
IT HAS TO BE
Quantum
MARINE STABILIZERS

Quantum Timeline

1985
Quantum Marine Engineering Inc opens – Newport Rhode Island

1989
Company relocates to Ft. Lauderdale – Quantum Marine Engineering of Florida

1999
Formed Quantum Controls (QC), – The Netherlands

1999
QC began manufacturing Quantum Systems

2000
Zero Speed™ installed on first vessel

2005
Patent Approved MAGLift™ Rotor

2006
Quantum Stabilizers Europe opens for service

2008
Patent Approved XT™ Fin

2017
New Headquarters completed in Ft. Lauderdale

2017
Remote Access – vessel connection to Quantum introduced

2019
Patent Approved Dyna-Foil™

2021
Quantum Stabilizers Barcelona opens for sales & service

2021
Patent filed for Dynamic Load Control (DLC)

2022
Patent filed for F45 Hybrid – Hydraulic/Electric Integrated Power Unit

The Quantum Journey

John Allen, Founder / President

Quantum Marine Stabilizers story officially began in 1985 as Quantum Marine Engineering, in Newport, Rhode Island. After years of studying engineering and working on and around boats, John Allen, originally from the UK, decided to take a gamble and open his own yacht service and repair business with a couple of his capable "mates."

The small Quantum Team of three engineers, were determined to become stabilizer experts. The opportunity for success was definitely in South Florida, so in 1989, the company relocated from Newport, Rhode Island to Fort Lauderdale, Florida. In the late 1990's, they decided to start manufacturing their own stabilizer system with new partners at Quantum Controls in The Netherlands.

These new systems included a revolutionary advancement, called Zero Speed™ stabilization. This technology ensured stabilization when it was needed most, at low or zero speed.

The Zero Speed™ innovation, was quickly followed by three global patents from the Dutch Innovation Team of Lambert Dinnissen, Theo Koop and Hans Ooms, including the MAGLift™ Rotor, XT™ Fin and Dyna-Foil™.

In addition to manufacturing, worldwide service continues to be a major part of the Quantum business model. There are service departments in the US, The Netherlands and Spain, together they cover the globe.

Today, Quantum is considered the "gold standard" serving the yachting, military and commercial industries. Quantum has mastered the ability to blend technology and engineering with lifestyle and comfort. It has to be Quantum.

QC Dutch Innovation Team: Hans Ooms, Theo Koop, and Lambert Dinnissen

The XT™ system has been the top choice of major US and European shipyards for decades, with Quantum representing 85% of the superyacht market in vessels over 55m. Repeat orders, combined with positive feedback, validate that the XT™ System is preferred by yacht owners, crew members and management teams throughout the world.

120m vessel - XT™ Fin

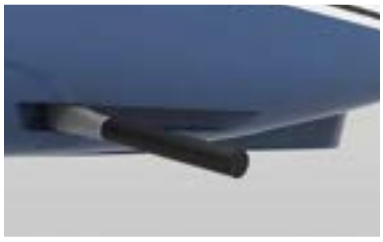
About the XT™ Fin

In the mid 2000's, it was theorized that zero speed performance could be enhanced with additional surface area on the fin. Thorough testing showed that by increasing the surface area by 1/3, it actually generated a lift force factor of 2. Essentially the main stabilizer fin housed an additional fin or foil that can extend or retract based on the speed and the control algorithms. Therefore, to maximize performance at zero speed, the foil is extended, providing 30% more surface area. That 30% more surface area generates 100% more lift force which creates stability! To maximize performance underway, the foil is retracted, reducing the surface area and the corresponding drag.

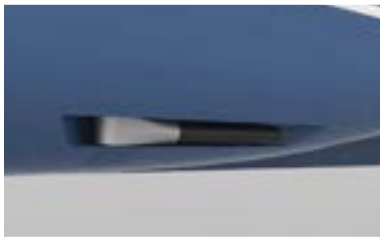
MAGLift™ Rotor

In the early 2000's, there was an increased demand for more compact, retractable stabilizer systems. The Quantum innovators and engineering team explored a unique application for a spinning rotor to generate stability through the "MAGNUS EFFECT." This phenomenon was discovered by Heinrich Gustav Magnus, a German chemist and physicist in 1853. He determined that the spin of the ball, generates lift and in the science of stabilization, lift creates stability.

