

## RACING YACHT



PHOTO: THIERRY MARTINEZ

# The world's fastest monohull

**THE WORLD'S LARGEST RACING YACHT HAS PROVEN SHE IS THE WORLD'S fastest monohull, and she has strong Kiwi connections.**



Greg Elliott.

Designer Greg Elliott represented one-third of the principal design team; Chris Mitchell did the rig analysis; Southern Spars built the masts and North Sails New Zealand built the sails.

The sleek, 42.6m (140ft) schooner, *Mari Cha IV* legged it west to east, 2,925 miles, across the Atlantic in six days, 17 hours, 52 minutes and 39 seconds. She beat the record set in February 2001 by Switzerland's Bernard Stamm on *Armador-Lux* of eight days, 20 hours, 55 minutes and 35 seconds.

En route *Mari Cha IV* became the first monohull to sail more than 500

miles in a day and set a new 24-hour distance record of 525.5 miles. That beat the record set in April 2002 by John Kostecki's *Illbruck*, of 484 nautical miles.

The *Mari Cha IV* project has involved Elliott since 1999 when a representative of Robert Miller, owner of the super ketch, *Mari Cha III*, walked into his Birkenhead office.

The representative asked Elliott to do some preliminary work on what the fastest monohull might look like, and of what it might be capable.

Elliott presented his efforts to a meeting of spar makers, sail makers and

designers who would potentially be involved. All were sworn to secrecy.

That meeting saw the appointment of a design team — Phippe Briand, Clay Oliver of Team New Zealand and Greg Elliott as principal designers working within a wider team. Frenchman Jérémy d'Etiveaud was project manager and design director, assembling the information from the principals.

"Every few months I'd fly to New York for a three-day meeting," Elliott says. "We'd go over the work we'd done and see what we needed to do next to get to this goal: what we





**TOP AND BOTTOM:** Total concentration onboard as *Mari Cha IV* sets a new speed across the Atlantic.



think is going to be the world's fastest monohull."

But yacht design is still an individual's sport and Elliott says, yes, there were plenty of strong discussions. "But it's like the design of any yacht – you have to put it all in the context of practicality." Here, he credits Mike Sanderson, Whitbread and America's Cup veteran, whose understanding of deck packages and placement of tasks throughout the boat was often a deciding factor of discussions. Between meetings in New York, designers' drawings and ideas flew through cyberspace.

Early on, they asked Robert Miller to firm up his brief for the world's fastest monohull – fastest doing what? The reply was "everything" – regattas in St Tropez, maybe the Sydney Hobart, break the Atlantic record, perhaps even be the fastest monohull around the world. Breaking records scored a higher priority than winning regattas.

A boat destined for regattas tends to be optimised for upwind conditions; a boat destined for breaking records can concentrate more on reaching and running performance.

Having set the boat's length at 140ft, the team tank tested three scale models over two weeks at Gosport in the UK to consider hull shape, drag, speed versus heel and sea-keeping abilities. From







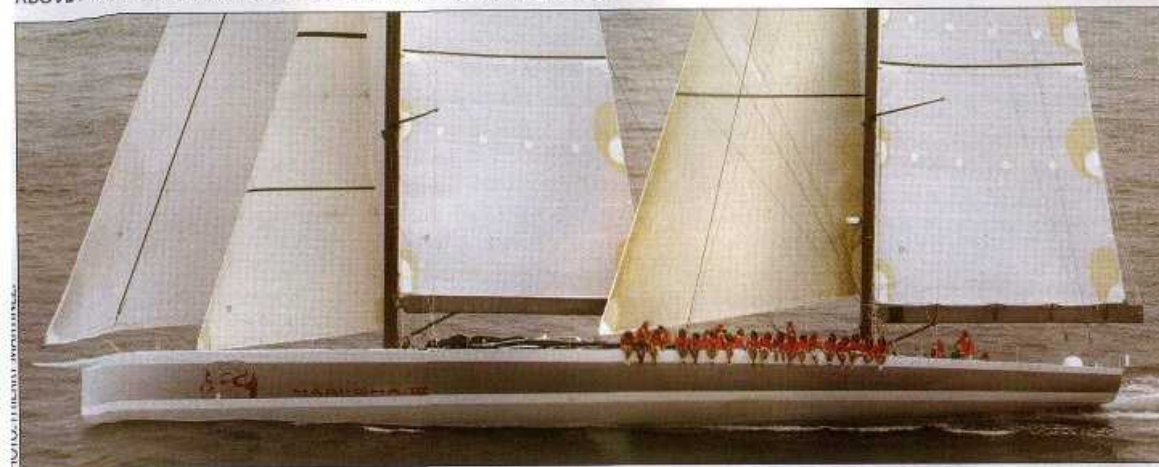
PHOTO: MARI CHA IV

there they developed a hull which became *Mari Cha IV*. One of the 7m models is behind Elliott's office and theoretically could become a boat. That would be pretty cool – to finish it off and sail around the harbour in a scale model – close enough – of the world's fastest monohull.

In Auckland, they ran sloop, ketch and schooner models in the wind tunnel, with the key issue being heeling force versus driving force.

Budget and practicalities put the length at 140ft. They had established 300m<sup>2</sup> as the maximum, manageable size for one sail. The sloop rig disqualified itself since a mainsail would be around 500m<sup>2</sup> and, being primarily a record-chaser, the superior upwind performance of a single-masted yacht wasn't as crucial. Further testing put the schooner at faster than the ketch.

