, Nelson cites increased competition in the sector which has created a soft market and pushed down rates, affecting Lloyd's profit margins.

"We will find ways over the next few years to boost profits. Marine insurers will also need to adapt to the changes in the shipping industry, as increasing vessel sizes and growing cargo volumes drive up risks," he says, before adding that insurers will also have to relook their risk assessment.

"We have to look at how we can handle catastrophies in the marine industry; how we can clear these up efficiently and in an environmentally friendly way, but also from a cost point of view. Otherwise the cost to shipping owners will obviously rise."

## Forging ahead

Despite these challenges, Nelson says opportunities abound, particularly in the Asia market. Lloyd's Asia, for one, has been growing at a healthy rate, with gross premiums reaching US\$520 million in 2012.

Hence, one of Nelson's immediate priorities is to increase Lloyd's presence in the region, particularly in countries like Malaysia, Indonesia, and South Korea. He says that the industry can expect to see more activity for Lloyd's in those territories over the next few years.

Outside of Asia, Nelson is aiming to expand the organisation's footprint in the emerging markets of South America and Eastern Europe. He expresses optimism by citing the organisation's solid financial results despite difficult economic conditions. The market posted a profit of US\$2.1 billion in the first half of 2013, with a combined ratio of 86.9 per cent and an annual return on capital of 14 per cent.

Looking ahead, Nelson wants to maximise the efficiency of services by Lloyd's, such as improving the processing of claims and making it more efficient for customers.

"A market or any insurance company, in a sense, is only as good as its own reputation; and part of its reputation rests on the prompt and timely payment of valid claims," Nelson says.

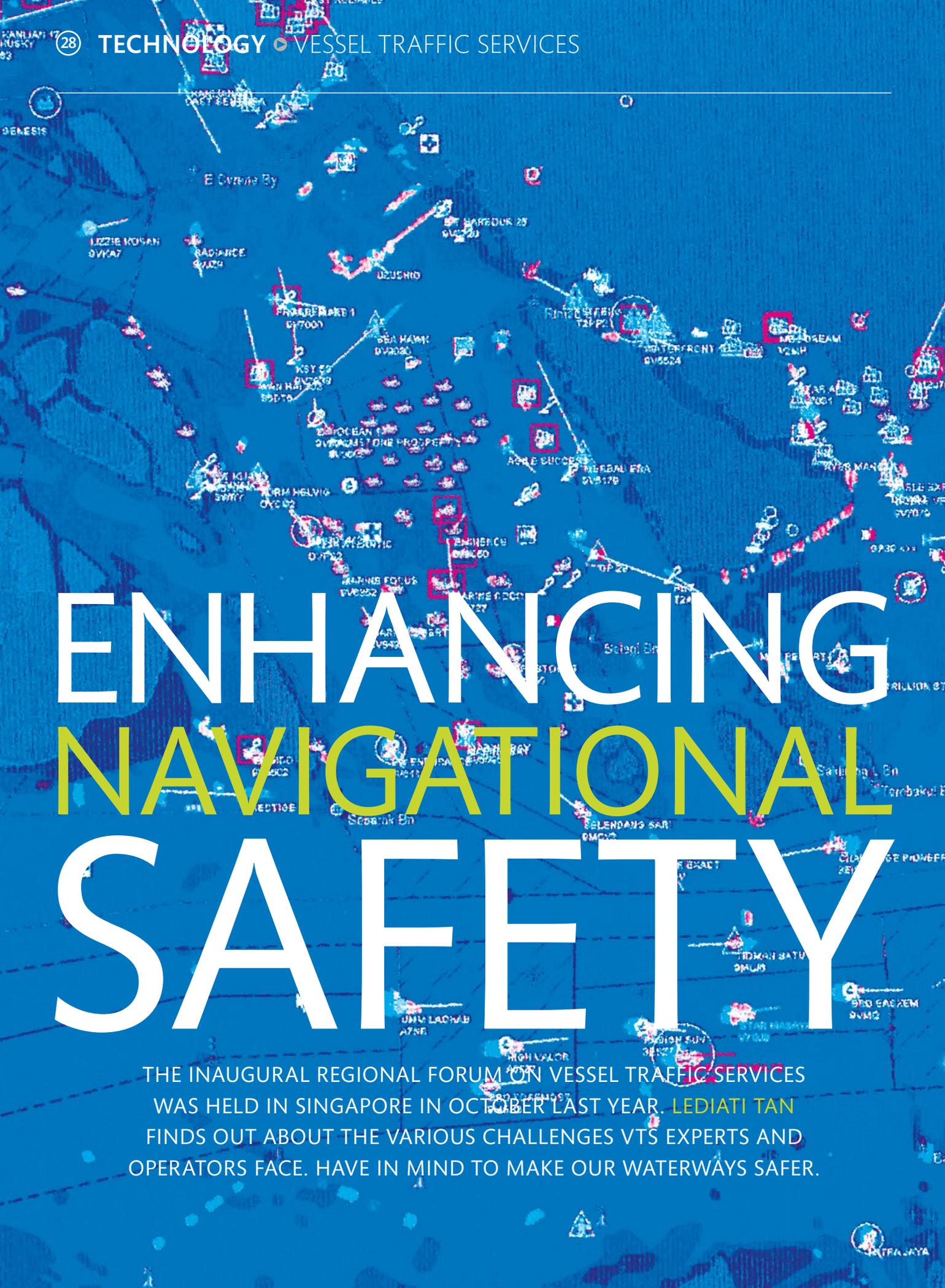
Above all, Nelson wants to ensure that underwriting standards at Lloyd's remain high – and he has reasons to be confident in this. Just two years ago, the company's underwriting strengths and discipline were put to the test when it was faced with a string of costly natural disasters, including earthquakes in Japan and New Zealand.

