



The growing complexity of the maritime market make a compelling case for the digital twin

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# From newbuilding nice-to-have to vessel lifecycle essential

**DIGITAL TWIN** The maritime industry is still assessing the long-term benefits of digital twins – not just for newbuilding projects – writes David Males, director of Business Development at SSI

The concept of the digital twin and its potential benefits have become embedded in the maritime industry. But how far the concept has penetrated the collective industry mindset is less certain.

Creating a digital twin for an expensive and complex newbuilding project is becoming more commonplace and is being driven by owners, particularly for defence, naval, coast guard or other specialist vessels. Powered by 3D model-based design and a PLM-led approach to shipyard workflows, a digital model will inform and sustain a vessel's entire lifecycle.

But does the same hold true for less complex commercial vessels like workboats, and what about existing vessels? Can they also benefit from a digital twin and how do we judge when the twin is good enough to create value?

Education and value creation are essential so that the ship-owner knows what to ask for in the specification phase, what it will do for them, and how they can extract value from the digital twin for however long they own and operate the asset.

## Business value

One reality is that many vessel owners and shipyards have yet to recognise fully the business value of digital twins. Until this awareness grows, the integration of digital twins into the construction and sustainment phases will continue to lag other complex manufacturing industries like aerospace.

Part of the reluctance stems from the perceived complexity of the task and in part from the need to make the business case. Ultimately it will happen if owners specify it in the contract and ship-

builders are paid to develop an accurate ‘as-built/as-delivered’ digital twin. Owners do not make investments without demonstrable returns on investment and shipyards only deliver what the contract requires. But there could be a further factor.

It is not a new idea but it should be kept in mind that a digital twin does not have to be absolutely perfect. It only needs to be ‘good enough’ for the intended purpose and usable by those whose job it is to operate and maintain the ship in the sustainment phase.

Issues arise when the digital version of the ship does not reflect the ‘as-built’ condition of the vessel. Most shipyards stop developing the model at some point and additional information only shows up on the 2D production drawings, resulting in a less usable model for the owner. Defining the deliverables and intended purpose can make the case more forcefully.

Getting the shipowner on board early is key to getting the digital twin embedded in the construction process. All parties to the project need to understand who has the opportunity and the responsibility. Some vessels – particularly in naval shipbuilding – are a ‘no-brainer’ given their long lifecycles in single ownership, but for commercial shipping the demand for a digital twin might require an understanding of whether the owner foresees a long-term ownership/operating position.

### Lifecycle role

For shipyards seeking to differentiate, the fact that a digital twin that can assist in the production process, streamline the handover and sustainment over the vessel’s lifecycle is added value, especially when a series of vessels has been ordered. For many shipbuilders, maintenance, repair, and overhaul (MRO) is the future of shipbuilding. Availability of an accurate, reliable, digital twin supports this strategic direction.

The common factor is for both owner and yard to understand that a digital twin can be good enough to serve the defined purposes, without being a multi-headed technology project that struggles to justify its investment case. The ability to capture enough data to create one is achievable using today’s shipbuilding-specific tools and a relatively straightforward process. An accurate digital twin for acquired and in-service vessels is essential

for effective management, supporting ongoing maintenance and operational needs while reducing downtime and costs.

There are many ways to aggregate existing information and combine it with model data from different sources such as 3D laser scans, 360-degree imaging and re-modelling in 3D to create the starting point for a ‘good enough’ digital twin. The digital twin can then be used to optimise in-service operations onboard ship and ashore, plan and execute maintenance, support modernisation programmes and inform safe decommissioning.

### Conclusion

The business case for a lifecycle twin is simple: it can support and assist in-service maintenance and planning for drydock. Availability of the twin can shorten refit and repair cycle times. The faster the vessel’s manager can get the ship in and out of the yard, the sooner it is back in service and earning.

The benefits can also be shared with the shipyard if they can use the digital twin to analyse the layout against the prepared scope. By having a reliable, current version of the ship, the yard can go beyond estimation and provide a more reliable cost projection and assessment of where challenges might lie.

The challenges are principally how to take the pain out of managing the digital twin and recognising that moving from paper to digital is not always an easy transition. The parties need to agree whose responsibility it is to keep an accurate record of model updates such that the in-service digital twin is reliable and trustworthy.

Shipowners commonly complain that they often struggle to update and verify paper vessel drawings. The prospect of using a digital system should remove most of that hassle, and yet understanding who has responsibility remains a frequent objection.

Where this conversation goes from here depends on the willingness of vendors to explain, shipyards to engage, and owners to realise the benefits. Governments can also take action by reducing acquisition and policy barriers to promote innovation and real projects.

The growing complexity of shipping markets and the demand for vessels that can be adapted and retrofitted over their lifecycles make a compelling case for the digital twin.

