

Steady business growth

ONCE REGARDED AS A THE PRESERVE OF THE SUPERYACHT FRATERNITY, ACTIVE BOAT STABILITY SYSTEMS ARE NOW ATTRACTING WIDER INTEREST IN THE PRODUCTION RECREATIONAL CRAFT SECTOR

WORDS: BOB GREENWOOD



▲ **MATN'S production facility in the Netherlands**

TO MAKE LIFE afloat more comfortable, growing numbers of boaters are now realising the benefits of active stability systems. That's the feedback from 13 manufacturers interviewed for this sector spotlight survey. The majority report an upsurge in sales in the past couple of years.

The concept of using gyros or active stabiliser fins to smooth out the pitching and rolling of vessels, underway or at anchor, is hardly new. Until fairly recently, a few techniques have been used to reduce the worst effects of rolling motion at sea. In the private leisure sector, only

the largest vessels would have been considered feasible for stabilisation on the grounds of size and cost. Today, however, comfort at sea is widely considered by boat owners to be second only to safety and stabilisers are now regularly being fitted as standard in small and -mid-range cruising craft.

There are even stabilisers for boats of below 20ft. The question in the minds of boat owners is now less likely to be whether to fit stabilisers, but rather 'what sort of boat stabiliser should I fit?'

There are almost as many types of stabiliser these days as there are types of

vessel. The two primary ones, however, are gyroscopic and active fin systems. Gyroscopes comprise of a horizontally spinning flywheel mounted on a vertical axis which maintains its own equilibrium regardless of conflicting forces acting upon it, such as vessel movement and wave motion. Moveable fins work by countering vessel pitch and roll using input from gyro or electronic levelling to vector the fins to the extent to counteract the destabilising side effects of waves and vessel motion .

Other stabilisation technologies are also available. These include tubes, which

like the fins, also extend outwardly from the hull below the waterline, but which spin fast to harness the Magnus effect to generate downward forces, just as tennis players use topspin to deflect the flight of the ball to make it more difficult for their opponents to play.

A notable yachting application of this principal is Russian businessman and Chelsea football club owner Roman Abramovich's superyacht *Eclipse*. When she was launched by Blohm & Voss in 2010, this Terence Disdale-designed behemoth at 162.5m was the world's longest privately-owned yacht – until she was surpassed by *Azzam* (180m) launched by Lürssen in 2013.

The company that first pioneered the Magnus effect in its stabiliser product offering to the yachting market was Naiad Dynamics' Dutch office (KoopNautic) in the 1980s. The company claims it sold over a dozen systems at the time.

Later, its former dealer Quantum Marine, which operates in the US out of Florida and also in the Netherlands, has been manufacturing its patented MagLift product since 2006. Mark Armstrong, technical sales and marketing manager, explains: "This system often offers improved at-anchor performance over our traditional Zero Speed fixed fin under most conditions. In addition it has the added advantage of providing a very high level of performance underway at slow speeds where fins would not be practical due to the increased fin size operating at slower speeds."

According to Armstrong, the system is also ideal when a vessel requires higher cruising speed, since the system can fully retract minimizing the potential for any drag. "The longitudinal location of the rotors is also far more flexible than traditional fins, allowing the rotors to be placed further forward or closer to the stern with none of the traditional problems that can be encountered with fin placement, such as slamming loads or propeller or rudder interference."

In 1999, seven years before MagLift, Quantum shipped its first Zero Speed fixed fin system. Recently it launched an improved version of this stabiliser, the

patented dual-purpose XT model. The improved at-anchor performance over the standard Zero Speed fin "is attributed to the reduction of fin geometry and additional 'working' area at the rear area of the fin when the foil is deployed, says Armstrong, adding that the XT fin has been designed by Quantum to meet the ongoing challenges associated with the placement of fixed fins required for zero-speed operation. "In general, the fin area required to meet the underway criteria for a vessel is less than that of the zero-speed requirements. By offering a fin with variable geometry and a smaller foot print in the retracted condition, Quantum is able to maximize system performance while minimizing underway drag. Across the whole spectrum of real world conditions the XT fins give larger

MARK ARMSTRONG | SALES & MARKETING MANAGER
NAIAD DYNAMICS

The awareness and low-cost appeal of the fixed fins has made them very popular

effective stabilisation forces with less power consumption, fewer unnatural jerky motions, less wear and tear, and less risk of noise problems."

Quantum has reported a steady increase in sales of its equipment for larger yachts (55m up) during the last five years and for that reason "we are building even larger fins at almost 20m", Armstrong reveals. He notes that although Quantum's focus is the larger superyacht market (45m and up), it appears that owners of yachts down to 15m are requesting stabilisation. "Based upon technology that has been a proven

system over many decades, the awareness and low-cost appeal of the fixed fins has made them very popular," he says. However, he cautions that in vessel stabilisation there's no one technology that is perfect. "The general statement and feeling within the industry is that fins provide the best all-round level of performance for both underway and zero-speed operation based upon empirical testing and real-world use."

USES AND ADVANTAGES

Among advantages that Armstrong names for fins versus gyros is that list and wind heel control can be applied while underway as well as lower lifetime maintenance costs compared with gyros which need servicing and can often mean removal from the vessel for items such as bearing replacement.

Other benefits are lower weight and volume, faster response for zero-speed use when anchoring (no spooling up time), and better underway ride control performance and tracking in following and quartering seas.

"Gyros have to 'spool up' for 45-60 minutes per gyro and can require sequential spooling to minimise power usage," he points out, while winding down can take four or five hours.

On the other hand, there are some disadvantages with fins too. Mark Armstrong says these principally being the need for through-hull protrusions similar to a rudder or propeller, which gyros don't need, and that performance at zero-speed in smaller yachts with roll periods of four seconds or less can be sometimes better with gyros fitted.

As for the advantages of rotor stabilisers, another company that has recently joined the Magnus-effect 'party' is DMS Holland. A relative newcomer to this sector, DMS (Dynamic Marine Systems) produces these rotor stabilisers for a target market of yachts from around 12m up to 30m.