"That was probably our worst year for coincidence of catastrophies, but we emerged with our capital intact, so that was a good stress test," he says.



**“A market or any insurance company, in a sense, is only as good as its own reputation; and part of its reputation rests on the prompt and timely payment of valid claims.”**

John Nelson, chairman of Lloyd's of London, stresses the importance of efficiency



# ENHANCING NAVIGATIONAL SAFETY

THE INAUGURAL REGIONAL FORUM ON VESSEL TRAFFIC SERVICES WAS HELD IN SINGAPORE IN OCTOBER LAST YEAR. LEDIATI TAN FINDS OUT ABOUT THE VARIOUS CHALLENGES VTS EXPERTS AND OPERATORS FACE. HAVE IN MIND TO MAKE OUR WATERWAYS SAFER.

► At a time when vessels have grown in terms of both size and number, the task of ensuring the safety and efficiency of marine traffic for vessels manoeuvring in our busy ports and narrow shipping lanes and channels becomes ever more important and challenging.

Hence, the maritime and shipping community has come to recognise the significant role that a Vessel Traffic Service centre plays in contributing to navigational safety, as well as the need to develop Vessel Traffic Service capabilities globally, for the benefit of shipping.

To address this pressing need, the Maritime and Port Authority of Singapore (MPA), at the invitation of the International Maritime Organization (IMO), hosted the inaugural Regional Forum on Vessel Traffic Services (VTS) from Oct 1 to 4 last year.

The forum, a first in Asia, was jointly organised by MPA, IMO, the Ministry of Foreign Affairs Singapore, and the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) under the Singapore-IMO Third Country Training Programme, which provides technical assistance to help developing countries acquire the capabilities and expertise to implement IMO regulations and standards.

The four-day event was attended by 31 delegates from 15 IMO member states and one associate member. The members in attendance were Singapore, Bangladesh, Brunei

Darussalam, Cambodia, China, the Democratic People's Republic of Korea, Indonesia, Malaysia, the Maldives, Myanmar, Pakistan, Papua New Guinea, the Philippines, Thailand, Vietnam and Hong Kong.

The VTS forum provided a platform for maritime officers, executives and the authorities in charge of VTS maritime safety and navigation to share pertinent concerns – including contemporary issues, operational considerations and training needs.

#### Sharing expertise

At the forum, representatives from MPA, IMO, IALA, as well as those from member states, shared their knowledge and expertise on a wide range of VTS-related matters, such

as the implementation and operation of VTS and VTS training and legislation.

As one of the world's busiest ports, Singapore places a strong emphasis on navigational safety, said Captain M Segar, MPA's Assistant Chief Executive (Operations), in his opening address.

Stressing the importance of VTS as a navigational tool in today's challenging marine

environment, he added:

"The Singapore economy is dependent on global trade and, within that, the safe and efficient transport of goods by sea. It is therefore very much in Singapore's interest to share our VTIS (Vessel Traffic Information System) experiences and expertise with like-minded countries."

#### Standardisation

Today, one of the challenges facing VTS lies in that VTS training is not mandatory – some VTS centres have qualified operators, while others do not. Also, not all training organisations are accredited or approved.

A situation could arise in which a vessel, with trained and qualified crew, enters a VTS area and is regulated

**About a third of the world's traded goods pass through Singapore's waterways, hence the focus falls on maintaining efficient traffic management.**

by VTS operators who do not have internationally recognised qualifications. This would present difficulties in navigational safety.

The other related problem is the lack of worldwide expertise in training VTS personnel and the lack of resources among many developing countries to provide adequate training.

These are just some examples of issues that such

regional forums can help address. Interaction among VTS countries can also create opportunities for further cooperation in enhancing navigational safety.

Singapore has also taken further active steps over the years to contribute to navigational safety in and around its port waters.

For instance, MPA recently upgraded its Port Operations Control Centres with state-of-the-art VTIS that can integrate critical information from various sources. This allows its officers to detect potential collisions and grounding situations, and facilitates timely provision of information and warnings to ships.

### Varying challenges

At the forum, delegates were also able to gain insights via the exchange of ideas and best practices on the use of VTS.

The ever-present issue of enhancing navigational safety was a common concern for many countries, which shared ways in which their VTS systems are designed to tackle challenges unique to their regions.

