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gear up for the future

Singapore Maritime Week (SMW), the premier maritime event in Singapore, returns for its 12th run with a stellar line-up – its most extensive – of over 34 events. More than 20,000 maritime professionals from around the world are expected to gather here for a week of conferences, dialogues, exhibitions and social events.

Themed “Navigating Through Challenging Times”, SMW 2017 will focus on how the maritime industry can rise above tough times and future-proof itself by leveraging disruptive technologies, embracing digitalisation, and building an innovative and highly skilled workforce. It also gives the public opportunities to learn about the vibrant and dynamic maritime industry through community events such as public exhibitions, outreach activities, and concerts. Read more about what SMW 2017 has to offer in this issue’s main feature.

In the Personality section, SMW 2017 speakers Patrick Rodgers, Chief Executive Officer of tanker company Euronav, and Aleksander Stensby, Chief Digital Officer of shipping firm Torvald Klavness, share insights on key developments within the maritime industry.

In line with the theme for SMW

2017, this issue of *Singapore Nautilus* looks at how different maritime organisations stay relevant to transformations within the industry. In the Port & Starboard section, find out how Jurong Port is investing in training to bring port workers into the future with the establishment of Jurong Port Academy in January this year.

The Maritime Services and Technology sections feature data analytics start-up Sense Infosys and underwater hull cleaning service provider C-Leanship respectively. These two companies demonstrate how businesses can leverage technology and innovation to find new areas for growth.

Through SMW 2017, I hope that the maritime community will find more opportunities to work together and develop plans and strategies that will help the industry to meet future challenges.



Caith
CAITLIN FUA
EXECUTIVE EDITOR

SUPPORTING RECAAP ISC'S ROADMAP FOR THE FUTURE



Singapore, as a Contracting Party to the Regional Cooperation Agreement on Combating Piracy and Armed Robbery against Ships in Asia (ReCAAP) and host of international organisation ReCAAP Information Sharing Centre (ISC), took part in the 11th ReCAAP ISC Governing Council Meeting, which was held from March 14 to 16 in Singapore.

At the meeting, the Council endorsed a roadmap and strategies for strengthening ReCAAP ISC as a Centre of Excellence for information sharing on piracy and armed robbery against ships in Asia by 2020. The roadmap was the result of extensive consultations among governors, and representatives from Contracting Parties and the shipping industry. It covers, among other things, the use of data analytics to provide insights on past incidents as well as the introduction of a new programme to deepen knowledge and understanding in key areas.

Mr Andrew Tan, Chief Executive of the Maritime and Port Authority of Singapore (MPA) and Singapore's Governor to the ReCAAP ISC Governing Council, said: "In 2016, the threat of piracy and armed robbery against ships, particularly in the Straits of Malacca and Singapore, was reduced significantly. This was the result of concerted joint efforts by all stakeholders, including regional governments, the industry and ReCAAP ISC...MPA also continues to engage regional and international communities on piracy issues through sharing of best practices and networking of contact points."

ABOVE Governors and representatives of Contracting Parties at the 11th ReCAAP ISC Governing Council Meeting.

RIGHT MPA's Mr Andrew Tan (second from right) and DNV GL's Mr Remi Eriksen (third from left) renewed an MOU during Mrs Josephine Teo's (third from right) visit to DNV GL's headquarters in Norway.

EXPANSION OF ONLINE SERVICES ON MARINET

To provide greater convenience to shipowners, ship managers, and authorised shipping agents of Singapore-registered ships, the Maritime and Port Authority of Singapore (MPA) has rolled out five new online services on its e-commerce system, Marinet.

Since July 1 last year, users have been able to submit applications for Civil Liability Oil Pollution Certificate, Continuous Synopsis Record, and forms for Declaration of Company, Declaration of Designated Person Ashore and Declaration of Company Security Officer, via Marinet. Previously, these could only be submitted via e-mail, post, fax, or at the counter of MPA's Registry Department.

To streamline the online process, Marinet provides a clear set of guidelines on the procedure to ensure relevant documents and mandatory information are submitted. Users receive a unique ID for each online transaction, so they can track its progress anytime and anywhere. They also receive e-mail notifications updating them on the status of their transactions.

Users have responded positively to the online rollout so far.

MPA RENEWS MOU WITH DNV GL

To promote research and development (R&D) and innovation in the maritime industry, certification body and classification society DNV GL and the Maritime and Port Authority of Singapore (MPA) renewed a Memorandum of Understanding (MOU) on Feb 3.

The renewed MOU, which extended the duration of collaboration for another three years, has an expanded scope. This includes R&D in intelligent shipping systems, green ports, and marine environment and resources, as well as organising thought leadership forums to promote green shipping, green ports, and green technology in the maritime community in Singapore.

The signing ceremony took place at the DNV GL headquarters in Norway,



during a visit by Mrs Josephine Teo, Singapore's Senior Minister of State, Prime Minister's Office, Ministry of Foreign Affairs and Ministry of Transport.

The MOU was signed by MPA's Chief Executive, Mr Andrew Tan, and DNV GL's Group President and Chief Executive Officer, Mr Remi Eriksen, and was witnessed by Mrs Teo and Ms Dilek Ayhan, State Secretary of the Norwegian Ministry of Trade, Industry and Fisheries.

MPA DRIVES INNOVATION TO ENHANCE COMPETITIVENESS

To keep pace with transformations within the maritime sector, the Maritime and Port Authority of Singapore (MPA) is leveraging technology and stepping up workforce training to help maritime companies innovate and move into new growth areas. It has announced the establishment of the MPA Living Lab, a technology partnership platform that will provide sufficient scale and real operating conditions in the Port of Singapore for technology providers and industry partners to develop and pilot innovations. To be set up this year, the Living Lab will focus on developing capabilities in four areas, namely data analytics and intelligent systems, autonomous systems and robotics, smart and innovative infrastructure, and safety and security.

MPA will also partner the Singapore Maritime Institute to set up three maritime research Centres of Excellence within local institutes of higher learning over the next five years. The centres will help to deepen and sustain maritime research and development competencies, build up new capabilities to support the maritime industry, and accelerate technology transfer.

The first centre, focusing on maritime environment and energy, will be launched by MPA and Nanyang Technological University by the second quarter of this year. Two other centres, focusing on port operations and maritime safety, will be established later.

To help Singaporeans upgrade their skills and prepare for more knowledge-intensive jobs, MPA has enhanced the Maritime Cluster Fund (MCF) for Manpower Development to include a wider scope of training topics and support longer overseas training attachments.

And to encourage maritime companies to boost productivity by adopting technology, MPA has also increased co-funding for the MCF for Productivity from 50 per cent to 70 per cent of qualifying costs, and expanded the scope of qualifying costs to include software licensing, specialised hardware, as well as the salaries of up to two company employees, to carry out productivity projects.

FROM TOP RIGHT Key anti-piracy personnel at the meeting and workshop on piracy and armed robbery against ships; participants from Africa, Asia and Europe attended the event.

FOSTERING CLOSER TIES AND INFORMATION SHARING AMONG ANTI-PIRACY PERSONNEL

The Maritime and Port Authority of Singapore (MPA) and international organisation Regional Cooperation Agreement on Combating Piracy and Armed Robbery against Ships in Asia (ReCAAP) Information Sharing Centre (ISC) jointly organised an inaugural meeting and workshop for about 20 key anti-piracy personnel from Africa, Asia and Europe.

Held from Jan 11 to 12 in Singapore, the event aimed to build closer links between anti-piracy contact points and to enable more effective information sharing and communication. The meeting and workshop were part of Singapore's continuing contributions to international

efforts to counter piracy and sea robbery in vital shipping lanes in Africa and Asia. Representatives from international organisations such as the International Maritime Organization, the International Maritime Bureau, and the Nato Shipping Centre also attended the event.

Besides gaining a better understanding of each other's work, participants also shared and exchanged best practices, protocols, and experiences in information sharing. MPA also put together and circulated a list of anti-piracy contacts for more effective communication and information sharing among the various anti-piracy contact points.



STUDY VISIT BY WORLD MARITIME UNIVERSITY (WMU) STUDENTS



MPA Academy, the training arm of the Maritime and Port Authority of Singapore (MPA), hosted WMU master's students specialising in port management on a five-day field study visit to Singapore from Feb 27 to March 3. They were here to learn about the country's port management practices.

CHINESE NEW YEAR LUNCHES



To foster better relations, MPA organised several Chinese New Year lunches in February for different sectors of the maritime community, including boat operators, representatives of maritime unions, and members of the media.

VISIT TO PORT OPERATIONS CONTROL CENTRE (POCC) BY UNIVERSITY OF HONG KONG STUDENTS



Students from the University of Hong Kong visited MPA's POCC at PSA Vista on March 7 to find out how Singapore ensures safety of navigation in the Port of Singapore and to understand more about its planning and development efforts.