"We are a new kid on the block with two different innovative systems. Our market share and the brand awareness are growing fast," reveals head of sales and marketing Patrick Noor. ➔

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Like many respondents in our survey, Noor notes an accelerating rate of take up of stabilisers in the boating market: “I always compare it with bow and stern thrusters. In the past they were regarded as luxury. Nowadays almost every yacht bigger than 12m is equipped with a bow and/or sternthruster. Today’s yacht owner requires more comfort and convenience on board. This also applies to stabilisers,” he says.

Noor also predicts that within a few years most yachts will be delivered with stabilisers. He also notes, like others in our survey, that while 12m is a common starting point where dynamic stabilisers become a serious proposition for boats, that threshold is decreasing.

OEM FOCUS

In its first two-and-a-half years of trading, DMS sold no fewer than 48 stabiliser systems, Patrick Noor says. All but two of which were rotor models. Selling initially mostly into the domestic market and with a large proportion of systems going into the characteristically Dutch steel boat market, that’s no mean achievement. Moreover, about half of these systems were retrofits, which could mean more appearing on boatbuilders’ option lists for new-builds in the not-too-distant future.

Meanwhile, the two supplied that didn’t come into the rotor stabiliser category were for the company’s new and award-winning AntiRoll system. This is a dual-axis fin stabiliser which rotates while the vessel is underway, but adopts a flapping motion when it is at anchor.

This system is targeted at yachts in excess of 30m and earned a special mention in the METS DAME Awards of 2014 as well as the 2013

Maritime Innovation Award offered by the Holland Marine Equipment Association.

“AntiRoll is of particular interest for sail yachts,” says Patrick Noor. “The fin is retractable and can be partly folded back in to the hull. This leaves only minor resistance while sailing, which solves



▲ Award winner DMS AntiRoll fin
▶ DMS Holland’s Patrick Noor

well-known problems related to non-retractable fins,” he claims, adding that “you could even fold one fin back in the hull and use the other one as a kind of dagger board.”

A further technology option for active stabilisation is offered by interceptor stabilisers. These units use adjustable narrow transverse blades mounted on the transom which are

automatically raised and lowered with computer controlled input from motion sensors by just a few centimetres to create lift pressure under the stern.

According to Swedish company Humphree, one of

the leading producers of adjustable interceptors, this has a number of benefits.

By smoothing water turbulence under the hull these electrically-powered interceptors reduce wave resistance and hull friction resulting in increased

speed and lower fuel consumption while trimming the boat and enabling it to make tighter and flatter turns. That’s compared with conventional trim tabs, for which interceptor stabilisers are offered as a more efficient alternative.

While improving ride comfort and performance, however, such stabilisers work only on planing and semi-planing hulls and only when the boat is being driven at planing speeds. They have little, if any, effect at low speeds and none at all when the boat is at anchor – unlike more conventional stabilisation systems. Even so, since Humphree was formed in 2001, the company says it has provided interceptor stabiliser systems for around 1,500 projects for boats from 12m to 100m LOA and has recently developed the X Series, a standardised interceptor for smaller craft.

Also from Sweden, and a new kid on the block, is Zipwake.

The company is making significant inroads with its range of interceptors. Its Zipwake Dynamic Trim Control System, Series S, was launched at METS last year. Its modular design makes the product affordable

and easy to install, ideal for both OEM and aftermarket.

According to Niclas Olofsson, product manager and former founder of Humphree, in which he was a major shareholder until 2009, systems based on new technology (interceptors, gyros) are winning ground over traditional flaps and fin technology. “Technology that five years ago was prohibitively expensive is now made available to a much broader spectrum of boat owners. Not only superyachts, but all motoryachts down to say 10m,” claims Olofsson, adding that Zipwake Dynamic Trim Control Systems have been installed on boats down to 23ft.

However, to meet most, if not all, boat stabilisation requirements for the vast majority of craft the more usual gyro and active fin systems generally

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serve well.

Conventional wisdom has it that both have certain drawbacks. Gyros are perceived to perform well at low or zero speed, but not to have the speed of reaction necessary for faster craft. In addition, they are also deemed to take up large amounts of internal hull space in small craft where space is often at a premium.

Fins, on the other hand, are conventionally regarded as most effective at a range of target speeds, but when designed for higher speeds, will be typically less effective at lower speeds. Although fins are frequently and successfully applied today at zero speed. And because they are externally mounted they take up little internal hull space, but create drag and are vulnerable to damage from grounding and floating debris.

To achieve the best of both worlds some boat owners fit both systems, but technical advances achieved by both the gyro and fin camps in recent years have made that less necessary.

Gyro stabiliser manufacturers have brought the latest electronic management and digital processing into play to enable their products more responsive while making them more compact and easier to install in small spaces. Active fin system producers have also improved their offering with electronic and GPS motion sensing as well as offering a choice of hydraulic, electrical and even pneumatic actuation while improving the hydrodynamics of their fins to reduce drag.

GYRO STABILISERS

Although anecdotal evidence suggests that the leisure marine market has generally favoured active fins over internal gyros, there are a number of gyro system producers that are doing good business in this sector and are expecting gyros to take a bigger share of the superyacht segment in particular.

Global market leadership across the wider recreational marine gyro segment is claimed by US-based Seakeeper.

Since the company launched its first Seakeeper Gyro model in 2008, more

than 2,400 systems have been installed in vessels from 9m to over 300m.

“Stabilisation is fast becoming a minimum expectation in recreational cruising boats,” says Andrew Semprevivo, Seakeeper’s vice president of sales and marketing.

“Stabilisation is now the hot topic in boat equipment. It will be on every style of boat built in one or two years, like bowthrusters or aircon are now,” he predicts. If the company’s rate of business is anything to go by, that could be feasible. This year Seakeeper expect to ship more than 1,000 units as demand expands. With a range of five models and a technology that’s scalable, Seakeeper has the ability to fit single stabilisers in

ANDREW SEMPREVIVO | VP SALES SEAKEEPER

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boats up to 110ft, Semprevivo points out. “For bigger boats multiple units can be used. For example, we’ve supplied five units in one boat of 220ft,” he says.