About a third of the world's traded goods pass through Singapore's waterways, hence the focus falls on maintaining efficient traffic management, as well as ensuring the safety of all vessels in the channels. Singapore has over 25 years of experience with a radar-based VTIS that is operated by MPA.

Chan Keng Nee, Deputy Director of MPA's Vessel Traffic Management Department,

## ABOUT VTS

**Vessel Traffic Services, or VTS, refers to a marine traffic monitoring service, which can range from the provision of basic traffic and navigational information to ships entering and leaving the port, such as the position of other vessels or meteorological warnings, to extensive management of traffic within a port or waterway.**

**Its main purpose is to improve the safety and efficiency of marine traffic and to protect the environment.**

**The job scope and responsibility of VTS personnel operating in large seaports is comparable to that of air-traffic controllers.**

**Training for VTS operators covers several aspects, including nautical knowledge such as navigation, vessel construction and control and port, organising traffic within the VTS area, transmitting and receiving information by radio and responding to emergency situations. VTS operators are also trained in providing information service, navigational assistance service and traffic organisation service.**

shared that the evolution of Singapore's VTS systems from the 1970s has made a significant difference.

Back then, there were no vessel-traffic lanes or radar systems, making positions of ships generally unknown to the port authorities.

Now, with the current state-of-the-art multi-sensor radar system in place, Singapore is continuing to show its commitment to enhancing the safety of navigation in the waters surrounding it.

For Australia, its first priority is to minimise the risk of a maritime accident in the Great Barrier Reef and Torres Strait region, an important conservation zone protected by a

range of national and international measures.

The VTS in the Great Barrier Reef is also the most extensive in the world, and it covers some very isolated reef systems and channels which are navigationally demanding.

Over in the Middle East, the channels in the Turkish Straits are very sinuous, often narrow and affected by strong and complex currents and rapidly changing weather conditions.

The main challenge lies in ensuring the safety of vessels passing through the straits that span 164 nautical miles from the Black Sea to the Aegean Sea, and includes the Istanbul Strait, the Marmara Sea and the Canakkale Strait.

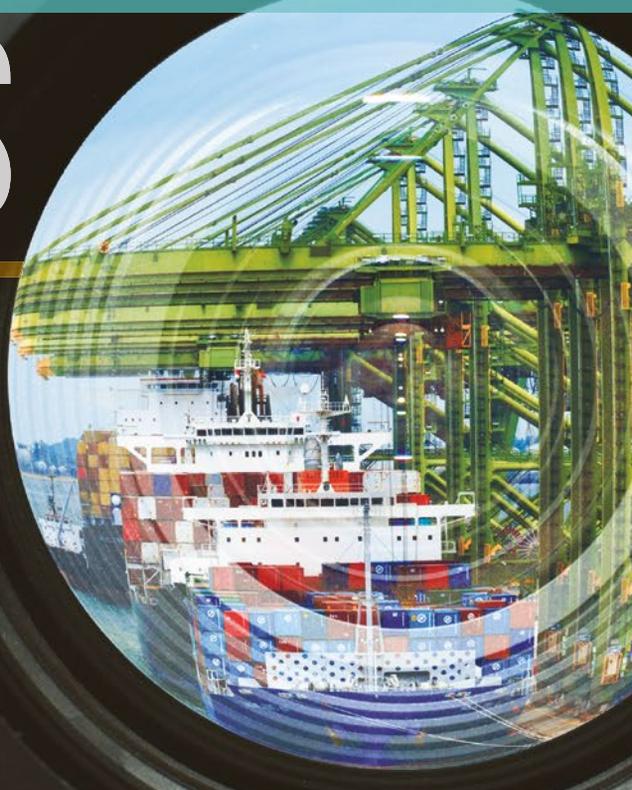
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# TRIBUTE TO A CHIEF

SINGAPORE NAUTILUS RECAPS THE ACHIEVEMENTS OF FORMER CHIEF EXECUTIVE OF THE MARITIME AND PORT AUTHORITY OF SINGAPORE, LAM YI YOUNG, WHOSE APPOINTMENT ENDED IN DECEMBER 2013.

► Lam Yi Young faced formidable challenges when he took over the reins at the Maritime and Port Authority of Singapore (MPA) as Chief Executive in May 2009. Many sectors of the maritime industry were then experiencing economic difficulties, and the rest of the year was marked by a gloomy global economic outlook and falling economic indicators in most developed economies.

However, Lam managed to take the problems in his stride, calmly navigating the industry through the crisis. He even managed to advance Singapore's status as a premier global hub port and International Maritime Centre, strengthen its port capabilities, and develop the organisation to better deal with future challenges.

## Global outreach

Furthering Singapore's goal as an International Maritime Centre was another one of Lam's key achievements. During his tenure, the Baltic and International Maritime Council (BIMCO) officially recognised Singapore as a maritime arbitration venue, a status shared only

by London and New York. BIMCO is the largest of the international shipping associations representing shipowners, with its membership controlling about 65 per cent of the world's tonnage.

