Catalyst

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Catalyst

Journal of the Amateur Yacht Research Society

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Chasing Speed Records IS Research

The last quarter of each year seems now to mean speed record events, not only in Weymouth, UK, but also in Namibia. The last few months of 2012 have seen not only a new outright World Sailing Speed Record (Vestas Sailrocket) but also a new World record for male windsurfers (Antoine Albeau), another for women windsurfers (Zara Davis) and about a dozen National records also. All very well, but are they yacht research and why does Catalyst keep reporting them?

Well, it's not because they are exciting, although of course they can be. It is a little startling to realise that these record holders are travelling faster on water, propelled by the wind, than I am legally permitted to do in my car on the road, propelled by 90hp.

No, it's because in order to sail faster than the other person, you must make more efficient use of the wind and water. Adding power is not enough: it's been a very long while since a good big one (e.g Crossbow) could be sure of beating a good little one (e.g. a windsurfer) (although it did take the windsurfers a long time to beat Crossbow's record at Weymouth!). And all that research into sails and foils can be translated to recreational craft be they boats or boards.

More interesting perhaps is to look at the windspeeds in which these records are being set. It is not for nothing that AYRS has sponsored an Efficiency prize at Weymouth Speedweek. In 2010, Rob Douglas needed 45 knots of wind to achieve the world kitesurfing record of 55.65kts. This year, Sébastien Cattelan did 53.27 kts in 30-35kts. The windsurfer Antoine Albeau broke the Windsurfing World Record with 52.05 kts in 40 kts of wind. Sailrocket set the World Record of 65.53 knots in 30 knots of wind. It would seem, from that, that fast boats can sail at 2 - 2.5 times the windspeed, kiteboarders at 1.5 - 2 times, and windsurfers at 1 - 1.5times the wind.

Less obvious is the work done on foils. It might not seem obvious that it applies directly to a 10 knot sailing boat, but what about its propellor? 65 knots though the water may be fast for a boat, but it's not especially fast for a propellor blade. The things the Sailrocket team learned in refining their foil, will be of interest to anyone designing fast powerboat propulsion systems, so in years to come us slowboat people may well have cause to be grateful for the research done to break speed records.

Sailrocket raises 500m Sailing Speed Record to 65.45 knots! (That's 74.16 mph or nearly 120km/hr)

At the beginning of October, the Vestas Sailrocket team flew out to Namibia to make another attempt on the world sailing speed record. At the end of the 2011 session, the craft had reached speeds of 49.19 knots, fast enough to take the B-Class record, but not fast enough. Paul Larsen wrote in his blog "Once we got into the low 50's we saw that we could constantly get there with whatever foil we stuck on the boat. It didn't matter whether we had a conventional foil, a weird wedge or even a weird wedge chopped in half. We seemed to be hitting the same numbers around 51-52 knots. This is where our first boat maxed out and pretty much where both Hydroptere and Macquarie Innovations ended up. It seems that this is the 'glass ceiling' for conventional foils."

Back in the UK therefore the 2012 task was to try and find out what was really happening, and then to refine the foil shape and size to make 60 knots at least a possibility.

So the team flew out to Namibia with a new rudder, and (eventually) a new foil. Out on site the task was simply to mate the new foils to the hull, assemble the craft and go sailing.

Straightaway - 50 knots

First day of trials, the wind was 21-25 knots, the sun was shining, the start up went pretty smoothly, and VSR2 broke free of all the low speed drag and got up on the plane. She was well over 40 knots in a

matter of seconds. It was a solid run that ticked a lot of boxes. There was 50.11 knots peak recorded; with an average was 45.57 knots over 500m.

Then it was a matter of tuning until the WSSRC Observer flew out in early November. However try as they might, Sailrocket had still not by then broken the "glass ceiling".

Then – a record

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On Friday 16th November, with WSSRC in attendance, it all came together. Sailrocket went down the 500m course at an average speed of 59.23 knots, with a peak speed of 62.5.

And another

Two days later, they launched onto the nautical mile course, and not only raised that record to 55.32 knots, but also, in passing as it were, raised the 500m record to 59.37.

There is an onboard video of that run, on the WWW at http://youtu.be/sZVIj5TUSKE

And then another

Saturday 24th November looked like it was going to be the last shot at a record: the forecasts were good – winds in the high 20 knot range with gusts into the low 30s. The aim was to push the record over 60 knots.

The first two runs were not good enough, "only" 58 and 54 knots average respectively.

For Run 3, the wind steadied in the 28-30 knots region – almost perfect conditions. From the start the boat accelerated hard, and the boat streaked down the course at peak speeds of over 67 knots to set a new average speed record of 65.53 knots.

That was good enough.

There is a video for this one too -

http://youtu.be/pipGWQmerEQ.

All these records have now been ratified by WSSRC, and the full story can be read on http://www.sailrocket.com/blogs.



Vestas Sailrocket 2 at 65+ knots. Note both front floats are clear of the water!

Lüderitz Speed Challenge 2012

The Lüderitz Speed Challenge was born in 2007 and in 2008 the event had entered the annals of sailing history, after the event's co-organizer Sébastien Cattelan broke through the mythical 50 knots barrier. From that moment on, records have continued to tumble here.

The wind speeds that enable these incredible feats are the result of warm desert winds meeting the cold waters of the Atlantic Ocean, creating a massive pressure differential. What remained was for the organizers to study the local conditions in meticulous detail and to use their worldbeating sailing expertise to continually improve the 500m run to the point at which, today, the event serves a model for other world-record breaking attempts around the world.

After the development of a channel on the margins of the lagoon in 2009, Lüderitz became home to the fastest ever sail speeds, when kite surfers shattered world records several times (ending with 55.65 knots). The lagoon-side innovation continued and for 2012 the organizers excavated an extraordinary artificial channel some way from the lagoon, resulting in flatter, safer conditions.

Three days into the four-week windsurfing component of the Lüderitz Speed Challenge 2012, Frenchman Antoine Albeau improved the



Zara Davis



Photos © Eric Bellande & Luderit 2012

Antoine Albeau

Windsurfing World Record with an average speed of 49.41 knots. Six days later his countryman Cédric Bordes clocked 49.66 knots but this was soon surpassed by Swiss Patrick Diethelm's speed of 49.71 knots. It was clear that the 50 knot threshold was going to be pushed and it was Anders Bringdal from Sweden who became the first ever windsurfer to do so with a time of 50.43 knots, though his triumph was short-lived as Albeau finished that day with a time of 50.62 knots. Pushed on a daily basis by Bringdal, Albeau broke the World Record eight times over the competition's four week period, ending with the fastest time of 52.05 knots. Albeau was joined in making history by the fastest female of the event, Zara Davis of Britain, who posted a Windsurfing World Record speed of 45.83 knots (made on Production board).

12 National multi-discipline records were also broken during the course of the event; in addition four National Windsurfing records were posted

Far from finished, the next two weeks of the Lüderitz Speed Challenge 2012 were dedicated to the kitesurfers. Unfortunately the winds were not as kind to the kites as they were to the windsurfers, and no World records were broken, the best speed being Cattelan's 53.27 knots. The weeks were not without records however, as a number of National records were broken.

