

## 2019 Maritime Innovation Challenge Statements

S/N	Challenge statement	Thrust
1	<p><u>Timely and Accurate Certification Authentication</u></p> <p>Compulsory certificates are needed for seafarers whenever they cross borders. The authentication of certificates has to go through a long process where companies spend excessive and unnecessary time and money, due to an outdated methodology. Moreover, tampered certificates is a real issue across the industry, which requires resources in checking and confirming each single certificate prior deploy the individual on board the ship.</p> <p>Time is of the essence in this industry, and a faster way to validate the information accurately is needed. Other solutions such as bar codes QR codes, and digital copies have been implemented, however they can be easily hacked. Additionally, to implement this solution one will need agreement from maritime authorities, training providers and shipping companies in terms of standards and requirements, as well as the seafarers as owners of their own digital certificate folder/wallet.</p>	others
2	<p><u>Keeping container terminal equipment efficiently in operation - predictive maintenance</u></p> <p>Container terminal operations is a set of complex tasks with lots of interdependencies. One of the bottlenecks in ensuring efficient operations without downtime is related to management of container handling equipment. One needs to ensure proper monitoring and maintenance of equipment, management of fleet and its maintenance planning, link those to other operations, and react quickly to unexpected events. There are several aspects how one can tackle these challenges, e.g. through machine learning and AI for better predictions on equipment performance, health and related maintenance needs, ensuring correct and optimal use of equipment with automation and novel technologies, and linking the fleet management with digital service layers to other processes enabling optimal real time reaction to unexpected events.</p> <p>Challenge statement sponsor's business area subsidiary is a global leader in container handling equipment and terminal automation. We are looking into how the container terminal efficiency could be improved with novel solutions ensuring higher availability and uptime of related equipment and fleet, preferably with solutions that could be scaled globally through our foothold in the market.</p>	Thrust 1: Efficient and Intelligent World Class Next Generation Port

S/N	Challenge statement	Thrust
3	<p><u>Optimised container terminal operations</u></p> <p>Container terminal operations is a set of complex tasks with lots of interdependencies. To drive up the efficiency, both within the terminal itself and during a port call, there are several aspects where one can find areas for improvement. For example, through solutions like dynamic planning, digital data sharing layers, machine learning and AI, one can achieve significant improvement in terminal logistics system and equipment fleet, yard management and housekeeping, loading operations, berth planning, and vessel turnaround times. Through real time data sharing and automating different tasks one can enable smooth integration of different processes and communication &amp; coordination between different stakeholders ultimately leading into efficient cargo flow through the terminal.</p> <p>Challenge statement sponsor's subsidiaries are leaders in container terminal operating systems and automation, and container handling equipment. We are looking into how the container terminal operations and respective port calls could be better planned, coordinated and optimized, and in general made more efficient and sustainable, preferably with solutions that could be scaled globally through our foothold in the market.</p>	Thrust 1: Efficient and Intelligent World Class Next Generation Port
4	<p><u>Cargo Tracking</u></p> <p>Challenge statement sponsor's current practice of manually recording their cargo movement is archaic, time consuming and labour intensive. This method results in misplaced cargo and unauthorized cargo storage, which consequentially leads to the arduous job of identifying the ownership of unplanned cargo which the operation checkers and the yard enforcement team have to take on. This problem is exacerbated by a shortage of labour inputs and the time-sensitive nature of cargo tracking – inputs have to be timely and accurate.</p> <p>Challenge statement sponsor has identified that this has been a severe pain for their logistics and general operations. They are ready to invest in a solution that can automatically track the type of cargo and its location. By having real-time visibility, consignees can schedule their cargo delivery far more efficiently. This furthermore eliminates the issue of misplaced cargo, and will reduce the number of unauthorized cargo storage. Currently, with no regulatory requirements surrounding the implementation of the solution, this problem has the urgency and high potential of being solved.</p>	Thrust 1: Efficient and Intelligent World Class Next Generation Port

