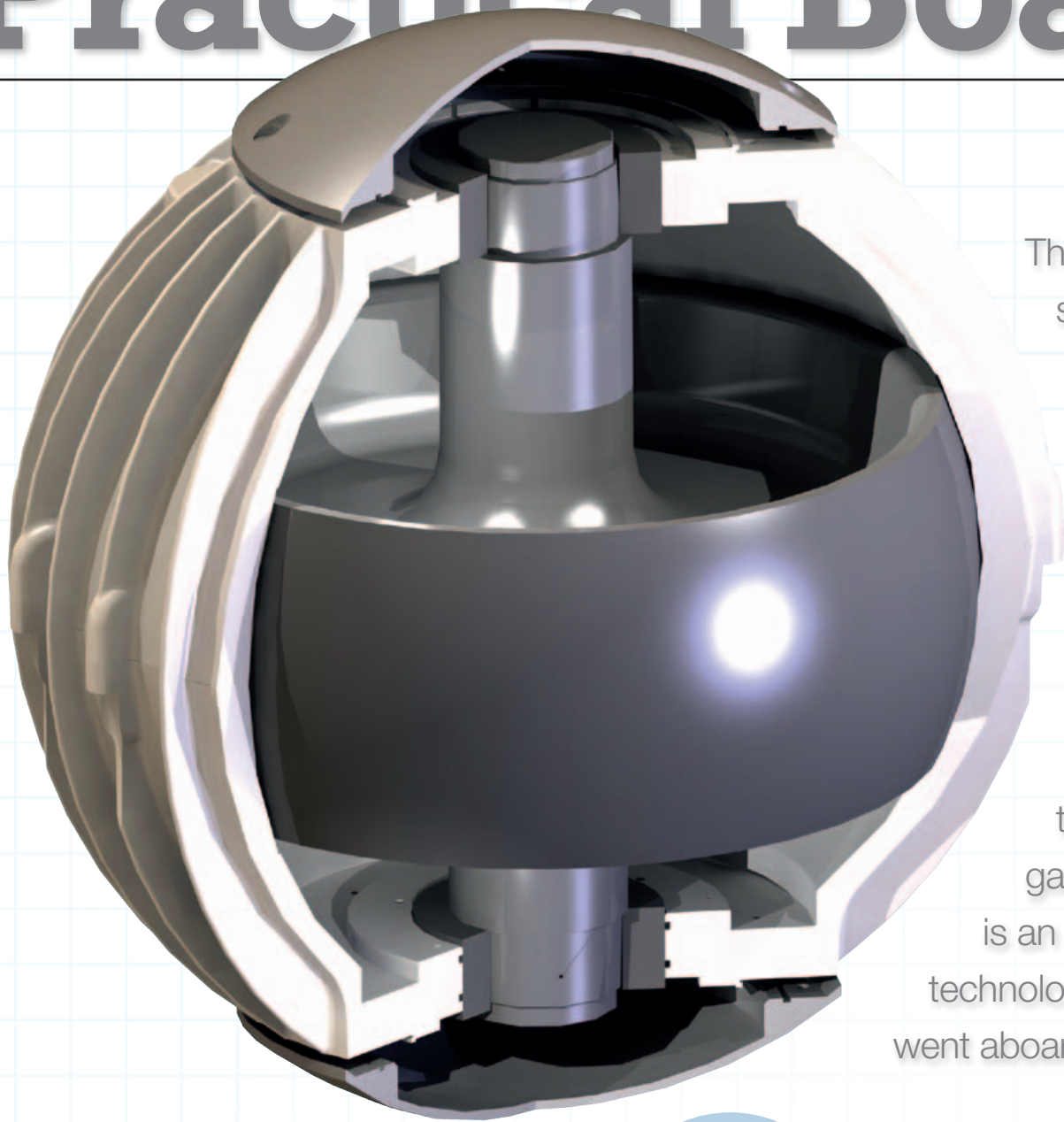


Practical Boating



They're standard fare in space craft and now gyro stabilisers are making inroads into the luxury yacht market. They significantly reduce roll at anchor and while underway, making life much easier for those prone to *mal de mer*. A 15m gamefishing charter boat is an early convert to the technology. *Lawrence Schäffler* went aboard to see it in action.

Spinning for stability



Matariki Nui is a beautifully-appointed Riviera 43 Offshore Express based in Opua in the Bay of Islands and specifically set up for luxury gamefishing charters.

She was launched in December 2010 and even then her owner Ian Witters wanted a gyro.

"I was very keen to equip her with a gyro unit. But I knew it would be a challenge as there was very little space in the engine room, as well as the weight factor to consider, so I dropped the idea."

