RESEARCH & DEVELOPMENT UPDATE

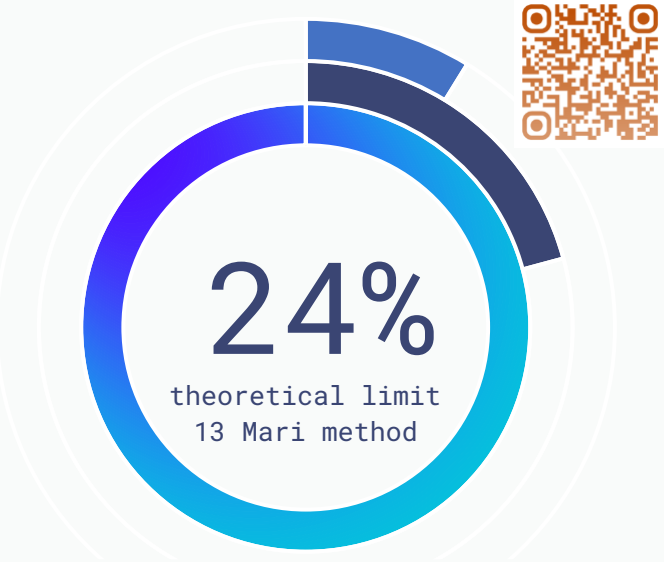
Over the past year, our dedicated team has focused the majority of its time and effort on developing an innovative Energy Saving Device (ESD) for the commercial shipping industry. Inspired by nature's genius in fluid dynamics—from the tubercles found on some whales to wind-formed sand dunes—we have created a "vortex lubrication" solution to reduce a vessel's fuel consumption and polluting emissions.

The Fukagata *et al.*[1] findings from Tokyo University corroborate our solution effectiveness estimations. Their research suggests that achieving a drag reduction of 24% is possible under optimal conditions.

From a commercial perspective, we've identified a clear benchmark for success: Securing a drag reduction of more than 2% justifies the investment in the solution. Such a performance would lead to an approximate 3% reduction in fuel consumption, but, most importantly, it is measurable.

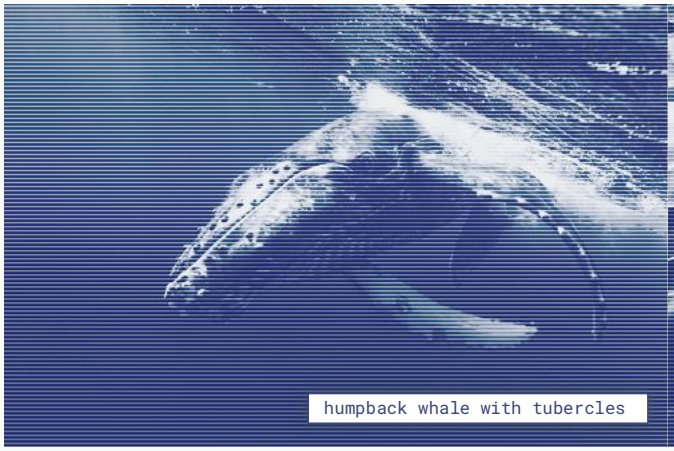
For reference, our current target of 3.7% could unlock fuel savings of approximately 6.78 billion USD across a fleet of 55,000 vessels of 10,000 DWT or more.