BASIC OCCUPATIONAL SAFETY AND SECURITY TRAINING (BOSST)



To enhance the specialist skills and knowledge of MPA officers, a group of port inspectors, hydrographic surveyors and port chemists took part in an eight-day BOSST course earlier this year. The training covered a broad range of topics, including fire prevention and fire fighting, as well as personal survival techniques.

FIRST AID AT SEA REFRESHER COURSE



To ensure that they remain well equipped to provide medical care on board vessels at sea, several marine surveyors took part in a first aid refresher course to keep their skills and knowledge up to date.

VISIT BY DELEGATION FROM LIBYAN PORTS AND MARITIME TRANSPORT AUTHORITY



Ms Tan Beng Tee, Assistant Chief Executive (Development) at MPA, hosted a delegation from the Libyan Ports and Maritime Transport Authority during their visit to MPA on Feb 9.

navigating through

Rahita Elias rounds up some highlights of the annual Singapore Maritime

challenging times

Week, which returns for its 12th instalment from April 22 to 28



COMMUNITY BUILDING PROGRAMME



SMW Exhibition

Visitors will learn about Singapore's success as a global port hub and IMC from the very people who made it happen, through their captivating stories. Visitors can also find out more about the maritime industry through interactive showcases.



SMW MPA Learning Journeys

Participants have the opportunity to learn the story behind Singapore's progress in the maritime industry via guided tours of maritime facilities, some of which, like Raffles Lighthouse on Pulau Satumu, are not usually accessible to the public.



Amazing Maritime Challenge 2017

The annual game-based Amazing Maritime Challenge 2017 will see about 1,000 participants engage in a day of fun and adventure as they tackle exciting maritime-related mental and physical challenges.



Sea Dreams Concert

Held on April 22 and 23, this inaugural event will take audiences on a visual and musical adventure featuring young people embarking on maritime careers, via an original interactive production. It fuses storytelling, elements of circus arts, and South-east Asian rhythms.

Asia's premier maritime event, Singapore Maritime Week (SMW), returns for its 12th edition in April. It will present a kaleidoscope of activities and events, reflecting the vibrancy and diversity of Singapore as a global hub port and major International Maritime Centre (IMC).

Driven by the Maritime and Port Authority of Singapore (MPA), SMW has grown in both depth and breadth since its inception in 2006. Each year, the number of offerings under the SMW umbrella expands, drawing an ever-increasing number of delegates, participants and visitors. MPA's flagship event has also attracted thought leaders, including high-level maritime and shipping leaders from both the private and public sectors, as well as academics at the forefront of their respective fields, to its conferences, forums and seminars.

Themed "Navigating Through Challenging Times", SMW 2017 is particularly relevant as the maritime and shipping industry continues to weather headwinds in current challenging conditions, with signs of positive recovery starting to show. SMW 2017, which will run from April 22 to 28, will focus on the most critical issues impacting regional and international maritime professionals today, and will gather the international maritime community for a week of conferences, dialogues, exhibitions and social events in celebration of all things maritime.

COMMUNITY BUILDING

As the maritime and shipping industry's champion, MPA understands the importance of creating awareness of, building interest in, and enhancing public understanding of Maritime Singapore. That is why a diversity of content-driven exhibitions and outreach activities catering to the general public will also feature at SMW 2017. This year's programmes will highlight significant contributions made by the industry, underscoring the role of seaborne trade as an important lifeline for Singapore.

MEETING CURRENT CHALLENGES

For the industry, SMW will address key areas of concern such as the economic downturn, infrastructural needs, regulatory regimes, oversupply, environmental issues, finance, security, and technology. Discussing and addressing these issues will help the industry to weather the current tough times while honing its competitiveness.

Among the events that will bring thought leadership to the next level is the iconic Singapore Maritime Lecture, which is the pre-eminent SMW event. The lecture looks at the foremost challenges facing the industry, and how industry players can draw on emerging opportunities and market forces. The 11th Singapore Maritime Lecture,

which will be held on April 24, will be delivered by Dr Detlef Trefzger, Chief Executive Officer of Kuehne + Nagel International AG, which is one of the world's leading logistics providers.

As a Board Member of the Singapore Economic Development Board, the lead government agency for planning and executing strategies to enhance Singapore's position as a global business centre, Dr Trefzger will share his views on how the maritime industry may change against a backdrop of shifting industry dynamics, geopolitics, and the digital transformation wave.

The biennial Sea Asia Exhibition and Conference will also return to SMW this year, themed "The Asian Voice in World Shipping".

Highlights of this year's programme include the Sea Asia Global Forum, in which a high-level panel will discuss the outlook for the world economy and the regulatory environment, and its impact on the shipping industry.

Another highlight of Sea Asia will be the Parliamentary Debate, which will see public and private shipowners cross swords over the motion "This House believes that the best days of the private independent shipowner are over".

For the first time this year, SMW will also see the unveiling of The Leading Maritime Capitals Of The World 2017 report. This biennial global benchmarking study polls over 1,500 maritime professionals to rank 15 leading maritime capitals

SMW 2017 WILL FOCUS ON THE MOST CRITICAL ISSUES IMPACTING REGIONAL AND INTERNATIONAL MARITIME PROFESSIONALS TODAY, AND WILL GATHER THE INTERNATIONAL MARITIME COMMUNITY FOR A WEEK OF CONFERENCES, DIALOGUES, EXHIBITIONS AND SOCIAL EVENTS IN CELEBRATION OF ALL THINGS MARITIME.



in various categories, including shipping, maritime finance and law, and ports and logistics.

Over at the 8th International Conference on Ballast Water Management Convention 2017, speakers and delegates will mull over the implications of the impending Ballast Water Management Convention, which is coming into force on Sept 8 this year.

Other thought leadership events at SMW include the 10th International Chemical and Oil Pollution Conference and Exhibition (ICOPCE), which is the only event in Asia that focuses on preparedness and response strategies for oil and chemical spills. Running from April 25 to 28, this year's ICOPCE is expected to attract over 300 industry professionals, including representatives from inter-governmental organisations, oil majors, tanker companies, as well as those from the international oil and gas community, the offshore sector, and the wider shipping industry.

POWERED BY TECHNOLOGY

Technology will also take centre stage at SMW. At the E-Navigation Forum, global e-navigation leaders and solution providers will provide their insights on e-navigation, its progression from concept to test bedding, and how it will cater to the industry.

The Singapore Maritime Technology Conference and Exhibition, with its two conference tracks, will cover leading port and maritime industry trends and technological developments, including smart shipping, ports of the future, big data, autonomous systems, and cyber security.

To build a future-ready Maritime Singapore, MPA and the Singapore Maritime Institute (SMI) have also organised the 2017 SMI Seminar. Held on April 26, the seminar will explore research and development opportunities for the application of augmented reality and artificial intelligence in the maritime sector.

To raise and promote the profile of maritime research and technology in Singapore, the biannual SMI Research Showcase, which features shortlisted maritime research projects supported by SMI, will also be launched during the SMI Seminar in April. Visitors will have a chance to vote for their favourite research projects, and the winners will be announced at a later date.



CELEBRATING NORWAY-SINGAPORE MARITIME TIES

Norway and Singapore enjoy close maritime ties. This strong relationship is reflected in two unique events that will be held during Singapore Maritime Week 2017.

The Norway-Singapore LNG Forum, held on April 24, is part of an ongoing collaboration between Norwegian

and Singaporean companies, government agencies, and research institutions to jointly promote liquefied natural gas (LNG) as a cleaner maritime fuel and energy generation option in Singapore, South-east Asia and beyond. Organised by Innovation Norway, the Royal Norwegian Embassy and the Maritime and Port Authority of Singapore, the forum will cover topics such as LNG for

maritime use, bunkering technologies and experience, and small-scale LNG distribution.