But the notion persisted, and after 18 months of discussions with engineers and 600 sea-hours, Ian has achieved his goal. The boat has just been

retro-fitted with a Seakeeper M8000 gyro unit manufactured in the US, and he loves it.

The technology is best described as a 'sphere' measuring about a metre in diameter and weighing 550kg. The major component is a steel flywheel which spins at 8000rpm in a near-vacuum inside the sphere, on a horizontal axis. There's more on the technical side further on in this article.

Matariki Nui is equipped with twin 435hp Volvo IPS 600s, and while they are creatures of beauty, they fill much of the engine room. Prior to the arrival of the gyro, they shared the space with an 11kVA Onan generator



(just forward, midships) and two large water tanks to port and starboard.

Squeezing the gyro into the engine room demanded some creative thinking, and the job fell to Dean Ryder, owner of Westpark Marina's Motor Yacht Service Centre.

"We removed the port water tank, shifted the generator into its place and dropped the gyro into the generator's bed. Eliminating one water tank compensated for the gyro's weight, and the new configuration ensured that the boat remained balanced."

The gyro's weight was actually a relatively minor issue.

"Of much greater concern is the angular or 'righting' torque the gyro imparts to the hull," says Dean. "It's an enormous force, and we had to beef up the bed for the gyro significantly using a robust timber structure with glass overlay."

The finished installation looks superb – you'd swear it was part of the original build – but at a total cost of around \$100,000, it wasn't a frivolous upgrade, so why did Ian want to do it?

FISHING EASE

"Two reasons. I admit to being something of a magpie – I like new gadgets – and the technology appealed to me. But

more importantly I wanted improved stability. When you head offshore for a few days of gamefishing you often find yourself in choppy conditions with a big swell running.

"We have a high tower on this boat, and sitting up there the roll is accentuated. Anything that can reduce roll is a huge advantage and it makes gamefishing much more appealing to charterers, particularly if the guests have a susceptibility to sea-sickness."

The Volvo's IPS – with its pinpoint manoeuvrability – comes with a Dynamic Positioning System (DPS) option that's also very useful says Ian.

"It keeps the boat in one spot, and that's very important when fishing for hapuka or broadbill in 200 metres of water. With these species, you want to fish on the edge of a big drop-off and you need to maintain your position very precisely.

"The skipper's job is to find the perfect spot and DPS keeps the boat over that spot. With the gyro, we now are also able to remain stable. That's makes the fishing much more pleasant and a lot safer – you're less likely to lose someone over the side. When fishing at night we also put lights over the side, and if the boat is stable there's less chance of lines and cables becoming entangled."



Left: The gyro is mounted on a heavily re-inforced bed, just forward of the twin engines; The gyro's flywheel spins at 8000rpm and can be disengaged with the touch of button

Ian is delighted with the gyro.

"My research suggested it could reduce roll by 80 to 90 per cent, and our experience so far has corroborated that. All of my regular fishing mates say it's the best stabilising technology they've ever experienced. When my wife comes along for a cruise, the first thing she says is 'Is that thing on?'"

Another advantage is that, unlike more conventional 'fin' stabilisers, a gyro stabiliser doesn't require any through-hull cutting.



"There are no appendages so there is no drag," says Ian. "And where the fin stabilisers need speed to be effective, the gyro works perfectly when the boat is at anchor or simply drifting."

Ian has just appointed charter boat veteran Brodie Newton as *Matariki Nui's* skipper, but despite working on boats all over the world, Newton had never previously experienced the gyro technology. He says he's amazed at how quickly and effectively it stabilises the vessel.

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HOW IT WORKS

Mechanical engineers can read about the physical laws governing the gyro's operation at www.seakeeper.com where they'll find plenty of fascinating information about moments of inertia, angular velocity, angular momentum and torque.

For mere mortals, think about the time you spun a bicycle wheel, holding on to its axle. The tendency for the wheel to want to remain on one 'plane' is a simplified example of the forces at work with the gyro. The stabilising force is generated by the flywheel spinning at 8000rpm. When the boat rolls the 'counter-acting load' the gyro generates and transfers to the hull is impressive. When you consider that *Matariki Nui* is an 18-tonne vessel, you can see why the gyro needed to be mounted securely onto the vessel's frames.

A network of built-in, integrated sensors constantly measures the vessel's motion, counter-acting the effect of each wave. Sensors measure flywheel bearing temperatures, vacuum pressure, motor and drive temperatures, gimbals angle, brake pressure and boat motion.