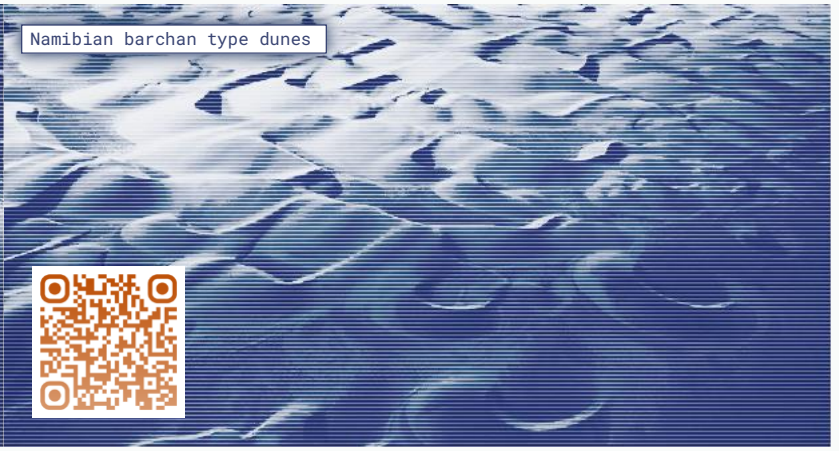
Our tow tank work achieved a 7% drag reduction measured on a plate and 2.1% on a highly optimized vessel model very recently. With further optimization, we can also close in on the 7% drag reduction on the model.



7% reduction measured on a plate; ultimate target and limit for first phase

2.1% drag reduction on a highly optimized container carrier; up to 7% is believed to be easily achievable


humpback whale with tubercles


Namibian barchan type dunes

R&D PLAN / CONCURRENT PROJECTS

Project (A) – Installation & hardware development work: The project is focused on developing and evaluating various methods and materials for attaching elements to hulls. Initially, the elements are being created from epoxy fiberglass, with ongoing research to explore the potential of alternative materials, including metals and other composites. The attachment techniques will be adapted based on the material of the hull, but currently, the primary method involves a unique welding-mechanical fastening system. This system is designed to attach elements without penetrating the hull or causing thermal damage to adjacent tanks or void spaces. The main aim of this initiative is to devise a method that allows for the installation of elements during drydock periods without affecting the scheduled maintenance work while also facilitating the underwater removal and repair of these elements later. Most of this work is taking place at the Odessos Shiprepair Yard in Varna, Bulgaria, under the leadership of Will Sykes.

Project (B) – CFD work: Running complex computational fluid dynamics (CFD) simulations to model water/hull interactions and optimize the design. This mandatory work assists the preparation and quality of the towing tank validations. The work focuses on modeling the flow conditions around the hull, particularly emphasizing the boundary layer, to reproduce the results obtained during the tow tank work. We have secured computer server time at Sofia Techpark's Petascale Supercomputer and the required specialized software licenses for this heavy computational work. The work has been split into several activities depending on expertise, desired outcome, and costs. At BSHC in Bulgaria, in charge of Grigor, at Aerotak in Denmark, in charge of Henrik. We anticipate that the universities of Glasgow, Strathclyde, and WPI in Massachusetts will participate in the R&D work managed by Krassi Fotev.

Project (C) – Tow tank work: The project involves collecting physical data using plates and ship models at CEHIPAR, which stands as one of Europe's largest and most sophisticated tow tanks, located in Madrid, Spain. Activities at CEHIPAR include constructing ship models according to their design specifications, instrument calibration, planning and conducting experiments, performing towing tests with plates and

[1] K. Fukagata, K. Iwamoto and N. Kasagi, "Contribution of Reynolds stress distribution to the skin friction in wall-bounded flows," Physics of Fluids, vol. 14, no. 11, p. L73–L76, 1 November 2002. https://doi.org/10.1063/1.1516779

models, and executing self-propulsion tests. Krassi Fotev oversees the project, and Javier Llompart provides on-site support.

Project (D) – High scalability work: The project focuses on creating a purely computational method for optimizing vessel hull forms, providing highly accurate predictive outcomes. This approach eliminates the need for costly and lengthy Tow tank work by leveraging recent theoretical breakthroughs in fluid dynamics. This advancement positions 13 Mari to transition into a pure intellectual property (IP) licensor, opening new distribution channels and revenue opportunities. We are now strategizing the most effective path forward based on our extensive experience and the vast data we've gathered.

