Catalyst

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Features

Regulars

Alex Stanley's wheeled catamaran on Barton Broad, Norfolk, Broad Horizons 2008 (photo: S Fishwick)

Catalyst

Journal of the
Amateur Yacht Research Society

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Getting back to normality

I am sorry that this edition of Catalyst is late. (What again?!) "Percy" Westwood's untimely death set us a little aback, but we now have this edition out, and the next is nearly ready to go.

Although this edition has a cover date of July, as I write this we are well into England's autumn, and it's at this time of year one tends to look back at what has been done, and look forward to what is yet to be done next summer.

For myself, I realise that the day job has kept me busier than I expected so my contribution to the sum of knowledge of yacht science has been less than I hoped. No so for others though. Amateurs are always restriced by the amount of funding they can apply to their projects, and the articles in these pages show what can be done with a reliatively limited amount of cash.

Perhaps typical of such is Alex Stanley's wheeled catamaran. Alex got fed up with dealing with trolleys and wanted a craft that would to a great degree be self-contained in it's shore handling. The result? Replace the daggerboard by wheels, not to reduce drag as others have done but simply to provide more mobility. Pictures oif his boat are on our cover and page 7.

Simon Fishwick
AYRS Editor

Subscriptions

For those who don't pay their subscription by bankers order, now is the time of year when payment is due, otherwise this may be the last Catalyst sent to you. Those who have already paid will we hope get another edition before the end of the year.

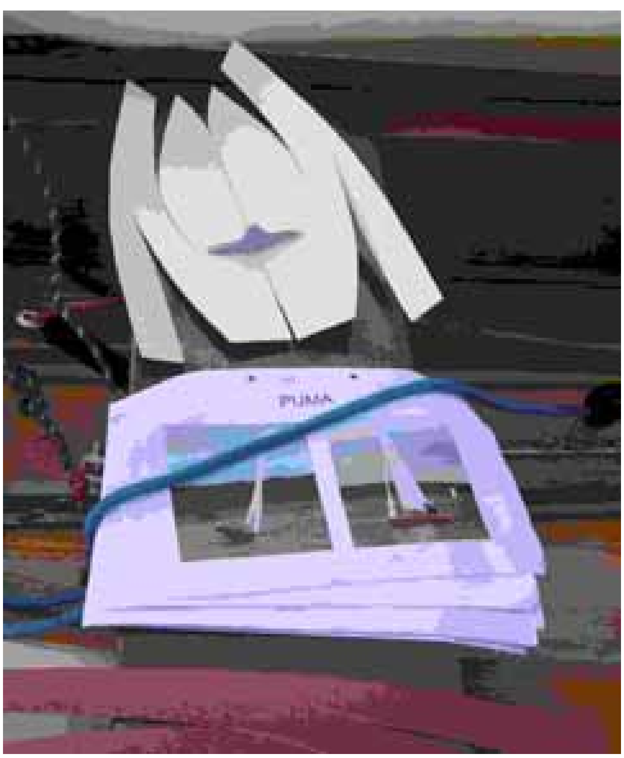
The sub remains at £20, $30 or Eur30, unless you wish to claim the retired concession, or are prepared to download your copy from the website, in which case it is half that. We will though need your email address so we can notify you of the password. We can take cheques, banknotes or Paypal.

Beale Park Thames Boat Show

This show is aimed at the small boat user and traditional construction and makes awards to amateur constructors, next year there will be more classes so perfection seen in this years entries might not be quite so essential.

AYRS had a small stand there but failed to attract much interest, maybe we should have one or two boats there another time.

One of the home builders had a neat cardboard shape to show how his plywood constructed hull had been developed, it had produced a very modern racing dinghy hull.



I was particularly interested in Tit Willow an exhibit on the water representing the Dinghy Cruising Association, she seemed to be a real "Little Ship"

One of the professionally built boats had a composite mast which appeared to have a "silver" carbon fibre, I think the manufacturers name was Platinum Spars*

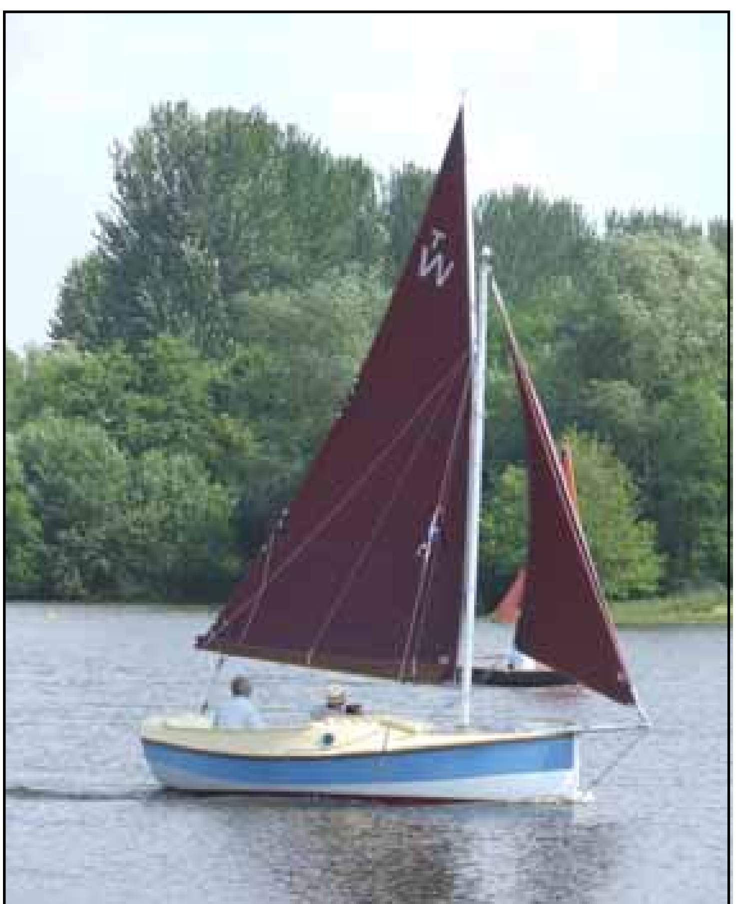
* "Platinum" carbon fibre spars - made by North for boardsailors, various stockists - see North's website www.north-windsurf.com/en/masts/Overview

Professional builders and restorers were also well represented with wooden boats fit to keep in the dining room! I'm not sure that I would trust myself to use such beautiful creations.