One advantage that gyros have compared with active fin stabilisers, Andrew Semprevivo maintains, is that “they can be installed anywhere on a boat”, unlike dynamic fins which need to be strategically placed on the hull and so limits the places you put them.



◀ Seakeeper’s new DC-powered gyro for boats from 9m-12m

Prices for gyros, he says, are comparable with those of fin systems. As an example he cites the Seakeeper 5 model. A single unit measuring 0.765x0.757x0.628m (LxWxH) would provide 70-90% roll reduction for vessels of up to 20 tonnes displacement, which could be a typical 45ft power cruiser and cost just under US\$30,000.

“Considering the price of that boat could be US\$1 million, proportionately that’s not a huge amount, so we find that cost is not a major factor for many boat owners.”

That assumption is supported by sales volumes. “The US is our biggest market because it has the most pleasure boats, but we also supply overseas markets and many leading OEMS including Bénéteau, Ferretti, Princess and Azimut, and Riviera. Roughly 75% of our sales are OEM and 25% retrofit,” Andrew Semprevivo adds.

Western Australian company VEEM’s target market for gyro stabilisers in the case of motoryachts starts at 27m in length, or 47 tonnes displacement, and goes up and going up to 100m or 3,500 tonnes.

Although well established in the global maritime business as a high-quality fixed pitch propeller manufacture, VEEM is relative newcomer to yacht stabilisation, having acquired the technology from Halcyon International, an Australian marine technology development company only 2011.

Paul Steinman, product manager for VEEM Gyro, has extensive previous experience of yacht stabilisation from the active fin perspective. He says that “almost all superyachts are now fitted with either zero speed fins or gyro stabilisers”, but explains that until now there has not been a suitable gyro stabiliser product for yachts over ➔

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30m in length. “We expect the takeup of gyros in this length range to increase significantly in the coming years,” he says.

Paul Steinman acknowledges that active fins have the advantages of taking up less internal hull space and can hold a steady righting moment for longer-period rolls such as happen during high-speed turns and with wind heeling than gyros. “But in all other respects gyros are a better alternative,” he adds.

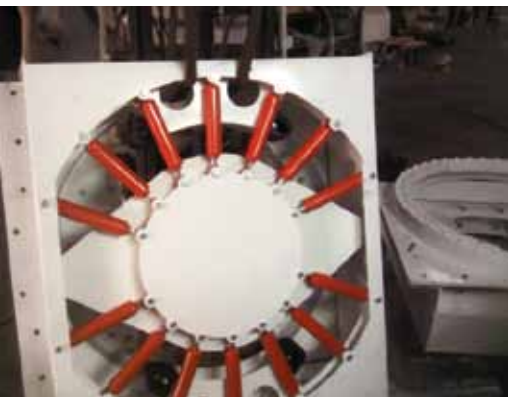
According to Steinman for craft with little or no chines, such as sailboats and displacement motorboats, “fins perform badly due to the almost vertical angle at which they are installed when perpendicular to the hull.” For such craft, he maintains, gyros do a better job. “Gyros are best installed with interceptor blades at transom, or trim flaps, as this overcomes their limitations and also provides highly efficient running trim optimisation,” he says. “We are confident that we can ultimately replace zero speed fins as the preferred solution for superyachts of more than 27m,” he concludes.

STANDARD FEATURE

In Japan, Mitsubishi Heavy Industries has also made a substantial investment in developing gyro stabilisers for marine applications including privately-owned recreational craft. Its product offer is the ARG (Anti Rolling Gyro) which has recently been extended with the launch of a smaller model designed for vessels of up to 25 tonnes.

Other models are offered with ratings of up to 40 and 60 tonnes, which in multiple installations can provide stabilisation for superyachts

- ▶ Colin Ayers
- ▼ Australia's Sea Gyro stabiliser



up to around 200 tonnes displacement.

ARG answers to this survey have been provided by a Mitsubishi panel comprised of Katsuya Umemura, project manager and one of the inventors of the Anti Rolling Gyro, Motharu Ota, deputy manager of the ARG business group, and Hiroaki Minamino of Misaki Engineering Co, the sales agency for ARG.

“Gyro stabilizers have been well acknowledged and accepted by the market over the past five years. Many boatbuilders have set up the gyro stabilizers as a factory options,” reads the company statement. Knowledge of gyros is also spreading among the boating community as is the fitting of ARG units. “It is getting more common year by year,” says the panel. “A lot more boat owners know the effect of our gyros these days.”

The company also reports that sales are also increasing year by year, with new builds accounting for between 80% and 90% of the business, the Mitsubishi ARG panel says. Retrofit, although a small proportion of ARG’s business, is nevertheless important too. “We receive inquiries from boat owners every day for the retrofit of ARG,” the panel says.



The smallest boat so far to be fitted with an ARG stabiliser has been 36ft, with a displacement of 12 tonnes. “Where you install the ARG does not affect its roll reduction, and you can fit it anywhere you want,” the company explains, noting this is so long

as it is not in contact with water and the mounting is strong enough to handle the gyro torque generated by the unit. Where space is tight Mitsubishi offers case-by-case fitting advice.

The ARG panel acknowledges that “superyacht owners tend to choose fin stabilisers, but since these have less effect in stabilisation at anchor or very low speed, the owners still would like to choose our units because of their effectiveness at anchor and low speeds.”

“The advantage of active stabilisation systems is that they are electrically controlled, and more accurate than before”

ARG also mentions that while gyros work both at anchor and trawling speed around 10kt, when the boat is underway the occupants feel less effect from the anti rolling gyro as the boat tries to stabilise itself as well.

The panel notes that improvements in control technology have done much to improve stabilisation performance in general. “The advantage of active stabilisation systems is that they are electrically controlled, and thanks to the

increase of computer technology, more accurate than before,” it points out.