Messenger -- an exercise in Lean Design

Roger Dyer



Portland Harbour 20th October 2011 - Photo by J Perry, AYRS

Finding my Laser® too physically demanding* I looked at deeper hulls.. However, the cost of new dinghies led me to seriously question my needs. Kit construction used to be a low cost option, and older kit designs are still available, but sailing technology has moved on. Unfortunately, tax changes when the UK joined the EU in 1973 made it commercially unattractive for local designers to work on completely new kit concepts. So, in 2004, I decided to propose my own new kit solution (I did not know then there was another like-minded designer - Dudley Dix).

As I wanted to have a new dinghy at a reasonable cost, my idea was to use modern design methodology to achieve an economic return for the effort used . As I have an academic training in structural design/ aeronautics, have been professionally involved in hydrodynamics, and also have experience in the design of timber structures, I could recycle some of my engineering training.

This new design aims to make a reasonably good performance dinghy available for considerably less than half the cost of a commercial plastic or 'fibreglass' product. The final target at the time of design in 2008 money would be less than \pounds 1500 including spars, sails and rigging, and with less than 200 hours work (including making the kit construction package). The construction and assembly is targeted at the one-off DIY amateur with no special tools, who will also want to buy easily available, and proven, new components. It is planned to make a technical paper available with the design, so it can be suitable for a schools project, where it could be used as an introduction to hydrodynamics and aerodynamics.

^{*} For those who have not done it - Laser sailing and racing presents a unique set of physical and skill based challenges. Fast Laser sailing requires an advanced level of fitness in order to endure the straight legged hiking and body-torque techniques essential in getting upwind and reaching quickly.



The hull design was started more than five years ago and has been influenced by the 'Lean Design' approach suggested by the Institute for Manufacturing at the University of Cambridge . The prototype hull was launched in June 2007, and now has more than ten design improvements and is on its fifth set of sails.

A 3.65 m long, 1.6 m beam dinghy with hull weight, including keel and rudder, of less than 60 kg. The hull is also deep to provide a good and comfortable hiking position. This is an all plywood hull with a reduced need for expensive petrochemical based products. The main point has been to produce a design that performs as well as, or better, than the competition, but for much less than half the cost. The hydrodynamics follow some historical Australian developments as I want to sail in coastal waters (Chichester/IoW/Portland). Such coastal sailing offers more, but gustier, winds, and there are longer fetch waves. More frequent planing is possible in 10kts+ winds, but bow design is very important to maximize performance. The unique design of lifting and wave piercing bow is part of the Messenger hydrodynamic four-surface concept.

The photographs show the important part of a dinghy - the 'wetted surfaces'. It should be immediatly obvious that these profiles are in no way similar to traditional plywood dinghies. The keel and rudder are also 'modern' Near Laminar Flow (NLF) designs, and are wood, not mouldings. How all this is achieved will be described in due time.

Hydrodynamics

Having used 'Lean Design' techniques to develop an economical dinghy construction technique it would be all too easy to reproduce an existing hull form. However, I have used the same Lean Design Concept Engineering Methodology to produce a hull optimised for coastal sailing.

Some AYRS members were specifically interested in the hydrodynamics, so I have given some lectures at AYRS Meetings over the past three years, but as yet, have nothing published. When I publish I plan to section this work into a comprehendible story.

Background

Design and Construction Effort vs. Performance:

The Messenger hull concept has enabled me to make some analytical and empirical improvements over old wooden dinghy designs. I emphasise the dual approach, as shallow displacement hulls working both above and below their displacement speed are, in my opinion¹, impossible to analyse using tools such as Computational Fluid Dynamics.

¹In 1976 I wrote a computer program for nondimensional analysis of model test results, and followed this up with several papers on the subject.



In addition, model testing at the necessarily near full scale also has its problems (cost being the real hurdle for a small project like a dinghy). My sailing results at Weymouth Speedweeks have confirmed that I have achieved reasonable results on such an 'economical compromise' hull design.

Photo 3 shows sailing at near 4 knots and bow wave on the 2007 hull: sailed with more heel than optimum to show clearly the wave trough under the hull bottom. This can be used to reduce the wetted surface at a certain range of speeds near the critical hull speed.

From these tests I concluded the Bow needs to be deeper (a 2008 modification) and have a 'bulb' to initiate the wave before the change of section about 300mm aft starts to break the wave crest.

Photo 4 shows the 2008 bow with more immersion and with a thickening bulb at stem to initiate wave. Notice how the starboard hull curvature just aft (300mm) of the bow causes the crest of the bow wave to break early.

Photo 5 (overleaf) shows the 2008 hull on an even keel at above 3.5 knots. Note how the hull lines have been arranged at a similar contour to the wave trough over the middle half of the hull. This reduces the wetted surface and makes the hull 'appear' to be narrower at the waterline. Notice also that the new bow now clearly initiates the bow wave. For some idea of the actual wetted shape I have drawn it full scale on the dinghy: (Photo 6)

The full wetted hull at zero speed is the area hatched and shaded (blue) on the starboard side. The hatched area (red) on the port side is the approximate wetted surface above 3.5 knots. Notice it not only reduces the wetted area, but makes the hull 'apparently' only as beamy as the stern. This becomes significant at the critical hull speed as it reduces the additional force required to lift the hull onto the plane. The full planing surface is approximately the solid (blue) area on the starboard side.

Final Problem With A Short Hull

In coastal waters we have to cope with swell. As Portland is one of the largest man made harbours in the world, swell can be a problem for small dinghies. Photo 7 shows what happens when the hull pitches and the bow comes out of the water.

In the longer term I plan to produce a longer bow and compare the sailing performance.

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Dyer



"Messenger"







Foils

We are specifically interested in Directional Stability, which we get from the Keel, Rudder, and Chines. With a chined hull we should be able to reduce the rudder area, so the target was the smallest rudder possible, but still maintaining good stall characteristics. This makes for easier sailing by the less-than-expert helm.

Some people will be specifically interested in the hydrodynamics, but that is too long for this note, and to follow my reasoning would need you to fully understand the theories of O. Reynolds, W. Froude and F. Reece. For practical purposes I have used the work by M. Fujino (Chief Engineer Honda R&D Americas), as I have no access to a towing tank to optimise the design.

I have used the construction technique suggested by Richard Engelbrecht-Wiggans: From the chosen section make a plan of the chord positions vs. thickness in steps equal to the plywood verniers (make a blank with an equal number of equal thickness verniers). Use a belt sander to shape the board. If you do it right, the glue lines between the layers will be a copy of the plan at the precomputed positions.

Rudder

Dinghy Rudders often come quite a way down the list of commercial design priorities, so good examples tend to be on highly priced 'performance' hulls. It would be all too easy to try to produce a cheap copy of a good existing rudder, but having used 'Lean Design' techniques to develop an economical dinghy construction technique, I decided to start from scratch. So, I have used the same Concept Engineering Methodology to produce a rudder optimised for both performance and cost.

Rudder Blanks - Typical profile

Photo 8 shows the blanks made up from equal numbers of verniers. One used epoxy, the other Polyurethane adhesive. After profiling (Photo 9), the 'neck' was reinforced on one rudder with glass & epoxy. After a couple of years the non-strengthened rudder did crack, so the reinforcement is needed.