Also present were some interesting historical exhibits including a fold flat boat which had rows of hinges along the curved chine spaced close together and working perfectly when the boat was folded or un folded, everything tucked away neatly resulting in a package approximately 2 metres long and 200mm thick, In the canoe section there were several Klepper type folders and a 3.5m long dinghy of similar construction.

An altogether very interesting show for the small boar enthusiast and I shall look forward to going to next years event.

Fred Ball



Titwillow

(All Photos: F Ball)

Seawork International Commercial Marine Exhibition and Forum - Southampton, UK 16-18 June 2008

It is interesting to have a look at what is going on in the commercial world and I had the opportunity to visit this exhibition this year. Exhibitors were mainly from the diving industry, port construction industry, small boat and ship construction.

Exhibits that I found interesting were -

Several catamaran based workboats, their open deck space making them ideal for many tasks and low resistance hulls reducing fuel consumption, one exhibitor said that one of his customers had doubled his profits because of this.

A towing hawse for RIBs, a very neat semicircle of stainless steel articulated on the transom to allow free turning and tilt of the outboard, a traveller device on the arc ensuring that the tow line align with the axis of the engine allowing full control to be maintained. www.turboswing.nl *[This item won the 2008 Seawork Innovation Award - Ed]*

An aluminium catamaran with catapillar tracks / paddles that was fully amphibious, designed to have various attachments such as reed cutters, excavator buckets rakes etc for the maintenance of marshland and inland waterways.

See www.doroteamekaniska.se & www.aquaclearwatermanagement.com

The indoor exhibition had numerous stands and three exhibits caught my attention.

The first was of a monitoring system for fishing boats to warn of impending instability, essentially the roll periods were monitored and changes analysed by computer.

The second was a gyroscopic roll damping system, the stand had a small model in a wave tank to demonstrate the idea.

The third was a company specialising in corrosion control and what caught my eye was what looked like a chunk of shiny lace, real artwork it could easily have been on display as sculpture somewhere, it had however started life as an impellor and been destroyed by cavitation.

Fred Ball

AYRS Southwest UK Area Meeting, March 2008

Over the last few years, AYRS has held excellent winter meetings at Thorpe, which is on the South West quadrant of the M25 (London's Orbital motorway), but we have felt that there could be more winter meetings in other parts of the UK, possibly even in other parts of the world. Finally getting around to doing something about this, our first step was to ask the AYRS Secretary, Sheila, for an up-to-date list of members; then we mailed or emailed everyone living within about two hours drive from our location near Plymouth.

Not having held such an event before, we could only guess at how many people we needed to cater for, so we decided to hold the meeting at home rather than risk the embarrassment of hiring a meeting hall then sitting in it all alone. As it worked out, a dozen attended, certainly enough to make a viable meeting. This number included the AYRS Chairman and Treasurer, who travelled all the way from Surrey; the others were local. Another four replied to say that although the date did not suit them they would like to come another time. I include this information for the benefit of other AYRS members who may like to set up provincial meetings of the Society - I think the interest is there, it just needs a few people in different parts of the country to announce some dates and venues. Also it is worth pointing out that you don't need a big crowd, a gathering of even just two or three enthusiasts is enough to exchange ideas and make a good evening.

We scheduled our meeting for a Saturday afternoon and early evening, starting with a short stroll along our local coastal footpaths. I thought that this would give people a chance to introduce themselves whilst avoiding spending the whole time indoors. The weather was grey and blustery and the onshore swell gave us a chance to watch the antics of surfers on our local beach; but then rain threatened so we hastened back up the hill for afternoon tea at our house.

I had invited people to bring along their project or sailing photos but I had no idea what to expect; so I was delighted to discover that two attendees had come fully prepared with presentations on very relevant AYRS-style projects.

Simon Tytherleigh started by telling us about his project to build a cruising catamaran based on a Kurt Hughes design but with considerable modification, including a full bridge deck cabin in place of an open bridge deck. The construction is by Kurt Hughes 'cylinder moulding' method. A single male mould is used to laminate several compound curvature wood veneer panels, which are then joined to build up the hulls. For this craft, the laminate comprises two layers of 3mm marine ply and also a layer of balsa wood for thermal insulation and stiffness. There is glass and epoxy sheathing inside and out. It is a graceful looking craft with a rotating wing mast, dagger boards, slightly raked stems, good bridgedeck clearance and spade rudders with the stocks in mounts which pivot in slots in the transom sterns so that the rudders can kick up in shallow water. The shape is all sweeping curves and a small streamlined 'blister' on the cabin roof gives standing headroom over part of the bridgedeck cabin area. The rotating mast is unidirectional carbon laminated over a very thin plywood inner structure, standing rigging is non-metallic. The message that came across to me is that a boat building project of this size and complexity is a pretty big undertaking, but Simon is well on the way to finishing it after two years of very determined effort and with help from a few sailing friends. Other comparable projects I have seen or read about mostly seem to have taken a lot longer than that.

Our second talk was by Nigel Rollason who is working on a rather more experimental project, another big catamaran but not at all similar to Simon's project. Nigel started by taking a female hull mould off a sliding seat racing rowing boat. From this mould he produced two lightweight fibreglass hulls. These hulls each retain one set of sliding seats and rowlocks - that is the auxiliary propulsion system. The framework between the hulls is a welded fabrication of aluminium tubing. The hulls have lifting hydrofoils, which are inclined outwards, the opposite way to those on many more traditional hydrofoil catamarans such as 'Icarus'. I don't think Nigel has got as far as the rig, but I gathered that this was likely to be an inclined rig to reduce heeling effect. This project is truly in the AYRS tradition - don't worry too much about the theory, just get on and build it then sail it and refine it until it works, learning all the time. Nigel generated much discussion among our small audience, the outward inclined hydrofoils in particular attracting some critical questions. Nigel said that he will try them that way, if that doesn't work he will just change it a bit.

We will be holding another winter meeting in Devon on Saturday 7th March 09. We will keep the same general format as last time. If you would like to join us for a short coastal walk (not more than three miles, less if the weather is bad) we will set off at 14:30 from our house at 7 Cross Park Road, Wembury, PL9 0EU. We should be back at our house for tea by 16:00ish, so if you don't want to come on the walk join us then. After tea we will show slides and talk about boats.

We can display digital 'slides' from CD, USB stick etc. If you want to show real slides you would need to bring a projector. Paper photos, models, posters etc. can be displayed. I am hoping we might get an update on the two projects that were presented last time. We have floor space and airbeds if you are travelling from far away and need to stop the night, there is also space to camp in the garden but it might be a bit early in the year for that.

