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New Humphreys Class40

Andreas Hanakamp gives us the guided tour to Christof Petter's new Vaquita

Thursday November 28th 2013, Author: [James Boyd](#), Location: none selected

The Transat Jacques Vabre is providing a good preliminary reference for the pace of the Class40s, and in particular the plethora of new designs, ahead of next year's all-important Route du Rhum, where an unprecedented-sized fleet of more than 50 Class40s are expected to be on the start line.

Among the latest offerings is the new design from Tom Humphreys (son of Rob), the Lymington-based design office's second stab at the Class40 following on from their two first generation boats, including Richard Tolkein's *ORCA*. (Read Tom Humphreys design notes about the boat [here](#)). The first example of their latest offering is competing in the TJV in the form of Austrian Christof Petter's *Vaquita*, co-skipped by the boat's project manager, Andreas Hanakamp, former skipper of the *Team Russia* VO70 (another Humphreys design).

This is Petter's second Class40. Having got into sailing race boats when he did part of the delivery back to Europe on the *Team Russia* VO70 after she'd retired from the Volvo Ocean Race, Petter initially acquired an Akilaria RC1. Aboard the first *Vaquita*, he won Italy's leading doublehanded race, the Cinquecento X2, before crossing the Atlantic with the ARC and subsequently racing the RORC Caribbean 600.

After contemplating the refit of an existing boat to bring it up to Category 0, Petter chose to go with a fresh design for his second *Vaquita*, which he had hoped to take in this year's Global Ocean Race until the start date for the Class40 round the world race was shifted on by a year. Having competed in the Rolex Fastnet Race in the new boat this summer, and now nearing the end of the TJV, the program ahead for the boat includes the RORC Caribbean 600, a new eastbound Class 40 transatlantic race and then the RORC's Sevenstar Round Britain and Ireland race.

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The new boat has all the features you'd normally expect from a latest generation of Class40 – minimum freeboard, a chamfer (angled deck to hull join/gunnel) running the full length of the boat and a cabin top, complete with side windows, designed to promote self-righting (to conform with Global Ocean Race requirements) while reducing windage, deck weight and lowering VCG. Compared to the earlier generation designs there is more volume forward (somewhere between the voluminous Mach 40 and the latest Verdier design *Fantastica*) and there is a prominent chine that runs most of the way to the bow, maximising hull form stability while minimising wetted surface area.

Andreas Hanakamp explains: "Everybody has tried to have maximum power when heeled at 15-20° and reducing wetted surface area and it is a case of finding the right compromise between the two."

Hanakamp has been central to the creation of the new *Vaquita*, working with designer Tom Humphreys on the conception of the boat and then project managing its build at Ocean Tec in Slovenia, reasonably close to his home base in Austria. While Ocean Tec handled the construction (in glass/foam/epoxy – carbon/Nomex is prohibited by class rules), Hanakamp brought in his own team to carry out the technical fit out. The boat was built from female tooling so further examples can be built.

A list of stability and weights of all the Class40s is available and while others are close, it shows that *Vaquita*, along with the Botin 40 *Tales Santander 2014* are the only ones in the fleet to have hit both absolute minimum weight (of 4,500kg) and maximum righting moment. "We were very much driven by weight consideration," states Hanakamp. "We saw a lot of boats were heavy and for example the old *Vaquita* was 200kg overweight. This boat is 4500kg. What we wanted to achieve was maximum righting moment with minimum weight and with the weight concentrated in the middle as much as possible. During the build everything was weighed and we had a guy who spent his time looking over people's shoulders to make sure that no extra weight was coming on board."

It is believed that some of the latest Class40s are now coming in under minimum weight and rather than have the measurers place correctors in an unfavourable position (as stated in the rules), the builders/teams are adding weight centrally through extra laminate to bring it up to the 4,500kg minimum. The class has attempted to resolve this with designers now obliged to submit plans prior to construction. but Hanakamp reckons that internal ballast should be legalised. This he argues would keep Class40s competitive for longer as inevitably boats get heavier over the course of their life and the internal ballast could be removed over this period to compensate. However this would require an ever greater exactitude to how the boats are built which would in turn raise build costs.