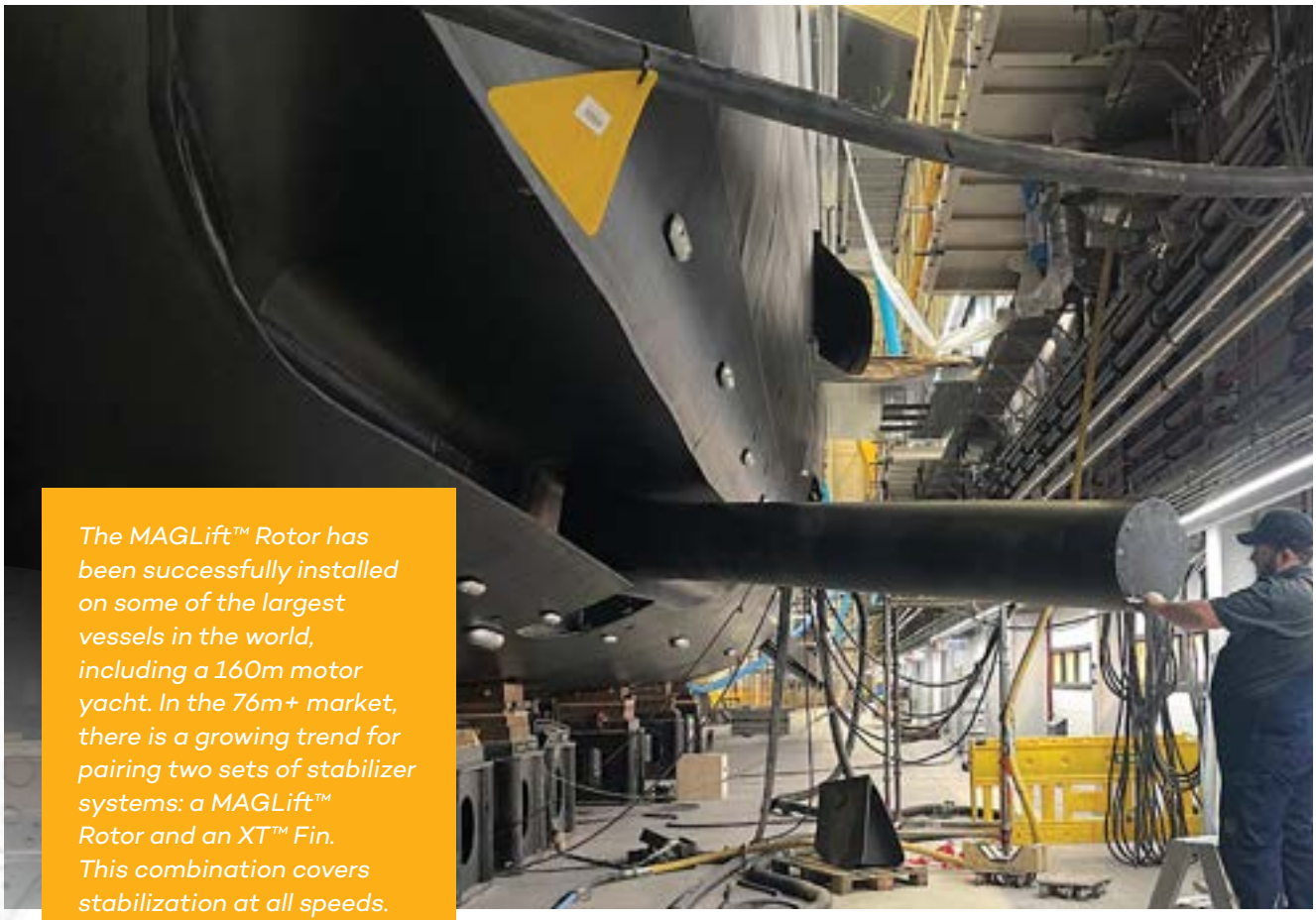
For zero speed, the carbon fiber rotor combines both a swinging and spinning motion to generate hydrodynamic forces and stability. At slow or loitering speeds (under 16 knots), the rotor is deployed, perpendicular to the hull and the system controller initiates a "righting" force. At higher speeds the rotor is fully retracted or stowed.