On April 26, Norway Night, an invitation-only event organised by the Norwegian government, will return for its second edition. Norway Night, which will be held at Fullerton Bay Hotel, will bring together Norwegian businesses and Singapore-based maritime companies for a night of networking and drinks.

event calendar for SMW 2017

Visit www.smw.sg for more information

	SAT 22 APR	SUN 23 APR	MON 24 APR	TUE 25 APR	WED 26 APR	THU 27 APR	FRI 28 APR	
MPA EVENTS			KEY EVENT Singapore Maritime Lecture 	Pre-event for ICOPCE 	E-Navigation Forum 	Opening of SMTC 		
					Opening of ICOPCE 	Singapore Maritime Technology Conference & Exhibition (SMTC) 		
					International Chemical and Oil Pollution Conference & Exhibition (ICOPCE) 2017 			
					KEY EVENT (CO-LOCATED) Opening of Sea Asia 2017 	Launch of The Leading Maritime Capitals Of The World 2017 Report 	4th CoC (Special Limits) Graduation Ceremony 	
			Norway - Singapore LNG Forum 	KEY EVENT (CO-LOCATED) Sea Asia Exhibition & Conference 2017 				
			International Conference on Ballast Water Management Convention 2017 		SMI Seminar 2017 	Singapore Marine Insurance Conference 2017 		
				TOC Asia 2017 			Lloyd's Asia Marine Open Day 	
			CIL International Conference on High Seas Governance 			Moore Stephens Shipping Forum 		
				Gard's Charterers & Traders Seminar 		ReCAAP 2017 		
						2nd Asian Marine Casualty Forum 		
CO-LOCATED EVENTS	Singapore Iron Ore Week 2017 							
		SMW Opening Reception 		KEY EVENT International Maritime Awards 2017	Sailors' Society Shipping Drinks 	IBIA Dinner 		
					Norway Night 	Lloyd's List Business Briefing & Drinks 		
					Panama Reception 			
					SIOF Welcome Reception 			
NETWORKING EVENTS	SMW 2017 Exhibition 							
		Sea Dreams Concert 						
		Opening of SMW 2017 						
		Amazing Maritime Challenge 						
PUBLIC OUTREACH EVENTS		RASI II 					International Sportsweek for Seafarers 	

 By Invitation Only

 By Registration

 Free Admission

Singapore's ageing population and a rapidly changing economic environment are placing increasing demands on its workforce. To address these issues, Jurong Port launched its training facility, Jurong Port Academy, on Jan 20 this year, with the aim of transforming the port industry.

Located at the Devan Nair Institute for Employment and Employability (e2i) in Jurong Gateway, the Jurong Port Academy will leverage new technology and innovation to enhance the capabilities, increase the productivity, and upgrade the skills of port workers.

BELOW A trainee undergoing simulator training at Jurong Port Academy.



building a future-ready workforce

Sol E Solomon finds out how the newly launched Jurong Port Academy will enhance the capabilities, increase the productivity, and upgrade the skills of port workers to keep pace with developments within the port industry

This is important because Jurong Port prides itself on being a multi-purpose port operator, providing professional and reliable solutions for the non-homogenous and complex cargo requirements of its users and partners, said Chief Executive Officer Ooi Boon Hoe at the academy's launch. He added: "Jurong Port Academy is an integral component in helping us enable a sustainable and promising future for all industry participants, port users, stevedoring service providers, and Jurong Port itself, with its vision of being a world-class multi-purpose port operator."

The ageing workforce, however, has become an immediate challenge for Jurong Port. So by raising labour productivity through training, the academy will help reduce labour dependency in its operations while enhancing the skill levels of its workforce at the same time. "And both of these will work in a self-reinforcing way to allow for better recruitment, better rewards, and a future-ready workforce," said Ooi.

Through the academy, Jurong Port also hopes to attract new blood, and that people contemplating entering the port operations sector will begin to see



RIGHT An aerial view of Jurong Port. **FACING PAGE** Training at Jurong Port Academy covers different aspects of port operations, including specialised courses on operating port equipment such as the sideloader.

that the sector offers viable and rewarding career prospects, says Michael Goh, Chief Corporate Services Officer, Jurong Port.

STAFF GURUS

Jurong Port Academy aims to continue using trainers and courses offered by its existing training partners, such as the Continuing Education and Training Centres, as well as polytechnics and Institutes of Technical Education. Complementing these are specialised courses on operating port equipment such as forklifts and sideloaders, as well as a simulator-based course for ship crane operators, or winchmen. The trainers for these are experienced port staff, who are operators, managers and winchmen themselves.

Winchmen in the terminal teams do a vital job in loading and discharging cargo, says Selva Raj, Director of stevedoring contractor Dockers Marine, and the stevedores have been waiting for such courses for quite some time.

Furthermore, as Thomas Yang, Managing Director at shipping company SingUnion Shipping points out, vessel types and sizes, and cargo types

ABOUT JURONG PORT

- **Established in 1965**
- **Annual cargo throughput has grown from 3 million tonnes in 1974 to nearly 20 million tonnes**
- **Gateway terminal for general and bulk cargo in Singapore and the region**
- **Its multi-purpose port expertise includes handling of containerised, general, and bulk cargo**
- **Essential goods such as cement, steel, and even MRT trains pass through its 32 berths, which can serve vessels of up to 150,000 deadweight tonnes**

and packings, have evolved much in the past decade, and there have not been enough young people joining the stevedore labour workforce in Jurong Port. "With the academy in place, new blood can be well trained to fill the stevedore labour shortage and we can also train existing labour in new skills to the extent that they may become multi-skilled workers," he says.

Seah Kiin Peng, Executive Director of steel reinforcement solutions provider BRC Asia, which receives shipments of steel and building materials at Jurong Port, says that this initiative will make the future handling of cargo at the port even more safe and efficient.

According to Josephine Teo, Senior Minister of State, Prime Minister's Office, Ministry of Foreign Affairs and Ministry of Transport, who officiated the academy's launch, while Jurong Port upgrades the skills of its port workers, it is inevitable that some jobs will change.

She added: "Some port workers will have to learn how to operate new equipment, such as the new sideloaders Jurong Port acquired late last year. Others may have to perform new functions,

"JURONG PORT ACADEMY IS AN INTEGRAL COMPONENT IN HELPING US ENABLE A SUSTAINABLE AND PROMISING FUTURE FOR ALL INDUSTRY PARTICIPANTS, PORT USERS, STEVEDORING SERVICE PROVIDERS, AND JURONG PORT ITSELF, WITH ITS VISION OF BEING A WORLD-CLASS MULTI-PURPOSE PORT OPERATOR."

OOI BOON HOE, CEO, JURONG PORT

for example, after manual processes become automated. Port workers will need support and help to upgrade their skills and capabilities."

Even as jobs change, Jurong Port does not foresee retrenchments, says Goh, stressing that with the current shortage, new hires will only be replacing those retiring. Furthermore, both new and existing port workers will benefit from a structured approach being applied to develop a new generation of professionals for the industry.

STRONG SUPPORT

The process of establishing Jurong Port Academy involved consultation with government agencies such as the Maritime and Port Authority of Singapore (MPA), which provided strong backing and funding support. Representatives from the port worker and stevedore communities in Jurong Port also played a significant role. To date, S\$2.8 million has been invested in the academy.

"This initiative is timely, as we are preparing our workforce with new skill sets that are not only relevant for the future but will also improve the productivity, efficiency and reliability of our port," says Andrew Tan, Chief Executive of MPA. "The Port of Singapore must continue to stay ahead of the competition and grow from strength to strength, while continuing to provide good jobs and maintain its key role in Singapore's economy."

Apart from its premises at e2i, a 5,000 sq ft open-area training yard has also been dedicated to Jurong Port Academy within the port. The training yard includes equipment used to provide workers hands-on cargo handling training. Over time, the academy, which also has an online learning portal, hopes to train 1,000 staff of Jurong Port and its stevedore partners.

Areas of training include operations and management, port equipment handling, wharf and hatch forklift operations, safety and technical maintenance training, and leadership and personal effectiveness training. Its methodology comprises coaching and mentoring, experiential learning, simulator and on-the-job training, as well as integrated and blended training comprising e-learning, e-assessment, simulators, and videos.

To ensure the academy's relevance, Jurong Port will form a Learning Council comprising representatives from the stevedore community and the National Transport Workers' Union to advise the academy on its training activities.



Digitisation and data analytics have unlocked the door to the brave new world of smart ships and smart shipping.

"Without digitisation and its corresponding data, there would not be any analytics. It is humanly impossible to access multiple sources and process voluminous data. Today, advances in cloud computing power and more affordable ship-shore connectivity present opportunities for realising the concept of smart ships and smart shipping," says Stephen Chow, founder of Sense Infosys, a Singapore-based maritime and risk data analytics company.

"Advanced information, if made available, can establish comprehensive and shared awareness for knowledge-driven decisions. All these are only possible when ship and shipping data are harvested and harnessed."

Sense Infosys provides customised analytics solutions to the maritime and risk domains, and serves both the public and private sectors. Its maritime solutions, based on its proprietary data fusion analytics technology platform, include anti-fraud and compliance monitoring.

During Sea Asia 2017, Sense Infosys will be rolling out a maritime community platform to connect global maritime professionals, maritime content, and advanced analytics apps. Called Teraweave, it will offer a wide range of complimentary maritime business applications, and enable app developers to access maritime data to develop and market analytics apps.

Chow says that the maritime domain is in the early stages of data growth due to the emergence of more modern and digital ships, relatively more cost-effective broadband satellite communications solutions, extensive Internet penetration, and the rise in mobile technology.

He says: "However, maritime data analytics will inherently and comparatively be more prohibitive due to higher broadband communications and connectivity costs. Hence, even if there is immense potential, maritime data analytics adoption will always be a laggard compared to the other domains."