This third photo (10) shows some modifications to the profile of the longer rudder to reduce drag. Basically I am re-profiling to a NACA 6-series shape much used by other constructors. This should give slightly less drag. During testing at planing speeds above 5 knots I could not see any improvement in performance; possibly *because* I was scared witless over the lack of directional control, as the modifications made the rudder stall much too easily!

These rudders have been sailed at AYRS Speedweeks 2008/09/10 & 2011 with three sizes of sail and in winds up to 25 kts to confirm the performance and structural strength. The conclusion is that the original short rudder is OK with all the sails.

Dyer







KEEL

Same theory to try to have the smallest keel, especially length, as I sail in some areas that are shallow at low tide (I have hit the bottom in the past).

Photo 11 shows a typical kit keel alongside the blank I am about to fabricate. Note: I have used a scrap keel off a 420 series dinghy - always trying to recycle old parts!. You can see I have opted for a shorter keel with a wider chord. As I have a deep hull the taller keel box is no problem and the shorter keel will save on a shorter keel box, so no added hull weight. Small point - the entrapped water in the keel box will be less, so a small 'plus' point.

Photo 12 in the centre shows the extra wood to produce a thicker leading edge. Stall is not quite so important as with the rudder design, but I decided to follow the same theory. I am looking for good 'lift' performance at as wide a range of yaw angles as possible, so the NLF section should be slightly more tolerant to the manufacturing shortcomings of my DIY approach. Note that some NACA sections are probably impossible to fabricate by DIY to good enough tolerance to make them work properly.

Photo 13 is the finished product after a bit of sanding, then a thin epoxy skin, primer and paint.

On the right (Photo 14) I have the final modification - make it smaller. The photo shows the strip I have cut off the keel to reduce the width.

After a literature search I could not find too much evidence to the trade off between having a keel too small and sailing performance; so I decided to see if I could notice any difference. A full set of instrumented trials would take weeks, and I was just interested to see if I could notice the difference.

I could, but not what I was anticipating! The smaller keel moves the centre of pressure forwards one or two centimetres. This actually showed up in sailing as I could feel the difference in the centre of pressure in the sail. I had to rake the mast back a centimetre or so to get the directional stability I had before the modification. This confirms the importance of mast position and rake. I now appreciate why it took me so long in 2009-10 to get a good setting for the sails I had chosen.



CATALYST



SAIL DESIGN AND CONSTRUCTION

This part will be expanded in a few months time. But, in the meantime take a close look at the two sails in the photo (15):

On the left is the Rooster 8.1[®], the details of which you can access on Rooster Sailing website www.roostersailing.com. It is a modern radially cut design with a lot of Steve Cockerill's experience input into the design. It works very well for the price they charge. My only downside is with the Laser[®] mast parts which are heavy. My solution has been to develop a three-piece Aluminium / Fiberglass / Carbon Mast to reduce the polar moment of inertia and make sail shape adjustment with the kicker require less brute force.

My sail on the right is a flat panel design with full battens. The battens protrude into the enlarged mast pocket where they drive round the Tear-Drop Wing-Mast. Construction of the sail was fully integrated into the 'LEAN' design. A professional sail maker was able to sew this sail up in 6 hours. It is possible on a heavy duty home sewing machine (if you have a big room) as all the seams are straight except the mast pocket.

Kit Development

Developing a Self Build Kit for a Low Cost Dinghy.

(For a short review of the UK self build dinghy history from WW II, see the sidebar pp 12-13).

First we have the complete plywood skinned hulls (built on wooden frames - see sidebar photo) sold as kits in the 1950's. Then in the early 1960's we added 'Stitch-and-Glue' which reduced the need for a lot of the structurally redundant framing, and hulls became lighter. In the mid 1970's there is the Miracle Dinghy design which uses 'Slot-and-Tab' to finally eliminate the traditional frame building technique. This further reduced the hull weight.

Finally in the 1980's and 1990's we have the wider acceptance of Epoxy which makes plywood

construction more robust and allows very light (wider use of 4 mm plywood) designs to be developed. With the understanding of how modern low viscosity epoxy reinforces the plywood it is now possible to build a hull as complete monocoque plywood shell that will be lighter and cheaper than a similar sized fiberglass (resin/glass) hull.

An all epoxy/glass/carbon hull can be developed to be much lighter, but the cost more than doubles when manufacturing and preinvestment costs are accounted for.

Continued on Page 14

Dyer

HISTORY OF UK PLYWOOD DINGHIES - SIGNIFICANT STEPS TO KIT PRODUCTION



Graduate assembly showing the frames and assembly at waist level.

1946 - The MERLIN Class was launched after an eight man syndicate from Ranelagh Sailing Club, on the Thames commissioned Jack Holt to design a lightweight 14ft., clinker hull with a 100sq.ft., sail plan and a moderate sized spinnaker. The Merlin Rocket is a fourteen-foot dinghy that is light, fast and responsive. It can be sailed in all wind strengths and on all types of waters. It rewards skill and finesse rather than brute strength weighing only 98KG.

1947 - The CADET is a junior trainer sailing dinghy again designed by Jack Holt, who was commissioned to design it by Yachting Worldmagazine. The prototype Cadet was launched onto the Thames, where it created a sensation in the dinghy sailing world. With its bow transom lifted clear of the waterline (when most other boats of the day still had plumb bows) and an easy to home build hull, thanks to the chine angle remaining constant throughout the length of the boat. After it became an accepted class, Bell Woodworking produced kits for home construction, which helped the rapid spread of the class across the country. Within ten years the fully framed "Mark 1" boats were being superseded by the newer Mark II versions, where the frames and the inflatable buoyancy bags were dropped in favour of a cleaner layout, with the buoyancy built into the tanks. Hull Weight 54 kg. and with fittings 61.5 kg.

1952 - The GRADUATE dinghy originated at the hands of Dick Wyche. The plan had been to produce an economical one-design dinghy that would sail as well as contemporary designs but could be made at lower cost. This was achieved with the use of new improved plywood based on a simple wood frame. The design incorporated built in buoyancy tanks eliminating the troublesome plastic bags in use at the time. The first production boat was sold by Wyche & Coppock in 1952 to a member of Beeston Sailing Club. Total weight 84 kg,

1956 - The YW SOLO One-Design designed by Jack Holt. "Build Her Yourself" plans were sold by Yachting World (I have an original set) for home building. The (now National) Solo has a light, double-chined hull weighing 70Kg

The REVOLUTIONARY STEP for kit construction was STITCH-AND-GLUE – In England, in the late 1950s, a man named Ken Littledyke cut out some plywood panels, stitched the edges of the panels together with fishing line, and reinforced the seams with putty made from polyester resin.

By 1960 in the UK there were over 50 welldeveloped kit designs being offered by more than 25 manufactures. While in the USA, Chris Craft claimed that between 1950 and 1958 they shipped 93,000 boat kits (!), in 13 different models sized from 8 to 31 feet.

1963 the final commercial step: Jack Holt's MIRROR Dinghy. More than 40,000 Mirror Dinghy kits were built worldwide before the change in the UK purchase tax regime to VAT in 1973.

