Seahorse
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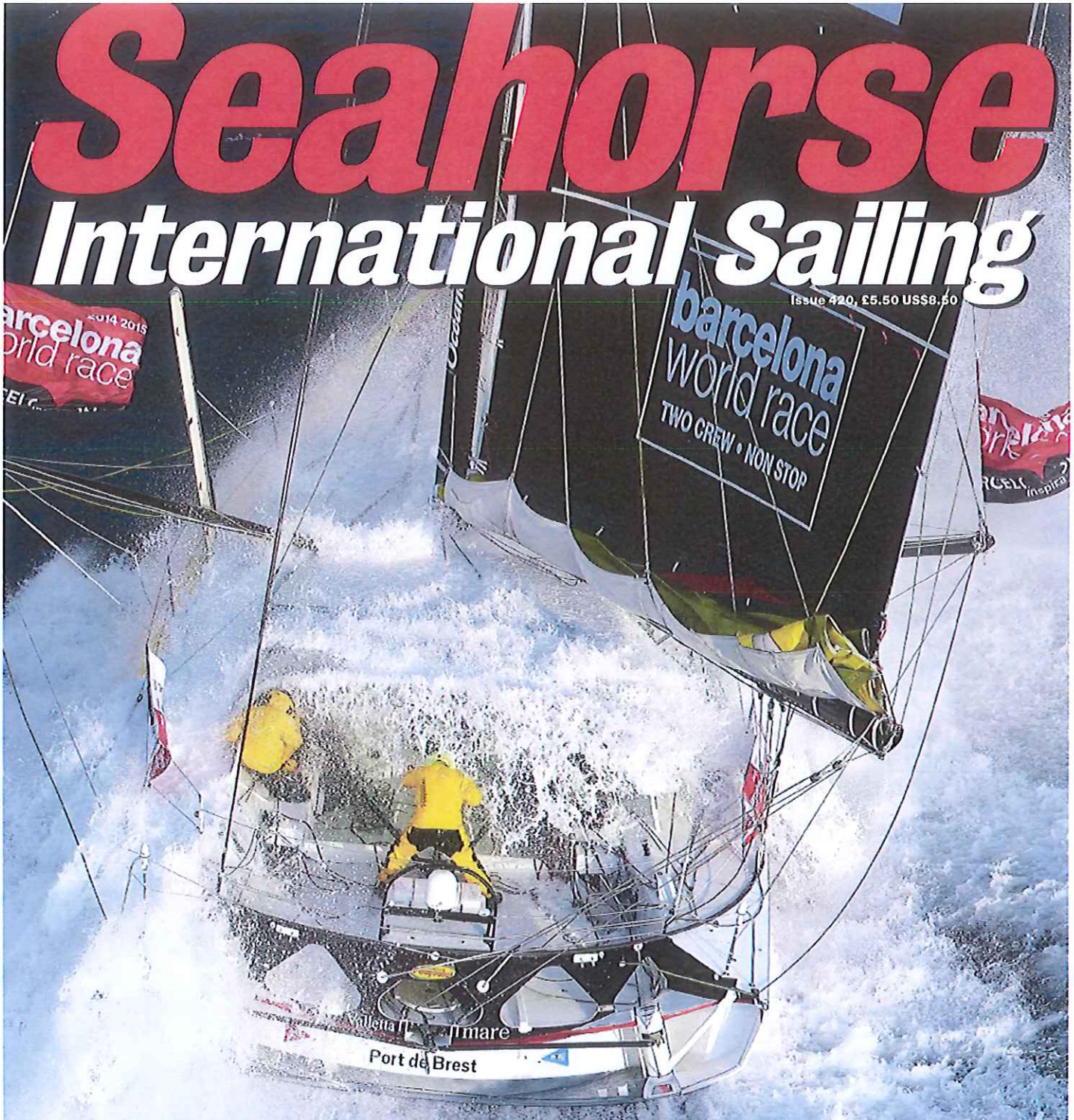

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concluded. 'The irony is that if Alex was French he would probably already have enough backing to race the Vendée Globe...'

Alex Pella ended up by slicing 1d 5h 23m off the previous Class40 record. He also becomes the first Spanish sailor to finish first in any class in the Rhum which was first raced in 1978. And, by extension, he is the first Spanish sailor to win a solo ocean race.