Engineering work for the new Humphreys Class40 was carried out by Giovanni Belgrano's company Pure Design and Engineering (engineers for Emirates Team New Zealand) and this included specing her build to Cat0, required for the Global Ocean Race, although the boat is currently racing in Cat1 configuration necessary for the TJV. As seems to be the modern way, the structure relies more on longitudinals (of which there are four), enabling lateral structure to be minimised - ie there are large apertures in the bulkheads to make stacking easier but these are small enough so that doors can be fitted to them to comply with Cat0.

Class 40s are not allowed a canting keel and are limited to carrying 750kg of water ballast each side. *Vaquita* has a single tank each side, the water is just used for increasing righting moment, with longitudinal trim adjusted by moving the stack.

The positioning, height, depth and length of the water ballast tanks has been carefully researched by Humphreys and, as on the Forty(1)Design, they have no transfer pipe, as the latest iteration of the Class40 rule includes in its 750kg water ballast limit, water carried in this pipe. So as a result before manoeuvres they dump the ballast and have to bring it back on board in the new tack.

In fact Hanakamp says he prefers this solution: "I always hate tacking with water ballast because with all the water in the leeward tank you are slow and going nowhere. So we built in these huge dump valves which empty the ballast tank in under 30 seconds." Pumping up ballast on the new windward side takes four to five minutes.

They also attempted to minimise the number of through-hull fittings. Thus the cooling water for the engine is extracted from the ballast system as is the water for the watermaker. To help centralise weight the diesel tank is incorporated above the keelbox.

According to Hanakamp a development group comprising himself, Tom Humphreys, their sailmaker Elvström Sails and Southern Spars worked on mast design, looking at the different options - swept back/in line spreaders, deck stepped/keel stepped, two/three spreaders, etc. While some Class40s have gone to the ultimate extremes in trying to the lower the VCG of the rig by having just two spreaders and fitting them low on the mast, *Vaquita* has a relatively conservative option with a deck-stepped set-up and three swept back spreaders. "It is conservative," Hanakamp admits, "but at the same time you gain stability under top mast reaching sails. VCG is basically the same as all the two spreader masts and you have more control over the mast. Windage is roughly the same, because other people have wider second spreaders and they have to have additional intermediate shrouds."

The upper spreaders are shorter which also makes it easier to sheet an overlapping Code 0.

The boats features what Hanakamp calls the 'Cadillac wings', the elevation in the stern quarters of deck which we call 'batwings', however these are only used to raise the chainplate for the spinnaker sheets - while other boats use this also as a chainplate for the runners, which on *Vaquita* are anchored on the transom, closer to the

centre line. "I wanted to have the runner in a position where it puts less torsional loads on the boat, so we did that for structural considerations," Hanakamp explains.

The school is also out over whether there should be a vang or not - the Botin Class40 has one for example, while *Vaquita* does not. "With the angles we are seeing, we don't feel that we need a vang or some improvised system," says Hanakamp. "We have fitted a line under the boom so we can hook up a tackle arrangement if we feel we need it, but we never have, because we have very good control over the twist. With mast height limited to 19m, you want to make use of the maximum luff length of the mainsail and while I was keen for a vang initially, when we fully understood the implication of having one and how it affects luff length, we let it go, but decided to have maximum traveller length to get the best twist control on the mainsail."

There is a single companionway, although this is offset so there is somewhere to put the companionway door, and as a result the pit is divided in two and there are twin tunnels piping lines back from the mast step through the top of the coachroof.

Antal deck gear is fitted and most significant about the cockpit layout is that it features four rather than five winches, having shed a dedicated mainsheet winch. They have managed this by hooking up an innovative hydraulic ram system on the runners (see the video below) which includes an auto-release system for the runner (which sounds dangerous). But as Hanakamp describes it: "It opens softly and there is not this 'bang' that you normally get when you take the runner off the winch. You open the clutch, go into the gybe or tack and, when you change side, you just pull a string and first the hydraulic ram opens the ram, it smoothly eases the runner and it automatically opens the shackle in the martinbreaker, which leaves the ram dangling from the guard rail."

The runner itself is in Kevlar, although Hanakamp in retrospect believes they should have gone to PBO to reduce windage, and is fitted with a deflector allowing the top of the runner to be pulled into the mast lower down when using fractional headsails.

