




Enabling emission reducing wind solutions with smart green shipping

In October 2020, the UK government announced a target of 1GW of floating offshore wind by 2030, which combined with a 60% target for local content set by the UK Offshore Wind Sector Deal, sets manufacturing sites around the UK with a requirement for a significant scale up in fabrication. This provides a real challenge for the sector, as well as an opportunity to innovate and collaborate. Offshore wind can be used to provide direct thrust for ships, effectively deploying wind power using 21st century materials and digital technologies, with an offshore wind turbine in effect a modern development of an 18th century windmill. Both harness wind power with modern solutions.



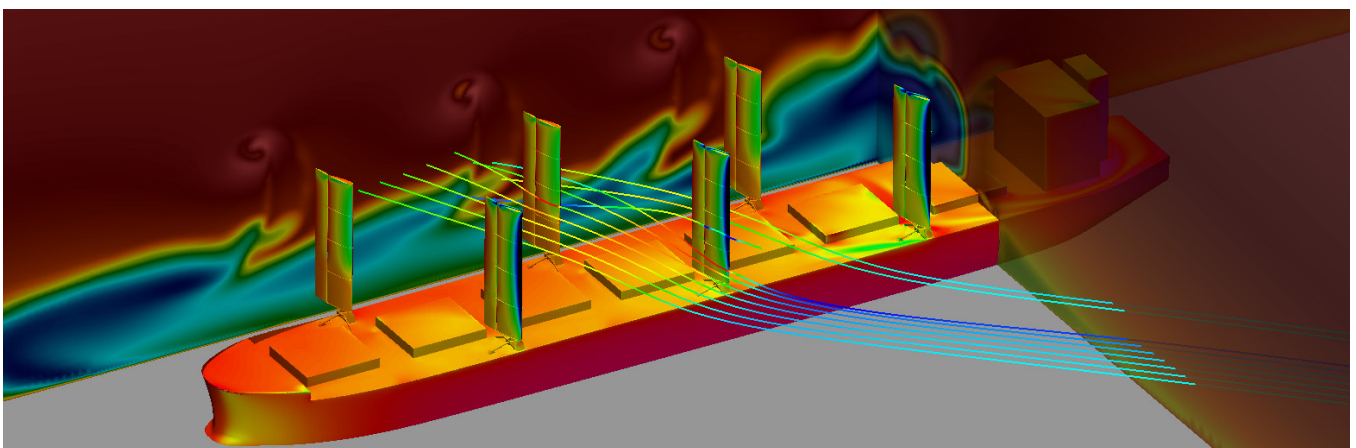
This article reviews recent work conducted between Smart Green Shipping and the Malin Group, who together are working to take the SGS Fully Automated Sail Technology FastRig from an engineered design into a finished fully operational product. The FastRig concept is being driven by draft new mandatory measures to cut the carbon intensity of existing ships, which have been agreed by an International Maritime Organization (IMO) working group, marking a major step forward, building on current mandatory energy efficiency requirements to further reduce greenhouse gas emissions from shipping.

These proposed amendments to the MARPOL (The International Convention for Prevention of Marine Pollution for Ships) convention requires ships to combine a technical and an operational approach to reduce their carbon intensity. This is in line with the ambition of the Initial IMO GHG Strategy, which aims to reduce carbon intensity of international shipping by 40% by 2030, compared to 2008. The amendments were developed by the seventh session of the Intersessional Working Group on Reduction of GHG Emissions from Ships, held in October 2020. FastRigs are designed to save 20% fuel and represent a significant and attractive commercial proposition regardless of regulation.

Feasibility Analysis

Smart Green Shipping (SGS) is an award-winning systems design house, who specialise in the development of system solutions to enable the rapid reduction of emissions from the global shipping industry. With a mission to create renewable powered ships, the first step is to retrofit existing shipping with FastRig autonomous, intelligent, retractable, recyclable wing sails, which can augment any powertrain to save fuel, reduce mechanical wear and generate emissions credits.

