SPEEDSEEKER – A REVOLUTIONARY NEW SAIL WITH RECORD BREAKING AMBITIONS

Throughout the month of July, Team Pryde stars Bjorn Dunkerbeck, Antoine Albeau, and Anders Brignal will be joined in Gran Canaria by Robby Naish in an historic attempt to break the World Speed Sailing Record, which currently stands at 46.52 knots. Speedseeker is the codename for the sail that has been developed amid tight security at the Neil Pryde Design Centre in Maui, with the sole aim of breaking the existing record and hopefully pushing beyond this to break the elusive 50 knot barrier.

Robert Stroj

Earlier this year we met with Neil Pryde's Head of Design, Robert Stroj, the man behind the Speedseeker concept. In the following interview he tells us more about how the Speedseeker came into being and about the innovative new developments behind this remarkable sail.

Tell us a little about how the Speedseeker project came into being.

Well the project really began last year with Bjorn Dunkerbeck's attempt to break the World Speed Sailing Record in the Canaries. At that time we hadn't done any specific development for a speed sail, Bjorn was simply using his RS Racing sails and was making a few test runs to identify where the weak points were in the sails.

We made some minor modifications right then and there to make the sails a little more "speed friendly", adding a little more material to enlarge the foot area, as speed sails tend to be used in a more upright position than regular slalom sails where you are raking the sails back more. I guess you could say that the Canaries attempts were more of a fact-finding mission to give us some idea where we needed to go with our later designs.

After the Canaries we continued adapting the RS sails, making modifications according to Bjorn's requirements and we definitely saw an improvement in the performance. But this was still basically a modified Racing sail rather than a purebred Speed Sailing rig and we knew that we'd have to make a bigger step, really start again from scratch, if we wanted to make a serious attempt on the World Record.

It's common knowledge that a double surface sail - that's a sail with a thicker profile - has certain aerodynamic advantages. So our first step was to build a fully double surface sail. There were two different avenues that we chose to explore with this. Firstly, Bjorn was in touch with some people at one of the Universities in Barcelona, and they'd

come up with kind of a concept project, which used a light foam that was moulded into a wing-like shape and then given a laminated coating.

All this particular prototype really demonstrated was that windsurfing sails require a high degree of twist, and this foam wing simply couldn't accommodate this, so we soon realised that it was almost un-sailable. The theory was good, but in practice it just didn't work. So we then took the alternative direction and began exploring twin surface sails based on more conventional, softer, flexible materials.

Our first prototypes were fully double surfaced, but we quickly learned that these too lacked the necessary degree of twist that a windsurfing sail requires. Essentially the two surfaces of the sail began to fight against one another once the sail was in motion and this restricted the natural twist of the sail and began causing drag.

So where we are today is we have a sail that has about 25-30% double surface in the leading edge - you could almost call this an unusually oversized luff pocket - and the remaining area of the sail is a conventional single piece which forms the "twist-zone".

We've found a very special Kevlar reinforced material for the double surfaced leading edge - what's special about the material is that it's very stretch-resistant in one direction, along the direction of the Kevlar threads, and it's a little more elastic and stretchable in the other direction.

We've placed the material in such a way that the Kevlar threads run horizontally, thereby preventing the sail from stretching and getting fuller when under load. But the material can still stretch and flex in a vertical direction up the luff curve enabling the sail to twist freely. So this material was a real breakthrough for us and was the real starting point for the Speedseeker design.

So take us on a quick walking tour of the Speedseeker in its present form, what makes it work?

The first real difference between the Speedseeker and the RS Racing is the outline. Right away you can see that the Speedseeker has a larger, lower foot, to accommodate the more upright speed sailing stance. You need to remember that Speed boards are shorter and narrower than conventional Slalom boards and that speed events are generally held in fairly flat water, so it's really not a problem to sail in the more upright position, which improves the efficiency of the sails.

If you look at the leech you'll see it's again a little different to the RS in that there are none of the Batwing concaves between the battens and because of this we've added more Mini-Battens - there are five in all - and they are a little longer than the regular ones to add more stability and support in the leech area.

Another very unusual aspect of the Speedseeker sail is that the regular sail panels and the double surfaced sleeve have quite a large area of overlap. Unlike a conventional sail where the panels end where they butt-up against the luff sleeve, the Speedseeker has quite a large area of overlap (25-30% of the sail area).