However, this advantage can also be a disadvantage. The Mitsubishi panel explains: “More complicated systems tend to fail more.

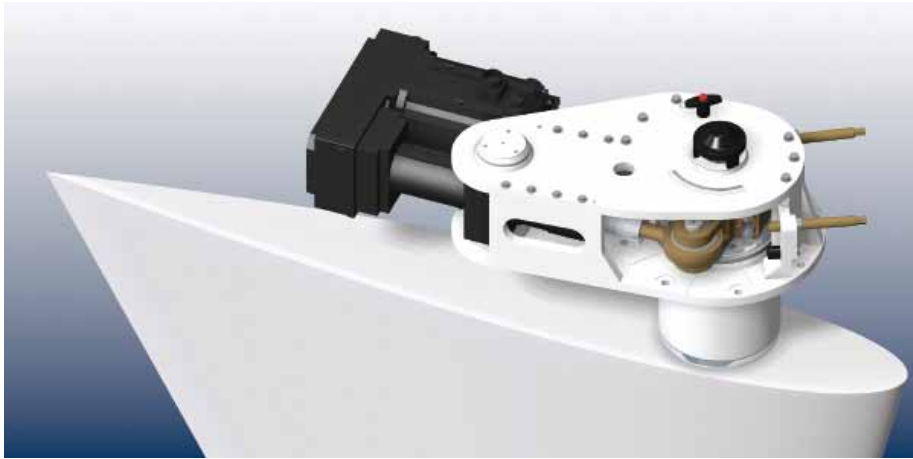
If the computer control system fails, the unit fails too. When the unit fails, it takes more time to find out where the cause of failures as the system is complicated. Mitsubishi Anti Rolling Gyro uses passive systems to keep them as simple, durable, reliable high quality as possible to remove all potential problems,” the company claims.

ALL-TIME STABILISATION

Australia’s Sea Gyro is at the opposite end of the scale from Mitsubishi, in terms of corporate size. The company, however, is a significant player in the market for larger gyroscopic marine stabilisers

Director and owner Colin Ayres comments: “When we started making gyros 10 years ago, the clients wanted roll reduction at anchor. The gyros were sized accordingly, being fitted to vessels operating in semi protected waters. But that has changed. Most of our current clients want to use the gyros at sea, and need roll reduction for all weather. This includes military, ferries and private yachts operating in open seas,” says Ayres. “Our best success stories are from game fishermen who find the gyro great for trawling and retrieving,” explains the Sea Gyro boss.

Sea Gyro has supplied craft from as little as 6m up to 40m, the smallest having been more of a test bed than an actual usable gyro. “But there is a story



▲ **Naiad's active fin stabiliser**
▶ **Charles Egan**

of a client who bought a system for his 28ft boat and was so impressed that he ordered a system for his 60ft boat," Colin Ayres recalls, adding that as far as gyro stabilisers are concerned, "smaller boats can lead to bigger boats."

According to Ayres, boat size is not the overriding issue. "Boaters want to reduce the rolling of a boat regardless of its size. I don't think that this has changed much over the years."

The choice of stabiliser, Ayres says, has a lot to do with how you use the boat and where you use it. "If you are travelling from port to port in moderate waters, then active fins are the most effective. But the boating scene has changed and clients tend to anchor more and operate in shallow water. This is where the gyros come into play. As there are no external appendages then there is no damage when grounding."

He sees both gyro and active fin stabilisers as having their place in the yacht market. "We see both products being installed. There are two types of superyacht, fast roll and slow roll. The fast roll vessels can only use gyros because they react quickly, but the slower roll vessels can use either the gyros or the active at-anchor fins," Ayres explains.

“Actively controlled stabiliser fins are the most effective roll control device available over the range of hull speeds”

ACTIVE FIN STABILISERS

No one can claim a legacy as steeped in vessel stabilisation expertise and history as Naiad Dynamics. Although this business unit was formed by the US-based Naiad Maritime Group only in 2009 following a series of acquisitions, it draws together the long-established stabiliser expertise behind the US, UK and Dutch stabilisation interests of Naiad Marine Systems, Maritime Dynamics, Vosper Motion Control, Vosper Stabilizers, VT Marine Products and KoopNautic Holland. Thus Naiad traces its roots back to 1891, when Sir John Thornycroft developed a fin stabiliser system and later created the Vosper Stabilizers brand.

Naiad's active fin stabilisation know-how comes more directly from its association with Sperry Marine in the 1970s, whose technology in this area became the nucleus of Naiad motion control brand. Since then it has been responsible for over 12,000 stabilisation systems installed globally in the luxury yacht, commercial ship and military ship markets.

Today, all Naiad fin stabiliser models are available with "AtSpeed" and

'AtRest' (zero speed) capability. The company's active fin offering spans a wide range of applications for craft of all descriptions from 9m up to 200m and is complemented by a slew of associated motion control devices including T-foils, lifting foils, spanning foils, yaw control fins, interceptors and trim tabs for yachts, as well as commercial and naval ships.

Charles Egan, technical documentation engineer at Naiad Dynamics US, explains: "Overall, actively controlled stabiliser fins such as those supplied by Naiad, are the most effective roll control device



available today over the widest range of hull speeds," he says, adding that "these fin systems automatically and proportionally reduce roll across the widest range of sea conditions, hull speeds and ship loading, and typically achieve a reduction

in roll of 90% in resonant roll conditions, which are the most uncomfortable and dangerous."

According to Egan, this roll reduction performance "is unsurpassed by any other device".

The company claims that the use of stabiliser fins to reduce roll while the vessel is anchored or drifting (at zero forward speed) was first introduced by Naiad's Dutch office in 1997. "Since then 'AtRest' fin stabilisation systems have been steadily increasing in both new build and refit applications," Egan notes.