END OF THE 1960's - Many kit designs were now being offered with a fiberglass hull, which could be fitted out. This reduced the building time and saved a lot of the tedious coating finishes needed to produce a rot-free hull.

1970 - The LASER designed by Bruce Kirby. Most importantly his partner, Ian Bruce, had the idea to franchise the manufacture World-Wide. The cost was reasonable as petrochemical products were cheaper before the oil-price hike, and series production offered cost savings. It was a historical success.

1971 - The single chine PHANTOM was designed by Paul Wright and Brian Taylor. They wanted to produce a single-hander that was exciting to sail, manageable and at the same time affordable to build, and suitable for home construction using the stitch and glue technique. They concluded it was not possible to design a boat that will accommodate all weights, even with 'wings' and equalisation systems. As there were already boats on the market for the lighter helms they decided to design a boat that was both

"Messenger"



The Miracle with only plywood bulkheads. This saved over 5Kg.

comfortable and fast for larger sailors 76 -115 kg. The weight (hull, centreboard & fittings) is 61 kg.

1975 - Before retiring Jack Holt designed the STREAKER dinghy as a lightweight replacement for his own Solo. His aim was to produce a similar performance to the Solo, but at lower cost. He also wanted to allow a wider range of helms to succeed. Competing with the new Laser®, it is not as fast, but the key sailing point is that, with hard chines, it is very much more stable, and it offers extremely lively racing performance in a very broad range of conditions (PY1162). The Streaker can also cope with a wide range of weight; 63 to 83 kg which is not so with the Laser®. The hull weight is 48 kg. And this is still regarded a very good light design for 'stitch-and-glue'. (Note it is lighter than a Laser®).

1975 - The MIRACLE represented the culmination of development for Jack Holt. However, the lines are very similar (exactly - I have both sets of lines plans) to the Solo designed by Holt in 1956, which is doublechined giving better hydrodynamics than single chine designs. These chines are close, resulting in a stable, fairly flat-bottomed hull. The resultant stability, combined with the modest sail area creates a shape which is easily driven, but without the need for a strong or athletic crew. Working in conjunction with Barry Read, they developed the Slot-and-Tab method of constructing Miracles, which enabled boats to be built from kits even by relatively inexperienced amateurs. However, the Miracle was built 'right-sideup', which could be bad for your back if you built on the floor and didn't use trestles! The Miracle weighs roughly the same as a Laser®: single-hander - weight: 59 kg with complete boat at 77 kg.

TODAY 2011/2 - The HADRON by Keith Callaghan represents the modern approach to follow the Merlin Rocket ideas, but with an easy to build hull. Weight (including fittings, without the rig) 83 kg.



Hadron - The multi-chine hull is fabricated over removeable bulkheads (above) and the frames are added after the hull has been turned over.



Dyer



The Kit including all materials needed

The Challenge:

Design a kit from my Prototype that can be assembled in 150-200 hours, and preferably less. Note that the Prototype had been built up on the frame and centreboard casing of an older hull. This added about 10 kg to the prototype, but allowed modifications (over 20 in actual fact) to be easily made during development.

Key areas of difference for the kit are in the Bow, Mast Location and Keel. The kit has a separately fabricated 2 foot section for the bow. This was planned back in 2004, but was not in the prototype due to the need to be able to reshape the bow during trials.

The Mast Location and Rake were constantly changed during trials, so the prototype has a complicated rake adjustment shoe on the keel. This has been considerably simplified in the kit.

The prototype had a Leading Edge Root Extension (LERX) to the keel to try and improve the flow separation round the centreboard when heeled at up to 10 degrees. Theoretically this should enable the 'board size to be reduced, so I have quite a small one. However, the practical construction problems combined with the handling problems with the hull on the slipway, make it difficult to justify.



The Jig at the start of laying out the Kit



The jig requires two supports (only one shown)

The separate bow fabrication has been chosen for several reasons:

- It makes the kit smaller and hence lighter and marginally cheaper.

- The reduced length makes building easier.

- Bow design changes can be continued past the original prototype.

- Hull length can be changed to increase displacement speed as 4.26m would be a more traditional length.

- A reinforced bow can be adapted to take rigging to add a jib, hence further improving performance.

Solution:

For a 'One-Off' kit with low pre-investment.

After many iterations, my proposal is to have a 'cheap jig' on which the hull is assembled. Although the jig is redundant after assembly it ensures dimensional control over the hull, which would be difficult to guarantee with other assembly techniques. This dimensional control was recognized in the development of the Miracle Slot-and-Tab method, and I seriously considered the slot-and-tab method.



Main parts set up ready to glue



Just to prove it is 90% natural fibrous material - plywood!

One key negative for myself is that the Miracle is assembled on the floor. This is quite difficult/ impossible for people with bad backs, so it forced me to an alternative solution which would have the hull at waist level.

The jig is merely an elevated and sloped 'floor'; the slope being the angle between the hull waterline and the hull deck. This then sets the waterline as the horizontal on the jig. My jig was made from two sheets of 20 mm 'Sterling Board'TM reinforced with two 4"x2" (100 x 50mm) joists. It is primed white to show up centreline markings for the kit assembly. The off-cuts from the board were then used to make the frame formers. All this is supported on two workbenches, so the whole kit can be packed onto the roof rack of and/or into a car. I have transported everything in/on my old Renault Safrane Hatchback.

NOT Stitch-and-Glue:

An important point from the hull structural design is that it is an all plywood hull that is strengthened by epoxy saturation into the wood and by selective reinforcement with epoxy glass. The plywood is joined by glue, either polyurethane or epoxy, along designed joints. This ensures most of stress flow is through the wood at the joints and not through a joining strip of epoxy/glass sheathing. Making the majority of the joints with a fast setting glue ultimately speeds up the assembly process.



All the non plywood materials used to build the prototype outer hull form. Note very little epoxy



Photo from 2008 shows my chosen light helm Christopher Fortescue (60kg) Note: I am 85kg and my heavy helm is nearly 120 kg The prototype instrumentation (3kg) is just forward of the mast.



Photo shows Christoper sailing past a wind surfer at 5 knots (above critical hull speed of 4.67 knots).
Gusts only lasted for 10-20 seconds and most wind surfers were not able to get onto plane.
Those (the semi professionals) that did were then able to ramp up over 10 knots.

Sailing at Weymouth Speedweeks in Portland Harbour (Oct 2008)

This is a long standing event sponsored by the AYRS (see www.speedsailing.com). The event provides timed runs over a 500 m course for six days, so weather conditions can be chosen to suit the vessel. In 2008 I chose 8-12 knot winds to look at the performance at sub-planing speeds.

At one period of relatively stable 9 knot wind Christopher managed four separate runs over 30 minutes with a consistency of less than 0.2 of a knot. This sort of accurate sailing is invaluable if results are to be meaningful.

Key time in the trial was when wind gusts rose to 12 knots.

Speedweek Results - Valuable Data

The Messenger Dinghy was sailed at Speedweek http://www.speedsailing.com/ and I was pleased with the results. I was also able to "borrow" a prototype Race-Trax http://www.race-trax.co.uk system that measured wind (solid state) as well as GPS data. This gives data at one second intervals, so allows detailed analysis of performance, similar to that which I had hoped to get from Model Tests.