What makes this particularly tricky is that the sail panels are designed with shaping in them and the challenge was getting the shaping to continue smoothly as the panels transition underneath the double surfaced area of the sail. Fortunately, the material in the double surface areas stretches in the vertical direction and this enables the double

surface to accurately follow the curves formed by the panel shaping.

As I mentioned earlier, double surfaces don't really accommodate twist in the sail. So we've varied the width of the double surface to facilitate twist where it's needed. So you'll see that the double surface is appreciably less wide in the head area to leave a large, loose "twist area" in the top part of the sail and it's at its widest at the boom, where the panel tension goes furthest back in the sail almost to the leech.

Another point of interest on the Speedseeker is the profile. I think people will be surprised to see how "full" the Speedseeker is, even quite high in the sail. The fact is that unlike Slalom courses, where you have upwind and downwind legs, Speed courses are pointed way further downwind and you only travel in the one direction. So Speedseeker sails can stay relatively full because we're not worried about the upwind angle, we're only looking for maximum efficiency. Because of this fullness up top, both the 2nd and 3rd battens in the Speedseeker have Cams, unlike the RS Racing where we only have Cams from batten 4 downwards.

With little need to gybe and sail back upwind, the cams on the Speedseeker are set to provide maximum stability, in particular the bottom two cams are loaded with a lot of pressure, which helps lock the sail in one direction. The sail can only be rotated by pushing the lower part of the sail pretty firmly with your foot.

With speed sailing you tend to be using sails that are about two sizes bigger than you'd normally use, and the aim is to get the sails locked into position. What you don't want are the cams rotating back on themselves when you make slight adjustments, like sheeting out a little.

Another issue with the Speedseeker was the oversized, twin surfaced luff area. Because of the extreme width it was difficult to maintain tension in the sleeve area, so we've placed an additional tension strap at the bottom of the sleeve, which straps onto the extension. You basically downhaul the sail like you would do a conventional sail, but then you do a further, downward adjustment just on the sleeve area, to equalise the tension that's created from the main body of the sail. This added tension helps give us a nice clean, stable, leading edge.

As far as rig parts go, you've basically stayed with the standard X9 mast and boom and with conventional battens too, is that right?

Yes, the rig parts and battens are the same as those we use in the RS Racing sails.

Having done all this experimental work with the Speedseeker where you've really been pushing the performance and structural boundaries of conventional sails - were there any lessons that you've learned that you'll put into the next generation of RS Racing sails?

Yes, to be honest we had no idea how this new oversized sleeve construction would work out, but we've been pleasantly surprised at how well it's been working. With the first real Speedseeker sail we made it looked really odd when it was rigged, but after a few minor adjustments back at the loft suddenly it turned into this totally kick-ass sail. Quite honestly I thought we'd be messing around for a lot longer before we got it to be as good as the RS, but in fact we seem to have got it right very early on.

But does this only apply to sailing in one direction, you mentioned this before, Speedsailing is pretty much one-way traffic, whereas Slalom courses have upwind and downwind legs?

No not at all, this was one of the nice surprises we got. We were expecting the Speedseeker to be all about the upper end of the performance spectrum, a specialist sail that thrived in overpowered conditions or for sailing downwind. But quite unexpectedly both Bjorn and Jimmy [Diaz] reported that the sails were going through the lulls better and actually pointing better.

Now these aspects of performance were like unexpected bonuses, because actually a speed sail doesn't really need any of this and we weren't actually interested in these aspects of performance for the Speedseeker. But now we're obviously very interested in seeing how we can make use of this, we want to see how we can make our more conventional sails benefit from these kind of breakthroughs.

As soon as there's time we'll be building an 11sq/m racing sail as a benchmark and we'll see how far we can go with that too. We probably won't have the same outline at the foot and the sails most likely won't be as full at the top, but the essential construction looks very promising.

Bjorn Dunkerbeck

As a former World Champion with 13 World Titles, Bjorn Dunkerbeck has to be the main contender to break the World Speed Sailing Record later this year. We caught up with Bjorn in Maui last month and spoke with him about his involvement in the forthcoming record attempt and about his future plans in windsurfing.