Let me know if you need further information or if you would like a map to find us.

John Perry, tel: 01752 863730;
email j_perry@btinternet.com
(note underscore in that email address).

Broad Horizons 2008

Photos by G Ward, S Fishwick and others

Peter Worsleys wingsailed catamaran

(Left) Alex Stanley's wheeled catamaran and (below) details of a wheel. One of these fits into a cassette in each hull. The wheels themselves are made of two shallow FRP cones with a solid rubber tyre. The cassette allows them to be removed (downwards) for maintenance. As far as one could tell, the performance was not significantly worse than any other catamaran with keel or dagger board, whilst the wheels allowed Alex to land his boat on the slipway and be off whilst others were still looking for their launching trolleys!

(Below) Peter Worsleys model windmill boat made to prove a point about sailing to windward. His full size rig can be seen on the WWW at http://www.speedsailing.com/Results_WeirWood_May_1999.htm

(Right) One of the more usual sights on Barton Broad!

World Speed Sailing Record Rule No 3

The WSSR Council announces an amendment to WSSR Rule 3.

The 3rd paragraph is amended as follows:

"For every record attempt on natural courses in every class, there must be a minimum depth of water, which is defined as follows.

At the time of the run in question, the shallowest part of the course must be covered by water with a depth of at least half the static immersed beam of the craft involved, or 10cm, whichever is the greater.

(Guidance note) To define the depth requirement, the craft or board involved should be afloat and the widest part of the hull or hulls touching the water should be measured. In the case of a multihull, the widest hull is measured or hydrofoil if fitted. In the case of an event involving a number of competing craft, the WSSRC Observer can announce at the commencement of the event what the minimum depth requirement will be"

Reason:

The WSSR Council had introduced the "50 cm minimum depth rule" after having commissioned an investigation from Southampton University's Wolfson Unit into the ramifications of "ground effect" on craft sailing in shallow water. This report had concluded that ground effect can indeed have a marked effect in reducing the drag of craft sailing in very shallow water, that it became significant at a depth factor of half the beam of a planing surface and that in general a minimum water depth of 50 cms would be more than deep enough to avoid this shallow water effect. In general, the sport had welcomed this ruling as it posed little or no practical problems.

Kitesurfers and Windsurfers however had a major difficulty in administering this new rule, to such an extent that it threatened to bring their attempts on records to a complete halt. These craft have traditionally used tidal courses, close to the shore since the 1980s, when the Weymouth Inshore course was established, Subsequent venues around the world - all verified by the WSSRC - had adopted this format of which the greatest advantage had been the ability to sail in smooth water. But by the physical nature of these courses and due to geographical and tidal effects, the depth of water varied considerably along the 500 metre length and thus complying with the 50cm rule overall could make it impossible to set courses, without ending up well out to sea, in conditions adverse to high speed.

All accept that "ground effect" exists and are unanimous that it should not be a factor in setting records. There was a danger that artificial courses might be created which could take advantage of this aid to higher speed but this was a separate issue which the WSSRC would address presently. However, in considering the Wolfson Report, the measurement at which ground effect came into effect was at half the beam of the board. As the average width of a board was 20 cms, it seemed reasonable to establish 10 cms as being the absolute minimum depth for natural courses - as opposed to manufactured courses - at the shallowest point.

John Reed
Secretary to the WSSR Council

Sailing the Jet Streams

Regarding my article "Sailing the Jet Streams....", Catalyst No. 30, April 2008, pp. 8-9:

On August 18, 2008, Dr. Ken Caldeira of Stanford University, who has pointed out that 1% of the energy in the jet streams could power the whole world, did a quick, back of the envelope calculation for me.

He found that lifting the water up to the jet streams, to be electrolyzed to produce hydrogen, would require roughly 10% of the energy that the conversion process could yield. His conclusion: "..., seems like it might make sense". If water could also be extracted directly from the air in the jet streams, that might be even more efficient overall.

Peter Allen Sharp
sharpencil@sbcglobal.net

Reply to John C Wilson concerning the gear ratio of Bauer vehicles Catalyst #28

I agree with John about the speed potential of the vehicle versus the ratio of the wind column leaving the propeller. When the air is blowing towards the rear and the ratio is greater than 1 to 1, the vehicle should go up wind. When the ratio is less than 1 to 1, it should go down wind faster than the wind. When the air column leaving the propeller is forwards, in the direction of the vehicle travel, it should go down wind slower than the wind. What I do not agree with, is that the ratios can be calculated without knowing the efficiency of the vehicle. Propeller efficiency, size, gear train losses and rolling resistance affect the ultimate speed potential.

The vehicle I built has a lift to drag, as measured on a treadmill at 8 mph, of 1.4 to 1. Meaning, for every unit of force required to push the vehicle at 8 mph, the propeller generates 1.4 units of lift or pull. For this lift to drag ratio, the most suitable propeller speed to vehicle speed turned out to about .57 to 1, and indeed it does goes downwind faster than the wind. If the vehicle losses were greater, the ratio would have to be higher like .4 to 1, resulting in a slower speed. If the vehicle were more efficient, the ratio would be lower like .65 to 1 and it would go faster. An 8 mph wind to ground speed difference, the potential energy available to a 40 inch diameter propeller is 23.2 watts of energy. That is all the power available, and does not change with the speed of the vehicle.

John asks how I reversed the gear ratio to get the car to go upwind. I flipped the fan over to put the concave side towards the wind and kept the rotation direction the same. The gear ratio was reversed to have the fan become a windmill with the blade speed/pitch at 1.75 that of the ground speed. I did not experiment with different ratios because most people can agree that a vehicle can go straight upwind.

John also asked why I did not leave the gears in place and reverse the direction of the fan. I saw no point in making a car that would go at about half of wind speed. In fact it would probably go faster if I disconnected the drive belt and held the blade stationary.

John asserts that the energy flow depends on whether the car is outdoors or on a conveyer belt. In all cases of DWFFTTW, the fan is blowing the air backwards and the wheels always turn the fan. The car gets its energy from the speed difference between the surface it is rolling on, and the air it is pushing against. There is no difference from the cars point of reference.

Jack Goodman
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AYRS Announces ...

2009 Annual General Meeting

The 45th Annual General Meeting of AYRS will be held on Sunday 25th January 2009 at the Village Hall, Thorpe, Surrey, starting at or after 4.00 pm (after the all-day AYRS meeting).