Below is a typical set of the raw data that was obtained over two days sailing in three sessions

In 2009 Speedweek went over to using an onboard GPS data recording system to gather official results. Full details on the Speedsailing.com website. The screen grab to the right shows the sort of information I am now getting while sailing. The Data Recorder is a LOCOSYS GT-31. The software is produced by a German - Dr. Manfred Fuchs

The Finished Concept at AYRS Speed Weeks 2010 & 2011

The aim was to produce a dinghy that performed as well as, or better than, current designs, but at less than <u>half</u> the cost. It has been optimized for sailing in coastal waters (Portland, Chichester) in higher/ gustier winds and longer fetch waves, so bow shape and deep/ wide chine hull was developed to provide a comfortable hiking position and give good controllable planing performance. The all ply hull (very little use of epoxy) has had about 20 modifications since the first launch. A new, fully developed hull kit will be available and this will be below a 50 kg target weight.



EXAMPLE of each second output:-			
01,L,1/1, 11:18:35, A, 2, 5034.72641N, 00228.06209W, 217.3, 0.04, 250.6, 05.8, 204, 203, 78, 50, 32, 35 *61			
Decode:			
HH:mm:ss	11:18:35	A/V = Acquired / Void fix	Α
Fix Type (2=diff, 1=std3D, 0=none)	2		
Lat	5034.72641N	Lon	00228.06209W
Course over Ground	217.3	Speed over Ground	0.04
Heading	250.6	Wind Speed (Kn)	05.8
Wind Direction (App)	204	Temperature (*10)	203
(use the SoG & Heading to calculate True)			

The remaining parameters monitor of the state of the equipment - Vcc (*10), 5V (*10), 3V3 (*10), Hygro Checksum footer



This image shows course sailed and exact position of 5 Knots sailing

Winner of the Portland Pot 2011

JANUARY 2013

After sailing with several rig layouts, I have three Mast/ Sail options for different weight sailors in different sailing conditions. The Laser® Radial, using a cheap 'training sail' with a composite two piece top mast is a good all-round option. The Rooster 8.1® with a Laser® bottom mast and composite top is better for the heavier sailor. My novel 'Portland 77'sail, mast, boom system was designed to be DIY assembled for less than £500. This works well at low wind speeds, but is still controllable in gustier conditions. I have also sailed and capsized in winds up to 25kts to confirm the structural strength of the rigging.

Photo shows the teardrop wingmast with the fine telltails I have attached. Photos of these when sailing at low wind speeds confirm good laminar flow on both sides of the mast.

In 2010/11 it was difficult to find the time for all the work I wanted to complete and I still have some towing tests I want to repeat. However, after 4 years, I feel the project to build a more economical and simple dinghy has been a success (inc. AYRS Tankard - 20/10/11 see photo). Next is a full write up of all the technical work for my tutor and editor Jim Platts of the Institute of Manufacturing at the University of Cambridge.



POSTSCRIPT - W hat it used to be like. In 1952 The Burton Trophy Race at Portland attracted 111 National 12 Dinghies, a majority of which would have been amateur construction from plans or kits. At the same time Bell Woodworking were selling the GP 14 foot dinghy complete kit for £,56.



Amateur Yacht Research Society News

AYRS Members Projects meeting January 2012.

There were a number of pictures held over from the report of this meeting in Catalyst 45 for want of sufficient space. Here they are.



This device, constructed by Chris Watson, is a sculling oar designed to be oscillated in a vertical plane, so that the pair of hydrofoils act like the tail of a sea mammal, not like a fish tail as in normal single oar sculling. Note the coffee cups – Margaret Ball supplied us with plenty of tea and coffee from the village hall kitchen.



A water pump, again constructed by Chris Watson. It is moored floating in a river and can be used to pump water from the river to a higher level. The river current acting on the vanes attached to the end of the red cylinder (a plastic bucket), rotates the cylinder. A coiled hosepipe inside the red cylinder takes water from the river and builds up pressure through successive part filled coils of the helix. Like Chris's other models, it is partly made from clear PVC sheet.



This model (above), also constructed by Chris Watson (Although displayed here by Josephine and Graham) is a wave propelled device based on the Wave Glider' – see the Liquid Robotics Inc. website, <u>www.liquidr.com</u>, where all is explained. This model is radio controlled and is reported to work very well. An electric winch retracts the submerged part when it is in shallow water.



This model was made by Fred Ball and was tried out in a small stream the day before the meeting. Fred made it to gain insight into the concept of a narrow monobull stabilised with small floats when at rest and with surface piercing hydrofoils when in motion. It is intended to represent a powered vessel.

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This general view of the meeting includes, in the background and left of centre, the pink coloured spherical wheel that Tim Glover has made as a prototype wheel for his amphibious land yacht. Tim also reported on a conference that he attended on maritime related inventions and patents.



(Left) This is Fred Ball's very preliminary model for a concept that came about through discussion between Fred and Mark Tingley. It is a device to propel a boat using two vanes that each act in a sculling motion, but at one part of the cycle of oscillation they come together to expel water from between them, hopefully creating an enhanced propulsion effect.



John Perry attempted to demonstrate that a 3D design program on a computer can be used to make a model to visualise a concept. This simple model was made during the course of a half hour demonstration, so it is probably a lot quicker than making a physical model, also much easier to make changes to it. You still have to build the real thing to try it out!



Southampton Boat Show - report by Fred Ball



Boats everywhere!

As usual I had an enjoyable day (a real reporter would need several days at least) and was impressed with the numbers of boats on display from traditionally built small craft to huge super yachts, this year I spent much of my time visiting larger yachts (thinking that I ought to have worked in the financial industry to fund my dreams!).

The small craft seemed to be almost ready to sail but most of the large one seemed to be fitted out for lounging in marinas, hand holds below being generally absent or as in one case almost out of reach! That was on a 57 ft motor sailor where on reaching the foot of the companionway steps I was faced with a huge saloon and the only handhold running forwards above my head, only just in reach, any one less than 1.65m (5'6") would struggle to grasp it. Large catamarans were also designed for serious lounging the Lagoon 560 I visited had a spiral staircase to the "flying bridge" with plush seats all the way around the perimeter, the helmsman had an excellent view forwards on starboard tack but I doubt if there was much to see apart from the fore sail on port tack and any work at the base of the mast would be hazardous a short distance from the precipice of the main saloon front windows, I am sure that most controls were remote and that only boatyard workers would have to sort problems out, as a charter boat with the bulk of her crew just there for sun, sandy beaches and relaxation I feel certain she will be successful.



Lagoon 560



Lagoon 360: Vast saloon (left) and View from Upper Helm Position (right)

Discovery Yachts had their new 56 foot cruiser on display, the largest yacht hull so far built using resin infusion; ensuring precise distribution of reinforcement and optimum resin to glass ratios.