On the dock, looking absolutely delighted, Pella said: 'Now I am so happy. To win the race you have to finish and it was really only when I crossed the line that I realised that I could finally relax. I finished this morning having had to run off, climb the forestay and sort out a major drama with the A2 spinnaker... Not ideal but at least I had the luxury of a substantial lead.

'The whole race was really hard, the rhythm is very intense. The first two nights were especially hard, I broke the Solent and then repaired it the next day, losing a lot of distance off Ushant to my closest rivals.'

Eleven of the 43 Class40s retired. On the beginning of the first night a drama occurred on the two (very) new Sabrosa Mk 2s. These designs feature a fabricated keel fin with metallic skins screwed together like on an aeroplane. Much lighter than a regular solid fin but clearly rather suspect... The problem occurred at the top of the fins at the attachment point within the keel recess. The screws simply broke. Both boats were recovered, although François Angoulvant's had capsized and was towed home upside down.

The last damage registered in the Class40 happened on 21 November, when the race's youngest skipper, 19-year-old Paul Hignard, informed race control that his boat *Bruneau* had suffered a broken mast between the first and second spreader. However, he made it clear that he was not seeking assistance, before duly erecting a nice jury rig and making it to Pointe à Pitre to complete the course. Bravo.

So was the 10th Rhum particularly devastating? The answer is no. About a fourth of the fleet did not reach Guadeloupe – which is about average in the history of the race. In 2002, the worst edition of the Rhum, 28 of the 58 entries did not reach the finishing line.

Loïck Peyron, winner of the race in a record time (all the classes set record times!), was 55 years old on 1 December – the oldest sailor to have won the Route du Rhum (Mike Birch was 47 when he triumphed in 1978). In some way the victory of experience is cocking a nice 'snook' at the youngsters. Regular *Banque Populaire* skipper Armel Le Cléac'h and weather expert Marcel Van Triest were permanently in contact with Loïck during the Atlantic crossing. Armel said the decisive moment occurred around Madeira at the end of day two...

'We asked Loïck to make a big push because it was crucial to sail fast during the following 12 hours,' said Armel. 'He was already tired because he had had virtually no rest since the start. At that point the boat was still under ORC jib and two reefs in the main because of the severe early conditions, but we told him that he must now set the full main and open up the gennaker. It took him a very hard two hours to complete the operation.

'However, we were soon celebrating because *BP VII* then rapidly cleared away from its closest rival, the 40m *Spindrift 2*.' Thereafter, Loïck was never threatened.

Another story that was played down by the Banque Populaire team is that rushing through Biscay in rough conditions some cracking had appeared in the front crossbeam of the giant trimaran. Loïck sent pictures to his team who estimated that the weather conditions for the following days should not worsen the damage. However, Armel Le Cléach nevertheless did later admit that a full 10 days of repair work were required on the beam in Guadeloupe before the boat set out back to Brittany...

Patrice Carpentier

NEW ZEALAND

Confirmation of the America's Cup's worst-kept secret brought with it a mixed bag of positives and negatives for Emirates Team New Zealand. Entirely reliant on commercial and government backing, the team made no secret of a preference for a North American venue for the 2017 contest, but was fully prepared for the Bermuda announcement. A big positive was reference in the official

A competitive commission...

Mark Mills describes design development of his aggressively targeted new 62-footer Super Nikka

In late 2013 we received an email enquiry from Italy for a design in the 60ft range. As we learned more about the client and his team the pieces began to fit together to form a very promising and productive design opportunity. A brief for a high-performance racer-cruiser is always a difficult request, often compromising both sides of the equation, but this client was a little different…

Roberto Lacorte is a very dynamic individual, a successful businessman who also drives for the Sport Prototype motor racing team he sponsors, races his 2012 Vismara 47 *Lady Nikka* as well as cruising it in summer with his family; and when he felt there was too little offshore racing in northwest Italy he founded the now-thriving 151 Miglia Race.

This race, plus others like the Giraglia, the Rolex Middle Sea Race and the Maxi Worlds, framed the target for Lacorte's new design, in a vision not just to combine racing with cruising, but to create something powerful and beautiful to do both in. The new boat had to look extraordinary as well as race effectively when not fully fitted out for family cruising. In cruising trim the requirements included sub-3m draft, powered winches, dinghy storage in the transom, a retracting bow thruster and an anchor windlass, on top of the two ensuite double cabins aft and the master suite forwards.

To get a feel for his options at this size Roberto chartered the 65ft *Stig* for the 2013 Middle Sea Race and placed second overall entered as *Nikka 65*, confirming the team's skill and learning a lot about what they wanted from their new design.