Under his guidance, MPA also actively represented Singapore at the International Maritime Organization (IMO) on issues such as greenhouse gas emissions and maritime security. MPA's contributions at the IMO were pivotal in its successful re-election to the IMO Council for an 11th consecutive term in November 2013. Focusing on improving knowledge-sharing within the industry in Singapore, Lam also championed maritime manpower development initiatives, productivity drives, and the promotion of Singapore as a maritime knowledge hub. This led to the formation of the Singapore Maritime Institute, which is developing towards being an international thought leader in maritime policy formation and a global leader in research and development (R&D).

To bring the Maritime Singapore story to Singaporeans and reach out to them about the success stories and

career opportunities in the industry, Lam spearheaded the development of the Singapore Maritime Gallery.

With his support, there was a heightened focus on public outreach activities during the annual MPA-organised Singapore Maritime Week, and on promoting maritime careers among Singaporeans by reaching out to schools and Institutes of Higher Learning.

## Strengthening port capabilities

To ensure that the Port of Singapore remained ahead of the competition, Lam led efforts on several fronts, including reviews of Singapore's port dues structure and reviews of the regulatory regime and market structure for various port and marine services like cargo terminals, cruise and passenger terminals, water sales, and towage services. Several initiatives in bunkering were also introduced with the intent to enhance Singapore's standing as a well-connected and reputable bunkering hub. For example, a review was carried out to improve industry standards, and mass flow meters were introduced to improve



measurement accuracy and efficiency.

Lam also helped Maritime Singapore stand out both regionally and globally, through technology and green initiatives. With regard to the former, he led the development of the new Port Operations Control Centre at Changi Naval Base (POCC-Changi) and the upgrading of the existing POCC-Vista, introducing a new state-of-the-art Vessel Traffic Information System. To promote clean and green shipping in Singapore, he initiated the S\$100 million Maritime Singapore Green Initiative, which comprises the Green Ship Programme, the Green Port Programme, and the Green Technology Programme.

He also engaged maritime companies' commitment to clean and green shipping through the Maritime Singapore Green Pledge, which to date has received a total of 60 signatories.

Lam also led in helping the Port of Singapore prepare for the future. Besides working and planning for capacity expansion through the Pasir Panjang Terminal Phases 3 and 4 and the new Tuas Terminal, Lam

encouraged the exploration of new ideas and technology for the port of the future through the Next Generation Container Port Challenge and new R&D projects under MPA's S\$150 million Maritime Innovation and Technology (MIINT) Fund.

### Transforming MPA

Apart from tackling the challenges at hand, there was also a need to ensure that MPA would continue to be well equipped to manage increasing complexities and future challenges. To that end, Lam focused on improving MPA's ability to innovate and, being passionate about people development, implemented policies to improve employee effectiveness.

In addition to enhancing the Maritime Sector Incentive framework to better support shipping companies in Singapore, plans were also put in place to equip MPA employees with tools to channel their creative energy. One such example is the introduction of the MPA Corporate Activists Network. This initiative aims to

harness the ideas and creativity of MPA employees, as part of efforts to make the organisation a great place to work in.

### Solid contribution, lasting impact

Lam's contributions have enabled Maritime Singapore to flourish. During his tenure, the Port of Singapore cemented its standing at the top of the industry, maintaining its winning streak of awards, such as Best Seaport In Asia at the Asian Freight and Supply Chain Awards, and remained the world's busiest port in annual vessel arrival tonnage. It has also consistently retained its title as world's top bunkering port, and ranks among the top 10 ship registries worldwide.

Building on Lam's contributions, Maritime Singapore – already home to over 5,000 maritime companies employing over 170,000 people – and MPA are better positioned and more ready than ever to face an increasingly complex future.

*Andrew Tan Kok Kiong took over the appointment of Chief Executive, MPA, on 1 January 2014.*

MARITIME EXPERTS TALK  
ABOUT WHAT RESPONSIBLE SHIPPING  
IS AND THE CHALLENGES IT POSES TO THE  
SHIPPING INDUSTRY TODAY.

# RESPONSIBILITY MATTERS

► **SINGAPORE NAUTILUS (SN):** *What are some of the contributions your organisation has made to responsible shipping?*

**HENNING MOHN (HM):** Our recent contributions to responsible shipping include the many conceptual designs for LNG-fuelled merchant ships that we released a few years back, updated class rules reflecting various technology developments, a review of safety systems, and the development of training programmes. I would also like to draw attention to the numerous completed projects related to emission-reducing technologies and fuel-saving initiatives, which are aspects of responsible shipping that I have focused on during my years in DNV Singapore and Norway.

**SVERRE PRYTZ (SP):** Green Marine Capital (GMC) is a contribution to responsible shipping in its own right. GMC is sponsored by BW Group and supported by a number of forward-leaning maritime companies such as DNV GL, who see it as their responsibility to actively contribute to the improvement of our industry. Backed by the capital, competence and assets of some of the world's leading maritime companies, GMC invests in and helps develop high-potential companies that have the ability to help our sector's push to be more environmentally responsible. As a result, we are able to significantly improve the speed of adoption of technologies which otherwise would struggle to penetrate a very conservative market.