The same applies to the company's 'AtSpeed' fin systems and those capable of both 'AtSpeed' and 'AtRest' stabilisation, Charles Egan says. "Once an owner experiences the seakeeping and comfort provided by a vessel equipped with our stabilisers, it is not likely he will have another boat without them," he notes.

As for drag that may be caused by fins protruding from the hull, Egan says that "they add only a negligible amount of drag to the vessel, in part because the ➔

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▲ CMC fin stabiliser panel control

“fins are continuously controlled, moving only to the extent required to squelch the roll tendency.”

Moreover, Egan observes that rather than impeding progress, good foil design efficiently generates useful forces, causing the vessel to track a straighter course which can actually enhance vessel speed made good (point-to-point).

And regarding the risk of damage from striking underwater obstructions or debris, Naiad Dynamics' Egan notes that this is minimised because “fins are located in the protected region of the hull within the vessel's block section (the region within the vessel's draft and beam) and are installed in the strongest part of the hull near the chine.

“They can be powered hydraulically or electrically and can be switched on, off or paused at a moment's notice. There's no spin up or wind down required, as is the case with gyros. Although those are not exposed, they tend to be heavy and run at turbine speeds of typically around 10,000rpm, so could be a danger,” Charles Egan points out.

ROLL REDUCTION

By contrast with Naiad, the ‘grandfather’ of active fin stabilisation technology, Norway's Side-Power is a relative newcomer to the sector, but in a few short years its new-generation Vector range has followed in the footsteps of the company's well-established global power cruiser thruster business and established a strong position there too.

Vector earned the top accolade at the

2013 METS show by being selected overall winner of that year's DAME Award.

Compared with conventional straight-finned stabilisers Vector fins have ‘organic-looking’ outwardly-curved foils which are designed to provide better roll reduction, better lift and almost negligible drag, whether at speed or at anchor. The digitally controlled fin actuators are electro-hydraulic and occupy minimal space inside the hull.

Sleipner Motor is the company that trades as Side-Power. Ronny Skauen, vice president of international operations and product development of Vector fins, says their solution can reduce boat roll by as much as 50% in comparison with straight fins, although he claims that the typical improvement is around 30-35%.

The current boat range that Vector targets is from 55ft-120ft for pairs of stabilisers, but if sets of four fins are installed this takes the upper boat length limit up to around 150ft.

“The smallest boats we hear of fitted with stabilisers are in the lower 40ft range,”

Ronny Skauen observes, adding that often these are typically slow trawler-type boats, and rarely with ‘AtAnchor’ capabilities.

Skauen continues: “Then you do see some modern fast boats also in the low 40ft range of modern types, like sport fishing boats that get gyro stabilisers, but they are then not really for stabilising in fast cruising mode, as gyros don't really work well then, only in zero or low speed,” he says. Like others in the sector, Skauen sees stabilisers being fitted in smaller boats. In the volume segments, and notably planing cruisers, “a measurable percentage of new boats from about 55ft upwards are stabilised now, while five years ago I would say that limit was over 70ft,” he states.

Generally speaking, relative to five years ago, “the boating market uptake of stabilisers (the total volume of fins and gyros) is exploding,” says Skauen, although he qualifies that remark by

adding: “It has been a gradual increase and is a trend that we believe will continue and strengthen.”

The company says that the problem is that very few owners and buyers of boats below 80ft have actually experienced a well stabilised boat so most don't really understand what they are missing when buying or having a boat without stabilisers.

“It is quite a shocking experience (to find out what stabilisers can do) if you are used to being on non-stabilised boats,” he says.

INCREASE DEMAND

With its bow and stern thruster products, Side-Power has long been a strong international player on the OEM side in the mid-size powerboat segment. That has carried through also to its Vector stabiliser

business, where 80%-85% of sales are to boatbuilders. Even so, Ronny Skauen confesses to being a little disappointed by the amount of retro-fit in existing boats. “I was expecting it to be more than we see now. Again, it clearly has to

do with knowledge, and you do have to compare to a quite high total cost of both equipment and installation. Fitting is a very ‘involved’ job to do on an existing boat,” he comments.

Ronny Skauen sees a positive outlook for stabilisers in boating market: “It is clear that with more and more new boats coming with it, the number of retro-fit installations will grow, and not least because quite new boats will not be easy to sell without stabilisers.

Federico Fiocchini, sales manager for Italian boat equipment manufacturer CMC Marine, like most respondents to this sector survey, has also seen an upsurge of market interest in stabilisation. “The request for comfort at anchor, obtained through the limitation of the rolling, has become a standard even for small boats,” he says.

“Over the years we have seen how ➔

“It is quite a shocking experience (to find out what stabilisers can do) if you are used to being on non-stabilised boats”

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stabilising systems are becoming more and more a common on board to the point that their installation can now be considered as a must," he explains.

CMC marine targets the yacht segment from 18m and upwards. So far, the largest craft in which its active fin units have been installed is 80m. Roughly 90% of the company's stabiliser business is with OEM clients, although Fiocchini says the company is following the retrofit with great interest, since it has shown a strong increase in recent years.

CMC Marine offers a choice of electric and hydraulic drive although Fiocchini believes that electric power is generally the best option, although the market most recent trend shows a clear preference for the electric systems. "The market has recently shown a clear preference for electric stabiliser systems," he says, adding that "electric stabilisers are smarter, more flexible and smoother.

Among the key benefits are reduced noise, vibration and hull stresses, reduced power absorption and compactness, making installation easier on small vessels."

OTHER OPTIONS

Added to the above is reduced work hours and thereby cost for installation, lower maintenance requirements and now, thanks to the company's introduction of a new patented adaptive control algorithm, much improved at-anchor stabilisation. "One of the great advantages in the use of electric stabilising systems when at anchor is that the fin acceleration/ deceleration phases are better controlled thanks to the lower inertia of the electrical drive, thus granting a faster response for greater comfort onboard," CMC's Fiocchini explains.

The same choice of electric or hydraulic actuation is offered by Dutch company MATN's Stabilizers, which manufactures units for yachts from 12m to more than 200m. What's different,

however, is that this company offers retractable and non-retractable options.