So tell us a little about how you came to be challenging the world speed record?

Well it's been quite a few years since I last competed in a speed competition. There used to be quite a few speed events, and they're usually a lot of fun, there's nothing quite as exciting as riding at the very limits, and I think it was this that made them so enjoyable. But then I got thinking about why I stopped the competitions, or what I felt was wrong about them, and basically it comes down to the number of sailors taking part.

As it is, you only get a few days of "perfect conditions" during which records might get set - 45-50 knots of wind and really smooth water is what you're looking at these days if you want to set records - so right there you've got a huge luck factor. And if you have too many people out on the water taking turns, then the number serious of attempts you get in those perfect conditions will be dramatically reduced.

So this time I'm looking to create a situation where I can maximise my time on the water in the right conditions and really take a serious shot at a new record. It's all about being in the right place, with the right equipment, all tuned-in, and ready to go when the conditions arrive.

I've spoken with Robert and he's said that the attempt you made last year on the record was really more of a fact-finding exercise than a serious attempt - what did you learn from that?

Well probably time was the main issue last year. An opportunity suddenly arose, we were talking with some people who were willing to put on an attempt and pay for the set-up costs and the timing, and basically all I needed to do was show

up and give it my best shot. Without any special preparations or without any specific development we figured we could push the existing RS sails, given the right conditions, and that we could make a serious attempt on the record.

As it turned out we didn't actually get the conditions we really needed. We'd get the right wind, but then the water would be too choppy and one way or another it never really came together. Eventually we ran out of time and had to pack it in. But it was certainly a useful exercise, we still learned a lot from pushing the gear, you learn so much from sailing equipment at the limits like that, so it wasn't time wasted. I guess you learn something every time you go on the water one way or another.

So how long have you been working on the new Speedseeker rig?

We've already put in a couple of months with these new sails and they keep getting better and better. Hopefully these next few weeks before July we'll squeeze even more speed out of them. I'd already confidently say they're several knots faster than an RS out there on the speed course and we're just finding ways to make them even smoother and more stable. It seems that the more sails we make the better they get.

From speaking with Robert, it sounds like the real challenge in the sail development has been stability and getting the shape all nicely locked-in.

Yes that's right, it's essentially been about efficiency, stability and acceleration - it's this combination that's going to make you go faster in the end.

And boards, what have you been looking for there?

We've made quite a number of boards; so far I think we're up to 12 prototypes that we've gone through of various sizes, but it's boards of between 35cm and 37cm where we'll be focussing on for breaking records. We've been looking at different tail widths and different concaves.

Actually the really good thing about having a private speed trial is that you have a month to try different equipment. As it is, I have already put aside most of June for testing as well so I'm hoping to log somewhere in the region of 100 hours on speed boards even before we begin the official record build up. Then we've allowed ourselves 4 weeks of official timed runs - weather and conditions permitting that is.

I understand that you've developed some "top secret" new method for smoothing the water during runs - are you at liberty to tell us more about that?

Yes, we have been working on a couple of different methods of eliminating chop in the water within the boundaries of the speed course - with the water conditions under control, we'll hopefully only be dependent on the wind showing. If this all works out then I'm looking at getting quite a few more hours of optimal conditions and these days you really do need the conditions to be perfect if you want to break the record.

It's not an altogether new method that we're trying, it's certainly been done before, but never quite perfected - all will be revealed when we're down in the Canaries in July. Either way, we're hoping to get it all

working in time for the official sessions and to make the most of those extra hours of ideal conditions to set a new record.

It's actually all about increasing the number of hours in which you have record-breaking conditions - and since we get those conditions so rarely you really want to make the most of it. The more time you have, the more runs you can make, you can try different board and fin combinations and really get your gear dialled-in.

For a windsurfer to break this record you firstly need to have a lot of wind. The big tri-marans like Yellow Pages can attempt records in 25-28 knots of wind, but above that speed the boats become unstable, so there's a relatively narrow window where they can operate. For a windsurfer you can usually go faster than the wind speed, but to break the 46-50 knots records we'll still need winds in excess of 40 knots and we'll need water that has no chop, so that's an awful lot of variables that we can't control.

