Words
Ivor Wilkins
Pictures
Thierry Martinez

MARI CHA IV

SPEED MACHINE

The design process for *Mari Cha IV*, which recently smashed the transatlantic record and the 24-hour monohull record, began four years ago and continued for 18 months with no guarantee that the ground-breaking yacht would ever be built.

"It is a real credit to the owner (Bob Miller) that he took the leap of faith to go ahead with the project," says Greg Elliott, who, with Clay Oliver and Philippe Briand, was one of the principal designers.

Elliott says the project began when he was asked to submit a concept design to fulfil a one-sentence brief: to create the fastest monohull in the world.

The *Mari Cha IV* project was governed by the fact that ocean record attempts have to be conducted on manually-operated yachts. All the sail trimming and handling functions, apart from the vangs and rig tensioning, must be driven by human power. "That was the overall controlling factor," says Elliott. "Everything had to be kept within the bounds of realistic deck hardware and, for example, the size of rope crew can get hold of and put around a winch."

Almost from the start, this limitation ruled out a sloop rig. Elliott has developed considerable experience with his very fast 50ft equal-masted schooner and it is no real

surprise to see a similar configuration on this yacht.

"But," says Elliott, "the decision was made easier by the fact that all the wind tunnel testing we did showed that the schooner rig was faster than a sloop on any given day and on all points of sail."

Elliott's 50ft schooner sports rotating wing masts, which must surely have tempted the designers of this project as well. "We looked at all kinds of rig configurations," says Elliott, "including, sloops, ketches and schooners. We looked at rotating wing masts as well. There is no doubt it could be done, but the owner took the decision to go with what has been tried and proven.

"Let's face it, the boat is already 'out there' compared with any other 140ft yacht on the water. I think the feeling was let's not be 'too out there'. We still have the option to retrofit the boat to a faster rig if we want to." Southern Spars, which built the *Mari Cha IV* masts, has developed a number of rotating wing rigs recently and would no doubt be keen to stretch their expertise with an upgrade on the *Mari Cha* project in time.

The trimming crew is split into two, the main section operating the forward mast, which carries the mainsail and headsails, with a smaller group handling the mizzen mast, which carries an equal size mainsail, but only utlises staysails when the sailing angles are quite broad.

In 12 knots of wind, with a true wind angle of 135°, the apparent wind angle will be 55° and the boatspeed will be 20 knots

The twin-wheel steering positions are quite well forward, with the mainsheet and headsail trimmers in front of the helmsman. Principal communication is with these trimmers, while the mizzen trimmers largely work intuitively to keep their set-up in balance.

With the typical speeds of this huge machine, the apparent wind is usually well forward, so that the mizzen sail is more often than not sheeted to the centreline or above. The speeds are more akin to multihull performance than anything usually associated with monohulls.

In reaching mode, the yacht almost always exceeds windspeed. "In 12 knots of wind, with a true wind angle of 135°, the apparent wind angle will be 55° and the boatspeed will be 20 knots," says Elliott, who joined the crew for the inaugural trans-Atlantic passage from France to the United States. "Upwind, with the apparent wind speed at 20 knots, you will be doing 12.5 knots in a seaway."

On the first trans-Atlantic passage, Elliott says it was impressive the way the boat maintained high speeds for long

periods. "It would just sit on 17 knots," he says. "On lots of other boats you will see 17 knots in bursts, but then it is back down to 12 or 13 knots. This boat just sits there. It produces phenomenally high average speeds (exactly what you are looking for in a record-breaker)."

Elliott says for one 24 hour period they had winds of about 16 knots on a broad angle and clocked up 420 miles. The boat's predecessor, *Mari Cha III*, which set many records in its own right, including the trans-Atlantic, never did a 24-hour run over 400 miles. On the record attempt, back across the Atlantic from New York to the Lizard, this one cracked 500 miles twice, clocking up a new record of 525 miles.

Stability is provided by a combination of canting keel and water ballast. The keel with its 10 tonne bulb can swing to 40° either side and 10 tonnes of water ballast can be pumped into the side tanks. "You use combinations of keel and water ballast," says Elliott. "You can't have the keel fully canted, plus full water-ballast, it would be too much. The rigs would not take the loads. "You either have the keel fully canted, with no water ballast, or half water / half cant, or full water and no cant."

In the absence of forward dagger boards, or canard rudders, the upwind configuration is to lock the keel in the vertical position to maximise lift and use water ballast for added displacement and stability. Then, as the wind angles come aft, you progressively get rid of water and increase the keel angle for stability.

Elliott says the principal design team comprised himself, Oliver and Briand with Mike Sanderson directing the sails and deck layout design and project manager Jeff d'Etivaud presiding. "It was very much a team effort," says Elliott. "Everybody had input into all aspects of the design. The design team would meet about every two months in New York for intensive three day sessions. Out of those meetings, we would assign areas for further investigation and research. Between meetings, communication was by e-mail.

