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Air lubrication systems finding favour with cruise sector



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Silverstream Technologies has found success in the cruise ship market. Here an air lubrication system can be seen fitted beneath the hull of a ship

ICSI discussed the future of cruise ship de-carbonisation with Silverstream Technologies' Programme Director for Cruise & Ferry Segment, Jon Wheeler, following the company's recent successes with Carnival Corp.

Silverstream's air lubrication technology, the patented Silverstream System, is to be installed on Carnival Corp's LNG-fuelled 'Excel'-class cruise vessel currently under construction at Meyer Werft's Papenburg shipyard in Germany.

This system is expected to reduce fuel consumption and emissions by at least 5% when the vessel enters service in 2023.

Meyer Werft is already installing Silverstream's technology on P&O Cruises' cruise ship 'Arvia', another 'Excel'-class vessel currently under construction. Both orders follow the 2017 installation of the system on Princess Cruises' 'Diamond Princess', which has achieved over 5% net fuel and emissions savings.

Silverstream has also retrofitted its system on the 'Sapphire Princess' during a scheduled drydocking at Sembcorp Marine Admiralty Yard in Singapore, a successful project despite the ongoing challenges of the pandemic.

The company saw a gap in the clean technology market for a system that reduces the frictional resistance of a ship's hull through water. Silverstream's system achieves this by using a series of air release units in the flat bottom of the vessel, which generate a uniform



Jon Wheeler, Silverstream's Programme Director for Cruise & Ferry Segment

carpet of micro-bubbles that travel the full length of the hull.

"From its conception over a decade ago, we at Silverstream have recognised the effectiveness of our technology in supporting the de-carbonisation of the cruise sector. Two of our first installations were with Princess Cruises and Norwegian Cruise Line," Wheeler explained.

"Over the last two years, the pandemic has meant that the cruise industry has been subject to extreme financial pressures. The nearly total cessation of global tourism has made for two years of heavily disrupted business, so today, any forward-looking investment decisions that relate to energy efficiency will be even more heavily scrutinised than ever.

"To increase uptake across shipping generally, and in cruise particularly, it's crucial that clean technologies match the performance claims made by their manufacturers," he said.

Unfair publicity

And why does Wheeler see a key role for clean technologies now? Cruise companies have been leaders in the shipping industry when it comes to minimising their impact on the environment, but recent high-profile and mainstream media coverage is shining a new – and sometimes not entirely fair – light on the industry's operations, he said.

For example, a September, 2021 article in the UK newspaper *The Independent* said that "cruise-goers [were] unaware of the 'harmful' impact of the 'unregulated' industry on marine life and human health". This article cited a report in the *Marine Pollution Bulletin*, which claimed that within the Mediterranean, cruise and ferry ship CO2 emissions were estimated to be up to 10% of all ship emissions.

"While these reports are not necessarily entirely reflective of the sector's efforts – and especially the efforts of market leading brands – they do highlight that, even as the wider maritime industry becomes more public facing, it is the cruise industry that will remain at the front line for ESG pressures," Wheeler said.

And although the cruise segment has been one of the maritime sector's leading adopters of LNG propulsion, a cruise industry round table led by Lloyd's Register (LR) in November, 2021 highlighted that delivering on the IMO's greenhouse gas ambitions requires other advances.

The IMO's forthcoming Energy Efficiency Existing Ship Index (EEXI) and Carbon Intensity Indicator (CII) pose particular challenges for the cruise industry. These requirements will enter into force in 2023 and pertain to every cruise vessel above 5,000 gt.

Quick wins

While EEXI is a one-time certification targeting design parameter, the CII addresses the actual emissions while in operation, and the combination of both rules is pushing many operators to pursue 'quick wins', including engine power limitations and slow steaming, to reduce their carbon impact.

"However, in a business where time is even more acutely correlated with capital, the leisure and tourism-driven itineraries of cruise ships may make these supposedly easier options unviable for cruise vessels," Wheeler said. "Even within the merchant fleet, these strategies must be challenged as short-term thinking, which not only fails to address the underlying aim of design efficiency, but also constrains operational flexibility."

There is much deliberation about new fuels, and as early adopters of LNG, the cruise industry is reasonably well-suited from a technical perspective to transition to ammonia and hydrogen once they are available. However, the reality is that these fuels are multiple times more expensive and less energy dense than current marine fuels.

"Caught between the pressure to act immediately and the relative lack of economically viable net zero fuel solutions to be adopted in the near term, the installation of proven clean technologies is one of the best levers that the cruise industry can pull at present, particularly if operators are looking for lifecycle solutions," Wheeler added..

"No matter, the fuel, clean technologies have the power to reduce fuel bills and emissions, provide operational flexibility to vessels,

and increase profitability for shipowners. Undoubtedly, with or without more stringent regulation today, failing to invest in proven fuel-agnostic and future-proof emission reduction technologies will leave shipowners and operators in a commercially perilous position in years to come," he warned.

Blueprint

Wheeler said the uptake of proven clean technologies must happen now, and it must happen at pace. In support of this, Silverstream is creating an operational and commercial blueprint for installing its technology in the cruise market that is designed around alleviating pressures for cruise lines to install technologies on vessels, including bringing in place bespoke project teams and creating unique supply chain arrangements that suit the segment.

Last year, Silverstream secured the largest ever order of a maritime propulsion clean technology with MSC ordering its system for more than 30 cargo vessels. MSC claimed it will save 1.6 mill tonnes of emitted CO2 and over \$250 mill in estimated fuel costs.

With this order, Silverstream now has more than 70 systems contracted, under construction or in-service, including equipment for major players, such as Carnival, Shell, Maersk, Grimaldi, Vale and more.

"The significance of the acceleration in the uptake of air lubrication technology over the past two years by some of shipping's biggest names must be recognised as truly progressive and a sign of things to come.

"It is hugely encouraging to see major industry players implementing and actioning de-carbonisation strategies beyond that of current regulatory ambitions. A case in point, MSC Cruises has pledged to achieve net zero greenhouse gas emissions in its cruise marine operation by 2050, going beyond that of the IMO's environmental ambitions," Wheeler said.

Investment choices are being pro-actively made based on ESG value as much as they are on fuel savings, he said. Wheeler also concluded that he expected the cruise industry to make a strong recovery from the challenges of the last two years and turn its attention to leading the way.