This means that at the start, data analytics is more likely to be applied on board ships within port and coastal waters, tapping land-based communications solutions such as Wideband High Frequency (which allows exchange of large amounts of data over high frequency channels) rather than using ship-to-shore communications.

optimising data for shipping

Stephen Chow, founder of data analytics start-up Sense Infosys, tells Rahita Elias how data analytics can benefit the maritime industry



SMART BENEFITS

As it stands, data analytics in the maritime domain today can be used to provide real-time insights to support awareness and decision-making in fleet management, compliance and risk management, and logistics and corporate planning, to name but a few. Over time, as more data is built up, advance predictive analytics can be developed to make anticipatory decisions in maintenance, supply chain, and resource optimisation, says Chow.

Data analytics can be particularly useful to the shipping industry today, which is facing challenges. He says: "If a company can use data smartly to manage risks and costs, plan better, and operate more efficiently, it will enjoy a competitive advantage. Another area is compliance, as the cost of non-compliance is increasing. With data, a ship can automate compliance processes and be more accurate in its reporting. This will save time, manpower, and costs significantly, as authorities focus more on those with compliance risks."

By making smarter decisions with the help of data, shipping companies can look to improve both their top and bottom lines. "They can use data to scan the horizon, and be more anticipatory of and resilient to shocks. With further digitisation and more data, automation, disintermediation, and economies of scale in every facet of shipping will follow. All this will result in right pricing of services and realising the immense potential of harvesting big data to save costs," says Chow.

Despite the benefits, there is still some resistance to applying data analytics in shipping. However, Chow is confident that this will change as crew who are better educated and need to remain connected to the broader world join the industry. In addition, he notes that parts of the maritime ecosystem have already gone digital.

He believes that governments and maritime and port authorities are best placed to catalyse change and bring about transformation in the industry. "Policies ought to be structured such that those who adopt data analytics faster than the rest are given an advantage," he says. In the longer term, tertiary institutions with maritime, shipping or logistics disciplines can be fertile ground from which to effect a new mindset that is willing to adopt data analytics technology, he adds.

Teraweave is supported by the Maritime Innovation and Technology (MINT) Fund. For more information on the MINT Fund, please e-mail mint@mpa.gov.sg.

WHAT IS YOUR OUTLOOK FOR THE CRUDE TANKER INDUSTRY IN THE SHORT TO MEDIUM TERM? WHAT ARE THE KEY FACTORS OR DEVELOPMENTS THAT WILL IMPACT THE INDUSTRY?

I am cautious about the short term and positive about the medium and long term. At Euronav, we look at five key drivers for our business. Firstly, the demand for crude oil, which has been consistently growing over the longer term. There have been just two negative years for growth globally since 1990. We expect this to continue, stimulated by economic expansion in Asia and a lower oil price.

Secondly, we look at vessel supply. There are around 50 very large crude carriers (VLCCs) and 50 Suezmax vessels due for delivery in 2017. Once this supply has been absorbed into 2018, the outlook becomes more positive. This is because new ordering has slowed substantially in the past 12 months due to owner discipline, restricted financing, and shipyard contraction, which have combined to reduce new supply.

Thirdly, tanker ton-mile has a mixed short-term outlook as production cuts led by the Organization of the Petroleum Exporting Countries (Opec) have begun to bite, thus restricting the amount of oil being shipped. But in the medium term, growth in demand from the Asia-Pacific region for oil sourced from either the Middle East or the Atlantic is positive for ton-mile development.

Patrick Rodgers, Chief Executive Officer of Euronav, one of the world's biggest listed tanker companies, will be one of the panellists at the Global Forum at Sea Asia 2017 Conference, held during Singapore Maritime Week 2017. He and other thought leaders will share their outlook on the world economy and the regulatory environment, and how these and other macro issues will impact shipping. He shares with Singapore Nautilus how the tanker sector will be shaped by key global developments.

buoyant energy

Patrick Rodgers shares why he believes the tanker market will remain a bright spot in shipping



Fourthly, with the increased supply of shale counterbalancing the Opec reductions, oil supply is currently balanced in our view. However, although exports from the United States are growing strongly, they are doing so from a low base, which is not enough to offset lower ton-miles in the short term. Oil supply in the longer term is a difficult dynamic to predict given geopolitical risks, but should the oil price remain between US\$40 and US\$70, then we believe that US shale can continue to grow and remain a positive driver for tankers.

Finally, in terms of financing, it is positive in the short and long term as the banking sector continues to restrict financing for shipping. We believe this is a structural change, and a barrier to entry for new participants to tanker shipping, especially given the cost of large tankers.

WHAT IMPACT WILL INTERNATIONAL ENVIRONMENTAL REGULATIONS HAVE ON THE TANKER MARKET?

At Euronav, we see this as a positive development, but one which will take time to have a tangible impact. Any application of tougher environmental legislation adds cost to shipowners, which will then result in further consolidation within the sector.

Increased costs will require greater investments which may, over time, result in an increased level of scrapping. This is because as vessels age, owners will have to decide whether the increased costs will be worth the investments, based on the likely freight rates until the next scheduled dry docking.

Based on current projections, over 100 VLCCs will be over 20 years of age by the end of 2020. And if we go by current International Energy Agency (IEA) demand forecasts for 30 to 40 new VLCCs every year, incoming regulations could be a positive driver for the tanker market.

WHAT WILL BE THE KEY GROWTH AREAS FOR THE CRUDE TANKER INDUSTRY?

There are several. Firstly, the Far East is sourcing oil from further afield; this should lead to higher ton-miles, which is positive for tankers.

Secondly, the further development of the shale industry in the US should continue to keep global oil supply at elevated levels and act as a potential

cap on oil prices. In view of this, the oil price should remain between US\$40 and US\$70 and continue to stimulate demand, thus maintaining a tailwind for tankers. The IEA has forecasted that demand will grow by 1.4 million barrels per day (bpd) in 2017, and that annual average demand will grow by 1.2 million bpd from 2018 to 2022.

Finally, stricter regulations should drive an increased level of scrapping from 2017 to 2020, as a significant portion of the global fleet will be over 20 years of age during this period. If this is combined with greater discipline from the banks, restricting lending capacity, and owners themselves not ordering new vessels, then this should translate into better balance between demand and supply for tankers.

WHAT IS THE SINGLE BIGGEST CHALLENGE FACING THE SHIPPING INDUSTRY CURRENTLY?

I can only speak for large crude tankers but it would be the shipyards. Owners must resist placing new orders for tankers and the temptation of lower prices being offered by shipyards, primarily from South Korea. This is important because the tanker market has an opportunity to break the boom-bust cycle of the past 40 years. If it can achieve this, then there is a chance we can develop a more rational sector financed more from capital markets than bank loans, which will generate more visible returns for investors. This year, 2017, will be a key year to watch for this development.

HOW CAN WE CREATE A STRONGER SHIPPING INDUSTRY?

One word – discipline. This is easier said than done. Discipline across the sector will make for a stronger shipping sector for all participants. This isn't about aggressive pricing or market share, but about building a safe, secure industry with zero tolerance for irrational behaviour as well as dangerous or illegal practices. Banks are leading the way by restricting the amount of capital available for shipping in general. All participants need to follow this lead going forward. We will benefit from increased regulation that is uniformly applied and impartially enforced.

digital matters

Aleksander Stensby shares lessons from Torvald Klaveness' embrace of digitalisation, and insights on the future of the maritime industry

Aleksander Stensby, Chief Digital Officer of Norwegian shipping company Torvald Klaveness, will be one of the speakers at the 2nd Singapore Maritime Technology Conference, held in conjunction with Singapore Maritime Week 2017. He will share Torvald Klaveness' experience with digitalisation, and take part in a panel discussion on smart shipping initiatives. He tells Singapore Nautilus his thoughts on how digitalisation will shape the maritime industry.



TELL US ABOUT TORVALD KLAVENESS' EXPERIENCE IN GOING DIGITAL.

Over the past two years, Klaveness has been on an exciting journey. From a small-scale pilot project in which we explored ways to improve the nature of shipping, we have established a dedicated innovation team to experiment with new ways of creating value for our customers and ourselves.

Today, Klaveness has its own business unit, called Klaveness Digital, which aims to improve and create customer value, leverage new technology and new business models, and ultimately make the lives of our customers easier, more efficient, and better informed. From our experience, our industry is lagging behind in many areas, and we had to make the choice between waiting for others to address the problems, or taking the lead ourselves. The benefit of lagging behind is that there is a lot to learn from other industries, and we do not have to re-invent the wheel when it comes to new business models or methodologies for automating today's processes.

It has been a really exciting voyage so far, but we are only just getting started!

WHAT WERE THE CHALLENGES? HOW WERE THEY OVERCOME?

One of the biggest challenges for any company aiming to change the way it works and thinks is to onboard the organisation and its customers, and open up to new ways of thinking and conducting its day-to-day business. The initiative needs to have support from top management, and the focus needs to be on building a curious and engaged culture. This is challenging and takes time, but it is critical for transformation.

Legacy business systems and data quality are also big challenges that should be addressed early. We put a lot of focus on data quality and integrity, and we believe there is great value in other companies making better use of their data for improved decision-making.