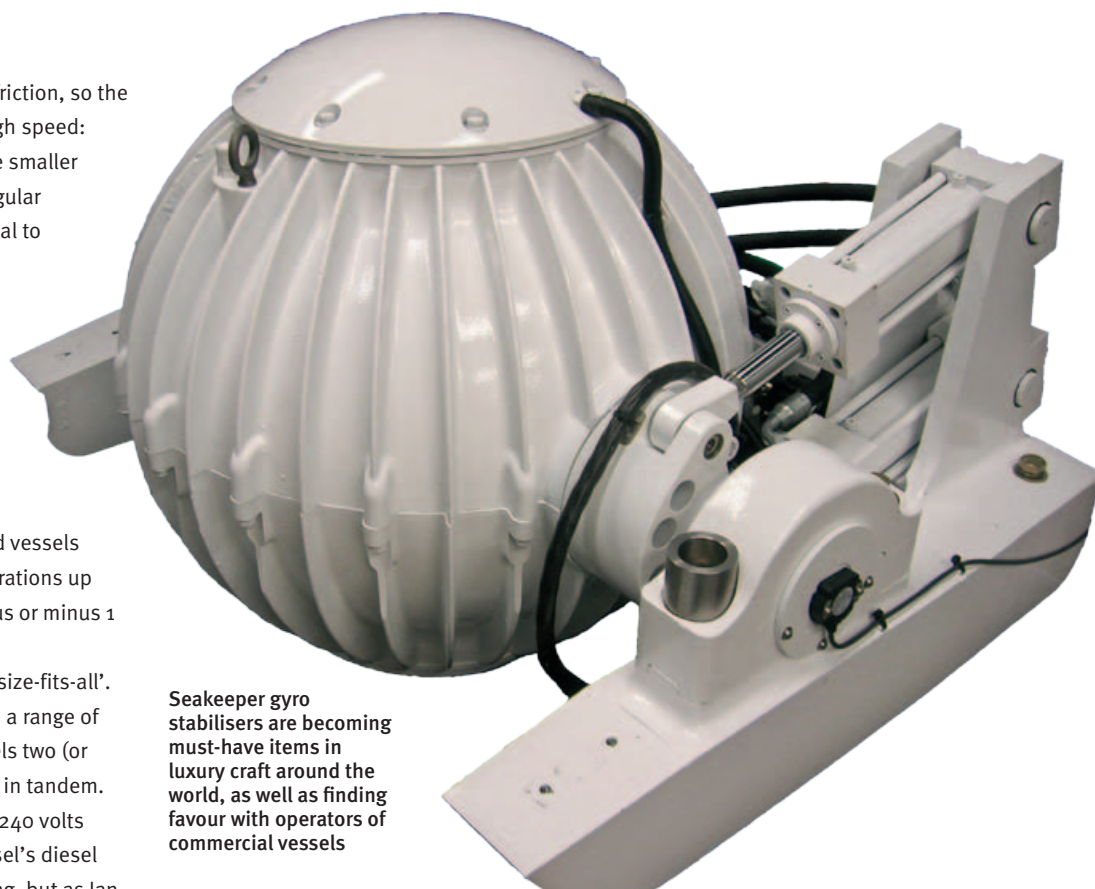
The flywheel spins in a near vacuum which effectively eliminates the power

needed to overcome air friction, so the flywheel can spin at a high speed: the higher the speed, the smaller the flywheel because angular momentum is proportional to speed. I knew that.

Interestingly, the gyro does not have to be located on the boat's centreline, though it is recommended that it is mounted aft, particularly in high speed vessels where the vertical accelerations up forward might exceed plus or minus 1 gee.

There is also no 'one-size-fits-all'. Seakeeper gyros come in a range of sizes, and in larger vessels two (or more) units are mounted in tandem.

The gyro operates on 240 volts AC which means the vessel's diesel generator must be running, but as Ian points out, the generator is running all the time in any event, to power *Matariki Nui's* air-conditioning system. Running costs are minimal and noise indiscernible.



Seakeeper gyro stabilisers are becoming must-have items in luxury craft around the world, as well as finding favour with operators of commercial vessels

DOES IT WORK?