"Jeff d'Etivaud did a good job of keeping everything on track. It would have been very easy to wander off the straight and narrow and, once that had happened, very difficult to bring it all back again."

No deadline was set. The initial task was to investigate the creation of the fastest monohull in the world but with no guarantees that the project would ever be more than a theoretical exercise. Finally, after 18 months of design and research, d'Etivaud judged the project ready to be presented to Bob Miller.

Having ventured before where nobody else had gone with his stunning Briand-designed carbon fibre ketch *Mari Cha III*, Miller has already revealed a pioneering spirit. Whereas that project had a split personality, sometime racer, sometime elegant superyacht, this one is a further leap to the edge. It is a no-frills, no-compromises racing machine. But Miller was ready to take that step and the result is the striking machine we see today.

Strong Kiwi connection in Mari Cha project

Mike Quilter in the nav station

New Zealanders made up a third of the 24-strong international crew on board Mari Cha IV when it embarked on its record-setting voyage across the Atlantic Ocean. Navigator Mike Quilter was one of the eight Kiwis on board. "It was one of those happy occasions where everything went right," he says of the historic voyage. "Straight out of the blocks, the boat went really well. We had no damage, apart from a trawled spinnaker. The boss was happy. We were happy. Everyone was happy."

Quilter's job was picking the right moment to embark on the record attempt and then, once under way, to keep the boat in the kind of wind that would get them across the Atlantic as fast as possible. In this he was assisted by Roger 'Clouds' Badham in Australia and Pierre Lanier in France.

With the boat ready and waiting in New York, Quilter set about studying the weather patterns. "You can look out ahead about a week to 10 days," he says. "As the weather systems track across the US, they tend to fall apart as they approach the east coast. Then, we saw one that held together and, in fact, improved."

The call went out all over the world for the crew to hurry to New York. They assembled on October 1 and in the afternoon of October 2, the giant yacht was officially timed off Ambrose Light at the start of its attempt.

"I have been lucky enough to sail on some special boats," said multiple circumnavigator Quilter. "This is one special boat." He said it was so smooth and effortless on the crossing that it almost felt like cheating. "You sail 450 miles in 24 hours on a Volvo boat and you are just about dead at the end of it," he said. "On this boat we did 525 miles and we didn't get a drop of water in the navigation station. Everybody was comfortable. We all slept in dry beds. It was good."

Most of the passage was sailed in four or five-sail reaching mode with a jib-top or code zero, inner staysail, the two mainsails and a mizzen staysail. In the first two thirds of the passage, they only gybed two or three times, but in the final 800 miles they were sailing almost straight downwind and had to gybe more frequently to maintain the optimum course and speed. "There was no surfing. We were in flat water most of the way, but the boat just smoked along. We saw 30+ knots on the GPS a few times, but most of the time it just sat on 21-22 knots for long periods."

The navigation strategy was to skirt around the north of the Atlantic high pressure zone and seek out winds in the mid to high twenties. The course took them about 3° north of the great circle route, coming into Ireland from the north and then working down the west coast. "We saw the Fastnet light." Then it was a sprint to the finish off the Lizard on the Cornish coast. On October 9, at 10.32 UTC, they were able to report that they were off the famous landmark, having completed the 2925 mile passage in 6 days 17 hours 52 minutes and 39 seconds, smashing Swiss solo ace Bernard Stamm's 2001 record of 8 days 20 hours 55 minutes and 35 seconds. Their 525 mile 24-hour run beat the previous monohull record of 484 miles set by Illbruck last year.

New Zealand's involvement in this project included Greg Elliott on the design team, the masts by Southern Spars and the sail wardrobe customised by North New Zealand.

Skipper / Owner:
Robert Miller – British

Navigator / Project Manager:
Jef d'Etiveaud – French

Navigator:
Mike Quilter – New Zealand

Helmsman:
Mike Sanderson – New Zealand

Watch Captains:
Brad Jackson – New Zealand
Stuart Bannatyne – New Zealand

Trimmers:
Brett Jones – Australian
Charlie Wroe – British
Jules Mazart – French
Robbie Naismith – New Zealand
Sean Clarkson – New Zealand
Sidney Gavignet – French

Grinders:
Brian McInnes – Canadian
Crown Prince Pavlos – Greek
Damian Durchon – French
Matthew Welling – American
Mike Howard – American

Bowmen:
Jacques Caraes – French
Jan Dekker – South African
Marco Chaverot – French
Richard Meacham – New Zealand

Pitmen:
Jared Henderson – New Zealand
Stefan Fodor – American

Engineer:
Rob Fischer – New Zealand