The Agenda will be as follows:

1) Apologies for Absence.
2) Minutes of the 44th Meeting held on Sunday 27th January 2008 at the Village Hall, Thorpe, Surrey.
3) Chairman's Report.
4) Treasurer's Report and Accounts
5) Confirmation of President and Vice-Presidents, Election of Officers and Committee Members.
6) To appoint a Reporting Accountant for the year.
7) Any Other Business
8) Vote of thanks to the helpers of the society.

The Annual Report and Accounts will be published with the next Catalyst and will be available on the AYRS website, as will the draft minutes of last year's AGM. At present there are a number of vacancies for Committee Members. Nominations for these, and also notification of any other business to be discussed under Item 7 should be sent to the AYRS Secretary **by 22nd December 2008**. Email: office@ayrs.org; post: BCM AYRS, London WC1N 3XX, UK.

(See also page 24)

The Delta Sail Project

Malcolm Henry

Description

The Bermudan rig has always irritated me. It is something of a one-trick pony - very good at sailing upwind but less and less capable the further off the wind you try to sail. Good fun for racing but not nearly as useful for passage-making or as an auxiliary sail on a motor vessel.

I was introduced to the dipping lugsail as a teenager and was impressed with its pulling power on a reach and the ability to set it 'square' before the wind was an obvious improvement, for a working rig, on a goose-winged Bermudan set-up or the complications of flying a spinnaker.

The incarnation of the dipping lug with which I became most familiar hails from the Outer Hebrides and uses a sail with a short luff and a long yard which is relatively highly peaked when compared to, say, the Breton lugsails. When set on a reach this sail provides a very noticeable and highly desirable lifting force to the front of the boat which is in stark contrast to the Bermudan rig where the sails tend to drive the lee bow downwards.

The 'crab claw' rig as described by Marchaj in his Sail Performance book* sparked my interest as I saw in it some of the attributes of the lugsail that I had enjoyed as a youth along with the promise of significantly superior performance to the Bermudan rig when reaching and running, and a means of easily tacking the sail by way of an 'over-the-top' arrangement.

*Sail Performance by CA Marchaj (Revised edition 2003) Adlard Coles Nautical.

Description of the rig as developed to date:

In 2005/06 I designed and built a 7m trimaran to provide a stable platform on which to develop a version of the delta sail based on the descriptions of the 'crab claw' model used by Marchaj in his comparative performance experiments.

The trimaran is fitted with a small centreboard, a spade rudder, and a 15hp auxiliary outboard motor set in a well aft of the cockpit.

Sail area is 21m² (226ft²) and displacement around 780kg (1,700lbs) fully laden, giving a Bruce Number of around 1.25.

The mast is an unstayed aluminium tube with a phenolic resin ball fixed to the top a stainless steel stem, the lower end of which is hinged at the top of the mast. This arrangement allows the ball to move from side to side through and angle of approximately 40º, which allows the sail to be set almost vertical on either tack. (Photo 1)

The ball bears in a socket in the cross-spar, held in place by a retaining ring of PTFE backed by aluminium. Stainless steel wire preventers are rigged

Photo 1 - mast top ball and socket joint

Photo 2 - preventer on cross-spar

to stop the cross-spar from articulating beyond the limit of the ball and socket joint. (Photo 2)

The sail-spars are made from redundant windsurfer masts - GRP tubes of 50mm diameter at the cross-spar tapering to 40mm at the forward end and 30mm at the after end. These sail-spars lie in sleeves that are cut to allow the spars to be straight when the sail is furled and curved when set. The forward ends of the sail-spars are located in a wood/epoxy/glass 'nose' structure that forms the apex of the delta. This allows one sail-spar to hinge against the other. (Photo 3)

The sail is 'hoisted' by means of a halyard rigged on the cross-spar that pulls the sail-spars apart, stretching the sail between them. The halyard is tensioned by a winch fixed to the mast before being made off on a cleat on the cross-spar. (Photo 4)

The sail is cut flat (i.e. without any camber) and controlled by means of the following lines:

- tack downhaul - keeps the sail in balance fore and aft when 'hoisting' the sail, going about, etc.
- tacklines - port and starboard - control the position of the tack when under sail.
- inner sheets - port and starboard - control the aft end of the lower sail-spar when beating.
- outer sheets - port and starboard - control the aft end of the lower sail-spar when reaching & running, and the aft end of the upper sail-spar on all point of sail.

The outer sheets and the tack downhaul can be tensioned by winches mounted on the port and

Photo 3 - sail rigged ready to hoist - see 'nose' hinge at forward end.

Photo 4 - lower end of halyard arrangement prior to hoisting sail - after hoisting, cam cleat on cross-spar holds halyard while turning block is unclipped from masthead and clipped to eye on cross-spar - halyard is then made off on cleat on cross-spar.

starboard side decks aft of the cockpit. These have rarely been used in practice but do provide assistance in stronger winds. (Photo 5)

On the wind the sail appears to work best with the 'nose' down.

On a reach the sail appears to work best with the axis of symmetry horizontal.

These results concur with Marchaj.

On a dead run sail is set forward of the mast with the axis of symmetry approximately vertical.

Going about into the wind requires the tacklines to be eased so that its axis of symmetry is approximately horizontal, otherwise the boat may

Photo 5 - control lines at cockpit

Clockwise from top left:

Photo 6 - starboard tack - preparing to go about

Photo 7 - going about - rotating the rig over the top of the mast.

Photo 11 - port tack.

Photo 10 - easing the outer sheet to complete the tack.

stall. Rotating the sail over the top of the mast (around the axis of symmetry) is easily done while head to wind. (Photos 6 - 11)

Gybing from reach to reach is done by setting the sheets at approximately equal lengths and then rotating the sail around an axis perpendicular to the axis of symmetry using the tacklines.

When overpressed on a beat or a reach the inner sheet is eased and the upper one brought in to cant the sail, converting some of the driving force to upward lift.

When overpressed on a run the tacklines are eased and the sheets pulled in, canting the rig towards the stern. This reduces the area of sail presented to the wind.

The sail can be completely de-powered when sailing on any point by pulling it onto the horizontal plane. This is easily done even when sailing directly downwind. (Photos 12)

Advantages of the rig as developed to date:

- Reduced windage - the mast stands less than 2.5m above deck level which means there is considerably less windage than with a conventional rig when motoring or moored, even when the sail is fully set and in the ‘neutral’ (horizontal) position
- Fewer components - compared to a conventional rig there are fewer components and loads are more evenly spread, which suggests lower capital cost and reduced risk of component failure.
- No reefing required - the ability to cant the rig removes the need for reefing, simplifying sail management.