PROGRESS & CHALLENGES

Significant progress has been made over the past 12 months. We have constructed and validated multiple prototype models through extensive towing tank experiments. These validations have yielded valuable insights, enabling us to refine and improve the designs.

As anticipated, we encountered several challenges, notably in modeling the intricate interactions of fluid dynamics. This necessitated further investments in enhanced computing capabilities and additional methods for physical data collection, as the prevailing industry standards for computer modeling need to simulate the desired effects accurately.

- Since joining the Njord Accelerator program in August 2023, 13 MARI has benefited from the support of Aerotak ApS in addressing CFD issues
- Fuyo Kaiun has played a crucial role in fostering the relationship between 13 MARI and ClassNK and with some of their major charterers in Japan.
- The Hydrodynamics Group at Nihon Shipyard has provided valuable technical and theoretical feedback. They've also facilitated a pathway for conducting a proof of concept on one of their Kamsarmax bulk carriers.
- The collaboration with Swire Shipping has culminated in a workable solution, and discussions are ongoing regarding an installation on an actual vessel by fall 2024.
- Beyond the tow tank validation work, our partnership with CEHIPAR has enabled us to prepare an application for the US Defense Advanced Research Projects Agency (DARPA) project on Changing Hydrodynamics and Aerodynamics on Structures.

DATA & RESULTS

Table 1 on the following page lists milestones that bolster our confidence in delivering a commercially successful solution.

THE PATH FORWARD

13 Mari is open for business, and we've already locked in our first commercial orders. These include installations and a 'sea trial' period between September and November 2024. In parallel, we're engaged in weekly discussions with a renowned global shipowner. We are gearing up for towing tank optimization efforts aimed at a 'sea trial' on one of their newly built bulk carriers from Japan within the same timeframe. However, achieving maximum drag reduction, fuel, and emission savings effect in actual conditions, also effectively barring competition, does require further R&D investment. Considering the product's gross margin, this can be easily done by diverting revenue as 13 Mari grows.

FIG. A: Quick and low-risk installation method tested in the ship repair yard at full scale.

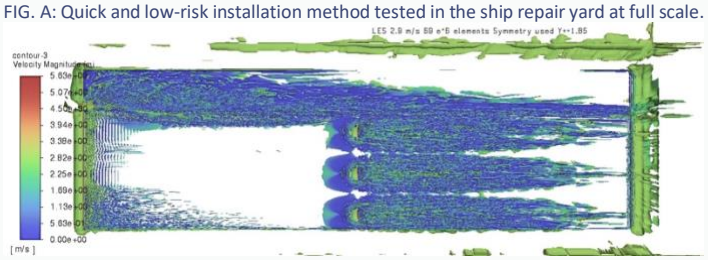


FIG. B: Computationally intensive LES CFD linking the simulated and physical world.

FIG. C: Tow tank optimization work on a container carrier—a commercial project.

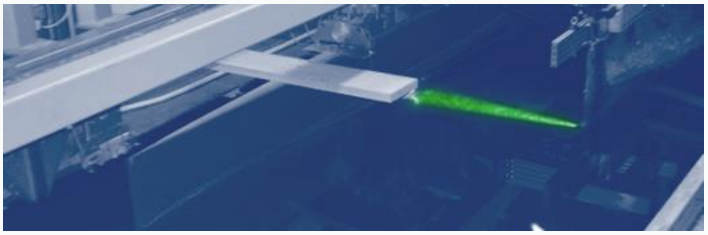


FIG. C-D: Laser particle image velocimetry measuring boundary layer thickness.

Looking ahead, our priority shifts toward commercialization. This encompasses fine-tuning our Element designs, securing more patents relevant to our technology, and gearing up for real-world pilot tests on operational ships as well as those under construction. Realizing these vital next steps will necessitate further investment. The forthcoming funding is critical for advancing this novel and ground-breaking technology from its current research phase to the next level and, eventually, to onboard applications that promise reduced operating costs and emissions for the industry.