**SHAJ THAYIL (ST):** The NOL Group is committed to sustainability practices across our global operations. Within APL – our container liner business – we have a fleet-renewal programme that consists of 34 container ships designed and outfitted with advanced installations for optimal fuel efficiency and environmental performance. These vessels have an Energy Efficiency Design Index that surpasses IMO guidelines. Also, 30 of our new buildings are equipped with approved ballast water treatment systems which are already operating ahead of the Ballast Water Management Convention. And in California, APL vessels calling at the port of Oakland have been tapping on shore power at berth – this too was taking place even before the

enforcement of cold-ironing regulations in January 2014.

**SN:** *What does “responsible shipping” mean to you?*

**HM:** Responsible shipping is all about finding the balance between inherent risks in maritime operations and careful behaviour.

Much of my work as Head of Section in DNV GL's shipping advisory arm is tuned towards helping shipping companies save on fuel costs, while also reducing emissions and discharges to sea. These issues are increasingly crucial for our customers due to high fuel costs and new regulations. Another key aspect of responsible shipping, which shipowners focus on daily, is a high standard of fleet maintenance. This is vital for safeguarding the crew, the

Shaj Thayil

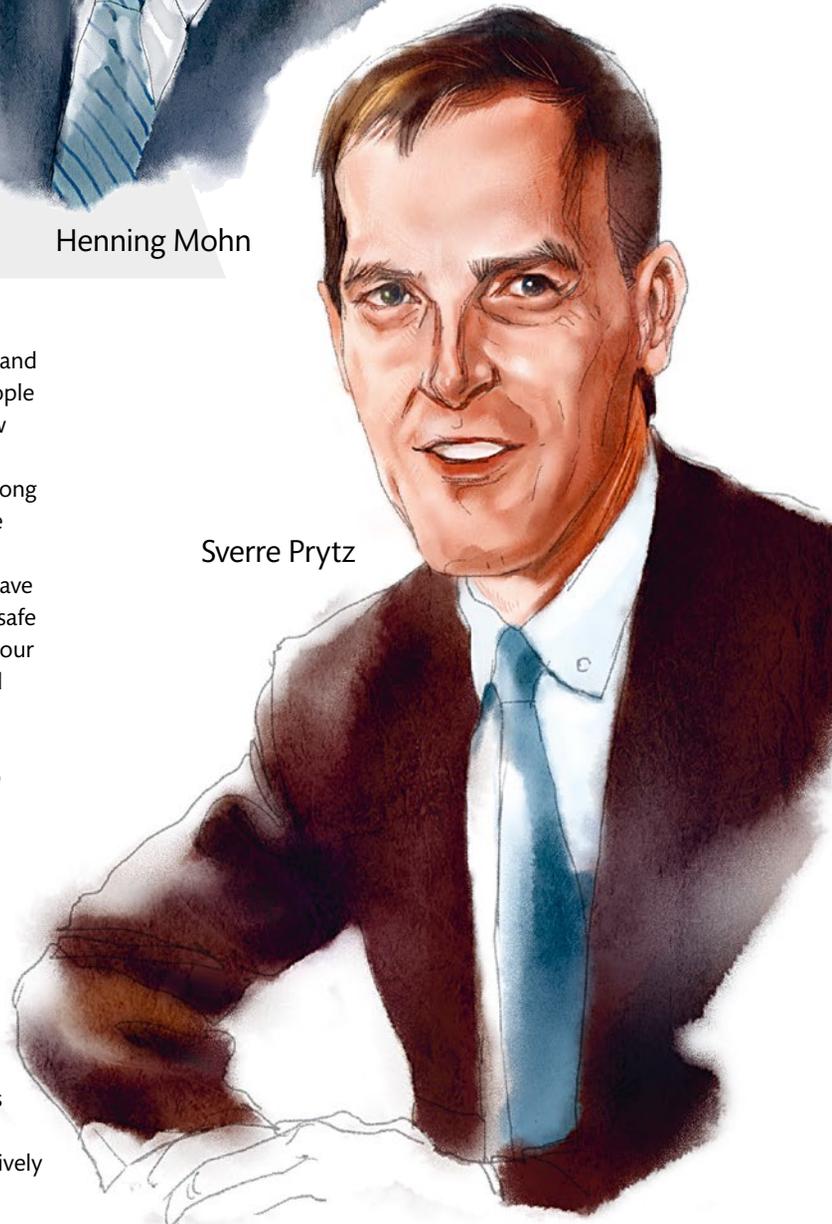


FROM LEFT: Shaj Thayil, Vice-president, Technical Services & Ship Management, APL; Henning Mohn, Head of Section, Shipping Advisory, DNV GL, Singapore; Sverre Prytz, Managing Director of Green Marine Capital

Henning Mohn



Sverre Prytz



asset value and the maritime trade's reputation.