Photo 8 - going about - head to wind.

Photo 9 - going about - rotating the rig onto the port tack.

- Upward lift - canting the sail shifts some of the heeling force to an upward force which helps to lift the boat over the waves rather than driving it into them as is the case with a conventional rig.
- Sail clear of the deck - 'over the top' tacking means that the sail does not interfere with anything on deck aft of the mast. Deckhouses and equipment can be mounted anywhere aft of the mast so long as they are no higher than the top of the mast.
- Safety - There is no danger from a swinging boom or flogging genoa. Going about and gybing are more gentle and more easily controlled.

Problems and improvements:

Sail shape - according to Marchaj the delta sail is at its most efficient when flat. As the wind strength increases it is difficult to stop sail-spars from moving towards each other, forming a camber in the sail. The inner sheets of the existing rig have been installed to help reduce this camber when close-hauled. The outer sheets perform the same function when on a reach but would not be available on a monohull.

Sail stowage - the current arrangement has the sail, complete with sail-spars, being lifted off the cross-spar and stowed on deck. This is acceptable on a small leisure craft where the rig can be manhandled and the resulting clutter on deck is merely inconvenient. If the rig is to be developed for commercial use it is desirable that the sail remains attached to the cross-spar arrangement and stowed overhead, preferably horizontally, keeping the decks clear.

Sail cover - currently the sail (including sail-spars) is covered by a sleeve that is introduced over the aft end of the sail & spar bundle while on deck and pulled forward. The result is nice and neat but the system is slow to manage and will become increasingly difficult as the size of the rig increases and when the rig is stowed overhead. (Photo 13)

In order to overcome the problems outlined above it is proposed to reduce the undesirable camber by using two cross-spars instead of the existing single one. One cross-spar will be located closer to the nose of the sail and the other closer to the points at which the sheets are attached. These cross-spars will be connected by a central beam that lies parallel to the axis of symmetry of the sail. The ball and socket joint will be mounted on this beam. It is hoped that the more rigid cross-spar structure will permit the use of a single set of sheets on a sheeting base that can be accommodated by most monohulls.

In order to facilitate stowage of the rig overhead it is proposed that each new cross-spar will be in two parts, hinged at the sail-spar end and attached to the central beam by way of a cantilever hinge arrangement that will be operated by an hydraulic ram. Extending the ram will open the cross-spars and spread the sail-spars, setting the sail. Retracting the ram will close the cross-spars, bringing the sail spars together aligned with the beam over the top of the mast.

In order to easily cover the sail it is proposed that, when in the closed position, the sail and sail-spars will be brought close to vertical. A sail cover that is similar to a spinnaker snuffer will then be run up the

Photo 12 - sail in the 'neutral' position.

rig by an arrangement of lines and blocks. The upper part of the cover will incorporate an elasticated panel and will go up around the mast to accommodate the joint at the masthead. Once covered, the rig can be brought to the horizontal and secured.

Photo 14 - sail & spars stowed on deck in a sleeve - cross-spar stowed in canted position to discourage seagulls from using it as a perch.

Applications:

The improved rig, as outlined above, could provide useful motive power for commercial craft such as fishing boats, cargo and survey vessels.

The rig will be relatively inexpensive to produce in and relatively easy to install and operate compared to other types of rig that have been proposed for this type of application (e.g. rigid wingsails).

If the rig is used only for reaching and running it will not impinge on any deck operations aft of the mast, other than the need for turning blocks, winches and cleats for the control lines.

The rig may also prove attractive for motor-sailing pleasure boats, reducing fuel costs and increasing range.

Further investigation of the upwind performance of the rig may make it a viable alternative to the Bermudan rig for cruising sailors.