We're thrilled about the prospect of you joining us as an investor. Together, we're poised to expand this innovative, straightforward, and low-risk solution across maritime and air transport sectors, unlocking its tremendous potential. Join us in steering towards a more sustainable, greener future for all! Just scan and say "Hi" to start!

Yours truly,

Krassi Fotev.

13 Mari Founder, CEO & Chief Scientist

Date	Facility	Milestone	Why is important
Dec 2019	BSHC, BG	Up to 20% drag reduction estimated in a LES CFD	Investigate further with realistic R&D targets set
Apr 2021	BSHC, BG	Coherent structures seen in a wind tunnel matched CFD	Confirmed link reality <> CFD, targets feasibility
Sep 2021	13 Mari, US; Johns Hopkins, US	Modern work explaining origins of drag identified	Theoretical support for 13 Mari, optimization criteria
Dec 2021	Captain's Table, HK	13 Mari won a Global Maritime award, USD 25,000	Enabled Maritime industry talks, additional CFD
Sep 2022	NJ CSIT, US	Voucher grant award, USD 75,000	Enabled towing tank validation work
Mar 2023	BSHC, BG	5.9% drag reduction achieved on a flat plate	Showed significant drag reduction is possible
Apr 2023	BSHC, BG	7% drag reduction achieved on flat plate	Confirms earlier estimates on effectiveness
May 2023	13 Mari	Significant amount raised with a convertible note	Ensured uninterrupted tow tank and CFD work
Jul 2023	BSHC, BG	Element scaling law devised	Allows transferring towing tank results to full scale
Oct 2023	MassCEC, US	InnovateMass grant, USD 247,397	Support for installation validation, tow tank work
Nov 2023	Njord, DK	MoU executed	Independent validation of sea trial data results
Nov 2023	Odessos Shiprepair Yard, BG	Installation validation work performed on a tug and plate	Confirms installation estimations and process
Dec 2023	Nihon Shipyard, JP	Committed a new built vessel to a 13 Mari trial	Industry validation, R&D geared toward licensing
Dec 2023	SWIRE Shipping, SG	Phase one of two commercial orders signed	Industry validation, market traction, modern hull R&D
Jan 2024	Aerotak, DK	Roughness introduced in the CFD work	Filters in methods applicable to full scale
Jan 2024	13 Mari; IITM, IN	Statistical work on scaling by Reynolds number pinned	Enables new class of CFD, Project D foundation
Feb 2024	Odessos Shiprepair Yard, BG	Mechanical fastening based installation work validated	Faster dry dock, under-water installation enabled
Feb 2024	Sofia Tech Park, BG	1,000,000 CPU hours reserved in pay as you go	Provides CFD flexibility and quicker R&D iterations
Feb 2024	CEHIPAR, ES	Boundary layer measured with PIV on a rough plate	Resolving discrepancy between CFD models
Mar 2024	CEHIPAR, ES	2.1% drag reduction achieved on a SWIRE model	3% fuel savings estimated, target feasibility
Mar 2024	DARPA, US; CEHIPAR; BLAST UT, US; WPI, US; Aerotak; 13 Mari	Joint proposal submitted on the DARPA CHAOS; USD 1,947,235 in R&D funding	Good reception in academia, quick consortium, perfect goal alignment
Apr 2024	Nihon Shipyard; SWIRE; Fuyo Kaiun, JP	MoUs executed, bringing the total number of MoUs to four	R&D directed toward sea trials and data processing
Apr 2024	13 Mari	Seed fundraising round announced	Enables uninterrupted R&D and commercial work
May 2024	Meyer Turku, FI	Shipbuilding meet with Meyer Turku invitation	Industry validation, R&D priorities realignment

TABLE 1. List of significant milestones, including business milestones directly affecting R&D work by making it feasible or a priority.