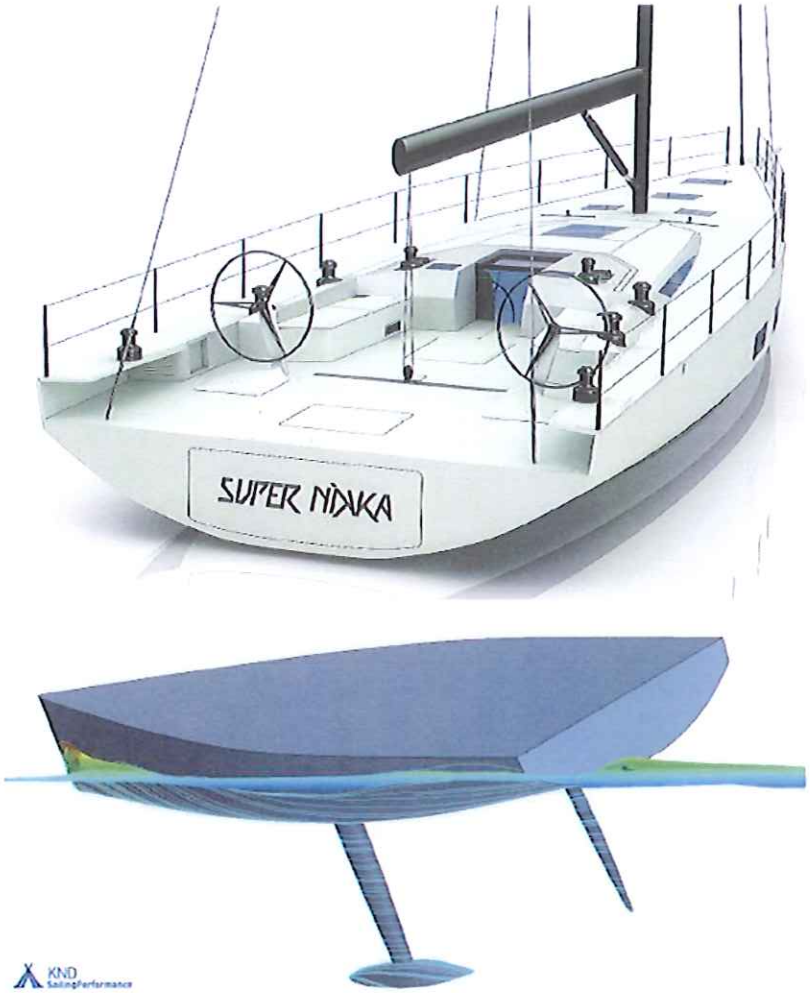
At the core of Roberto's team is builder Alessandro Vismara, head of the large Vismara Marine facility in Viareggio where he has produced two of Roberto's previous boats. The design responsibility would be a joint effort with Vismara, an experienced designer himself whose large technical office had already produced a detailed preliminary layout for *Super Nikka*. This allowed us to focus on our strengths in producing the external geometry for hull and deck, appendages and rig sizing while the Vismara team produced the structures, layout and systems.

At the outset we agreed that the basic boat needed to be as aggressive as possible and concentrated on separating the racing and cruising configurations by making much of the cruising gear removable – including the anchor windlass and replacing the transom door/swim step with a lighter panel. Draft would also be maximised with a lifting keel arrangement, lowering the bulb to 4.2m. Armed with a target racing measurement condition displacement of 16,150kg and resulting weight distribution, we could begin to shape the design around these initial requirements.

To develop the Super Nikka hull and appendages we relied on the development programme originally created with performance prediction and analysis experts KND/Sailing Performance for our 2014 Maxi 72 World Champion design *Alegre*. This process is now a fundamental part of our performance design procedure, and begins with an analysis of the weather conditions and expected racecourse types to build a weighting matrix favouring performance in the particular conditions we want each boat to excel in. This racing event profile was Mediterranean and primarily offshore, suggesting a light/medium-air bias and a more even mix of wind angles than our more usual inshore windward-leeward orientation. This larger reaching component favours a wider, lighter boat, with chines, and a healthy sail plan to keep moving though a quiet Med offshore night.

Working with KND partner and panel code specialist Roland Kleiter and using custom aero coefficients from the designers at North Sails Italy we began to analyse a range of hull shapes using the North Sails VPP. We started with a development of *Alegre* with soft chines set well inboard, and began sequentially comparing that with more aggressive shapes using more powerful chines further outboard – which proved to be very effective upwind.