Cynical journalists rarely admit to being impressed, but it would be churlish of me to downplay the gyro's performance. It is,

quite simply, remarkable. It's very easy to compare the boat's motion with and without the gyro thanks to a switch on the dash. Switching it off doesn't stop the



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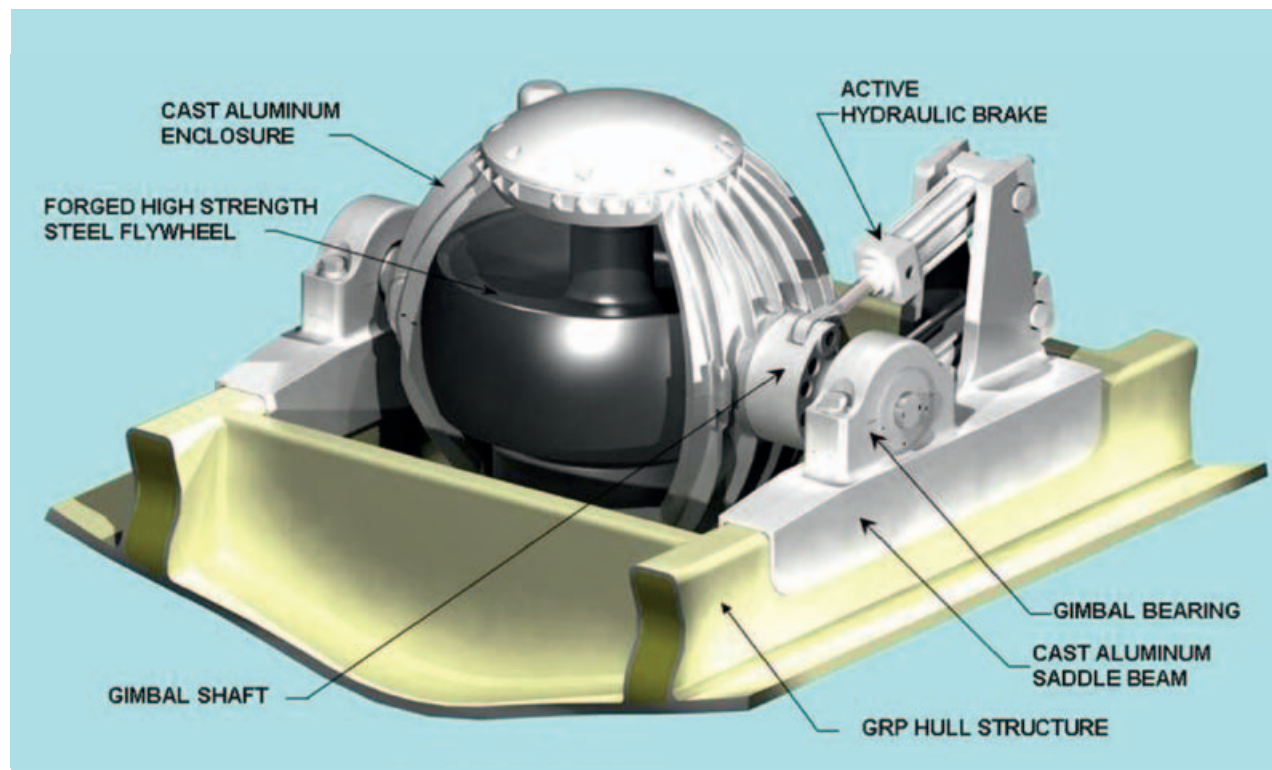
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flywheel's spin but merely disengages its effects by isolating the hydraulic rams.

Ideally, we would have liked a snotty south-wester barrelling up the Hauraki Gulf to sample the gyro's characteristics. Perversely, the weather gods provided a cloudless, breathless day, with barely a ripple in sight, so we opted for the next best thing: playing in the wake of the Waiheke ferry.

Lying side-on to the wake without the gyro produced a stomach-heaving roll and while up in the tower, a white-knuckled grip. Three seconds after switching it on, the gyro dramatically stabilised the boat, virtually eliminating the roll. We did this a number of times, switching between modes to gauge the gyro's effect, and it was very impressive. Check out the video at www.boatingnz.co.nz and make your own judgements.

Remarkably, Seakeeper has only been in business for five years, but its gyros have quickly become must-have options on top-of-the-range European yachts. Builders such as Sunseeker, Fairline, Heesen, Princess and Leopard, and Australian builders Riviera and Maritimo, have all begun fitting the units. French



builder Couach has made the gyros standard equipment on every yacht.

Seakeeper says its sales in the first nine months of the year were three times higher than for the same period a year earlier, and it expects sales to double

again next year. It is fielding a lot of interest from operators of wind-farm service vessels and pilot boats, and has also installed its gyros on military craft such as torpedo recovery vessels.

Matariki Nui is the first New Zealand

boat to be equipped with the Seakeeper M8000 gyro, although another is being fitted to a new build.

For more information on the Seakeeper, contact the agent, Manukau's Pacific Driveline Ltd, on 09 262 3241.

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