**SP:** Responsible shipping has in the past been a bit too much of a marketing slogan rather than representing real actions, but I see this changing. Shipowners and charterers are beginning to see the real economic benefits that come along with being responsible. After all, these technologies not only reduce the maritime industry's impact on the environment, but also lower operating costs, or the cost of compliance. My hope is that responsible shipping will be the norm 10 years from now.

**ST:** NOL defines this in terms of adopting and promoting sustainable practices across our global container shipping and logistics businesses.

We seek to achieve an equitable balance between fulfilment of our business

needs, resource utilisation, and the resulting impact on people and the environment – now and in the future.

To a large extent, our strong commitment to sustainable practices is reflected in the effective controls that we have in place to ensure a stable, safe and clean environment for our businesses, employees, and society at large.

**SN:** **How has the maritime community reacted to responsible shipping?**

**HM:** As the maritime community is diversified both geographically and into different markets, there isn't one typical worldwide reaction to responsible shipping. Currently, most shipowners and operators are working hard to operate cost-effectively

as this will help safeguard their business interests in light of low freight rates and high fuel costs.

Being a conservative industry, shipping will, in general, resist implementing new technologies unless doing so is a ticket to trade from a compliance perspective. The current financial state of the industry is not making this any better as most companies have very limited funds to invest.

**SP:** Once the industry sees that there are viable solutions that come with attractive economics, they will embrace the trend to go green.

I have also observed that the new generation of shipowners and younger CEOs seem to be more attuned to the responsibilities they have as stewards of not just their companies' assets, but also the environment.

However, due to rapidly increasing bunker prices and tighter regulations, the economic motivation now increasingly overlaps with the desire for greater sustainability.

Every company was forced to think about their Internet strategy 15 years ago but it has become a way of doing business today. Similarly, we are now forced to think about how we can be more "green". I believe this will be integrated into how we do business a few years from now.

**ST:** Generally, the maritime community is receptive to responsible shipping.

It is well understood, and indeed expected by our stakeholders, that the decisions and actions taken today must not compromise business,

society and the environment in the future.

The cost of practising responsible shipping can be a major challenge, particularly in the current market conditions. Shipping companies could do with support in the form of more financial subsidies or incentives for adopting green practices.

**SN: What are some key challenges in responsible shipping? How can the industry overcome them?**

**HM:** The dire financial state that the industry is currently in poses a major challenge to responsible shipping. The majority of companies are struggling to survive, and even with good intentions, they may not be able to direct multimillion-dollar investments to their fleet. They also face other challenges like navigational risks, crewing and piracy. On the aforementioned fuel-cost issues, there are hints that natural gas prices in the future will be more stable and predictable than oil prices, and LNG will certainly be cheaper than low-sulphur distillates, which are another alternative when the global emission regulations kick in.

Nevertheless, it is important to remember that all these new regulations come with an investment cost, and I encourage authorities and organisations worldwide to help the maritime industry through this transition period. MPA's Maritime Singapore Green Initiative is a good example of such a stimulus; The Norwegian NOx Fund

is another great initiative for driving change towards cleaner shipping.

**SP:** It is quite simply explained by the fact that firstly, the industry is very conservative and only a few dare to be innovative. Secondly, the industry is not making enough money, so even the best intentions are restricted by owners' ability to invest. Lastly, the industry has yet to be prioritised by the innovators who can make a difference.

I believe the first hurdle can be overcome in the next few years – hopefully, the market will turn around and allow owners to make the right long-term decisions, and with a few "wins" in the shipping sector, we will be able to attract the attention of technology providers.

**ST:** While a broad variety of green solutions is available to the maritime community today, the effectiveness of some of these solutions has yet to be conclusively proven.

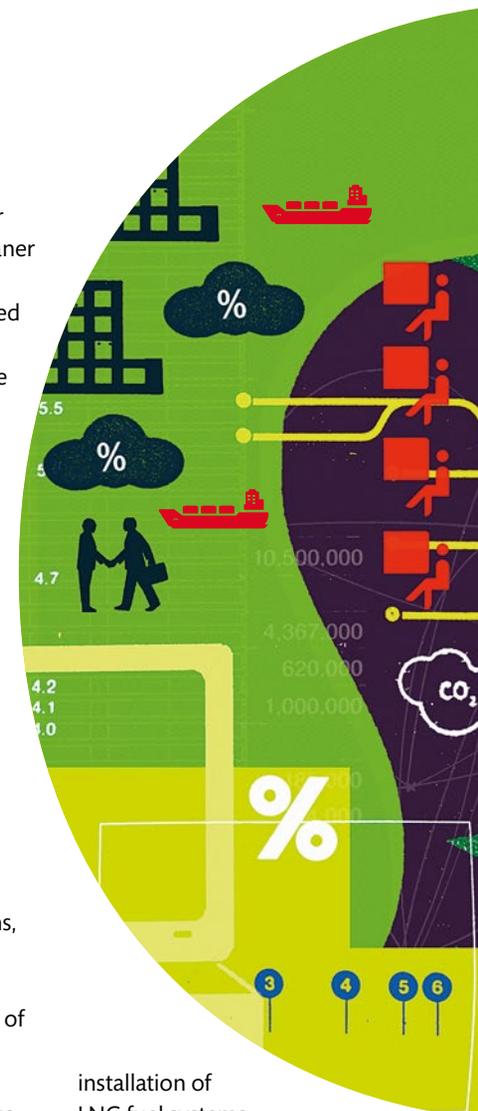
Verifying and adopting such solutions will take time and resources before shipping companies can make informed decisions on which ones to invest in.