Over more than 20 iterations we developed the harder chined hull form until we were happy that it presented



Super Nikka **boasts aggressive chines albeit sited relatively high up in order not to prejudice performance upright and in light airs. With relatively conservative and rounded aft sections a single rudder is felt to be more than adequate for good control**

minimal negatives in the light-airs upright condition, and was clearly beneficial when heeled over in a breeze.

The balance when drawing hulls of this type is firstly to try to use as much hull length as possible, especially when heeled, without a wetted transom that results in a drag increase, and then to gain as much stability as possible in the powered-up heeled condition upwind and reaching without an imbalanced helm or ending up sticky as a result of too much wetted surface area upright in light airs. Boats just intended for reaching are less troubled by these issues, while boats racing on windward-leeward courses find that balance more difficult, explaining why hard chines aren't common on inshore designs like TP52s and Mini Maxis. However, with a significant reaching component *Super Nikka* has a wide enough performance profile to make chines an attractive compromise, while retaining the need to perform in light conditions and carry added loads in cruising trim.

The North Sails VPP integrates the lift and drag solutions produced by the DasBoot panel code with other speed-producing factors such as sail area, aero coefficients, stability and so on, to produce the final performance output. Use of panel code allows a wide range of potential solutions to be evaluated more quickly thanks to a simplification of the governing equations (in essence their validity excludes boundary layer effects), but this does have the tendency to over-predict powerful solutions like wide transoms and full bows.

Validating the final stages of hull shape development using RANS CFD is an integral part of the process. 3D Reynolds Averaged Navier Stokes Equations (RANS) yield the most accurate solutions at the cost of a large volume of computation (thousands of iterations on multimillion element grids). In return, one can expect a very good assessment of the wave and viscous drag and to catch any drag under-prediction from the panel code stages.

Using a set-up developed for the KND Volvo 65 RANS program, the appended model featured 10 million elements, evaluating drag, rudder angles across the range of heel, and helm balance. Appendage sizing and positioning are a major component for performance, especially upwind in light airs. In the past it was common for designs of this size to find it difficult to achieve good balance, requiring large amounts of rake to get reasonable rudder angles – which is a key factor in upwind performance. Having resolved this issue during the design of *Alegre* we were confident regarding predicted balance, even on a relatively wide hull form with a single rudder and sizable sail plan. The RANS phase confirmed the design was on the right track with smoother stern sections, a relatively high chine aft, and moderate bow sections which produced the most promising combination in our race model.

Having originally proposed a relatively large rig for a racer-cruiser, we agreed after discussions with the team and their North sailmaker Alessio Razeto to ensure no compromise was made in terms of performance in light conditions, and went back to compare increased rig sizes with their rating impact. One factor in this decision was our experience that VPPs are insensitive to the negative effects of righting moment in light conditions. This may partly be down to sailor expectations that heeling early in the light feels faster; but it seems to be backed up by experience racing in the Mediterranean that heeling moment (HM) and righting moment (RM) work best in a certain range. Our revised rig sizing moved the HM/RM relationship towards the better feel end of that band, a step made possible by the powerful hull shape being amenable to the increase in power further up the wind range.

Once the hull shape was finalised we prepared preliminary deck shapes to combine an effective racer-cruiser deck layout with the aesthetic demands of the client for a sleek, powerful machine, in his words 'A missile'! At a meeting in Viareggio with Roberto and Alessandro and the other key players in the team this initial idea for a wide, low coachroof with chines and angular cockpit sides to complement the hull shape was refined into the final configuration, allowing the boat to be sailed by a range of crew numbers as well as creating a safe, confined space for family sailing.

The interior is a development of Roberto's previous *Lady Nikka*, similarly finished with minimalist Italian style. It boasts a large, open saloon with galley and desk either side of the main hatch, double guest cabins aft and a large owner's cabin forwards. Carbon/foam construction incorporates many techniques and ideas from the practical and resourceful Alessandro Vismara and his team, who have one of Europe's best track records with stylish performance racer-cruisers, albeit one that perhaps is not so well known outside Italy.

Yet again for Mills Design the best projects exhibit a team mentality. The Super Nikka project has been one of the most pleasurable we have undertaken, working with a gifted, enthusiastic owner and a very professional yard as partners. I look forward to enjoying the launching and trials with the team in March 2015, and to working with Vismara Marine on other new projects in the future.

Mark Mills, Ireland ❑