ANNEX A: Joint Industry Projects (JIP) to Build Post-COVID-19 Competitiveness and Resilience

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SINGAPORE SHIPPING ASSOCIATION

No	JIP	Project scope	Expected benefits	Beneficiary	JIP leader
1	Contactless launch services at Marina South Pier (MSP)	Pilot a project to automate and digitalise processes of launch services such as: a. Open platform development to enable any solutions/systems from the launch operators to interoperate on mobile devices or kiosks b. Universal display panel(s) at the pier for information on arrival/departure time and other information about the launch services c. Smart Locker system for fully traceable bunker sample deposits, with audit trail notification provided via a Mobile App	• More efficient launch services at across 10 MSP and WCP counters which will translate to better port services in Singapore including crew change, ship supplies, bunkering, surveyors, agents and labs. • Reduces human queues and COVID risk • Enhanced customer experience through data transparency • Enhanced security and fraud mitigation compared to the current system	Harbourcraft operators	Shipsfocus Services Pte Ltd and 26 other industry partners
2	Contactless launch services at West Coast Pier (WCP)			Harbourcraft operators	Innovez One and 5 other industry collaborators including ship agents and carriers

3	Electronic Supply Delivery Note (ESDN)	Digitalise the Delivery Note process by linking the various suppliers, chandlers, stockists, freight forwarder to a remote and digital approval process, including using 3 factor authentication architecture to authenticate the vessel stamp and Master's signature	• Improved productivity, e.g. billing turn-around time, reduced human errors, reduced costs of transactions through the value chain, from a pilot trial of 60 ESDNs • Enhanced transparency and security of maritime documentation • Enables Jurong Port lighter terminal to forecast and plan resources	Ship supplies/ Harbourcraft operators	SG Smart Tech Pte Ltd (leader), Jurong Port, 5 ship chandlers and ship management companies.
4	Development of a set of Singapore standards in remote ship survey, inspection & audit	Develop a baseline document to map out standards required for various technology providers, service companies and vessels, owners and managers to adopt for remote ship survey, inspection and audit processes. These standards could also be evaluated for Port State Control adoption. The project will also examine the trade-offs of remote survey compared to physical attendance, such as efficiencies and time zone challenges, time spent by crew, interruptions, crew fatigue and safety, information manipulation, etc.	• Standards that will guide the industry's approach to remote inspection • Improves operational resilience by supporting the ships' safety assurance system • Prepares our maritime SMEs to scale overseas	Ship owners/ Ship managers	DNV GL Singapore Pte Ltd, along with Singapore-based ship managers and owners (POSH, Hafnia, Executive Ship Management)

5	Development and Pilot of Universal Tool for Remote Ship Survey and Inspection (RSI)	Develop a universal remote ship inspection/survey ('RSI') tool that can facilitate a standard, secure and safe remote inspection/survey, in place of physical inspection, in part or full. The tool comprises a software system that can be interfaced with various ERP, databases, IoT systems and provides the surveyor/inspector with access to secured information (text, image, audio and video) on conditions onboard ship and at shore. The surveying/inspecting process will be supported by hardware such as wearable cameras and voice recording devices to capture activities on board.	• Productivity gains and cost savings to cargo, insurance and regulatory inspections, through pilot trial of 20 inspections/surveys • Reduces risk of being exposed to COVID-19 for crew • Improves operational resilience by supporting the ships' safety assurance system	Ship owners/ Ship managers	Alpha Ori Technologies Pte Ltd, and collaborators from the ship owners/ operators, P&I clubs and classification society sub-sectors to capture and cater to their requirements.

ANNEX B: Joint Industry Projects to deepen additive manufacturing capabilities in Maritime Singapore

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Additive manufacturing (AM) allows design freedom, which enables mass customisation and production of complex parts that cannot be manufactured by traditional methods. It also promotes sustainability by reducing material wastage and allowing simplified supply chains through on-demand decentralised manufacturing. **Innovative aspects** of the **26 3D-printed ship and marine parts** include – AM for part-redesign, material change to enhance functionality/part strength, reverse engineering capabilities, hybrid AM for part repair, etc.

No	JIP leader	JIP collaborators	Potential use case(s)
1	Wilhelmsen Ships Services	13 –DNV-GL, Kawasaki Heavy Industry, Hamworthy Pumps, Wartsila, Thyssenkrupp, Tytus3D, Wilhelmsen Ship Management, OSM Maritime Group, Executive Ship Management, Thome Ship Management, Berge Bulk, Carnival Maritime, Ivaldi Group	Range of 10 marine parts including valve components, engine components, and fuel nozzles onboard various vessel types such as car carriers, offshore vessels, bulk carriers and chemical tankers
2	3DMetalforge	4 – PSA Corporation, PSA Marine, Bureau Veritas, Professional Testing Services	5 parts e.g. valves and gears onboard PSA Marine's Tug boats
3	American Bureau of Shipping	3 – ShipParts.com, PACC Offshore Services Holdings, 3D Metalforge	2 Valve and pump parts onboard POSH's Offshore Support Vessel

4	Bureau Veritas	3 – PACC Offshore Services Holdings, 3D Metalforge, Professional Testing Services	4 Ship stores and spares onboard POSH's Offshore Supply Vessel
5	Lloyds Register	5 – Singapore Polytechnic, Neptune Pacific Line (NPL), 3D Metalforge, Kompressorenbau Bannewitz, Professional Testing Services	Turbocharger nozzle ring onboard NPL's Container Vessels
6	Thyssenkrupp	7 – Sembcorp Marine, Synergy Marine, OMC Shipping, X-Press Feeders, DNV-GL, Optomec, Forefront AM, Hamworthy Pumps	2 class-certified and 2 non class-certified parts onboard OMC Shipping and Xpress Feeders' Bulk Carriers and Containers

About the Singapore Shipping Association

The Singapore Shipping Association (SSA) represents a wide spectrum of shipping companies and other businesses allied to the shipping industry. It is a national trade association formed in 1985 to serve and promote the interests of its members and to enhance the competitiveness of Singapore as an International Maritime Centre. The SSA is a trusted advisor and partner in the local and international shipping community and collaborates with relevant maritime stakeholders to protect the marine environment as well as promote freedom and safety at sea. Despite being a not-for-profit organisation SSA, on behalf of its members, strives to give back generously to the community through Corporate Social Responsibilities activities. Currently, the SSA represents over 460 member companies; comprising ship owners and operators, ship managers, ship agents and other ancillary companies such as shipbrokers, classification societies, marine insurers, bunker suppliers, maritime lawyers, shipping bankers and technology start-ups amongst others.

About National Additive Manufacturing Innovation Cluster

The National Additive Manufacturing Innovation Cluster (NAMIC) is a pan-national initiative led by NTUitive, supported by the National Research Foundation under the Prime Minister's Office, in partnership with Enterprise Singapore and Singapore Economic Development Board. NAMIC aims to increase Singapore's adoption of additive manufacturing technologies to enhance its competitiveness in the rapidly evolving landscape of digital industrialization. NAMIC focuses on promising AM technologies and companies, as well as accelerating translational R&D from public institutions with a focus on industrial commercial applications. NAMIC also assists companies seeking capital injection either through project joint-funding or its investor networks.