**SN: What new technology has excited you recently? How will it help to shape your sector in the future?**

**HM:** Emission abatement systems and ballast water treatment (BWT) systems are examples of two such technologies. Similar challenges come with the

installation of LNG fuel systems, but these solutions open up attractive and flexible operational patterns where the ship selects between different fuel types on a daily basis.

Looking ahead, I think we will see more and more innovative ship designs and retrofit solutions to meet the need for flexible, cost-effective operations, with built-in compliance for the announced environmental regulations. With regard to the offshore shipping sectors, I believe we will soon see more gas-fuelled platform support vessels as a response to energy majors' requests. Other novel solutions like energy recovery solutions and batteries for intermediate





**“Once the industry sees that there are viable solutions that come with attractive economics, they will embrace the trend to go green.”**

Sverre Prytz, Managing Director, Green Marine Capital

energy storage will also be implemented.

**SP:** I have had the opportunity to see an amazing number of new technologies within the Green Marine Capital team.

One such technology is CleanHull. It is able to quickly but gently clean the hull of vessels (even when in port) with the help of a surface controlled cleaning rig, which through hydro-jetting loosens even the toughest growth while protecting the expensive coating underneath. It simultaneously collects the resulting debris, thereby protecting the ecosystem.

The other is BioGill, a company with a land-based water treatment technology that we are adapting for the maritime industry.

With its low capital and

operating costs, as well as a small physical footprint, it seems perfect for the maritime industry.

Its extremely efficient breakdown of biological waste products means that BioGill has the potential to revolutionise the way vessels think about biological waste treatment.

**ST:** The use of computational fluid-dynamics techniques has been central to the development of new ship designs that have made vessels more energy-efficient. Additionally, ship performance management systems have also seen considerable innovation, where improved decision-support tools facilitate voyage optimisation and more efficient turnaround. Scrubber technology, too, has evolved.

In 2011, as part of a pilot

project, APL retrofitted one of our vessels with an 8MW, three-inlet scrubber for the auxiliaries. The findings from the trial have led to further development of scrubbers and contributed to significant design improvements.

I would also add BWT systems to the list of exciting technologies. All our vessels built since 2012 are installed with approved BWT systems which comply with the D-2 Standards.

APL is proud to be amongst the first movers in this area, contributing to learning and improvement in the industry. Grandfathering the installed type-approved systems would be one way to go about promoting further innovation and global commitment to the installation of BWT systems.



# THE TRAIN

TEACHING HIS PEERS MAY BE TOUGH, BUT PORT OPERATIONS EXECUTIVE

Chuan Fook Seng, 45, is a Port Operations Executive at Jurong Port's Penjuru Terminal. *Singapore Nautilus* speaks with him about his job and what he loves most about it.

### Tell us about your job scope/responsibilities.

As a Port Operations Executive, I am in charge of training new staff in the technology used in operation procedures, such as processing shipment advices from trucks carrying in cargo. As of March 2013, all processes at the Penjuru Terminal have been fully automated. I also perform admin duties such as working out duty rosters and keeping track of the staff's over-time work.

### How did you get this job?

I joined PSA, previously known as the Port of Singapore Authority, in 1992, as a container machine operator; I left after two years to become a driving instructor. In 2003, I returned to the maritime industry because I missed the port. I joined Jurong Port's Container Terminal Operations as a rubber tyre gantry (RTG) crane operator and in just half a year, I was sent for training to operate the quay crane, which requires a different skillset. After operating quay cranes for a few years, I was transferred to the training section, where

my previous experience as a driving instructor proved rather useful. I soon took over the training function within the Container Terminal Operations department. In 2011, I was transferred to the General Cargo Operations department. Last year, I requested for a change of environment and that's how I ended up at Penjuru Terminal. I really appreciate the career development opportunities that Jurong Port offers.

### What are the toughest and best parts of your job?

The toughest part is communicating with my colleagues of various nationalities, such as Indians and Filipinos, as I have to adapt to different communication styles. I also advise them how to communicate effectively with Singaporeans. Another challenge is in teaching new staff to use our technology. But this is also the best part – watching them overcome their challenges with technology and learning how to operate different systems successfully on our computers and iPads.

### What have been some memorable moments in your job so far?

The most memorable moment was when I won the 2010 Cheaper Better Faster (CBF)

Model Partnership Award (Individual Category), an award from the National Trades Union Congress (NTUC) that recognised my efforts in upgrading my skills, and how I make use of these skills to improve work productivity. I was happy for the acknowledgement of my hard work over the years, and it definitely makes me happy with my decision to return.