I'd prefer to do the attempt in the actual open ocean rather than in a prepared speed ditch because that feels more natural. Windsurfing is a very natural sport and we'd obviously prefer to see the event held in more natural surroundings. For this reason the chop reduction measures we've been developing would look and feel much more natural, but if all else fails I guess we'll have to go to France and dig another speed ditch and give that a go instead.

So the official plan involves three attempts in three different venues?

I guess I'm actually more interested in breaking the record more than the place where I break it. We have first to break the current record of 46.5 knots and then we're looking at the magic 50-knot barrier. In the right conditions I'm actually very confident we can break the current speed record but 50 knots is going to be a little different. That's probably going to take longer than the first session we have planned for the canaries in July. So we now have plans to follow this up with two or three more attempts within the coming 10 months.

We've been talking a lot about the gear, but the other variable in the windsurfing equation is the human in control of the rig - have you been undergoing special physical or mental training for this?

Well you know how it is as an athlete, the fitter you feel, and the better you perform-so working on my fitness has always been something I've done. It doesn't matter if it's preparing for the World Cup or if I'm just going wavesailing here at Ho'okipa, the fitter you are the better you'll be out on the water.

Right now I'm only focussing on Wavesailing and Speedsailing, which is a perfect combination - when there's no waves I can go speedsailing instead. I actually like the combination; I enjoy the challenge of going at the limit. It's also good to have the time to put into this, rather than rushing from one race venue to another every second week as we did in the old days.

That was actually going to be my next question - now that you're not so involved in the World Tour how has this affected your approach to windsurfing?

If anything my windsurfing has got better and better. The more time I get to spend in the water the better I windsurf and now that I'm away from the structure of the tour I can pick and choose when and where I sail, so I'm sailing when I want in the conditions I want, I don't have to follow a certain pattern.

It's an unfortunate aspect of contests that you become so focused on your heat that you don't get to windsurf all that much in the end. When you're freesailing you can do 4 or 5 hours on the water whenever the conditions allow for it - so like I've said I can definitely feel that my windsurfing has got better.

And you're still as excited about windsurfing as you ever were?

Yes, although I'm probably less inclined to go out in bad conditions these days, unless I have to (laughing). I've never really enjoyed light wind sailing or choppy water, over these past few years I've sailed in what are undoubtedly perfect conditions. With The Search project I've been able to travel to some amazing places and sail in perfect, empty waves - having the time to discover these places and to go there in your own time is really the ultimate, it's perfection. One of the shortcomings of running from contest to contest and always focussing on beating everyone else you simply don't have the time or the space to enjoy it.