HOW HAS GOING DIGITAL BENEFITED KLAVENESS?

We see expansive digital development as part of our long-term survival strategy. We have equipped three combination carrier newbuildings in China with premium, bought-in technology. By running our vessels more energy-efficiently and reducing their carbon footprint, we reduce our impact on the environment, and improve earnings for ourselves and our customers.

In the long run, Klaveness' ambition is to

become a leading player in data analytics to improve business processes. Our digital team has a lot of exciting projects; some are early experiments while others are more mature solutions we seek to bring out to the market.

WHAT WERE THE IMPORTANT LESSONS LEARNT?

A digital journey requires time and dedication. A lot has to do with educating the organisation, and onboarding to create internal brand advocates. An important lesson we learnt was to narrow our scope and focus more, so that we could bring value to both internal and external users faster.

THE MARITIME INDUSTRY IS SEEN TO BE SLOW IN EMBRACING DIGITALISATION. WHY IS THIS SO?

A lot of efforts have been driven by old research and methodologies that weren't feasible to implement, because of hardware and connectivity limitations. Another obstacle has been cost, which is now going down. An attitude towards privacy, and a lack of transparency in our industry, are also contributing factors.

We need to become more transparent and embrace the changes we see around us in other industries when it comes to the sharing economy, data transparency, and improved decision-making through the use of advanced analytics and data.

HOW DOES MARITIME'S DIGITAL FUTURE LOOK?

It is one in which data drives direction and forms the basis for decision-making to a greater extent than it does today. Those working in the industry will need different skills; technical capabilities will be different, and this will allow for increased flexibility. Semi-automated vessels will require our crew members and our on-shore staff to develop new competencies and capabilities.

WILL THE INDUSTRY EVER GET ITS UBER MOMENT?

As with all innovations, we tend to overestimate the effect of a technology in the short run and underestimate its effect in the long run. Our industry has many areas where disruption can take place, but we think the changes will be stepwise, and will take time. For example, the automation movement has caused people to fear for their jobs. But even with automated ships, not all vessels will be without a crew. There will be a mix. There's a lot of technology to support remote control. It is, rather, about a change in skill sets; seafarers, for instance, will need to maintain sensors and manage automation systems on board.



Prospects for trans-Pacific trade are looking brighter, and APL is poised to take advantage of this improvement. Says APL Chief Executive Officer Nicolas Sartini: "The trans-Pacific market looks relatively balanced with demand looking up. This sets a positive backdrop for the new trans-Pacific contracting season."

Among its trans-Pacific offerings, APL is synonymous with its Eagle Express (EX1) service, which offers fast and reliable transits from North Asia to Los Angeles and on-dock rail connectivity to inland destinations across North America. APL will raise the bar further with its newly launched time-definite Eagle Guaranteed Service to complement its EX1 service, says Sartini. Under the Eagle Guaranteed Service, customers can expect goods delivered on its EX1 service to reach the rail yards of Chicago, Columbus, Dallas, El Paso, Kansas City, and Memphis from the Global Gateway South Terminal in Los Angeles by the specific date promised to them at the time they booked their shipments.

Another market that APL is focusing on is the Guam-Saipan route. APL, which is now part of the CMA CGM Group, launched its Guam Saipan Express (GSX) service last year. Then in January this year, the carrier doubled the GSX service frequency from fortnightly to weekly. And APL is not stopping there. Says Sartini: "We are working on making further inroads in Guam and Saipan."

APL also expects to benefit from being a part of the OCEAN ALLIANCE, which it will join in April this year. "APL will be well placed as a formidable container shipping carrier as we stand among the strongest forces behind the OCEAN ALLIANCE. When APL joins the alliance as part of the CMA CGM Group, our network coverage of over 70 services will be enlarged with 38 additional services," says Sartini. He adds that being part of the OCEAN ALLIANCE will enable APL to create new value that facilitates its customers' global connectivity and speed-to-market capability.

On the macro level, it remains unclear how shipping will be affected by recent developments,

poised for
growth

Rahita Elias finds out how APL intends to grow its business globally amid key developments within the industry

ABOUT APL

- One of the world's leading ocean carriers
- Has over 160 years of heritage and experience
- Offers more than 90 weekly services to over 50 countries worldwide
- Part of the CMA CGM Group, a leading international shipping group headquartered in Marseille, France

including the more inward-looking stance of the current United States (US) administration and China's proposed One Belt, One Road plan. Says Sartini: "It is too early to tell how global trade will be affected under the new US administration.

"It is also still hard to predict the effectiveness of China's One Belt, One Road initiative, and its impact on global trade, as this depends on the responsiveness of and coordination among the Chinese, Asian and European governments in multiple areas of interest as well as the global business environment. While we wait to see how this will unfold over the medium to long term, APL will continue to evaluate and offer superior global connectivity and excellent value-added services that meet our customers' evolving shipping needs."

Overall, APL's strategy is to continue developing its brand with profitable growth. Says Sartini: "We have launched 24 new shortsea and linehaul services since becoming part of the CMA CGM Group in June 2016. APL will continue to expand our global network based on market demands to better serve our customers with superior services across the world's trade lanes."

GROWING GLOBAL PRESENCE

Even as APL grows, Singapore will remain an important part of its operations. Says Sartini:

"Singapore has been and will continue to be the location of APL's corporate headquarters and a key regional transshipment hub for our shippers' cargoes. It is a strategic hub within our global network, particularly for our stronghold trans-Pacific and intra-Asia trade lanes, where we will fortify our market leadership position and growth in these markets.

"Meanwhile, we are enhancing our presence in the Middle East and Indian subcontinents, and seeking growth opportunities in the Oceanic and Transatlantic routes."

Underscoring Singapore's importance to APL and its parent, CMA CGM Group, the group launched a navigation and port operations centre in the Republic in January this year. The state-of-the-art facility is CMA CGM's third in the world. The Singapore centre serves the Asian time zone, while the other two, in Marseille, France, and Miami in the US, are in charge of the European and American time zones respectively.

The Singapore centre leverages the latest navigation assistance tools and technologies to track and examine wide-ranging nautical, meteorological and geographic information in real-time, 24/7. The live analytics empower the centre's team of experts to guide the navigation of the group's combined fleet of more than 500 container vessels.



polished & ready to go

A new underwater hull cleaning solution, ShipShiner Technology, for which Singapore was the development test bed, could boost ship performance and enhance operational efficiency for shipowners.

The technology, co-developed by underwater hull cleaning service provider C-Leanship and Swedish defence and civilian security company Saab Group, comprises a remotely operated vehicle (ROV) by Saab and a washing unit with specially-designed water jets. C-Leanship worked with partners such as paint suppliers, nozzle providers, and shipping lines to develop the washing unit, which makes it possible to deep clean anti-fouling painted surfaces without damaging a ship's paint.

Sol E Solomon finds out why C-Leanship's remotely operated ShipShiner Technology provides an efficient solution to underwater hull cleaning

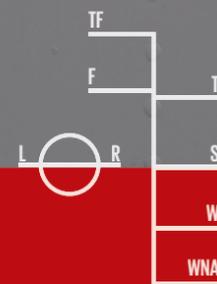




The washing unit has undergone extensive testing in test tanks in Denmark and Sweden, as well as on vessels in the ports of Singapore and Gothenburg. C-Leanship currently operates the ShipShiner Technology in Singapore.

Traditionally, ship hulls are cleaned by divers. This requires shipowners to plan stopovers because a ship must leave a cargo terminal and stay at an anchorage overnight to get cleaned. With ShipShiner Technology, a vessel can be cleaned while cargo is being unloaded and loaded at the cargo terminal. This is because the ROV's slim design allows the cleaning unit to manoeuvre in the tight space between the quay and the vessel's hull. This means that a vessel can be cleaned within a 10- to 12-hour port call,

ABOVE The ShipShiner is operated by a team of pilots and engineers.
FACING PAGE The progress of the underwater cleaning process is reflected on computer screens in the pilot cabin.



says Peter Schioeler, Chief Technical Officer of C-Leanship Singapore.

"It's hassle-free for shipowners. They get the savings and we leave them with a nice clean smooth hull. So the whole idea is that you can maintain your hull and paint more frequently, and not wait until it's too late, basically," he adds.

The ShipShiner is operated by three pilots on board a workboat. Two of them work inside the cabin, with one piloting the ROV to do the cleaning while the other monitors real-time data. A third pilot visually monitors the operation and the environment from outside the cabin. Six video cameras on the ROV help the pilots monitor work done while Saab's on-board navigational software provides updates on the ROV's exact position on the hull. Real-time updates are delivered via a 3-D electronic chart modelled after the ship's hull. When cleaning starts, a green mark forms across the chart, moving as the operation progresses.

GENTLE STRENGTH

Fouling occurs when marine organisms such as algae grow on structures in the sea, such as the hulls of ships. Its main negative effect on shipping is increased hydro resistance, leading to higher fuel consumption. Regular hull cleaning optimises a vessel's performance and helps safeguard the marine environment by minimising the spread of invasive alien species between continents.