### What skills would someone who is considering a job in this field need?

One has to be very mindful of safety, and be committed to the job. Some basic crane lifting and maritime knowledge would also be useful. Staff working at Penjuru Terminal need to be patient when dealing with customers and colleagues who may not speak the same languages. We must also be willing to learn in order to deal with ever-changing technology and processes.

### What do you do in your spare time?

My wife, two children and I travel during the school holidays, using the S\$400 travelling benefit that the company gives us each year. On weekends, we go swimming or cycling. But sometimes, I just like staying home for quiet family time.

PHOTOGRAPHY AIK CHEN

# ING EXPERT

CHUAN FOOK SENG TELLS AMAYA CHAN THAT HE IS ENJOYING EVERY BIT OF IT.

One of MPA's trusted workhorses, the buoy tender vessel *Panduan*, was recently retired after 17 years of operational service.

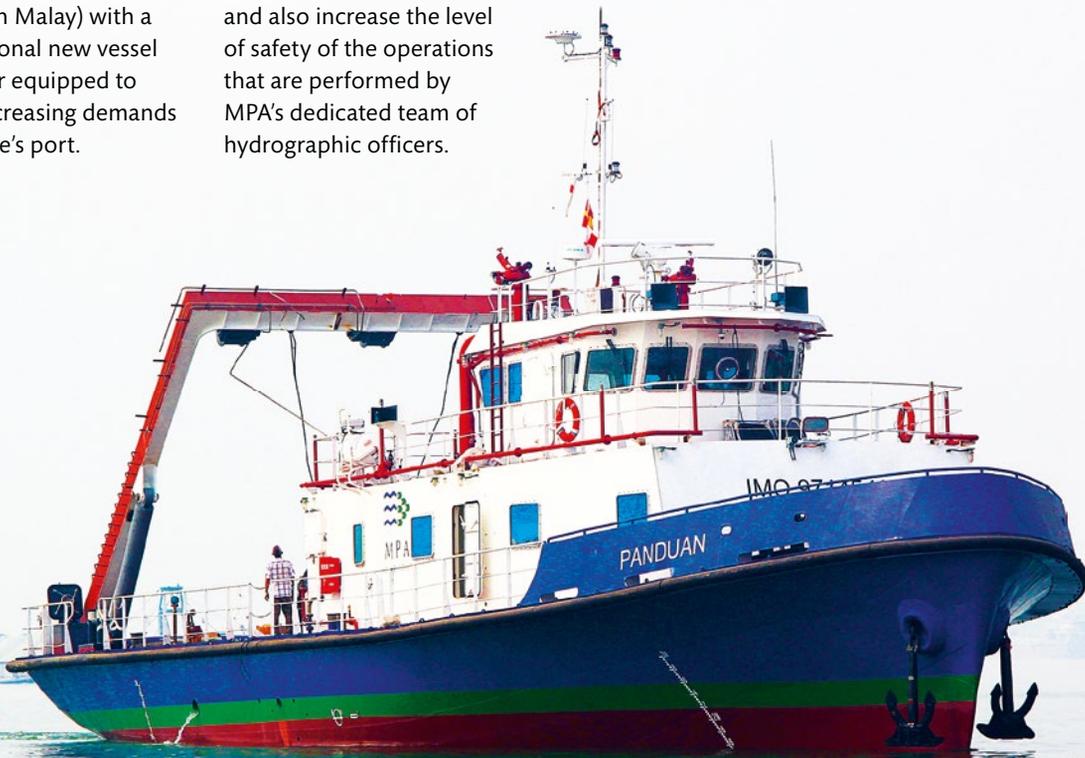
It had primarily been used to retrieve and deploy MPA's navigational and mooring buoys as part of the organisation's navigation maintenance programme.

MPA made the decision to replace *Panduan* (meaning "guidance" in Malay) with a multi-functional new vessel that is better equipped to meet the increasing demands on Singapore's port.

The new vessel, which retains the name *Panduan*, can handle larger buoys of up to 10 tonnes as its A-frame and more powerful deck winches provide heavier lifting capacity. It can also achieve a higher cruising speed using greener engines, and can be used to combat fires and oil spills.

All these features facilitate MPA's maintenance works and also increase the level of safety of the operations that are performed by MPA's dedicated team of hydrographic officers.

COMPARISON	OLD	NEW
Buoy handling Capabilities	2 units (maximum diameter 2.4m)	2 units (maximum diameter 3.5m)
Buoy deployment method	Forward deployment via lifting horn	Aft deployment via A-frame
Sinker handling	Up to 10 tonnes	Up to 15 tonnes
Cruising speed	10 knots	15 knots
Firefighting capabilities	No	Yes



# THE NEW PANDUAN

## Discover Maritime Singapore



How did Singapore transform to be one of the world's leading international maritime centres? And home to the world's busiest port? Why is maritime a vital part of our past, present and future?

Find out more at [maritimegallery.sg](http://maritimegallery.sg)

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