The boat that most impressed me was the Allures 45 which appeared to have a very sleek and modern design but a very workman like layout, I believe that the show boat had just returned from a cruise to Russia. Her hull was aluminium and the coachroof GRP and below she was one of the few boats I looked that had adequate handholds for safe movement down below in a seaway. I was also impressed by the engine room layout which had a useable workbench and vice in spite of being in the region of the cockpit

The Sirius 35 Deck Saloon design was another impressive sailing yacht with wheel steering in the cockpit and "fly by wire" using the electronic self steering remote joystick at the "Internal Command Position" (chart table) a nice comfy seat well away from the elements but not a perfect look out station.

The Fisher Boat Co. had two quite different designs built using essentially the same hull moulding, the rigs, deck and coachroof were very different. The Yarmouth 23 was a traditional style gaff cutter and the Yarmouth 22 a Bermudian sloop rig on a reduced freeboard and very sleek coachroof (I had difficulty getting down below!) www.yarmouthboats.com



Yarmouth22 (top) & 23 (bottom)



Allure 45: Handholds everywhere

CATALYST

Away from the boats I found other things of interest:-

Team O Lifejacket; back pull harness and lifejacket, hooking on is still done on the chest but the tether can pop over the shoulders when called into service and the MOB is towed on his back, head up and mouth away from oncoming water. PBO has a review in its latest issue (November 2012) and was very impressed, earlier this year they tried conventional ones with a dummy and found that drowning was likely unless the boat speed was less than 2 knots. www.teamomarine.com

Two companies were selling composite rigging:-• The Rig Shop www.rigshop.com all forms of rigging aluminium and carbon spars, based in Southampton; and

• Colligo Marine www.Colligomarine.com synthetic standing rigging etc. based in the USA

Kayospruce Marine and Technical Fabrics as well as sailcloth and upholstery fabrics were offering sail battens part tapered and fully tapered at extremely competitive prices and also rolls of untapered batten material for simple DIY batten making. www.kayospruce.com

Hawke House Ltd also sold fabrics etc and offered one day courses on upholstery or fitting headlinings. www.hawkehouse.co.uk

I felt that the tradename of Ultimate Sails was very suggestive and they offered a good range of cruising and high tec sails. www.ultimatesails.co.uk

Marine Chandlery were offering "Storm Bag" a form of storm jib intended to be deployed over a rolled up furling jib, it was a wrap around sail in a bag complete with sheets setting it up should be much easier than fitting a temporary stay and hanking on a proper storm jib but I'm not sure that the final hoist will be as easy as suggested maybe a member will have one and can report back otherwise I shall look for a report in the yachting press . www.marinechandlery.com

Vinyl surface protection was being offered by The Wild Group as an alternative to painting GRP www.wildboatwraps.co.uk

[A note from experience - To make vinyl to stick well to GRP, you need to do almost as much surface preparation as for painting, otherwise the vinyl comes off through wave action. It is also very difficult to stick a large vinyl sheet to a compound curved surface with leaving bubbles.l - Ed]

Useful fittings were on display by Baseline Marine Products; U bolts, cleats and fastenings www.baselinemarine.com

John Claridge Composites Ltd was exhibiting his version of Lymington Scow and Pram as well as the Lightening 368, my attention was however caught by his Stainless steel launching trolleys; he also makes carbon fibre spars, fittings and performance foils to order. www.johnclaridgeboats.com

Has anyone seen this boat sailing this year? I would have expected her to be around Plymouth as I saw her at Millbrook earlier this year when I went to see the Greyhound lugger in build. (That was launched in September). I would be interested in how well she sails with her biplane rig She is a Moxley 12 built by J D Marine of

Millbrook. www.jdmarine.co.uk



Weymouth Speedweek

As usual the event was mainly dominated by sail and kiteboards and only six boats took part. Flaxcat was unable to sail effectively as she is permanently a port tack boat and the course favoured starboard tack, Vari-Swift had similar problems being essentially a proa but could be set up for either tack but getting to the start gate was extremely difficult, a newcomer was "Awol" a triscaffe foiler was under powered but showed promise, a two man catamaran and the Hobie trifoiler were able to put in some good runs

The results and details of future speed weeks can be seen on www.speedsailing.com

-FB

AYRS Weymouth Speedweek Meeting October 2012 (Report by John Perry)

It is customary for AYRS to hold an evening meeting at the Royal Dorset Yacht Club on the Wednesday of Speedweek. The format is a series of approximately five-minute presentations from anyone who feels they have something that would be of interest to other members. My notes from the 2012 meeting are as follows:

Nick Povey welcomed the assembled crowd and made the point that this is a landmark year - the 40th year for which Speedweek has run.

Bob Downhill — This being a landmark year for Speedweek, it was fitting that Bob Downhill, who has been involved with the event throughout its 40 years, should give us a brief history of the event.

Bob started with the first event in 1972, helping James Grogono to campaign the hydrofoil catamaran Icarus'. Then came Tim Coleman and the record breaking Crossbows. 1977 saw the first windsurfers at Speedweek, and perhaps disbelief that such a diminutive device could challenge the existing record holders. By then, Speedweek was enjoying sponsorship from Johnny Walker, the whisky distillers. With rapid developments in windsurfing technique and equipment, world records were falling on almost a daily basis, giving great publicity in return for sponsorship money. However, by 1989, it was taking a bit longer to set each new record and commercial sponsorship melted away, but a small group of enthusiasts moved Speedweek to West Kirby rather than allowing it to disappear without trace. In 1992, Bob and Norman reinstated Speedweek at Weymouth. Since then Speedweek has

steadily regained popularity, with a gradual shift of emphasis from experimental boats to windsurfing, and in the last few years kitesurfing has grown in prominence. Having said that, there are still some very interesting experimental boats to be seen at Speedweek.

Roger Glencross – Roger announced that an off the shelf hapa is now available in France - see www.seaglider.fr. It has been demonstrated that this hapa, used in combination with a conventional kite surfing board and kite, enables a kite surfer to be continuously elevated above the water. Roger is excited about this development and is about to get one of these hapas on order, if it arrives in time it will be available for inspection at the next AYRS meeting.

Alex Powell – Alex arrived at this Speedweek with an impressive new hydrofoil boat, so the meeting was keen for Alex to take the stage and tell us more about it. In brief, Alex's boat, named AWOL, is a sailing hydrofoil with a canard layout of three hydrofoil units, i.e. two aft and one forward. The overall length of the craft is 7.2m and the weight, without crew, is 110kg. That is pretty light and has been achieved by careful detailed design and workmanship - lots of carbon fibre. The two aft foils are inclined surface piercing foils mounted at each end of a carbon fibre cross beam. The forward foil assembly and attached buoyancy pod turns to steer the craft and is also controllable in vertical angle of attack. This forward foil assembly consists of a vertical strut carrying a series of tiny lifting foils machined from stainless steel. This is effectively a 'ladder foil' arrangement, the number of lifting foils that are immersed reducing as the bow of the craft lifts. The single crewmember is comfortably seated in a cockpit towards the rear of the craft. The rig is at present a standard windsurfer rig with the mast foot mounted immediately ahead of the cockpit and the boom sheeted to the rear extremity of the craft.