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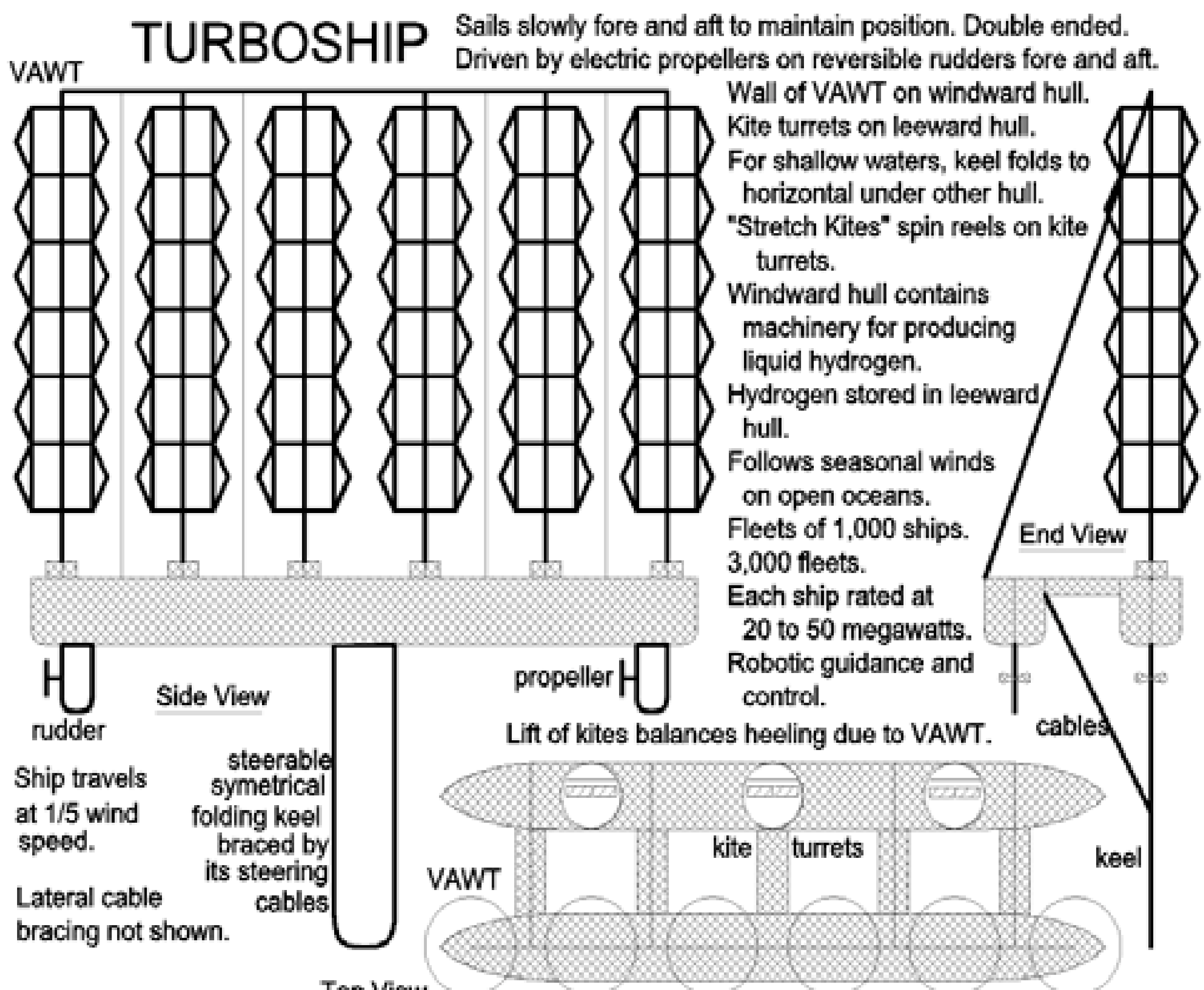
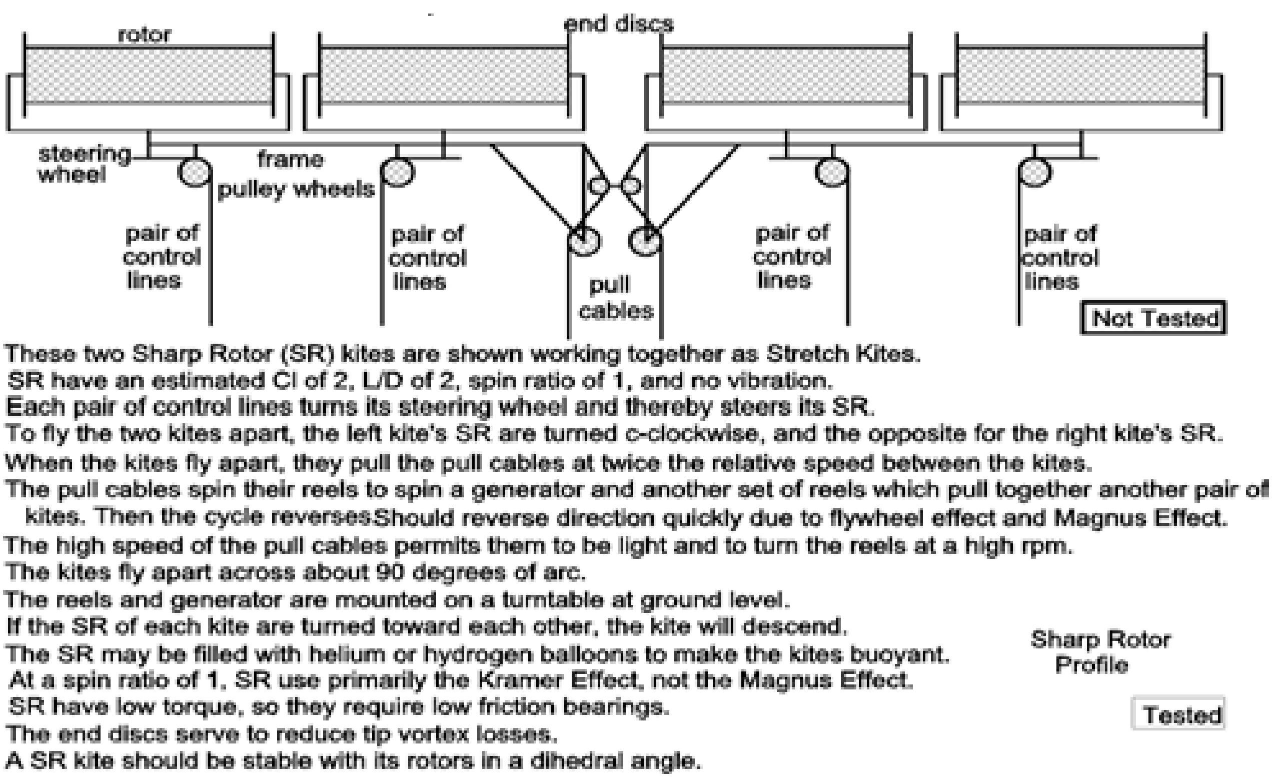
TURBOSHIPS

Peter Allen Sharp

The purpose of Turboships is to produce liquid hydrogen by sailing the open seas using a combination of vertical axis wind turbines (VAWT) and power generating kites (PGK). Turboships would be robotic, meaning that they would function autonomously in fleets of about 1,000 ships (about 37 rows by 37 columns). The ships would be spaced far enough apart so as to not interfere with each other's wind, and to give them ample time to stop, steer, or reverse direction in an emergency. The ships would hold position by sailing slowly back and forth over a distance of a few kilometers so as to counter the leeward drag of their VAWT and PGK. Each ship would be equipped with a very large keel to provide sufficient hydrodynamic lift to windward at low speeds (1/5 of the wind speed). The keel would fold up under the ship before entering coastal waters to unload hydrogen.





Turboships would be windmill and kite propelled sailing ships except when they were motoring using stored hydrogen (as when outrunning storms). They would achieve the return of commercial sailing ships, although in a new configuration and application. (Large traction kites pulling ships directly in order to reduce fuel consumption will also play an important part in the future of sailing.)

Thousands of fleets of Turboships deployed over the oceans could supply most of the world's energy needs. However, they are best suited to supplying coastal cities with energy. The majority of major cities are located near coastlines. The US has good winds off all three coasts and on the Great Lakes. Any nation with a deep-water port could launch its own Turboships. Many islands located in the trade winds, such as Hawaii, would become major centers for hydrogen sales and distribution.

The hydrogen would be converted back into electricity at city ports and distributed throughout the cities using the existing infrastructure of electrical transmission lines. Originally, the hydrogen would be used by gas turbines to generate electricity, and later it would be used by more efficient (60%) fuel cells when they become available and economical.

The vehicles in those port cities could be Hypercars using hydrogen (gas) fuel tanks and fuel cells (when available).[1]

In cases where Turboships were too far from port to conveniently deliver their hydrogen, specialized tanker ships would make the transfers. In addition, existing cargo vessels could be retrofitted with tanks for liquid hydrogen. They would transport that fuel along with their other cargo in exchange for free fuel (the boil-off from the hydrogen tanks). That could eliminate the use of highly polluting bunker oil for their diesel engines. The transfer ships could function as floating gas stations.