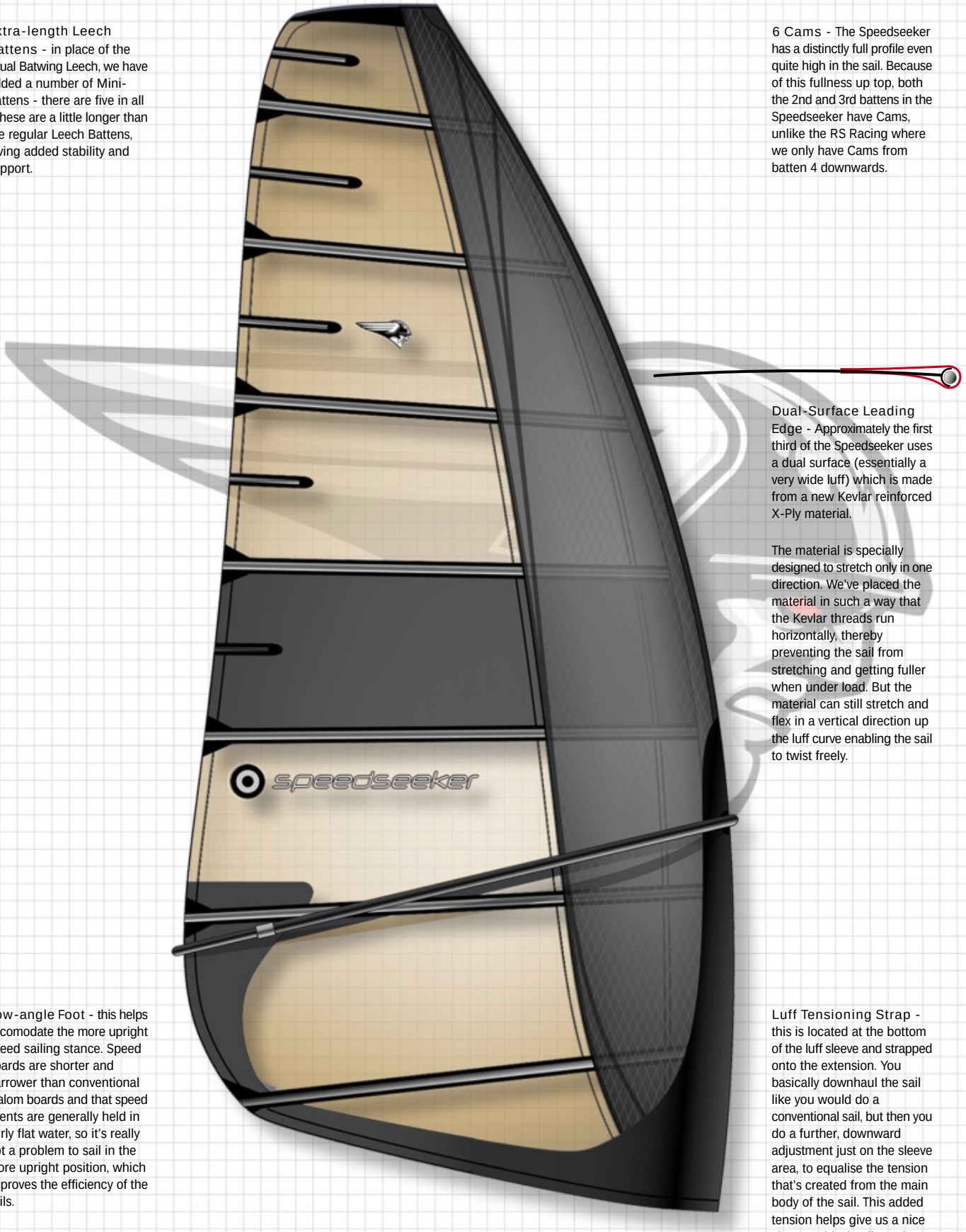
You've had one or two additions to the Dunkerbeck family this past year - you're now married and you have a baby daughter - how has this affected your lifestyle?

Well little Alba was six months old yesterday and so far we've been everywhere together. It's still a wonderful experience; every day is full of surprises. She seems to love the water and she swims every day if it's warm. She's already been out on the ocean on surfboards and windsurf boards and looking ahead with her growing up around the ocean I guess it's very likely she'll find her own way out into the water as well, who knows?

Anyway like they say, you never know what it's going to be like until you finally become a dad and I've got to say that I'm really very happy that I've found Maria my wife and now with little Alba as well, and I'm pretty sure that this is not going to be our last addition to the family. I'll be sure to keep you posted on that! (Laughing).

Extra-length Leech Battens - in place of the usual Batwing Leech, we have added a number of Mini-Battens - there are five in all - these are a little longer than the regular Leech Battens, giving added stability and support.

6 Cams - The Speedseeker has a distinctly full profile even quite high in the sail. Because of this fullness up top, both the 2nd and 3rd battens in the Speedseeker have Cams, unlike the RS Racing where we only have Cams from batten 4 downwards.



Dual-Surface Leading Edge - Approximately the first third of the Speedseeker uses a dual surface (essentially a very wide luff) which is made from a new Kevlar reinforced X-Ply material.

The material is specially designed to stretch only in one direction. We've placed the material in such a way that the Kevlar threads run horizontally, thereby preventing the sail from stretching and getting fuller when under load. But the material can still stretch and flex in a vertical direction up the luff curve enabling the sail to twist freely.

Low-angle Foot - this helps accomodate the more upright speed sailing stance. Speed boards are shorter and narrower than conventional Slalom boards and that speed events are generally held in fairly flat water, so it's really not a problem to sail in the more upright position, which improves the efficiency of the sails.

Luff Tensioning Strap - this is located at the bottom of the luff sleeve and strapped onto the extension. You basically downhaul the sail like you would do a conventional sail, but then you do a further, downward adjustment just on the sleeve area, to equalise the tension that's created from the main body of the sail. This added tension helps give us a nice clean, stable, leading edge.