C-Leanship's founder, Jesper Hojer, a scientist, engineer and recreational yachtsman, first thought of developing a new cleaning technology in 2011. Observing how his yacht gained speed and performance after a hull polishing got him thinking about how it might apply to large ships.

However, traditional underwater hull cleaning uses a resin with some hard contact, which can create small dents or rough finishes on a vessel's paint surface. Aiming to make cleaning contact less abrasive to paint surfaces while still sufficiently strong to remove any fouling, Hojer developed a washing unit that cleans without rupturing the paint surface, using water pressure just strong enough to take off slime. C-Leanship then partnered with Saab, which provided its Sabertooth ROV, and worked to integrate the washing unit with the ROV. The finished vehicle arrived in Singapore in late 2014.

Schioeler describes the process of getting technologies to work together underwater as akin to getting one's hairdryer to work in water. This is because ShipShiner Technology uses a lot of power subsea, and comprises equipment that must work stably in an environment that experiences waves, currents and electrical "noise". It is also a new technology, and most of the related

equipment available initially had been developed for the oil and gas industry. So a lot of effort had to be put in to design a product that would actually run on a hull surface. It was also a challenge to keep costs at a level that would sustain development, he adds.

Headquartered in Denmark, C-Leanship plans to develop Singapore as its operations base. Of its 10 staff here currently, seven are Singaporean pilots and engineers who operate the ShipShiner.

Nahush Paranjpye, Managing Director of C-Leanship Singapore, says that the ShipShiner reached a reliable level for commercial operations last year due to support from the maritime community in Singapore, including the Maritime and Port Authority of Singapore and port operator PSA. Currently, the company has only one ROV, but it hopes to have a second unit here by the end of the year. Eventually, it plans to build a global network of cleaning stations featuring this technology.



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TAP FOR VIDEO

Cyber security has been in the news in recent months in part due to reports of hacking and cyberattacks involving both public and private institutions as well as individuals, and other forms of cyber breaches.

Indeed, with increased connectivity through electronic devices and a growing reliance on technology in every aspect of our lives, we have become more vulnerable to cyber threats. The risks associated with using the Internet of Things to exchange data as well as privacy concerns over the use of mobile apps and social media are topics of daily discussion, both around kitchen tables and in boardrooms. Unsurprisingly, the International Maritime Organization (IMO) and other maritime stakeholders are taking steps to create awareness of the risks associated with connecting ships to the digital network.

Risks have been identified in two general categories, namely information management and operational technology systems. Threats in the former category are generally well understood as most people have experienced the effects of or heard of viruses, malware and data theft. Threats in the latter category are getting more attention as shipboard equipment is often designed with software systems that can be remotely managed from ship offices or fleet operations centres.

There is no doubt that such integration has led to enhanced efficiency in terms of receiving updates and maintenance instructions via remote diagnostics, as well as data collection

for analytical purposes. The downside is that it raises the maritime industry's vulnerability to risks such as hacking, data theft, and other nefarious cyberattacks such as rogue elements taking control of on-board equipment remotely.

It is true that most older ships do not have digitally-linked operating systems, hence their risk of attack through e-mail and data management systems is limited. As a result, cyber threats are not seen as immediate by many individuals in the maritime community, including seafarers and shore managers.

On the other hand, it is equally true that most ship companies and other maritime stakeholders are moving rapidly to bring their vessels into the digital age. Electronic delivery and installation of software and chart updates, remote diagnostics of shipboard engine monitoring systems and shipboard equipment like radars, as well as data collection for fuel management systems are some instances of the digital revolution that is gaining traction in the maritime sector.

It is important to understand that maritime cyber security is a complex subject. The IMO has identified seven areas of concern including cargo handling and management systems; propulsion, machinery management and power control systems; and administrative and crew welfare systems.

It has also issued interim guidelines on managing such cyber risks based on a standard ISO risk management framework. The guidelines state that maritime stakeholders need to identify the risks, protect themselves by implementing risk control measures, detect any cyber event in a timely manner, develop plans to respond to cyber events, and identify measures to backup and restore cyber systems impacted by a cyber event.

INDUSTRY COLLABORATION

However, these are rather generic and do not give a full picture of the onerous administrative work required. The preparations that were done for the Y2K bug at the turn of the century seem insignificant in comparison to the nitty-gritty of cyber security preparations. While there is no doubt that the transition to a digital maritime environment is rapidly taking place, each company will need to decide the pace at which their ships will be linked to the digital sphere and how the associated risks will be managed.

For newer ships, including prototypes of semi-autonomous and fully autonomous ships which are being built with hardware and software connectivity, the work involved in safeguarding their systems from cyber threats will be challenging. And the task will become more complicated if these vessels

are further linked to sea traffic management and port systems, vessel traffic services, customs, and equipment and engine manufacturers.

There is currently no centralised source of information for tracking cyber threats. Reports of cyber breaches are usually unsubstantiated and lacking in hard evidence, especially regarding the origin or motive of the cyber incident. Maritime cyberattacks can result in potential revenue loss, environmental damage, and loss of life, among other impacts. The industry needs to come together to find solutions that are cost effective and which can be applied across all ships.

Such measures include stricter protection of communication channels by service providers, security testing of marine systems, networks, hardware devices and any associated software, improving staff awareness of cyber security threats, and getting staff to adopt simple measures such as strong user and network access controls. Maritime companies also need to regularly backup their systems, keep their software up to date, and identify and report any cyber security breach to the relevant authorities.

It is still early days when it comes to generating awareness of maritime cyber security. While there is no reason to panic, shipowners, managers and seafarers will need to acknowledge and accept this new challenge to their ship operations.



ABOUT CAPTAIN PRADEEP CHAWLA

Captain Pradeep is Managing Director for Quality, Health, Safety, Environment and Training at Anglo-Eastern Ship Management, a leading independent provider of ship management services. He started out as a Deck Cadet in 1974 and attained the rank of Master in 1986. In 1992, he joined Anglo-Eastern Ship Management for a shore-based position.

shoring up cyber security

Captain Pradeep Chawla shares his perspective on the need for safeguards against cyberattacks on ships and other maritime systems



powered by green energy

At the 19th Singapore International Bunkering Conference and Exhibition held in October 2016, four panellists participated in a dialogue on the medium-term outlook for the marine fuels industry. Here, they share with Low Shi Ping their thoughts on developments within the industry, and the expected impact of the 0.5 per cent global sulphur cap

CLOCKWISE FROM TOP LEFT
Luca Volta, LNG Venture Manager at ExxonMobil;
Goh Tiak Boon, Head of LNG New Business at Pavilion Gas;
Christopher Chatterton, COO of the Methanol Institute;
Dirk Kronemeijer, CEO of GoodFuels Marine.

SINGAPORE NAUTILUS (SN): WHAT WILL BE THE IMPACT OF THE 0.5 PER CENT GLOBAL SULPHUR CAP ON THE MARINE FUELS INDUSTRY?

DIRK KRONEMEIJER (DK): There is a need to reduce and limit the use of dirty bunker fuel. The 0.5 per cent global sulphur cap coupled with the global need to reduce carbon will be a good way to focus on finding and using alternative options. One great way is to use marine biofuels, also known as low carbon marine fuels, which are sulphur-free and reduce carbon by 80-90 per cent compared to fossil fuels.

The biggest challenge is in how the industry will adjust. Will it invest in capital expenditure to meet requirements and industry demands, or remain flexible by using a marine biofuel? This will affect everyone, from shipowners to shippers.

LUCA VOLTA (LV): The future is going to be a multi-fuel future. A one-size-fits-all solution is a thing of the past. Regulations are going to be so complex that they will yield different compliant fuel solutions, which might not all be available at every port in the right quantity. In this new landscape, ExxonMobil no longer sees itself as fuel supplier, but a solutions provider. We will work with shipowners to offer a bespoke solution for every vessel they own, and provide the correct quality of fuel. Our technical and commercial background, safety record, and substantial number of in-house experts are some reasons why we can do this.

The implementation of the sulphur cap will be extremely difficult to execute. The lack of available substitutes makes it challenging. The industry is at a crossroads, particularly for shipowners, because of the complexities of choosing an alternative fuel that will be suitable and right for their ships. To overcome this, the industry needs to make clear decisions on what to do next, plan ahead for a longer-term horizon, and have clear and consistent enforcement of the regulations.

CHRISTOPHER CHATTERTON (CC): The impact will be significant as it is a large drop from the current 3.5 per cent. This equates to additional financial burden for vessel operators, requiring them to either deploy scrubbing technology or burn more expensive distillates - neither of which are guarantees for meeting both sulphur and nitrous oxides emission requirements going forward.