Liquid hydrogen is by no means the best way to transport energy. It may eventually be replaced by any of a number of other alternatives. For example, Turboships might eventually produce gasoline or other long chain hydrocarbon fuels by using CO_2 from the air to produce carbon monoxide (CO), and then combining it with hydrogen derived from water. This process requires high temperatures. Wind turbines and kites could produce high temperatures by means of direct agitation heating which is, in principle, 100% efficient. Basically, all that is required is a rotating paddle and stationary baffles in a well insulated bucket built like a Thermos bottle.

For the present, hydrogen is sufficiently well understood to be useful. Converting gaseous hydrogen into liquid hydrogen adds 30% to the cost. However, if liquid hydrogen is stored in large, insulated, spherical containers, the boil-off rate of the hydrogen per day can be very low (a small fraction of 1%). Liquid hydrogen requires about 4 times the volume of gasoline for the same energy content. Gaseous hydrogen is not economical to transport over long distances because it must be compressed to 5,000 up to 10,000 psi in relatively small tanks made of carbon fiber. Hydrogen is expensive to pump through pipelines because its energy content is low relative to its volume, and because the pipes must be able to withstand the embrittlement that hydrogen causes. Expensive stainless steel pipes are typically required (with some exceptions, as when hydrogen is mixed with methane and other gasses to create "town gas", and the pipes are fitted with appropriate liners).

A major advantage of Turboships over most other wind energy conversion devices is that they could follow the best seasonal winds. Winds tend, in most places to be strongest in the winter (with some exceptions such as California). That reduces the annual capacity factor for fixed-place wind turbines. The capacity factor is basically the amount of energy the wind turbine can actually produce each year as compared to the amount it could produce if it always had as much wind as it could handle. Turboships would therefore have a higher capacity factor than land based wind turbines or stationary, off shore, wind turbines. Typically, wind turbines have a capacity factor of about 19% to 35%, with a few of the best locations reaching about 50%. Turboships, on average, should be able to consistently exceed 50%, but it not yet clear by how much. The capacity factor would also be higher due to the fact that average wind speeds are about 1 meter per second faster at a distance of about 15 kilometers from land.

Another advantage of Turboships as wind energy conversion devices is that there is no limit on how much energy they could contribute to the electrical grid of port cities. Wind turbines that feed electricity directly into the electrical grid are typically limited to about 20% of the total energy flow because the wind is so variable.

However, if the electrical grid is very large, then the average energy from wind becomes more stable and less variable, since wind is usually blowing somewhere, and the percentage of energy from wind can therefore be increased. It is also important to carefully integrate wind and solar energy sources since they are seasonally, and sometimes diurnally, complementary.

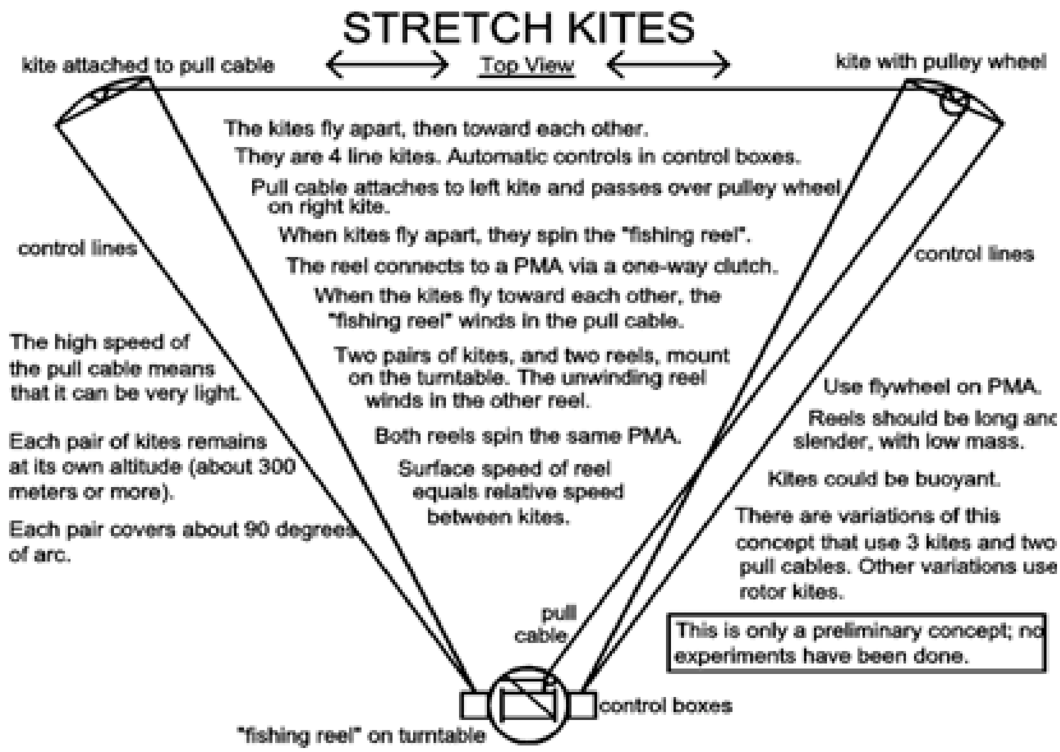
A synergy might occur. The hydrogen-fueled generators could take the place of current stand-by generators that use natural gas and which serve to make up for the electricity from wind turbines when the wind is not blowing. So Turboships and stationary wind turbines could cooperate to stabilize the flow of electricity from the wind. As the available hydrogen increased, that would permit electrical grids to make use of a larger percentage of electricity (more than the usual 20%) from stationary wind turbines as well.

However, for the hydrogen be used most efficiently and profitably, instead of using it to fuel large, centralized generators near ports, it should be transported in pipes to small gas turbines or fuel cells located on each city block of the port city so that the waste heat could be used for space and water heating. These "total energy systems" would create a "distributed grid". Such systems are more reliable and less vulnerable, and they can be individually brought on line or shut off according to the needs of the electrical grid as a whole. When parked, automobiles fueled with hydrogen could also be integrated into this distributed grid. (They would be less efficient, though, if their heat emissions were wasted.)