Having the runner on a ram frees up a winch for the mainsheet. To achieve this they have a 'German' mainsheet system, ie the main sheet is double-ended with both ends running forward up the boom before returning to the pit area.

Hanakamp has been working on a sail development program for *Vaquita* with Elvström in Denmark and says they have built to date around 15 sails (they are on a second generation main and third and fourth generation jibs).

As mentioned previously, the Class40 rule changed recently so that boats no longer have to carry a trysail if they have an equivalent-sized fourth reef. This has had the effect of adding a sail to the inventory of eight. After main, solent, staysail and storm jib this leaves four for reaching and downwind. Hanakamp says they have chosen their four from 10 sails. So this indicates that the Class40 rule isn't at present doing a satisfactory job in containing sail development....

Hanakamp observes that this does allow you to tailor your sail inventory to specific races. So for the Rolex Fastnet Race for example they had a very good idea of the expected weather and the wind angles they would most likely be seeing, whereas for a substantially longer race, like the Transat Jacques Vabre, sails must cover a broader spectrum of conditions.

"We did a lot of climatology work about the TJV route and we have two sails covering quite a small area on the crossover chart because we feel that is where we need to gain speed and an advantage over the race course. So we have an A2 and another sail. Then you have to have some kind of heavy downwind sail, which leaves one spot open either for a Code 0 or a Code 5."

Unlike the majority of new Class40s, *Vaquita* has a fixed bowsprit (most can articulate enabling deeper angles to be sailed downwind). "When we analysed all the data and saw the wind angles we have been experienced, we didn't feel we needed a rotating bowsprit," Hanakamp explains. However the set-up is such that a canting sprit could be fitted in the future.

On the foredeck the aim had been to minimise the number of lines running aft by, for example, using one tack line for both the staysail and inner forestay but in the end they opted for individual lines. Halyard locks are currently prohibited by the Class40, but Hanakamp says he would very much favour them being allowed. The boat is fitted with the now ubiquitous movable rings (rather than tracks) to control the jib sheet leads.

As on the [Forty\(1\)Design](#), the angular cabin top extends well forwards of the mast, to optimise the part it plays in righting ability during the inversion test. From around the mast area forward, the coachroof sits on top of the deck (ie the deck continues beneath the coachroof), on which the mast is stepped (ie around 20cm below the coachroof). According to Hanakamp, this is for VCG and structural reasons. It also prevents water ingress into the cabin with lines at the mast step disappearing beneath the coach roof and round hidden turning blocks before they are piped directly aft to the pit through the twin tunnels.

The cockpit is deep, both lowering VCG and increasing protection for the crew, with a central elevation that allows access down below to the escape hatch in the transom. There are twin tillers and, with a mainsheet track in the way, the shape of these took some working out to enable full rudder angle to be achieved. There is some protection around the sides of the cockpit (although this can be adapted according to what an owner wants) and there is even a sliding hatch over the companionway.

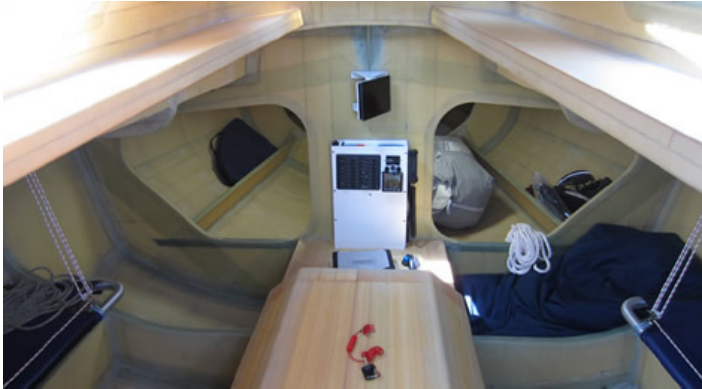


The instruments are interesting. They use a new Austrian product called Sailmon which Hanakamp says is the best display on the market. "Every display has its own processor, so if you have a multiple display set-up you define one as the master and the others as the slave. If the master fails one of the slaves picks up as the master. And from calculating power point of view they are probably better..."

Effectively these are like PC displays and have the flexibility so they can display whatever data you wish, in whatever format (ie analogue or digital), either in portrait or landscape format. Hanakamp says they

used an early iteration of the displays on the first *Vaquita* for two years. We'll be writing about the Sailmon system in greater depth in due course.