The organisation has created a partnership with Malin Newbuild, part of the Malin Group, who have a shared ambition to demonstrate and implement the SGS





FastRigs technology to the global shipping fleet. Once achieved, this ambitious goal represents a significant leap forward, toward the decarbonisation of shipping.

FastRigs, as illustrated in the figures, are folding and automatically actuated sailing rigs that allow vessels to harness wind power to augment their primary propulsion system. They are fully automated, hydraulic cylinders move them into the vertical position, when in operation and retract them, into the horizontal position, when not in use, for example in periods of heavy weather or in port for loading and discharge.

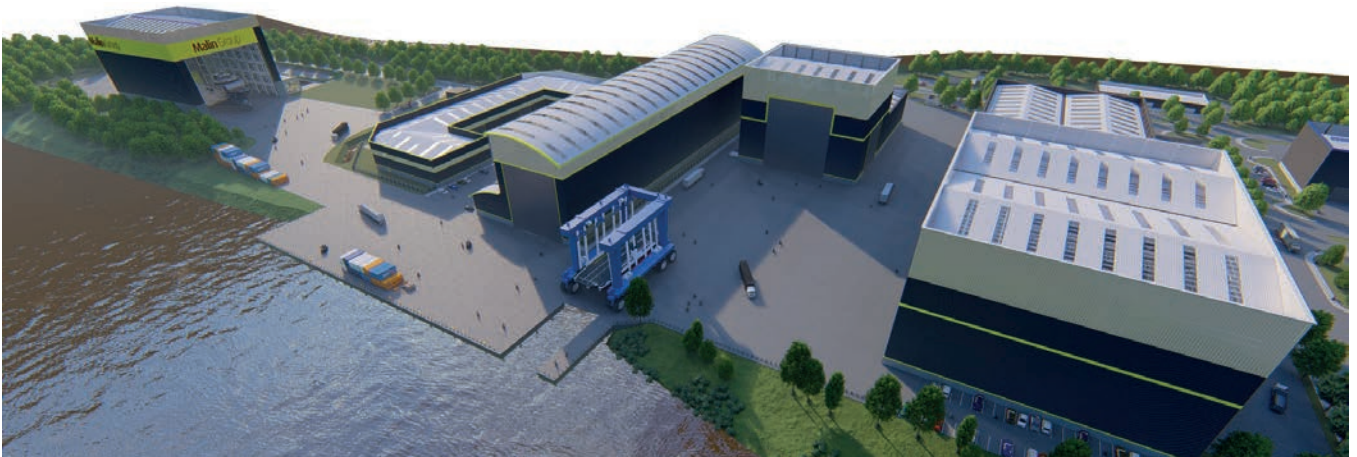
Once the FastRigs are installed, no additional crew is required to operate or maintain the systems. As they are all linked to a centralised control system which is installed at the time of inception of the project, they

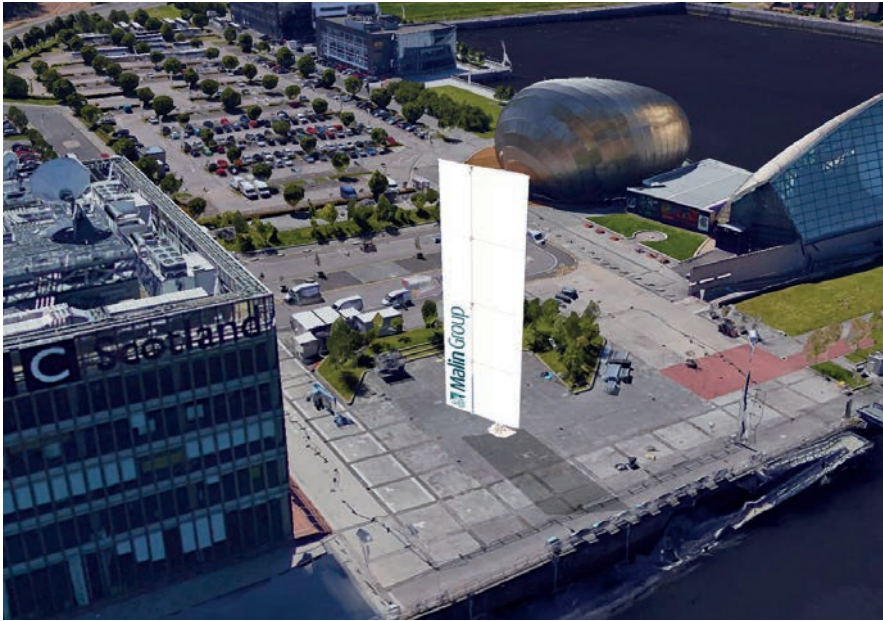
may also be operated by an on-board ships engineer operating a control panel to extend and retract the units as required. Ultimately the optimal power call off will be via an AI system being developed by SGS with European Space Agency support.