Martin Starkenburgh, MATN's owner observes, along with most stabiliser producers, that yacht stabilisation is now much more common than five years ago. "The price levels of our smallest systems are now more acceptable for the owners of smaller boats," notes Starkenburgh.

Also like several other makers of active-fin stabilisers, Martin Starkenburgh sees a move in the superyacht market away from gyro units. "Gyroscopic stabilisers were quite a trend in the superyacht industry, but the performance of these systems have never been as effective as fins on

long waves. This is why most of the new-build superyachts are now fitted with fin stabilisers."

Another actuation option is compressed air, an option favoured by active fin stabiliser manufacturer Gyro-Gale. The Florida-

based company produces stabilisers for boats ranging from 30ft-150ft and also specialises in catamaran stabilisation.

"Gyro-Gale Stabilizers is the only pneumatic stabiliser producer in the world," claims Zeyad Metwally, vice president of engineering.

"Air makes our stabilisers simple, clean and oil-free for our customers. We are in a class of our own. We are ahead of the market by 20 years," asserts. Gyro-Gale has seen "a definite uptake" of stabilisers in the boating market. "Our sales have tripled in the last five years," the company says.

Since Gyro-Gale started in 1976, the overall number of stabilisers fitted by yacht owners has increased tremendously. "Of course things slowed down in the 2000s, but this is still a strong number in comparison to the 1980s. Yachtsmen have come to recognise stabilisers are not a luxury, but rather a way of life on the seas," Metwally comments.

The proportion Gyro-Gale stabilisers fitted by boatyards to new builds compared to retrofits is now roughly even,

marking an increase in OEM sales.

Articulated-fin stabiliser manufacturer WESMAR produces these for boats from 30ft-200ft. Michael Vourtsis, manager of international sales for the mechanical division of this manufacturer based near Seattle, succinctly says that from the perspective of his company, prospects in the stabiliser sector are "very promising".

For the stabilisation sector as a whole, the boating market is clearly seen by most players as one where business has advanced markedly over the past five years for proponents of all technologies involved in it.

COMPLETE SOLUTION

For active-fin systems, most progress has been made in the mid-size and larger planing and semi-planing powerboat sector where this technology demonstrates many advantages. Gyro stabilisers which do not generally perform as well in that area, still hold much attraction for smaller boats operating at displacement speeds and appear to excel at zero-speed and are viewed by some as a fitting accompaniment to fins and also interceptor stabilisers.

There is one other retractable technology not yet touched on which truly democratises stabilisation as it applies to boats ranging 10ft-16ft, such as the retractable Dolphin Aqualisers stabiliser, a device produced in New Zealand.

This is an inexpensive polypropylene and steel unit that's sold on the aftermarket for retrofitting to the chines on small open aluminium and GRP widely used for multiple uses. The hinged flaps of Dolphin Aqualisers, which are stowed flat against the freeboard when not in use, fold down to the horizontal position and are locked out with diagonal struts to provide a wider platform on the water that can be used at zero or trolling speeds.

Bearing in mind that small non-keeled boats are inherently less stable than most when occupants move about and use it for fishing, for xample, these units are a reminder that stability is not all about comfort. This survey reveals that safety is even more paramount. **IBI**

“Yachtsmen have come to recognise stabilisers are not a luxury, but rather a way of life on the seas”

Boat stabilisation manufacturers

EXPERTS IN THE MARKET OF MARINE STABILISATION OFFER A RANGE OF SOLUTIONS FOR YACHTS OF ALL SIZES

CMC MARINE

CMC Marine is one of Italy's leading producers of fin stabilisers. In recent years it has expanded its business elsewhere in Europe and further afield.

CMC stabilisers have both electrical or hydraulic actuators, and the company also produces the Dualis series of electric and hydraulic thrusters, and the Dia-log electronic control system. It also has plans to introduce electric steering gear.

Back in 2012 CMC Marine launched Stabilis Electra (SE), which it claims was the world's first electric stabilising fin protected by EU patent. Since then the SE has been further improved and its performance enhanced, thanks to its integration in a more advanced and complex stabilising and control system.

Among the key benefits are reduced noise, vibration hand hull stress, reduced power absorption, greater compactness for easier installation, and a new algorithm for improved stabilisation control at anchor.

DMS HOLLAND

Dutch company DMS Holland (Dynamic Marine Systems) offers a fast-spinning rotor stabiliser that uses the Magnus effect that, subject to the direction of rotation, generates upward or downward pressure to provide lift. The company claims that the biggest advantage of a rotor system compared with a fin-driven conventional system is greater roll damping capability at lower speeds. As the rotors have no effect on boat steering, they can be mounted at a position of choice. Electrically powered, the system has compact retractable rotors, thereby lessening the risk of damage and providing less resistance than fins. The DMS rotor stabiliser system is intended for boats of up to 30m. For

larger craft the company introduced AntiRoll, a dual-axis fin stabiliser that's said to be unique and which won a METS DAME award in 2013.

AntiRoll is designed to provide stabilisation both underway and at zero speed without compromising performance in either case. The curved, high-aspect ratio fin is claimed to reduce drag by between 50% and 75% while sailing. And with the fin flapping at zero speed as opposed to rotating, a greater lifting force is generated to provide a more stable platform. Of particular interest for owners of sailings yachts, the fin is also retractable and can be partly folded back into the hull.

DOLPHIN AQUALISERS

This New Zealand manufacturer produces what it claims is the first retractable stabiliser system for small GRP and aluminium boats of 10ft-16ft. It has flat panels attached to the hull at the waterline and hinged so that, when deployed, they lie flat on the water surface and are locked in place by diagonal struts to provide a broad footprint that enhances stability and prevents tipping. The polyethylene panels are designed for use at zero and trolling speeds. When retracted, they stow flat against the boat's freeboard.