This craft has performed well more of less 'straight out of the box', but Alex listed several areas where he intends to concentrate further development. Firstly, Alex told us that the windsurfer rig was selected for expediency and is not ideal; I think we can expect to see a somewhat larger purpose designed rig next time round. Another problem is spray filling the cockpit. That should be relatively easy to solve with some kind of kayak style 'spray deck'. The steering is controlled by foot pedal and has been found to be too highly geared, making it 'twitchy'



AWOL at rest. (Readers of the electronic issue of Catalyst may find that clicking on this picture brings up a video on YouTube. Others will have to browse to http://youtu.be/JX-9P2hOB4g)

and hard to keep a straight course, again that should be solved fairly easily. This is a promising project and we look forward to future developments. Alex Powell was a deserving winner of the 2012 Speedweek award for innovation.

Michael Ellison – Michael reported that he has achieved a long standing ambition by sailing his Iroquois cruising catamaran from Plymouth to St. Kilda and back. He showed us some pictures of the anchorage off St Kilda - it looks a pleasant enough spot on a fine day. Michael told us that he entered into a bet with Paul Larson of the SailRocket project that he would reach St Kilda before Sailrocket achieved 60 knots. It seems that Michael has won that bet, however recent news is that Sailrocket is doing well with its latest hydrofoil design which is smaller than any foil they have used before. Michael expects to back soon at Walvis Bay in Namibia to record Sailrocket's speed trials.

Zara and Peter Davis – Zara and Peter gave a joint presentation on their experiences competing in the Luderitz Speed Challenge event in Namibia this year. Zara holds the women's world record for production sailboards at 36.99 knots. They explained that the event takes place on a purpose-built canal dug in a sandy beach above high tide mark. Environmental considerations govern how this canal is formed, for example the sand dug from the canal cannot be removed from the beach but must be piled to one side of the canal ready to reinstate the beach. The canal was first dug in 2010, that year the sand was piled on the leeward bank, which risked catching kitesurfer lines, this year it was on the windward bank which caused turbulence that was not ideal for windsurfers. The canal has an initial acceleration section that is intended to be 100 to 110 degrees off the prevailing wind, then there is a sharp turn into the 500m speed course at approximately 140 degrees to the wind, this followed by minimal stopping distance. From the pictures shown during the presentation, the canal is something like the width of a two-lane road and it is not hard to imagine that it is quite a challenge to negotiate it at speed with either windsurfer or kiteboard.

Slade Penoyre – Slade reported on some hapa trials that he has been carrying out in collaboration with Roger Glencross and Fred Ball. The hapa they are trialling is based on the French design reported by Roger Glencross (see above). So far it has been tested by towing with a motor boat and by pulling it along from a marina pontoon. Slade appealed for a volunteer kite surfer to try it out properly and Emile Lautier stepped forward. I heard that a test run took place the following day, but the hapa did not perform as well as hoped. Perhaps better results will be achieved when Roger's French-made hapa is available. Kite surfers interested in collaborating in trials with this could contact Roger or Slade. **Chris Edwards** – Chris told us a bit about the timing system now being used at Speedweek. This is provided by a company called Speed & Track, which has evolved out of a collaboration between Nick Povey and Tim Daish, names long associated with Weymouth Speedweek. Their main advance for Speedweek in 2012 was the ability to measure live wind speed and direction information from buoys out near the course and transmit this data by wifi back to displays on the beach and to spectators' smartphones and laptops. The company is marketing their technology and event planning expertise to other potential event organisers and sponsors. For further information refer to

www.speedandtrack.com. (Note the and between the speed and the track).

Emile Lautier– Neils Haarbosch, Emile Lautier and their colleagues have been regulars at Speedweek for many years, bringing a wide variety of experimental craft over from Holland. Last year they had an asymmetric craft with a displacement hull to

windward and two small planing hulls to leeward. This was unable to sail on the course because the cross beams were not strong enough and broke at the start of the week. This year the craft has been rebuilt with stronger cross beams but it is designed to sail at Weymouth with wind from the west, this year the wind had been from the east so no successful runs had been made, at least not up to Wednesday. Their presentation carried a note of sadness in that he has come to a decision to terminate their years of experiments with unorthodox boats and instead to learn kitesurfing and perhaps become involved with technical advances in that field. They offered this current boat for auction, on condition that the buyer brings it to Speedweek 2013. The reserve price was $f_{,5.00}$ and there were no takers. At first I didn't believe that they were really going to give up boat development, but they do seem set on this so we wish them well for kite surfing, I am sure there are technical improvements to be made in that field.

Snippets:

Professional Boat Builder "Pecha Kucha" event in Amsterdam

Professional Boat Builder Magazine has some interesting video lecture clips from the PetchaKutcha event (4 minute lectures with 20 slides) sponsored by Vripack on the eve of the recent METS exhibition, go to www.proboat.com and scroll down to find ProBoat Design and click on "Learn more"

Topics included:

- Jack Ross Gifford Hydrofoiling Catamaran
- Uwe Feller What Is Powering The Future Craft

• Charlotte Schiffer — Boat Design With A Positive Impact

- Klaus Roeder Mainstream or Going Wild
- Nick Danese 8 Hour Boat
- Marnix Hoekstra VRITHINK!
- Helge von der Linden Kits For Kids
- Jethro de Vries Minor Yacht Building
- Dan Spurr Wood To Glass
- Jay Paris P-32 Research & Development
- Joost Mertens LDL

Cordless Canoe Challenge 2013

This is to be held again at the Beale Park Boat Show in June.

There will be two classes: one limited to 60 volts of power to use a 300 metre dog leg course; and the other has: no limit to the total power available but uses a 600 metre course. Otherwise the rules are as for last year ie Max length 16'3", buoyancy aids to be worn, safe operation (unsafe in the view of judges not allowed to race) and immediate cut off of power in emergency.

Entries to be made no later than April 15th 2013 to ccc@water.craftmagazine.com enclosing pictures and details of the entry.

Further details and links to videos of the previous events etc can be found at www.watercraftmagazine.com

AYRS NORTH WEST LOCAL GROUP meeting, 8th December 2012

Seven out of the nine regular members turned up, for what has become our annual Christmas 'Party'. Apologies were received from Colin McCowen and Peter Gilchrist. A ± 10 contribution to AYRS North West Local Group was received from John Morgan, another member who was unable to attend but who follows our proceeding by receiving the records of meetings which are distributed to sixteen local members.

Due to Mike Howard's personal circumstances, this was the first (and last) meeting of the Group in 2012. A buffet lunch, accompanied by some general chatter, was enjoyed by all before the group sat down to some discussion. (Thanks Col for lunch - it was delicious as always).

Mike Howard welcomed the members and apologised for being so inactive during the year. He promised a full programme for 2013 which it is hoped will include not only quarterly meetings but 'days out' which may include a visit to the Beale Park Thames Boat Show (7th - 9th June) and a visit and tour of Sunderland Point, the ancient port of Lancaster, time to be co-ordinated with Peter Gilchrist, subject to the tide time as the road/ causeway is flooded two hours either side of high water.

A discussion of Speed Sailing led to Adrian Denye explaining the workings of rigid wing sails on racing land yachts and ice yachts and how they are controlled. This discourse included several reminiscences of him travelling in excess of seventy miles an hour on Lytham sands. and over one hundred miles an hour on ice!

