

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

Supported by:



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 | 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.