GYRO-GALE

Florida company Gyro-Gale Stabilizers manufactures products for boats ranging from 36ft-150ft and also specialises in catamaran stabilisation. It also offers a pneumatically-actuated stabiliser, with benefits that include simplicity of design and cleaner, oil-free, speedy operation. The company's latest design is the Tab-Fin and Electronic Gyro, introduced in 2014. This Tab-Fin has twin

foils mechanically connected to produce three times the lifting power of standard fins of equal size, while the Electronic Gyro is programmed to anticipate the vessel's motion even before it starts. This combination of Gyro and Tab-Fin are claimed to provide the most efficient stabilising system for underway and zero-speed operation.

Gyro-Gale also offers other types of fins optimised for vessel size and speed. The Cruiser-Fin is aimed at trawlers and slow-speed boats while the Ultra-High-Speed Fin, as the name suggests, is for faster boats. The newly patented Tab-Fin variant has a tab on the trailing edge of the fin so that as the fin moves to the starboard side, the tab will move further in the same direction to hold the water onto the blade when the vessel moves to



▲ Gyro Gale complete stabilisation system

port. This is all done mechanically and is proportional to the motion of the vessel. The tab increases the power of the fin by a minimum of three times, according to the company.

MATN'S STABILIZERS

Dutch company MATN's Stabilizers provides stabilisation for boats from 12m up to more than 200m, with electrical and hydraulically-driven retractable and non-retractable fin stabilisers. All

are designed for both zero speed and underway operation.

MATN's electrically driven stabiliser was launched at the beginning of this year. It has what the company says is the smallest controller with integrated sensors, 3-bus (RS485) structure for control, data logging and internet connection, plus some of the sturdiest and most reliable mechanics on the market, all backed with worldwide 24-hour service.

MITSUBISHI HEAVY INDUSTRIES



▲ New Mitsubishi ARG175T

The technology behind Mitsubishi's Anti Rolling Gyro (ARG) was taken from the Control Momentum Gyro, which is the attitude control actuation system for Space Satellite that Mitsubishi Heavy Industries designed and perfected for the marine market in the 1990s. As an inventor and leader of gyro stabiliser technology, the company continues to develop its ARG to offer improved comfort and stabilisation to boaters.

Three models are currently offered. The newest is the ARG175T, which covers applications up to 25 tonnes. The flagship model, covering boats with up to 40 tonnes, is the ARG250T, while the the largest model is the ARG375T targeting displacements of up to 60 tonnes.

With a combination of multiple unit Mitsubishi can offer stabilisation for

superyachts of up to around 200 tonnes displacement. ARGs are sold globally by Japan's Misaki Engineering.

NAIAD DYNAMICS

Naiad Dynamics, part of the US-based Naiad Maritime Group and with operations in the UK and Holland, is the self-declared 'world leader in ship motion control solutions'. Today, the company produces a full range of active fin stabilisers for use on yachts from zero through top planing hull speeds, complemented by a full array of motion control devices that include active motion interceptors and active trim tabs.

The latest additions to this range include the all-electric E-525 fin stabiliser for vessels of 35m-50m. Powered by an AC electric motor, this unit, which was launched about six months ago, gives active control both at speed and at rest.

In 2014, the Naiad model 925 (for vessels of 90m-150m) was successfully sea trialled, leading to immediate sales to Dutch superyacht building group Feadship as well as a number of military customers.

Naiad also claims to have pioneered the use of fully digital stabiliser and ride system controls, as well as the application of the first CAN-Bus control system for stabilisers. It has also launched several other new motion control products, including a yaw control fin design as part of an advanced integrated Ride Control System for a 70m Incat commercial vessel.

QUANTUM MARINE

US stabiliser producer Quantum Marine, which also has a European base in the Netherlands, offers Zero Speed fixed fin, XT (extendable fin) Zero Speed and MagLift rotary stabilisers for zero speed and/or underway application.

The company's patented dual purpose XT stabilizer offers improved zero speed performance over its standard Zero Speed fin. This improvement is attributed to the reduction of fin geometry and additional 'working' area to the rear fin when the foil is deployed. The XT fin was designed by Quantum to meet the



▲ Quantum XT fin stabiliser

ongoing challenges associated with the location of fixed fins required for zero-speed operation.

In general, the fin area required to meet the underway criteria for a vessel is less than that of the Zero-Speed requirements. By offering a fin with variable geometry and a smaller foot print in the retracted condition, Quantum is able to maximise system performance while minimising underway drag.

Advantages of the design include greater effective stabilisation forces, reduced power consumption, smoother functioning while cutting wear and tear and attenuating noise.

Quantum's patented MagLift also offers improved zero speed performance over the traditional Zero Speed fixed fin under most conditions. It is also designed to give a high level of performance underway at slow speeds where fins would not be practical due to the increased fin size operating at slower speeds. The system is also designed to operate when a vessel requires higher cruising speed, since it can fully retract and reduce drag.

The longitudinal location of the rotors is also far more flexible than traditional fins, allowing the rotors to be placed further forward or closer to the stern with none of the traditional problems that can be encountered with fin placement, such as slamming loads or propeller or rudder interference. ➔

ELIMINATE BOAT ROLL.
KEEP EVERYONE SMILING.

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▲ Vector fin 1350 with SPS92 actuator

SEA GYRO

Western Australian company Sea Gyro is capable of custom-building any size of gyro marine stabiliser, but generally focuses on the bigger end of the spectrum with gyros developing torque of between 30-50,000 Nms (Newton metres per second). However, the company has designs that could produce as much as 2,000,000 Nms.

SIDE-POWER

Sleipner Motor introduced its Vector stabiliser range to the planing and semi-planing power cruiser market about five years ago. Today, this Norwegian manufacturer, which trades under the name of its market leading Side-Power thruster brand, has grown its presence in the stabiliser sector to where it reckons it's now one of the five biggest players.

All its fin stabilisers have electro-hydraulic, which are extra compact and designed for both zero speed and full-ahead operation. Featuring a curved fins, this units are designed for maximum lift to offset the direct drag that any appendage protruding into the water has to that speed and fuel consumption penalties are minimal. In certain boats, they can even providing a slight speed bonus.