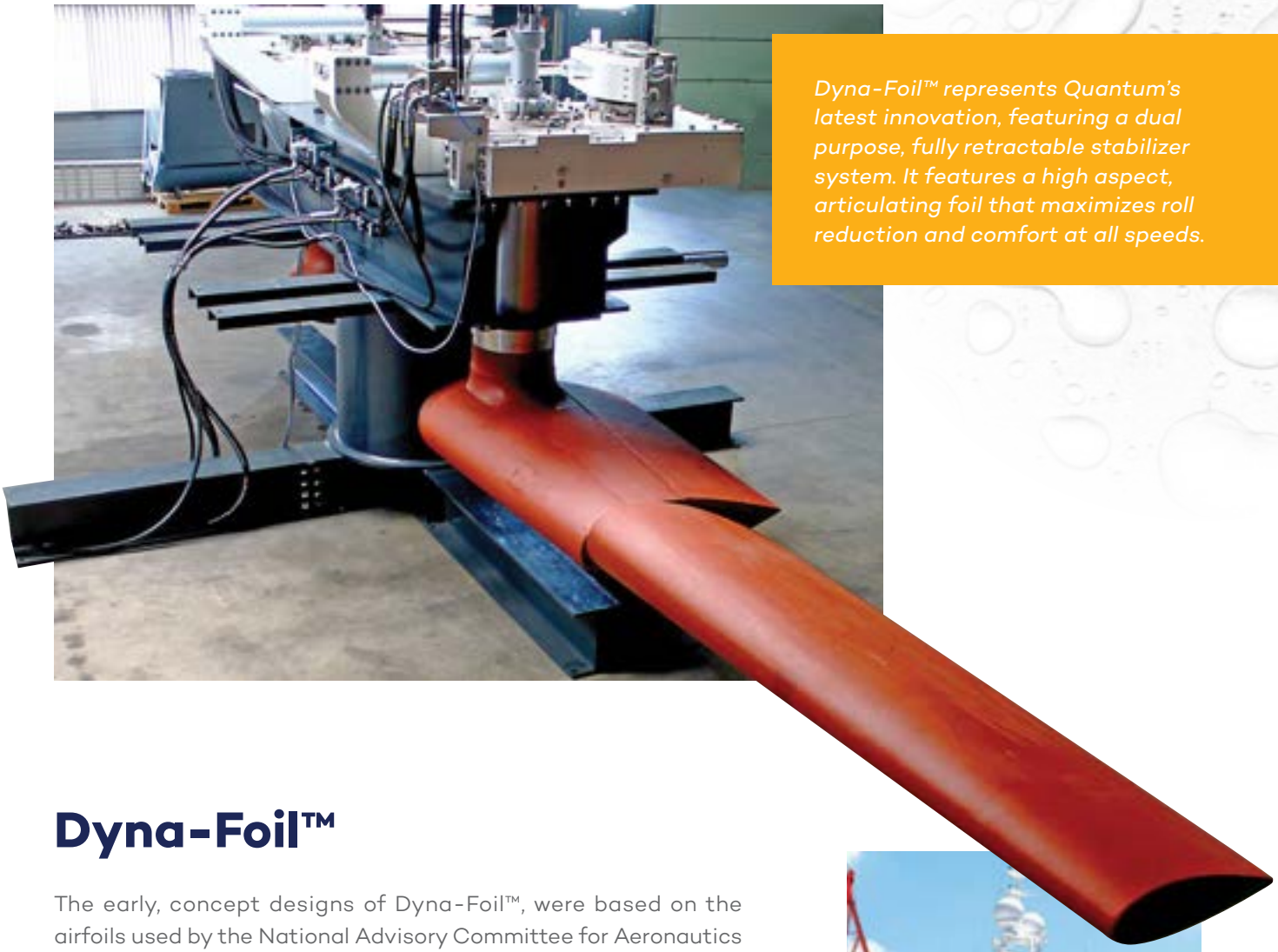
Rotor perpendicular to the hull for slow or loitering speeds



Rotor retracted – reduced drag at higher speeds (above 16 knots)



The MAGLift™ Rotor has been successfully installed on some of the largest vessels in the world, including a 160m motor yacht. In the 76m+ market, there is a growing trend for pairing two sets of stabilizer systems: a MAGLift™ Rotor and an XT™ Fin. This combination covers stabilization at all speeds.



Dyna-Foil™ represents Quantum's latest innovation, featuring a dual purpose, fully retractable stabilizer system. It features a high aspect, articulating foil that maximizes roll reduction and comfort at all speeds.

Dyna-Foil™

The early, concept designs of Dyna-Foil™, were based on the airfoils used by the National Advisory Committee for Aeronautics (NACA), the precursor to NASA. The technology proved to be similar in concept to the lift in a helicopter and early calculations showed that it would greatly surpass the performance of other, existing fin stabilizers.

It was considered a radical idea to swing the high aspect Dyna-Foil™ fin both forward and backward, through a travel range of 140° and use the foil to generate lift. Following extensive analytics and model testing it proved to dramatically improve stabilizer performance. The design was approved, patented and brought to market.