A recent report for the Department for Transport estimated that between 37,000 and 40,000 ships in the global fleet are suitable for wind systems. FastRig's systems, which can be retrofitted, provide a cost-effective emission reducing solution. The FastRig technology may also be used for the development of future new-build, 100% renewable powered vessels, combining with hydrogen to mitigate the cost and energy density challenges of this zero-emission fuel. In short, the benefits of the system are wide ranging and easily applied.

Independent modelling and analysis by Wolfson Unit for Marine Technology and Industrial Architecture, established that the system, when installed onto a Panamax dry-bulk cargo ship produced at least 20% fuel savings per annum on a Liverpool – Baton Rouge and return route.

With the design and environmental case for FastRigs complete, SGS turned to Malin, as a fabrication and installation marine services partner with experience of bringing preliminary designs to a production ready status through multi-disciplinary engineering and production quality control. The result will be a demonstration FastRig to be installed on a working ship. This demonstrator enables the two organisations to test, verify and rapidly scale-up production and installation roll-out.





Malin Newbuild, with over 100 years of marine engineering experience, through the Malin Group, draws on multi-disciplinary engineering expertise, especially in taking renewable energy projects from drawing board to delivery, across the group, and combines this with its extensive fabrication capability. Thus, offering one of the largest covered fabrication facilities in Western Scotland at over 20,000m². Longer term, the Group have an ambitious plan to deliver the Scottish Marine Technology Park (SMTTP) at Old Kilpatrick. This park will provide an accessible option for any business looking to expand into the marine manufacturing sector on the West coast of Scotland, and it will

allow them access to the deep-water channel on the Clyde via a shared marine facility from their own base of operations.

This new collaborative approach will lower the barriers to accessing the open sea from an open-access focal point for marine manufacture on the Clyde. It will kick start new growth industries which will both build and develop existing talent and skills in Scotland while simultaneously attracting new talent from overseas. It will attract Scotland's next generation of engineers, scientists, and technologists into the marine sector, leverage existing planned public expenditure and help Scotland build a lucrative export offering that can be

promoted in global markets. This renewed vigour and focus, combined with SGS's innovative technology, signals a technically, commercially, and environmentally sound and sustainable route to the rapid decarbonisation of shipping commensurate with the challenges of a climate emergency.

Malin has already identified and prioritised the clear and detailed workstreams, dependencies and milestones required in a three-year plan to get FastRig operating in the global shipping market.

The overall plan is to build the FastRig demonstration unit in Scotland in year one, retrofit a unit to prove the commercial solution to one or more working ships in year two and harvest data from these demonstration units on working ships in year three, to physically demonstrate the product – as well as offer insight for continual refinement and improvement. SGS have an agreement in place with a shipping company which they are confident will verify the fuel savings predicted by Wolfson and serve as operational proof of concept.

The vision is ambitious; it will create new jobs on the Clyde, and further afield across Scotland in the development of modern low-emission materials, digital systems, and 'green' financing; this vision, through collaboration, may be achieved and represent a step towards achieving the Government's commitment to a Net Zero economy by 2045.

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