The meeting was brought back down to earth with a discussion of methods of paddling a canoe and this led to some thoughts on sailing canoes. Both John Shuttleworth and Brian Shenstone, both active canoeists, admitted that they had had few outings during 2012. Is it any wonder after the appalling weather we have experienced.

An update on the Morley Tethered Kite Sail by Mike Howard explained that the project almost went afloat in September but has now been put to bed for the winter. It is hoped to 'fly' the Enterprise dinghy based rig in the early Spring.

Under the subject of new projects, John Alldred showed drawings and a prototype of a special pair of stainless steel scissors he has developed for cutting rectangles out of the centre of A4 paper. This is not the place to go into the ins and outs of his project but adequately illustrates the vast scope of talent embodied in AYRS members and the diversity of subjects tabled at our meetings.

John also told us of a recent trip to Ghana where he observed traditional dug out canoes of all sizes still being constructed from a tree trunk using only an adze. He also related a tale of a very poor fisherman who had had to resort to first principles in the choice of his fishing craft. The fisherman sat astride a rectangular baulk of timber, his fishing basket balanced precariously between his knees. He would cast his net and then slip over the side of his timber baulk to gather in his net before re-mounting and emptying the catch into his wicker basket. John watched, fascinated. while the fisherman repeated the process without any regard for the crocodiles who lurked in the river!

Adrian Denye asked if any of the members had any new boat building projects in hand. In reply, Mike Howard offered a cardboard model of *Eahta* (Old English for eight), a sailing canoe hull he is developing for his own use. The hull shape comprises eight identical plywood panels cut from two standard sheets of plywood. He explained that the basic idea came from Chris Waite's *Octavia* rowing skiff and and Graham Neil's *Katie Beardie*, a sailing canoe which used similar developed plywood design principles.

Mike has modified the panel width to produce a 5.00 metre (15 foot) long x 0.85 metre (33 inches) wide vee-bottomed single chine hull with a small transom stern. Mike hopes to incorporate a weighted centreboard or dagger board to aid self righting. Mike has contacted the designer and builder of the above boats and has had approval to develop their idea. Anyone who is interested in following up on the above mentioned designs needs to look on the internet under the UK HBBR Forum or PORT NA STORM webblog. The ensuing discussion seemed to favour a leeboard combined with twin floats/ outriggers as deployed with sailing cances rather than Mike's cumbersome weighted keel idea.

The meeting was rounded off by a slide show presented by Adrian Denye under the auspices of AHD Design in which he showed photographs and 3D images of a large cruising catamaran and a Swedish Navy Special Forces RIB.

Mike Howard

Catalyst Calendar

This is a free listing of events organised by AYRS and others. Please send details of events for possible inclusion by post to Catalyst, BCM AYRS, London WC1N 3XX, UK, or email to **Catalyst@ayrs.org**

January 2013

- 12th 20th London International Boat Show and
- 17th 20th The Outdoor Show EXCEL Exhibition Centre, London Docklands. AYRS will be there on Stand A167, close to the Multi-Activity area, on the left as you come in through Door S4. Helpers are wanted to staff the stand, sell publications and recruit new members. If you would like to help (reward: free ticket!) please contact the Hon Secretary on 01727 862268 or email office@ayrs.org

27th All-Day AYRS Meeting

9.30am-4pm, Thorpe Village Hall, Coldharbour Lane, Thorpe, Surrey (off A320 between Staines and Chertsey – follow signs to Thorpe Park, then to the village). Tea and coffee available but bring your own lunch. Donations invited to pay for hall. Further details from Fred Ball, tel: +44 1344 843690; email: fredcball@btinternet.com.

27th AYRS Annual General Meeting

4pm, Thorpe Village Hall, Coldharbour Lane, Thorpe, Surrey (as above). Details are on the AYRS website www.ayrs.org. Note: Items to be considered by the AGM, including nominations for the Committee MUST be received by the AYRS Secretary before 12th January 2013 (post to AYRS, BCM AYRS, London WC1N 3XX, UK, or email: secretary@ayrs.org)

March 2013

2nd AYRS North West UK group meeting

2pm, 12 The Boleyn, Lydiate, Merseyside, L31 9PT. Contact Mike Howard for details: Tel: 0151 531 6256; e-mail: ecotraction@aol.com

2nd – 3rd RYAVolvo Dinghy Show, Alexandra Palace London

Many sailing dinghy classes and beach cats will be on display, dinghy skill lectures and demonstrations, new fittings and bargain sailing kit. For details see www.rya.org.uk

9th (Provisional date) AYRS South West Area Meeting Details to be arranged, there is a possibility to visit the Marine Dept of Plymouth University and see their facilities. Contact John Perry -01752863730(L) 07729334325(M) j_perry@btinternet.com for more information

April 2013

28th Beaulieu Boat Jumble The National Motor Museum, BEAULIEU, Hampshire, UK. AYRS will be there!

May 2013

Date to be arranged Boat trials, Weymouth

Probably at the Portland and Weymouth Sailing Academy. Contact: Norman Phillips email: wnorman.phillips@ntlworld.com; tel: 01737 212912.

Broad Horizons 2013

IF there is enough interest, we will organise a sailing meeting on the Norfolk Broads in late-May again. Email office@ayrs.org if you would like this to happen and would come (with or without boat)

Details will be posted on the AYRS website www.ayrs.org.

June 2013

7th -9th Beale Park Boat Show As usual we will have a stand and would appreciate small exhibits and display material and of course offers of help to run the stand. Contact: AYRS Secretary, 01727 862268, email office@ayrs.org

October 2013

12th-18th Weymouth Speedweek Portland and Weymouth Sailing Academy, Portland Harbour, Dorset UK See www.speedsailing.com

16th "Speedsailing" AYRS
Weymouth meeting
19.30 for 20.00hrs, probably at the Royal Dorset Yacht Club, 11
Custom House Quay,
Weymouth.
Map: www.rdyc.freeuk.com.
Contact: AYRS Secretary, BCM
AYRS, London WC1N 3XX;
check the website www.ayrs.org
or email: office@ayrs.org tel:
0780 820 0987 before going just
in case the location changes!

AYRS Annual General Meeting 2013

Notice has been given that the Annual General Meeting of the Amateur Yacht Research Society will be held on 27th January 2013 in Thorpe Village Hall, Thorpe, near Staines, England, starting at 16.00 hrs. All members and their guests are welcome to attend, but only paid-up members may vote on resolutions.

The business of the meeting will include the following, not necessarily in this order:

- 1. Receipt of apologies for absence
- 2. Minutes of the previous AGM
- 3. Chairman's Report
- 4. Treasurer's Report and Approval of Accounts
- 5. Election of Officers and Committee members
- 6. Appointment of a Reporting Accountant
- 7. Any Other Business

Relevant documents will be posted on the AYRS website www.ayrs.org.

Matters for discussion under Item 7 should be notified to the Hon Secretary as soon as possible. Email hon.sec@ayrs.org

Any queries should be addressed to the AYRS Office, email office@ayrs.org.

Please note: The Annual Report is UNLIKELY to be published in Catalyst before the AGM. It WILL be published on the AYRS website www.ayrs.org.

Catalyst — a person or thing acting as a stimulus in bringing about or hastening a result

On the Horizon . . .

More sources and resources: reviews, publications and Internet sites

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