

Coming out of the dark

by Will Fray, Director, Maritime Strategies International (MSI)

From trade wars and military conflicts to pandemics and natural disasters, not to mention growing environmental regulations and government interventions, disruptions to supply chains and global shipping markets have had an enormous impact on freight costs and asset values in the last decade. Disruptions have primarily impacted the efficiency of the global fleet through factors such as distances, speed, port days, maintenance schedules, and ballast patterns. These efficiency factors are central to MSI's shipping and offshore market models, even if obtaining reliable measurements has sometimes been challenging.

Automated identification system (AIS) data holds huge potential to better understand ship trading efficiencies and has been a key data source for MSI's analysis for over a decade. The main focus of recent AIS-based analytical tool proliferation has been commodity trading, but MSI has focused on improving its understanding of vessel behaviour. By joining the dots in global trade, it is possible to understand how ships perform and how owners deploy them.

Casting light

Starting with the most comprehensive coverage available of satellite, terrestrial, and onboard AIS data, MSI's vessel activity augmentation algorithm fills in the coverage gaps – dark events – using historical trading patterns of similar ships to estimate vessel positions, speeds, and activities. Each month, MSI's algorithm identifies and fills over two million dark events.

As a result, MSI maintains a set of continuous hourly ship activity data for over 90,000 commercial marine and offshore vessels, covering not just locations, speeds, and headings but also estimated draughts, cargo loaded, fuel consumption, and emissions (the latter closely aligned with the 'bottom up' approach adopted by the International Maritime Organization's, IMO, *Greenhouse Gas Studies*). We combine this with our set of over 20,000 tightly defined berthing and shipyard polygons (which we compile and maintain using

machine learning techniques to discover berths) to identify and define port activity.

MSI's port call algorithm goes a step further than flagging a port visit and counting the days spent within its limits – port call behaviour is an aggregation of associated stoppages, anchoring, manoeuvring, and berthing, even if some of this activity takes place remotely from the terminal itself.

In addition, combining ship and port activity data populates our voyage database, providing valuable insights into the trading behaviour, efficiencies, fuel consumption, and emissions estimates at both a vessel and a fleet/owner/portfolio level.

Collating data sources

For the first time, MSI is now bringing this augmented AIS data set to market through our new map-based online platform: MSI SEASCAPE. Also integrated into the platform are fair market values (FMV) driven by our long-trusted model Forecast Marine eValuator and discounted cash flow (DCF) value assessments guided by MSI's expert forecasts for ship earnings, operating costs, and future values using our HORIZON market forecasting model.

At launch, the platform contains just over 30,000 vessels encompassing dry cargo (dry bulk, container ships, multi-purpose, car carriers) and wet cargo (oil & chemical tankers, LNG, LPG). Insights include vessel and fleet deployment patterns and trading efficiencies, emissions and alignment/compliance with Carbon Intensity Indicator

(CII)/Poseidon Principles, EU ETS and FuelEU Maritime exposure (accounting for both tank-to-wake and well-to-wake emissions profiles), sanctions monitoring, and benchmarking tools to compare vessel operational performance to cohort fleets.

Creating insights – fleet activity

Whilst there is a wide range of applications for MSI's proprietary ship activity data set, MSI SEASCAPE aligns with two key purposes. First, benchmarking the activity of existing fleets and vessels. Second, due diligence for acquisition, lending or chartering activities. MSI SEASCAPE can also extract insights for particular sections of the fleet, or groups of vessels by age, size, and other characteristics.

For instance, whilst there are strong similarities between the behaviour of the Supramax and Ultramax dry bulk fleets (such as geographical deployment, speeds, ballast ratios), there are some key differences, like anchorage; over the past 12 months, Supramax vessels have on average spent 23% of their time at anchor compared with 17% for Ultramax. This means that the latter have been far more productive, spending 53% of their time at sea vs 46% for Supramax, travelling much further distances (on average 13% further). It is no surprise that the Ultramax fleet has been more efficient from an emissions intensity perspective; on average, the CII scores for the Ultramax fleet have been 8.9% below the CII reference line (representing Middle C), whereas the average