S/N	Challenge statement	Thrust
5	<p><u>Data Repository Management</u></p> <p>Port operations controllers have to constantly communicate during daily vessel operations. However, this knowledge is not retained for the planning of subsequent vessel calls and exception handlings. The absence of a system to track and tag real-time and past information has made the retrieval of historical data difficult and time consuming. Although the operations controllers have tried using alternative solutions such as WhatsApp group chats,</p> <p>Challenge statement sponsor is looking for a specific solution to facilitate, store and retain real time communications during their operations of which they will have ownership of. They are hoping that the solution will provide knowledge retention and search capabilities to provide historical knowledge input for planning of subsequent vessel calls and for suggestions of solutions to exception handling during vessel operations in the control centre.</p>	Thrust 1: Efficient and Intelligent World Class Next Generation Port
6	<p><u>Automation of Challenge statement sponsor's attendance taking, time keeping and tracking of personnel in the shipyard</u></p> <p>Shipyards are operating with in excess of few thousands men a day and faces challenges in attendance taking, time keeping and tracking of personnel in the shipyard which is currently very manual and takes up about 20% of the engineer/foreman's time. It is proposed to develop an integrated system to better manage these processes.</p> <ul style="list-style-type: none"> <li>- Attendance taking: Every morning and after lunch break, the workers enter the gantry and report the engineer/foreman at their respective stations for attendance taking. The engineer/foreman will then collate the attendance and communicate to section administrator as well as section managers through Whatsapp and section administrator will key into the system which is time consuming and ineffective. Leveraging on technology such as facial recognition (i.e. the foreman/engineer to take photos using their mobile phones) for attendance taking will help to speed up the process of gaining the dashboard report for operation needs.</li> <li>- Time keeping: Currently there is lack of visibility on the duration taken for the workers to complete the task assigned to them. The engineer/foreman will only know whether there is a delay at the end of the day when they conduct inspections and henceforth unable to make timely interventions (i.e. adding more manpower). The proposed system would need to allow supervisor to update the system when the task has been completed so that the engineer/foreman/shipyard managers has better visibility on the progress. This will also help in computing the actual man hour input for payment to the contractor and also the productivity output. Most importantly the visibility will enable setting of shift target to meet the KPI require.</li> <li>- Tracking of personnel in the shipyard: There is lack of visibility on the location of individual workers in the shipyard. While in areas where cameras can be installed, facial recognition technology can be implemented for tracking of personnel. However, the workers could be in (confined) places where installing camera are not feasible. It is proposed to develop a personnel tracking device to provide the engineer/foreman better awareness of the location of the workers at any point of time to facilitate job assignment.</li> </ul>	others

S/N	Challenge statement	Thrust
7	<p><u>Prevention of hull and propeller fouling</u></p> <p>Hull and propeller fouling are always big concern for vessel operators. Fouling on ships drives up fuel consumption due to increased resistance. Fouling is caused by many reasons such as poor paint performance, loss of anti-fouling paint, long port stay, drifting. Many factors affect hull and propeller fouling and vessel operators are required to pay attention to them to minimize risk of fouling until next drydock.</p> <p>Are there new technology that could prevent or slow down fouling instead of using paint? How do we monitor remaining paint? Are we able to know the risk of fouling before deciding drifting or anchorage area?</p>	Thrust 5: Sustainable maritime energy and environment
8	<p><u>Vessel space control using machine learning models</u></p> <p>Challenge statement sponsor's experienced staff plan and optimise use of vessel space, controlling customer bookings, considering multiple determinant factors. After one year of operation as a newly established company, Challenge statement sponsor has accumulated minimum data for machine learning. Information including booking acceptance time and various determinant factors around it. We would like a solution where machine learning models can assist our staff in making decisions.</p>	Thrust 1: Efficient and Intelligent World Class Next Generation Port
9	<p><u>Efficient Vessel Coordination and Assistance</u></p> <p>Challenge statement sponsor has identified that there is currently no efficient way to help ship owners timely locate the necessary resources and services for the repair of equipment on board ships. With no proper platform to publish problems and look for remedial actions, ship owners and seafarers are not promptly and timely supported by solution providers should there be a problem on their vessels. Additionally, due to different time zones in which vessels operate, promptly getting in touch with the local engineers relative to their geographical location is also a challenge. Creating a platform where vessels can bring shipboard problems and solution providers together, will allow ship operators, makers, service providers and free lancers to collaborate efficiently to cater to vessel assistance. Challenge statement sponsor is hoping that the solution will also bring all fleet vessels online so that in-house knowledge can be used if a similar problem which has happened in past, occurs again. This will also have huge potential in terms of economy of scale as almost all shipping companies face this issue.</p>	others