The company recently delivered its first set of the latest VF1650 fins, a 1,65m² Vector fin that will provide about the same stabilisation force as its earlier straight 2m² fins delivered.

The Vector fin was the overall winner

of the 2013 METS Dame Award.

SEAKEEPER GYRO

Seakeeper was founded in 2002 with the purpose of researching, developing, and marketing motion control devices for boats under 70m by Shepard McKenney and John Adams. McKenney previously owned Hinckley Yachts and developed its innovative JetStick technology, a fly-by-wire control system for jet powered boats. Adams previously owned Maritime Dynamics, which under his leadership, became the world leader in motion control for high-speed ships.

Headquartered in Maryland, USA, Seakeeper began full production in 2008 and now claims global leadership in gyro stabilisation. The company has sales and service offices in Florida, Italy and Singapore.

Recently, the company launched its first DC-powered gyro for boats of between 9m and 12m. The Seakeeper 3DC is designed to reduce resonant roll up to 95% in a wide range of sea conditions. Based on the company's widely-popular Seakeeper 5, the new unit shares the same small footprint of 0.765m L x 0.757m W x 0.628m H and weight of 358kg.

Seakeeper 3DC has a modest electrical draw of between 500-1,000 watts, depending on sea state. Shipments are scheduled to start in June this year.

VEEM GYRO

More widely-known for its fixed pitch boat propellers, Western Australian company VEEM diversified into gyro



▲ VEEM Gyro product manager Paul Steinmann

stabilisers in 2011 having aquired the technology from marine technology development company Halcyon International.

A late entrant into the market after



▲ VEEM VG120 stabilisation for superyachts

considerable further product development, VEEM Gyro has no sales history to date. However, it has assembled capability to produce gyros for boats starting at 27m and going up to 100m, or 3,500 tonnes displacement. The range now comprises of VEEM Gyro 120 (VG120) for yachts of 27m or 47 tonnes, the VG260 with application for yachts of 45m or 350 tonnes, and the VG1000 (45m or 350 tonnes upward).

The VG260 was launched at METS 2014 and will be available for purchase in Q4 this year. The Gyro 1000 will be introduced in the coming months with production starting in 2016.

Design features through the range include strong roll stabilisation both at rest and at speed, reduced drag for higher speed and extended endurance, the elimination of noise in the owners' spaces, in situ maintenance, simple integration with services, simple operation and faster spin down times of 20 minutes when other gyro stabilisers can take up to six hours.

WESMAR

Seattle-based WESMAR (Western Marine Electronics) brings 50 years of experience designing and manufacturing equipment that operates underwater in the most violent of oceans and challenging of lakes. The company provides rugged and reliable equipment to the recreational, commercial and government marine operators throughout the world. On the boat stabilisation side it manufactures active fin stabilisers for boats of between 30ft and more than 200ft.

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▲ **Wesmar advance new fin stabiliser**

This year, WESMAR is launching its latest DSP4800-K model, a development of DSP4800 which the company says has fin control that moves stabilisation forward. The K stands for Kinematic, or controlling objects in motion. The new technology, the company explains, uses unique signal processing to interface the key elements of fin position, (velocity and acceleration) with the company's rugged, neutrally buoyant and hydrodynamic fins to create a new level of boating comfort.

DSP4800-K is offered in three variants: Standard Digital Stabilisation, offering the high-speed gyro and control of roll, with on-screen display of fin movement in real time; Digital Stabilisation and Lift, where gyro and controller software maintain the fins in a positive lift position during all stabilisation movement and allow maximum fuel savings; and Digital Stabilisation, Lift and At Anchor. The At Anchor mode monitors incoming swells and automatically controls fin movement.

ZIPWAKE

Zipwake Dynamic Trim Control System, Series S, was unveiled at METS 2014 to some acclaim. Modular designed for mass production, the Series S represents advanced yet affordable interceptor technology for planning and semi-planing vessels from 6m-18m.

Interceptor or blade actuation takes place by way of a calibration-free submersible electric servo within the interceptor unit. Its natural water-cooling provides excellent working conditions for the brushless DC servo motor, which

runs on 12-32 volts. The company claims the blade stroke takes just 1.5 seconds, outperforming the competition by a factor of five.

Installation is aided with an integral mounting plate and the option of a concealed or above-waterline, self-sealing, thru-hull cable fitting.

Zipwake has set its sites on dominating the market for dynamic trim control systems within a few years, making conventional trim tabs and outdated interceptor systems history. Ambitious certainly, but the firm already has 300 systems on order and its products is fast winning friends. The range will be expanded soon with larger interceptors to cater for boats up to 50m.

Zipwake has been designed to be suitable both for OEMs and the aftermarket looking to upgrade existing boats. The firm anticipates the retrofit market contributing a significant part to its business eventually.

HUMPHREE

Swedish company Humphree, a leading manufacturer of interceptor trim and stabilization systems, moved into new premises in Gothenburg in June. At twice the size of its former home, the new facility will be able to cope with its rapidly expanding product portfolio.

Latest products include the new 24V DC electric-powered Fin stabilizer system intended for Swath catamarans and trimarans, where fins are installed in the bow of each hull or, in the case of the trimaran, in the centre hull or outer hulls.

The system, designed for cats or trimarans from 18m-40m, includes interceptors mounted at the transom and the new fins in the bow, all controlled from the same control panel.

Other latest launches is the X-Series, a new range intended for pleasure boats and commercial boats ranging from 25ft-55ft. Four sizes, X300, X450, X600 and X750 are available, all with 50mm (2") stroke needed for superior control of dynamic hull motions.

Today, Humphree has a global presence with offices in Europe, the US, Taiwan, China, Australia, Brazil, India and Mexico. Key sectors remain leisure boats and yachts from 25ft-70ft, but also commercial semi-planing and planning, monohulls and catamarans, as well as military vessels up to 70m. **IBI**

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