ecochlor®

SCANVI INTERYARDS AS

ARMADA

TECHNOLOGIES

Passive Hull Air Lubrication System

The cleanest energy is the energy we never use

Armada Technologies has developed the world's first passively aspirated hull air lubrication system (PALS™). By taking advantage of passive physical phenomena, combined with the forward motion of the vessel, the Armada's PALS™ system dramatically reduces the power required for bubble production and distribution under the hull. PALS™ also automatically adjusts in real time to a wide range of ship operating conditions.

First generation hull air lubrication systems use multiple power hungry air compressors to create and distribute the lubricating bubbles. In contrast, the Armada PALS™ system does not use compressors, thereby significantly reducing the power requirements of the system.

PALS™ uses a carefully designed venturi combined with the forward motion of the ship to passively create the optimum size of lubrication bubbles. The net result is superior lubrication over a wide range of speed and depth variables, which when combined with low power consumption offers the vessel owner savings of up to 12% in fuel usage.

Hull air lubrications systems are recognized under the IMO Energy Efficiency Design Index (EEDI) for newbuilds. Air lubrication retrofitted to existing vessels will also be a key factor in improving their efficiency ratings in the IMO's upcoming Energy Existing Ship Index (EEXI).

"Our system is more advanced than any other hull lubrication technology on the market today. Armada utilizes the ship's own forward motion to help drive the system. An eductor is used to draw air in whilst a series of micro bubble emitters distribute the bubble swarm under the ship; this significantly reduces drag, offering clear and immediate benefits to any shipowner looking to reduce emissions on their ships."

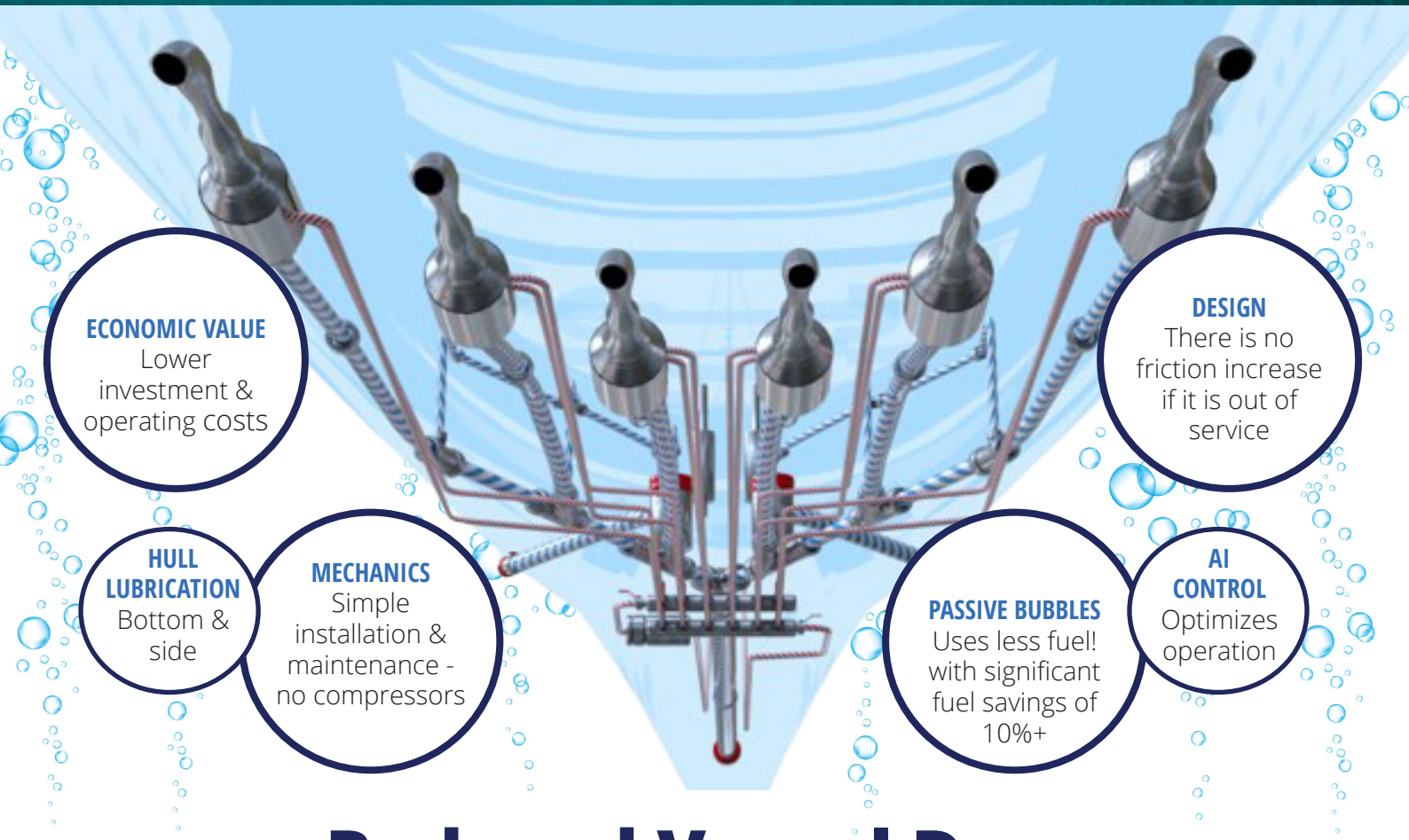
- Alexander Routledge, CEO of Armada

HIGHLY EFFICIENT PERFORMANCE

- Low power requirement for system operation
- PALS™ venturi design creates optimum bubble size and volume
- System automatically self-controls over a wide range of operating variables
- Simple to use with low maintenance
- PALS™ is easy to install

Armada Technologies is an affiliate of the Ecochlor Marine Technology Partnership

ARMADA TECHNOLOGIES: THE POWER BETWEEN WATER AND AIR



Reduced Vessel Drag

Results in reduced carbon emissions & operation costs

Given that water friction can account for "up to 85% of a hull's total resistance" an Armada PALS™ installation offers shipowners a reduction in requisite power to an ordered speed, allowing for a higher speed for a specified power or some combination of both these benefits. In either case, a dramatic reduction in fuel consumption and associated impact on operations can be realized.

The Armada PALS™ unit is user-friendly and needs no additional staff to maintain the system. Plus, the system allows for a simple integration in the vessel operation. It can be fitted in a routine dry dock and more than 50% of the work can be done when the vessel is in service.

COMPETITIVE COMPARISION

In comparison to hull lubrication competitors, the Armada system has relatively low installation and operating costs. Its unique design uses less power than other hull lubrication technologies, decouples speed from drag reduction and is easier to maintain. This provides an economic payback to the shipowner within a very short period of time.

As an added bonus to shipowners, the Armada PALS™ generates a proportion of electrochemically active bubbles with a strong negative surface charge. This unique type of bubble supports the physical separation of organic matter (e.g. slime) from hull coatings and therefore enhances the long-term performance of hull coatings in the process.

Ultimately, the system will deliver an estimated fuel saving of 10%+ depending on hull design and is effective regardless of fuel type, making it a key technology in transitioning to zero carbon fuels.

ORDER NOW! *The Armada* PALS™ *is expected to be available to shipowners to install in 2023.*

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