From an industry perspective, it is not yet clear the extent to which low-sulphur fuel will be available, and how price will be impacted if a major shift towards distillates occurs. A third option is to burn alternative fuels such as liquefied

natural gas (LNG) or methanol. Methanol's use as a marine fuel provides shippers and port facilities with a practical option for compliance with tightening emission requirements. Over the past five years, methanol has been less expensive than competing fuels, such as marine gas oil, on an energy equivalent basis. As methanol is a liquid at ambient temperatures, with a history of being safely handled as one of the top seaborne traded chemicals for over a century, current bunkering infrastructure needs only minor modifications to handle methanol. This can be done at a fraction of the cost of competing technologies like LNG. Similarly, converting existing vessels to run on methanol will be cheaper than an LNG conversion, and on par with abatement technology.

GOH TIAK BOON (GTB): We can expect this impact to be more significant than that of the previous reduction. The marine fuels industry will be confronted with the challenges of fuel availability, infrastructure readiness, and higher investment costs to meet the new requirements.

SN: HOW SHOULD BUNKERING HUBS SUCH AS SINGAPORE PREPARE FOR THE SULPHUR CAP?

DK: Bunkering hubs should be at the forefront of driving and accommodating alternative fuel options. There needs to be a mindset change. I feel that Singapore is still not giving enough incentives to encourage the adoption of alternative fuels, such as biofuels, in shipping. There is a lot of focus now on LNG, but this does not address the carbon

"SINGAPORE IS UNIQUELY POSITIONED TO PLAY A LEAD ROLE IN THE IMPLEMENTATION OF THE SULPHUR CAP, DUE TO ITS LOCATION ALONG MAJOR MIDDLE EASTERN AND ASIAN SHIPPING LANES AND ITS STATUS AS A PROLIFIC BUNKERING MARKET."

CHRISTOPHER CHATTERTON, COO, METHANOL INSTITUTE

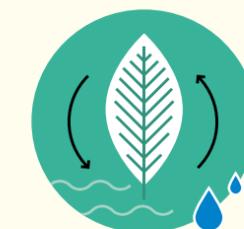
challenge, and not every ship will or can migrate to LNG. It may want to refer to Europe as a guide to learn how to look beyond cost, and focus on the environment and sustainability. This is not about cost, but about capturing a huge economic growth opportunity while preserving the planet we live on. I see it as a positive story in enhancing competitiveness, not destroying it.

LV: A lot is already being done, particularly in Singapore. For instance, there is financial aid available for companies to seek alternative fuels. The Maritime and Port Authority of Singapore (MPA) has also signed Memorandums of Understanding with different ports around the world to promote cooperation and exchange of information on this. MPA has always been at the forefront of developing new technology and ways to support the shipping industry. It is a thought leader that partners other thought leaders. I know it will continue to take significant steps to be ready for the implementation of the cap.

CC: Singapore is uniquely positioned to play a lead role in the implementation of the sulphur cap, due to its location along major Middle Eastern and Asian shipping lanes and its status as a prolific bunkering market. Singapore is already committed to facilitating maritime technology transfer, innovation, and cleaner sources of fuel, such as LNG and methanol, through various initiatives, including its Next Generation Port 2030 project. Continuing on this path by supporting energy efficient and low-carbon technology, and working with other global and regional ports, will ensure it maintains an edge in maritime transport and trade as well as set a course for securing a low-carbon future across the maritime industry.

GTB: As a key global bunkering port, Singapore has already embarked on important initiatives to prepare for the sulphur cap. In 2016, MPA granted two LNG bunker supplier licences, one of which was awarded to Pavilion Gas. Pavilion Gas is currently developing the transportation logistics to deliver LNG as a bunker fuel via the truck-to-ship method. This involves loading LNG at the Interim Truck Loading Bay, located at the Singapore LNG Corporation (SLNG) terminal, into cryogenic ISO containers. Trucks will then transport these containers to a berth, from which LNG can be transferred directly to LNG-fuelled vessels.

A set of LNG bunkering technical references are also being developed to provide guidelines for safe LNG transfer operations, custody transfer, and crew competency requirements.



SN: WHAT SHOULD SHIPOWNERS, OPERATORS AND BUNKER SUPPLIERS CONSIDER AS THEY PREPARE TO ADAPT TO THE CAP?

DK: They have to pick the right alternative solutions that meet their objectives and business needs. There will be no silver bullet. Some owners may go for LNG, but others may decide to use a low carbon marine fuel to avoid costly engine modifications, and simultaneously comply with sulphur limits and stand out on the carbon dioxide (CO₂) front. The issue of reducing the amount of CO₂ contributed by the shipping industry will eventually be just as important as the sulphur one.

LV: Shipowners and operators need to plan ahead by looking at the fleets of ships they work with, understanding their current status, and thinking about where their fleet and business is going. Once those decisions have been made, they can speak to suppliers like ExxonMobil about how to marry their enterprises with compliance. We need strong, collaborative relationships to find a solution.

CC: The timing of specific investments required to remain compliant will be critical, and should address scrapping, disposals, abatement, conversion technology, and access to funding. Fuel availability and pricing within their respective markets should also be studied carefully, as well as the ability to hedge against price fluctuations. Timing a potential investment too early or too late could render an organisation uncompetitive.

Additionally, it is not yet clear how compliance will be enforced globally. Some markets may be better positioned to enforce any sulphur cap violations more strictly, while others may require more time to systemise their enforcement policies.

GTB: For a start, they must acknowledge that preparations are needed across the entire fuel value chain. All stakeholders in the supply chain should work together to provide holistic solutions. They all need to be involved in addressing the challenges related to fuel availability, infrastructure readiness, and higher investment costs.

Close collaboration between regulatory bodies and the maritime industry is also paramount to the smooth transition to cleaner fuels. This includes the timing of regulatory requirements and standards, as well as enforcement processes to ensure compliance within the industry.

SN: WHAT ISSUES DO YOU FORESEE WITH COMPLIANCE AND ENFORCEMENT WHEN THE CAP IS IMPLEMENTED?

DK: It is going to be very tough to ensure

compliance, which is why the penalties need to be severe. Heavy fines should be put in place, and authorities should not hesitate to name and shame those who do not comply. Another way to overcome this is to work with end-clients – the shippers – directly. These include multinationals such as Heineken, Ikea and Apple, which rely heavily on shipping to move their goods. Getting them to pressure their supply chains to adopt sustainable practices that fall in line with the cap, as well as a carbon reduction target, would help.

LV: There is a need for strict and consistent enforcement of the cap, but it will be challenging to do so. Fortunately, we are already seeing organisations, like the Trident Alliance – made up of a group of shipowners and operators who share a common interest in robust enforcement of maritime sulphur regulations – coming together and working towards this goal. One thing that industry players should never forget is that with any legislation, the cost of compliance cannot possibly be higher than non-compliance.

CC: Compliance can be readily addressed on a countrywide basis, largely through the implementation of more advanced technology to track and monitor bunkering operations and vessel emissions. For example, North America and China have begun fining non-compliant vessels within their respective Emission Control Areas (ECAs). Singapore has taken a lead role in implementing mass flow metering, which will come at a very slight cost increase, but will ensure a more transparent, secure and level playing field. In the end, it will save the industry significantly more than it will cost, due to increased accuracy in delivery, shorter delivery time, back flow prevention, and better surveying and dispute resolution processes.

GTB: There are several solutions available to shipowners to meet the global sulphur cap. Compliance and enforcement requirements will differ depending on the solution used. For example, scrubbers should be employed throughout a vessel's route if non-compliant bunkers are used. There are enforcement challenges when the vessel is in international waters and penalties may differ in various ports.

SN: HOW CAN WE ENSURE A LEVEL PLAYING FIELD WHEN THE CAP IS IMPLEMENTED?

DK: Regulatory bodies first need to decide what their goals are. Is it sulphur, nitrogen oxide (NOx) or CO₂ reduction? A focus on CO₂ reduction is

now severely lacking in shipping compared to other heavy transport segments such as aviation. That is not sustainable in my view. Once a CO₂ cap is added, regulatory bodies should create a framework for different alternative fuels and enforce compliance through a mix of green merits, such as by combining zero sulphur emissions with a choice between scoring well on CO₂ or NOx. The focus needs to be on output rather than technology; there is too much emphasis on the latter at the moment, when it should just be a tool to achieve an ideal end.

LV: At ExxonMobil, we are trying to make compliant solutions, be it fuels or technology, easily available to shipowners so they have options and possibilities at hand. Other stakeholders also need to come to the table to work with shipowners.

CC: At the moment, it is still unclear how flag states will enforce fines or other means of penalising vessel owners or operators for non-compliance. There should be a balance between incentives to comply and penalties for non-compliance. While there should be heavy penalties for non-compliance, the focus should be on incentivising and rewarding companies to comply. Embracing new technology and smart systems at all levels, which enhance the overall efficiency of the industry, while creating sustainable maritime policy to support such initiatives, will ensure that everyone is playing by the same rules.