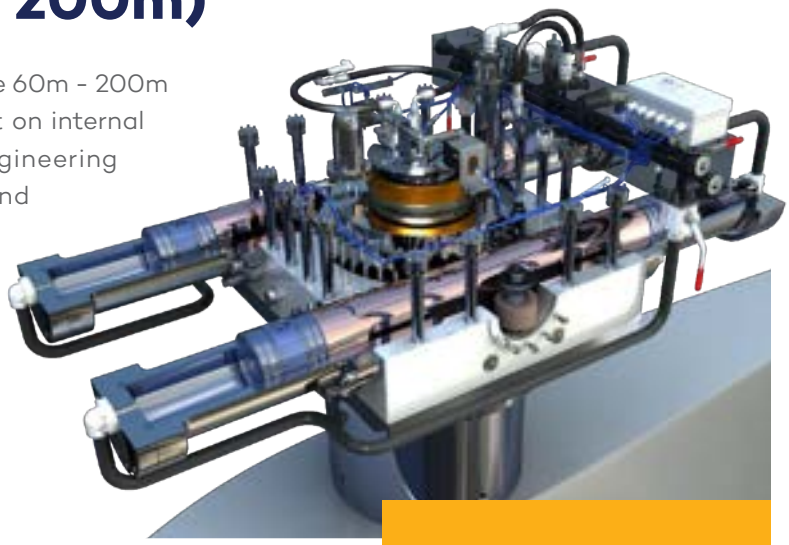
The final version of the foil provides an incredible 0.98 lift coefficient at zero speed. The unit has a larger lever arm than a standard fin, which increases the stabilizing torque and reduces the roll more effectively. Additionally, the force exerted by Dyna-Foil™ happens over a greater range of motion, smoothing the stabilizing action resulting in improved passenger comfort.

1st Dyna-Foil™ - 70m Benetti Refit

Process of Buying a Stabilizer (60m – 200m)

Buying a stabilizer system for any vessel in the 60m - 200m range requires analytics that are dependent on internal and external data, specifications and engineering expertise on sizing, power, placement and performance predictions. That information is then integrated into the following four components that make up an active Quantum Stabilizer System:

- Hull units (port & starboard)
- Controls
- Hydraulic Power Unit (2 for an XT system)
- Fins/Rotors (port & starboard)



The new Rack & Pinion "R Series" Actuator, designed to maximize the performance of the MAGLift™ Rotor, Fixed and XT™ Fins. The footprint is more compact than a traditional hull unit. Extended maintenance period of 15,000 hours to replace the main bearing.

These components communicate using customized algorithms that drive various functions, such as producing fluid power and managing the oil pressure that will direct the fin movement with the appropriate timing and angle to maximize the roll reduction. Whether it is a military application, yacht or cruise ship, stabilizers are considered essential today.

Due to the complexities of a stabilizer system the initial drawings of the hull or hull envelope, fin/rotor placement and equipment positioning in the engine room/bilge will usually require a naval architect and direction from the engineering team at Quantum. In the 60m - 200m range, the pre-planning is extensive. It often begins the year preceding a three-year build, so four years before the keel touches the water. On a refit, planning begins as early as possible.

MARIN Model Test Facility

Stabilizer Room – 73m Feadship

Below are some of the hydrostatic characteristics that are required to design and engineer a proper system:

- Natural Roll Period
- Vessel Speed
- Metacentric Height (GM)
- Displacement
- Beam
- Hull Form
- Sea State Requirements

5000S Control Panel

Once that information is gathered estimates and calculations are conducted, which lead to performance predictions (estimated roll reduction) and often scaled model testing, which can be done at the MARIN in The Netherlands or HSVA in Germany. Model testing is used to measure the performance of a system during the design stage and can also provide valuable information when comparing one stabilizer brand to another. With so many variables influencing the size of the fin or rotor, the power required and type of system, consulting with the experts will ensure the performance lives up to your "stability" expectations.

Courtesy of: Nobiskrug – 80m Artefact

STABILIZERS HELP WITH THE FOLLOWING

- *On-board comfort*
- *Keeping passengers safe*
- *Enabling passengers to engage in activities, as planned*
- *Ensuring crew members can fulfill their responsibilities*
- *Expanding overall operations at a higher sea state*
- *Reducing vessel downtime and ensuring original travel schedule – critical for military ops and charters*
- *Protecting the vessel structure and interior assets*
- *Enhancing the value at resale*

WE BELIEVE IN

- Supporting Multiple Charities
- Training
- Expanding Green Technologies
- Environmentally Safe Oils
- Leed Certified Building

Quantum

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