Fig. 1. Detailed port call activity by component

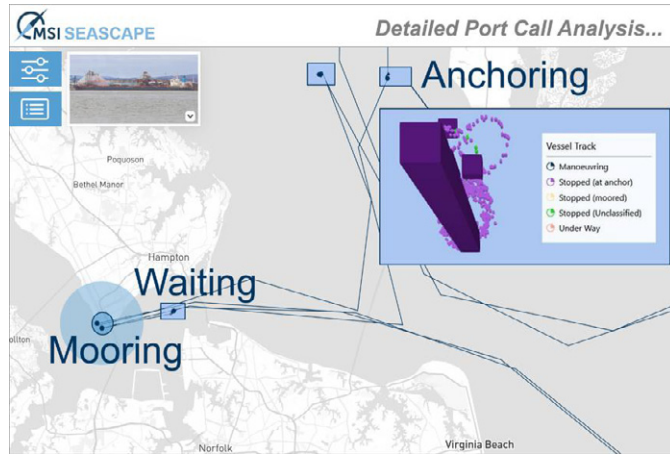
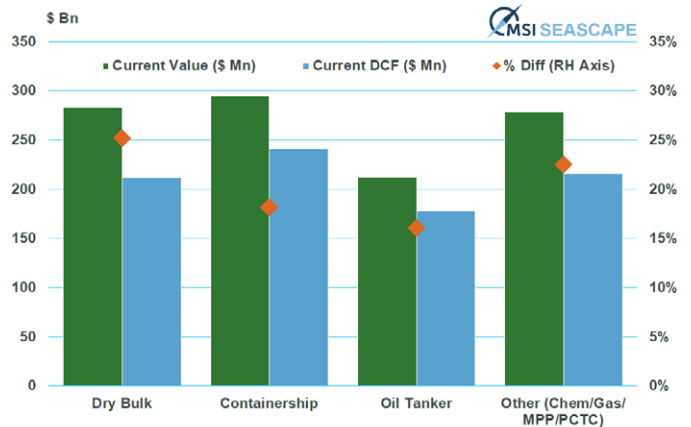
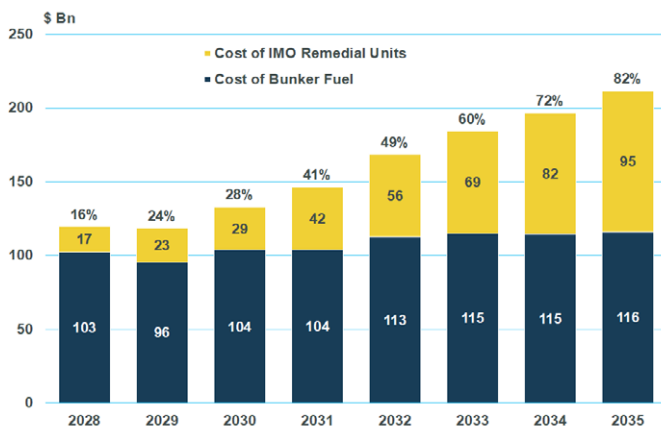
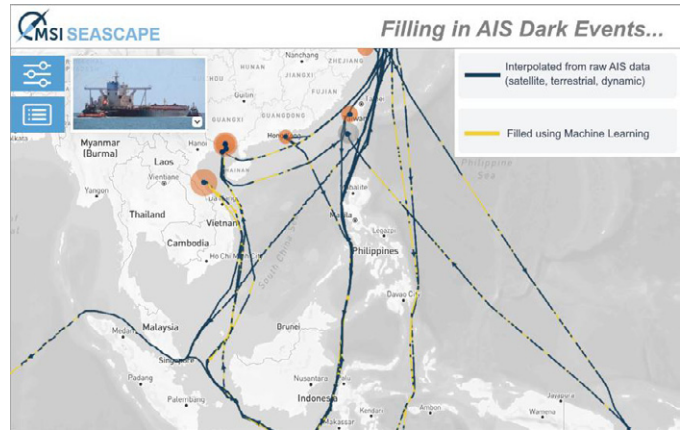


Fig. 2. Using machine learning to estimate AIS dark events



CII scores for the Supramax have been only 2.4% below the CII reference line.

Creating insights – fuel and emissions

MSI SEASCAPE’s fuel consumption and emissions estimates offer a robust foundation for assessing the financial implications of upcoming IMO regulations at both vessel and fleet levels.

By extending SEASCAPE’s 2024 annual fuel consumption estimates through to 2035 and applying MSI’s bunker price forecasts, we can project future fuel costs for over 30,000 conventionally fuelled vessels in the platform – alongside expected IMO penalties.

While not exhaustive, this analysis provides a clear indication of scale: by 2035, IMO penalties could represent an 80% premium on top of fleet bunker costs – equating to nearly \$100 billion annually for the ships included.

Viewed differently, this also signals a major opportunity for the marine fuel market. Redirecting the projected \$100 billion per year toward drop-in biofuels and low-carbon alternatives could create a powerful incentive for innovation and investment in sustainable shipping.

Creating insights – fleet valuation

MSI analysis reveals that, compared to their discounted cash-flow values, vessels in all shipping sectors possess a higher fair market value, indicating most assets are overvalued relative to projected future earnings and values.

Using the fleet and portfolio selection tools in its new MSI SEASCAPE platform, it is possible to extract and aggregate MSI’s assessment of asset values and investment potential. A dedicated tool calculates fair market value, while MSI’s forecasts, driven by its own analysis through the HORIZON forecasting model, determine the DCF value. Comparing the two valuations reveals MSI’s assessment of real value; a relatively higher DCF assessment, for instance, flags a buy signal.

In the current market of historically elevated asset values, however, the opposite is

more likely to be true. The data currently presented on MSI SEASCAPE certainly shows this. The chart illustrates the overall gap between current fleet-level FMV valuations and DCF values as of May 2025, where both metrics represent the combined valuations of the just over 30,000 vessels within each sector on the platform.

All sectors have higher FMV in relation to their DCF, which suggests that vessels are overvalued when compared with MSI’s expectations for future earnings and values. The divergence between FMV and DCF is largest among the dry bulk fleet, with vessel fair market valuations being over 25% higher than MSI’s DCF value on average. This divergence suggests that market sentiment and forward-looking expectations are more positive for this sector than for others, when compared with the MSI Base Case.



From market analysis to investment decision support, Maritime Strategies International (MSI) offers high-level, independent market forecasting, as well as business advisory services. For over 35 years, MSI has developed integrated relationships with a diverse global client base, including financial institutions, ship owners, shipyards, brokers, investors, insurers, classification societies, regulators and accountants, along with equipment and service providers. Head to msilt.com to learn more.