GTB: From an enforcement perspective, the use of LNG as a marine fuel will be most ideal as it minimises the need to monitor compliance. To ensure fair competition and a level playing field, the industry has to adopt better technology and systems to monitor vessel movement and fuel use. Port authorities will need to work together to ensure rigour in monitoring and enforcement. Penalties for non-compliance will have to be as equitable as possible throughout the world.

SN: WHAT DO YOU THINK WILL BE THE FUEL MIX IN THE MEDIUM TO LONG-TERM?

DK: My industry's goal is for biofuels to make up 5 per cent of the fuel mix by 2030. Currently, it is less than 1 per cent. LNG will probably also be a significant portion of the pie. I see new technologies emerging too. In Norway, there are a lot of hybrid vessels. I hope that by 2050, fossil fuels, including fossil LNG, will be eradicated. If we are ambitious, we can do it.

LV: It is going to be a multi-fuel future. In ExxonMobil's Outlook for Energy 2016 report,

"ALL STAKEHOLDERS IN THE SUPPLY CHAIN SHOULD WORK TOGETHER TO PROVIDE HOLISTIC SOLUTIONS. THEY ALL NEED TO BE INVOLVED IN ADDRESSING THE CHALLENGES RELATED TO FUEL AVAILABILITY, INFRASTRUCTURE READINESS, AND HIGHER INVESTMENT COSTS."

GOH TIAK BOON, HEAD OF LNG NEW BUSINESS AT PAVILION GAS

which has a view to 2040, our research analysts have predicted that by then, LNG will form about 10 per cent of the marine fuel mix. The remaining 90 per cent will be equally split between residual and distillate fuels. Niche fuels such as methanol and biofuel will take up a relatively small volume.

CC: The world has consistently been moving towards a cleaner fuel environment. The International Maritime Organization has been discussing maritime emissions for at least a decade, so it seems that the time to make a significant pivot to cleaner maritime fuels is now upon us. I expect this trend to continue.

Refiners are already producing more ECA-compliant, middle distillate-based gasoil and marine diesel oil, albeit with a significant premium over heavy fuel oil. Refiners will most likely either blend fuel oil into a hybrid product, which will be targeted at maritime vessels, or retool and upgrade the fuel oil into a higher-margin distillate product. Either way, it will take time, measured in years, for new, low-sulphur product introduction, acceptance and uptake.

Russia, historically one of the major global producers of residual fuel oil, has been steadily decreasing its production on the back of a nationwide refinery upgrade programme over the past five years. The effects of this are already being felt in St Petersburg's bunkers market, when it experienced shortages of fuel oil in October 2016.

GTB: This will be highly dynamic as the fuel mix will depend on a range of factors, including availability, price, infrastructure readiness, technological advancement, regulatory policies, and enforcement efficacy. Pavilion Gas believes that LNG will remain a key component of the fuel mix. LNG has one of the highest potentials for growth, due to its relative cost competitiveness compared to other compliant fuels.



fair play

Consultant Prem Gurbani tells Rahita Elias what makes a good maritime arbitrator



Patience, a calm disposition, and fair-mindedness are the key qualities of a maritime arbitrator, says Prem Gurbani, a Consultant at law firm Gurbani & Co LLC. "In maritime arbitration, you have to ensure procedural justice. Indeed, it is one of the most challenging aspects of an arbitrator's job. You also have to make sure you have addressed all the issues and done your best to make the correct decision on those issues – both on the facts as well as the law," he says. "The burden is on you to get it right to the best of your ability because the parties involved generally do not have any other recourse once the decision is made. In court, you have the right to appeal. In arbitration, your right to appeal is very limited, if you have one at all."

Gurbani says he "sort of stumbled" into arbitration. He started out as a maritime lawyer in 1978, and was first a pupil, then an assistant, to the late Mootatamby Karthigesu, a preeminent maritime lawyer who later became Judge of Appeal. Gurbani decided to train as a maritime arbitrator in the 1990s to leverage his extensive maritime experience, and first acted as an arbitrator soon after his training.

Today, though he has retired as a Partner of Gurbani & Co LLC, Gurbani remains a Consultant at the firm and continues in arbitration practice. He acts both as an arbitrator and a counsel in

arbitration cases. He is a member of the Advisory Panel of the Singapore Maritime Foundation and also sits on the panel of arbitrators for several leading arbitral institutions, such as the Singapore Chamber of Maritime Arbitration, whose aim is to provide a framework for maritime arbitration that responds to the needs of the maritime community.

Gurbani declines to give any details of the cases he has heard or acted for, citing confidentiality. Indeed, confidentiality is one of the main reasons parties take the arbitration route rather than going to court.

EARNING RESPECT

But Gurbani does say that anyone with strong maritime knowledge and experience can become a maritime arbitrator. "It does help to be a lawyer because most maritime lawyers do know the process of arbitration even before they themselves become arbitrators," he says.

After all, lawyers represent the parties involved in arbitration, and present their respective cases before arbitrators. "However, a maritime arbitrator does not necessarily have to be a lawyer. Some arbitrators are surveyors, or naval architects, or individuals who have some form of maritime knowledge. What you do need is to undergo arbitration training," he says.

Organisations such as the Chartered Institute of Arbitrators and the Singapore Institute of Arbitrators, run training courses. Upon successfully completing a course, one becomes a member, and eventually a fellow, of the institution.

Training is just the first step. The next is to be appointed by one's peers to be the arbitrator hearing their case. Says Gurbani: "Even if you have the necessary qualifications, you still need to be appointed by the parties involved. To get that respect, you have to just keep working at whatever you are doing, whether you're a maritime lawyer or other maritime professional, so that people will eventually notice you and consider you to be a good choice as an arbitrator. Don't get discouraged if you don't get your first appointment immediately."

Gurbani believes that the work he and his fellow arbitrators are doing contributes to Singapore's status as an international arbitration centre. He says: "The appointments we get come from both Singapore-based and foreign parties. In this way, we help to bring Singapore to the rest of the world. The efforts of the whole arbitration body add up to a substantial advantage for Singapore."



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Sea Asia 2017 Set To Host Industry Leaders From Over 80 Countries



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Sea Asia 2017, the region's anchor maritime exhibition and leading forum for analysis and debate on key issues facing the industry, is gearing up to host more than 16,000 people from over 80 countries this 25-27 April at Marina Bay Sands®, Singapore.

Taking place as part of the 12th Singapore Maritime Week (22-28 April), it will be graced and opened by Singapore's Coordinating Minister for Infrastructure and Minister for Transport, Mr Khaw Boon Wan.

Chairman of the Singapore Maritime Foundation (SMF), Mr Andreas Sohmen-Pao, said this edition of Sea Asia will provide a platform for maritime leaders from around the world to address trends and challenges.

"The maritime industry has always played a vital role in Singapore's economy. This sector is here to stay, and by attracting companies and talent, we will continue to build on the strong platform that has been established over the past decade," said Mr Sohmen-Pao.

According to statistics released by the Maritime and Port Authority of Singapore (MPA), Singapore remained the world's top bunkering port in 2016. Total cargo tonnage and vessel arrival tonnage also increased by 3.0 and 6.3 per cent respectively in 2016 compared to 2015.

Mr Sohmen-Pao added, "Sea Asia 2017 provides a golden opportunity for executives to interact with each other, to discover new opportunities, and to collaborate to find solutions to the industry's challenges. We are delighted to have many new national pavilions join us this year."

This year's edition of Sea Asia will feature 10 national pavilions – four of which are new to Sea Asia. These are the Japan, South Korea, Denmark and Greece pavilions. Over 300 exhibitors from across different sectors around the world will also be showcasing their latest and innovative maritime products and solutions.

Notably, the Sea Asia conference will see six shipping industry leaders debate for and against the motion at the inaugural Parliamentary Debate. The leaders will each share their thoughts on the motion, 'This House believes that the best days of the private independent shipowner are over'. Seatrade Chairman, Mr Chris Hayman, said current developments in the industry today, such as the challenging offshore and marine sector and the implications of smart shipping, will also form significant parts of discussions at Sea Asia 2017.

"These trends are impacting the industry in more ways than one. The move towards smart shipping and data analytics, for example, provides opportunities for industry players to potentially cut costs and enhance productivity. At the same time, there is a need to think about the talent and skills needed in this area.

"Sea Asia 2017 will provide that critical and established platform for industry leaders from around the world to come together and share their thoughts on the current developments and how the industry can navigate challenges together moving forward," said Mr Hayman.

Other topics that will be discussed at the Sea Asia 2017 conference include the importance of technical change and innovation for the industry, the future of freight markets, and the opportunity for ship finance against a challenging market environment and more demanding regulatory framework.

Mr Hayman said, "We are excited to welcome maritime leaders from the world and to hear their insights on some of the more prominent issues that the industry is facing today. With the new features and format introduced for this year's edition of Sea Asia, we look forward to more engaging and fruitful discussions on how we can all work together to propel the industry further."

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