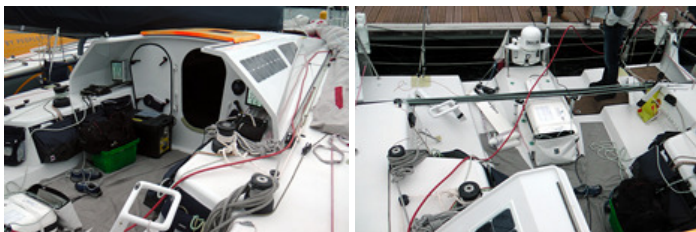
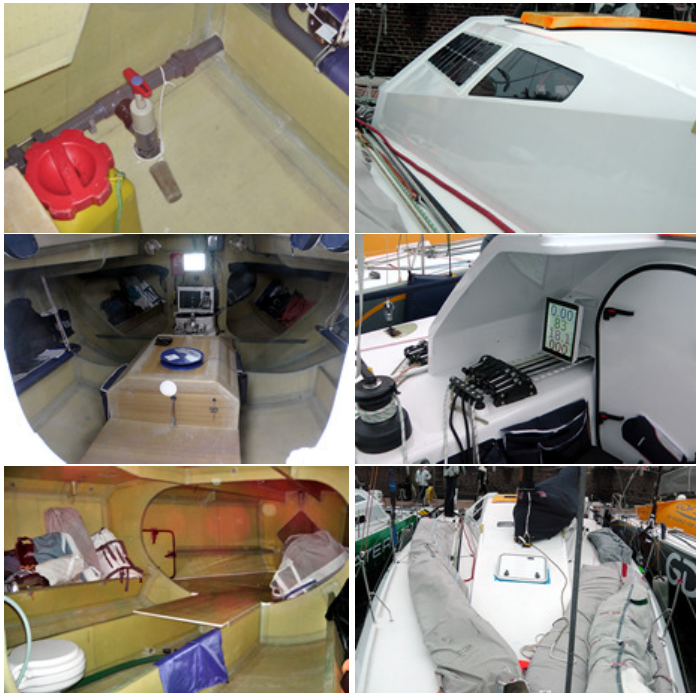
They also use a Simrad HS70 GPS compass plus the venerable KVH Gyrotrac to improve the compass heading, vital for the accuracy of the true wind calculations used by the autopilot. For the pilots they have two independent B&G H3000 ACP1 set-ups, with the option of either driving a Raymarine linear drive ram or a B&G hydraulic ram.

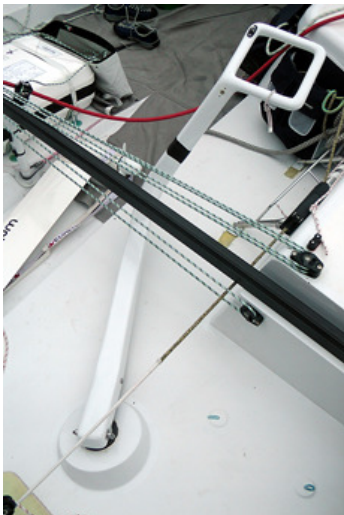
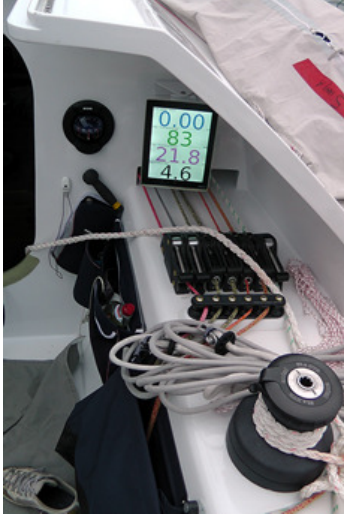


Down below the finish is bare glass with the engine box in the middle of the saloon and with the galley and nav station on the main bulkhead. There is a pipecot on either side of the main 'saloon' area and a plumbed in head mounted on the forward side of the main bulkhead.

After the VO70, sailing the Class40 is like a dinghy, says Hanakamp: "It is fantastic. Everything can be hoisted by yourself. You don't need to assemble troops to get a spinnaker on to the foredeck."

The basic boat costs €325,000, excluding the rig, sails, electronics, safety gear, delivery and tax.







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