S/N	Challenge statement	Thrust
10	<p><u>Identification of Vessels and Improving Operational and Navigational Safety</u></p> <p>Captains are tasked to navigate vessels safely in challenging port environments which are busy and congested. Occasionally, these environments are made even more dangerous by bad weather conditions such as thick fog, heavy storms and darkness at night. Despite already using existing technologies such as radar and automatic identification system (AIS), an automatic tracking system that uses transponders on ships and is used by vessel traffic services, and further relying on visual identification, there is still much room for improvement when it comes to accurately identifying the existence of nearby vessels. A large variety of vessels are simultaneously moving at ports, where some may not be equipped with radars or AIS and have very different capabilities and characteristics, such as speed limit, time taken to change course, etc. A serious consequence for not identifying vessels' presence, type and location accurately and timely is collision.</p> <p>Challenge statement sponsor is looking for an enabling technology or protocol for full remotely-operated or autonomous vessels. We hope to increase operational and navigational safety via superior situational awareness capability and automatic route planning systems. One key feature is also the ability to identify the types of vessels accurately to factor in their characteristics, such as the speed and turning radius, etc into the prediction algorithm.</p>	Thrust 3: Smart fleet operations and autonomous vessels
11	<p><u>Automated Handling of Towing Lines</u></p> <p>Handling of towing lines between the tug and vessel remains very manpower-intensive. Due to a large variety of ships and hull shapes, there is no standard interface for how towlines can be 'connected' to the vessel. Automating the process of connecting and disconnecting towline between vessel and tug will diminish labour intensive work, whilst improving operational safety.</p> <p>Challenge statement sponsor seeks simple, reliable and robust automated solutions to efficiently handle towing lines between tug and vessel.</p>	Thrust 3: Smart fleet operations and autonomous vessels

S/N	Challenge statement	Thrust
12	<p><u>Optimised supplies delivery</u></p> <p>Challenge statement sponsor, which is a ships service company manages delivery of marine consumables to and fro ship and onshore. The key jobs to be done include scheduling and planning, inventory management and warehousing and last mile delivery. On average, ships only stay in ports for 10-12 hours. Hence, shipping service companies such as Challenge statement sponsor have to ensure timely delivery to the right customers at the right place.</p> <p>However, planning is made challenging by data that is inaccurate and not real-time. This is due to changes in global trade where ships will be redirected to different ports, causing over stocking/under stocking problems, changes in cargo type carried by carriers (for bulk carriers and tankers – when they change cargo they need to clean the tanks and cleaning requires products which WSS has in our portfolio) leads to change in demand for products and fluctuating vessel arrival times causing inefficient scheduling of final delivery to ships. This problem plagues a few stakeholders, including the shipping services companies, scheduling and planning, inventory management and warehousing teams.</p> <p>Challenge statement sponsor is looking for a solution which will holistically and accurately manage information on the ports the vessels are heading to, time and the ports where change of cargo carried take place and vessel arrival schedule at ports</p>	Thrust 1: Efficient and Intelligent World Class Next Generation Port
13	<p><u>Tools for standardisation of chemical inventory and consumption on offshore rigs</u></p> <p>Service and inspection processes done on board vessels and rigs are important steps to ensure all equipment and systems are operating well. Offshore operators seek to standardize chemical consumption across their offshore rig units to reduce cost, number of suppliers and time spent procuring non-critical items. Challenge statement sponsor's technical service team lacks relevant tools/devices to collect and record the findings from their onsite inspection of our customers' chemical inventory and consumption on their offshore rigs. As such, it remains challenging for the offshore owners to review and standardize chemical inventory and consumption.</p> <p>Challenge statement sponsor seeks solutions to assist their customers with standardising their chemical inventory and consumption process.</p>	others

S/N	Challenge statement	Thrust
14	<p data-bbox="353 169 994 201"><u>Effective logging of the Statement of Facts (SOF)</u></p> <p data-bbox="353 236 1839 403">Statement of Facts (SOF) is a detailed chronological description of the vessels' activities during port stay. Details include: taking the sea pilot on board, mooring, preparation of loading and unloading operations, actual loading and unloading operations, amount of load transfer, unmooring and departure. This manual data entry process by the Ship Agent can only be carried out when he/she goes back to the office and keys it into the system. This manual process inherently time consuming and subject to human errors.</p> <p data-bbox="353 438 1839 502">Challenge statement sponsor seeks solutions to simplify the process for Agents by reducing data re-entry activities and recording the SOF effectively.</p>	<p data-bbox="1865 220 2029 451">Thrust 1: Efficient and Intelligent World Class Next Generation Port</p>