"That doesn't mean *Mari Cha IV* is no good to windward," Elliott says. "She's exceptionally good: twenty-two apparent at twelve and half knots, it is



absolutely ...". It's not the only time in this interview that he is stuck for words.

The tank testing and calculations gave them the optimum heeling angle which led the team to consider ballasting options to achieve that heeling angle for the sail area.

Velocity prediction programmes and computer generated polars showed a swing keel boat would be faster on an Atlantic crossing but water ballast would prove faster in other conditions. They decided to have both.

*Mari Cha IV* would sail upwind with her keel set in the middle, like a conventional, fixed keel, with water ballast to provide the stability. Off the wind, her crew would dump the water ballast, thus saving weight, and cant the swing keel to windward.

Controlled by a hydraulic cylinder, it would be the biggest swing keel ever built, and part of 19 tonnes of ballast.

More than a year had passed. "There was no guarantee the project would go ahead," Elliott remembers. "Then we presented the results: 'This is what we think is the fastest monohull in the world.'" The owner gave the go-ahead.

Design work moved to include the tedious stuff like stanchion foot details. Construction began at JMV in

Cherbourg, France in November 2001. The boat was launched in August 2003.

"It's a great boat," Elliott says, "but all the way through the brakes were on a little bit because who wants to be the first person to build a 140 foot racing yacht that breaks in the middle of the Atlantic?"

*Mari Cha IV* represents a lot of new technology but all those involved are tight-lipped. Richard Bicknell of North Sails says the most amazing aspect is the 3DL carbon fibre sails – the world's largest of their type – for upwind work which have no other fabric in them, to keep them light. The downwind sails include other fabrics, including nylon and Spectra. There are 15 sails in total. The lightweight, C-Tech carbon fibre battens were developed for the huge loads.

"The sails were just fantastic," Elliott says. "The first time we put them up, they were great and that is not easy to do at that size."

The carbon fibre technology was tested on *Mari Cha III* during the Millennium Cup and proved viable. Incidentally, there are more differences than similarities between the two boats: *Mari Cha III* is 148ft, 109 tonnes and decked like a superyacht below decks. Much of her interior can be removed for racing but it takes about two weeks to





PHOTO: MARI CHA IV



convert her and requires storage, transport and refitting. With the launching of her smaller sister, *Mari Cha III* will keep her luxury interior.

*Mari Cha IV* is 50 tonnes without water ballast and a barren cave below. Elliott has sailed about 3,500 ocean miles on the *Mari Cha IV*, including initial sea trials near her launching in France and her delivery to Bermuda and on to Newport. What was it like? "It's... it's pretty cool."

"I guess the thing that's most fantastic is: you've got a 140ft boat under sail and you can sail it like a 40-footer because it's like a racing yacht. It's very responsive – two fingers on the wheel at 25 knots-plus. You can put it anywhere you want. It doesn't have a bowthruster yet we came into Newport, did a u-ee and reversed back and berthed it. Just like a 45ft yacht."

Inside, he says, *Mari Cha IV* is a cavern. If Elliott stands on the cabin sole, he can just reach the cabin top. The long white interior stretches, almost empty except for bulkheads, ring frames, the nav station and the odd pipe berth – there were 23 crew on board when the boat broke the Atlantic record.

Below decks, when sailing, it's a carbon drum. "At 25 knots, the resonance of the carbon is extremely noisy but you get used to it. You think you're doing 40 knots but you come out on deck and you're only doing 20." Only.

As for the motion: "It's a big boat, it still bangs going upwind in a seaway like any normal boat does but you don't see waves coming over the decks. It doesn't recognise two metre waves but it recognises a decent swell. It's not uncommon for the boat to come out of the water back to the mast going upwind." The *Mari Cha IV* website talks about the boat breaking the 40-knot barrier. "I don't think that's achievable. It would have to be one hell of a wave."

His personal satisfaction from the boat comes from its role as a proving ground. "It's interesting to note the lessons learned with smaller boats flow into the bigger boats," he says, noting it shares many characteristics with his 16-metre schooner, *Primo*, launched in 1994.

"It's just fantastic that somebody had the vision and the courage to build a boat like *Mari Cha IV*. It's an enormous commitment no matter how you look at it. And I hope it will spark other proj-

## SPECIFICATIONS

loa	42.6m, 140ft
hwt	40.2m, 132ft
beam	9.6m, 31ft 6in
draft	6.5m, 21ft 3in
disp dry	50 tonnes
water ballast	10 tonnes
keel & ballast	19 tonnes
mast above water	45m, 147ft 7in
sail areas	
mainsail/mizzen	310m <sup>2</sup> , 21ft 3in <sup>2</sup>
code 0	550m <sup>2</sup>
mizzen staysail	390m <sup>2</sup>
genoa staysail	110m <sup>2</sup>

ects, that it will get people interested in trying to break over 600 miles in a day."

There is serious talk of *Mari Cha IV* being the first monohull to go around the world in less than 80 days. The current record is held by Michel Desjoyeaux's *PRB*, at 93 days, three hours, 57 minutes and 32 seconds.

When *Mari Cha IV* set the new Atlantic record, she shaved around 25% off the existing record. To sail around the world in less than 80 days would require her to shave just 14% off the record. They'd better start making crew out of Kevlar.