For Turboships to be competitive, they must produce as much hydrogen as possible. For that reason, they would combine both a wall of VAWT with PGK so as to maximize their wind energy conversion rate. A wall of VAWT would be composed of either fixed-blade Darrieus Rotors or variable pitch Sharp VAWT (or similar Sicard/Bayly-Kentfield VAWT). These VAWT use blades that are straight, with no twist or taper, so they are easy to fabricate. Sharp VAWT can use V blades which can withstand higher centrifugal forces. By using stacks of VAWT, each VAWT can be made with 2 blades instead of 3 (without creating vibration problems) so as to minimize their cost.

The use of stacked VAWT would permit the generators to be located below deck. A stack of VAWT can operate at a higher rpm than a horizontal axis rotor with the same total swept area. This can potentially eliminate the need for a transmission, and permit the use of low rpm, large diameter, permanent magnet alternators (a large, direct drive, "bicycle wheel" PMA is under development for use with large wind turbines).

The wall of VAWT would not need to orient to the wind. When the ship moved across the wind at 1/5 the speed of the wind, the angle of the apparent wind would shift only 11 degrees. Adjacent VAWT



would not block each other's wind. They are spaced a small distance apart so as to take this 11 degree shift of the apparent wind into account.

A wall of VAWT would have much less mass than one or two large wind turbines of the same total swept area. That is because, as objects increase in size, they tend to increase in volume, and mass, by the cube (width X height X depth). As a wall of VAWT increased in size, its volume and mass would increase only by the square (width X height) because there is no increase in the depth dimension. Smaller wind turbines are also easier to mass produce, so as to minimize their cost.

PGK can operate at higher altitudes where winds are stronger, and where much more energy is available. The energy in the wind is proportional to the cube of the wind speed, so higher winds traveling at higher speeds contain a lot more energy. The PGK might be any of a number that are currently being developed. Makani Power Inc. in Alameda (next to Oakland), California, is presumed to be developing kites that fly back and forth (probably figure 8s) carrying small wind turbines. (They received a $10 million grant from Google.) Delft University in the Netherlands is developing kites that pull a cable to spin a reel (at low speed) connected to a generator (or alternator) at ground level. The kite flies a figure 8 pattern to conserve its momentum and to increase its lift.

My own concept is called "Stretch Kites" (see drawings). It uses two kites that fly apart (and back together) to pull a cable to spin reels (mounted on the ship) at a high rpm. The reels are directly connected to a generator (or alternator). This arrangement would eliminate the need for a gear box, and it would greatly reduce the necessary tensile strength and weight of the cables. Three pairs of Stretch Kites would work together to create overlapping cycles and reasonably constant power. Each pair would fly at a different altitude and would be automatically controlled. Various types of kites could be used as Stretch Kites, perhaps including kites with steered, auto-rotating, cylinder-like Sharp Rotors (see drawing). Four-line, Revolution brand kites might be used for the first stretch kite experiments.

If Turboships produce liquid hydrogen, the "coolth" of the extremely cold hydrogen must be conserved so as to not waste the energy required to liquefy it. The coolth could be used to produce large amounts of liquid nitrogen, dry ice (solid CO2), and water ice. These have many industrial, commercial, and domestic applications. For examples, Bismuth-based, super-conducting wires can now be cooled with liquid nitrogen. Dry ice and water ice can be used to provide refrigeration and air conditioning. (When I was a child in Los Angeles, we still used blocks of water ice for refrigeration in our "ice box".) In many hot countries in Africa, Asia, and South America, dry ice and water ice could provide the first home refrigeration and air conditioning available to most people.

The coolth of the liquid hydrogen could also serve to increase the maximum temperature difference for Sterling engines, which would spin electric generators. Liquid hydrogen would provide cooling, and burning hydrogen (which burns especially hot) would provide the heat. The efficiency of Sterling engines depends upon the difference in temperature between heating and cooling sources, so these Sterling engines might be especially efficient.

In some parts of the world, water is already in short supply and the problem is getting worse due to increasing populations and changing weather patterns. Turboships could be used to produce fresh water by reverse osmosis, and then transport very large volumes of fresh water in giant "torpedo barges" made of flexible plastic (since fresh water floats in salt water). They could be towed to shore using wind turbines and/or traction kites.

Turboships could also be used to convert wave energy. For example, Gorlov helical turbines could be mounted under the bows of Turboship hulls, with their central shafts parallel to the hulls. The rise and fall of the bows due to waves would spin the turbines to spin generators while reducing the pitching and roll of the Turboships. The calmer seas on the leeward side of Turboship fleets might be a good location for ocean based fisheries and seaweed farms because the Turboship fleets could provide some protection from the strongest seasonal winds and waves.

Critics claim that renewable energy is too expensive as compared to fossil fuels. What they deliberately ignore (and want the public to ignore) are the enormous delayed costs of using fossil fuels. If the cost of gasoline (or other fossil fuels) included the cost of losses due to global warming (including millions of lives lost to spreading diseases, the loss of much of the world's most expensive real estate due to rising seas, plus huge losses of species and ecosystems, great reductions of crop yields, farm stocks, and fishing stocks, increasing droughts and floods, stronger hurricanes, etc.), gasoline would cost many times as much as it does now, even though the price rose dramatically in 2008. The most important cost to consider when determining the cost of hydrogen produced by Turboships is the long term global debt incurred by not producing that hydrogen. If government policies and taxes reflected the real cost of burning fossil fuels, hydrogen from Turboships would be very cheap by comparison.

Besides Turboships, we also need to develop dirigible kites to tap the enormous energy of the jet streams. (See my article, "Sailing the Jet Streams, to produce Hydrogen, to power the World", Catalyst #30, April 2008.) They could serve many of the inland cities and nations not served by Turboships.

Peter Allen Sharp
7/08 sharpencil@sbcglobal.net

1. However, most automobiles could be voluntarily replaced by ultralight, Personal Rapid Transit vehicles traveling on automated guideways, non stop from origin to destination. For example, streamlined, recumbent, electric motorcycles called "Skybikes" (my concept, 100 page article) could be balanced and switched by the guideways, and could travel at about 50 km/hr on local guideways and 130 km/hr on express guideways. Ultralight vehicles (less than 60 kg per person) are desirable because the cost of the guideways is proportional to the weight of the vehicles. The lower the guideway cost, the more guideways can be afforded to service a given area.

Most traffic jams and accidents would disappear, commute times could be cut in half, and the privacy afforded by the Skybikes would enable riders to do work while traveling, thus shortening their work days. Cities would become bicycle and pedestrian friendly ecocities.

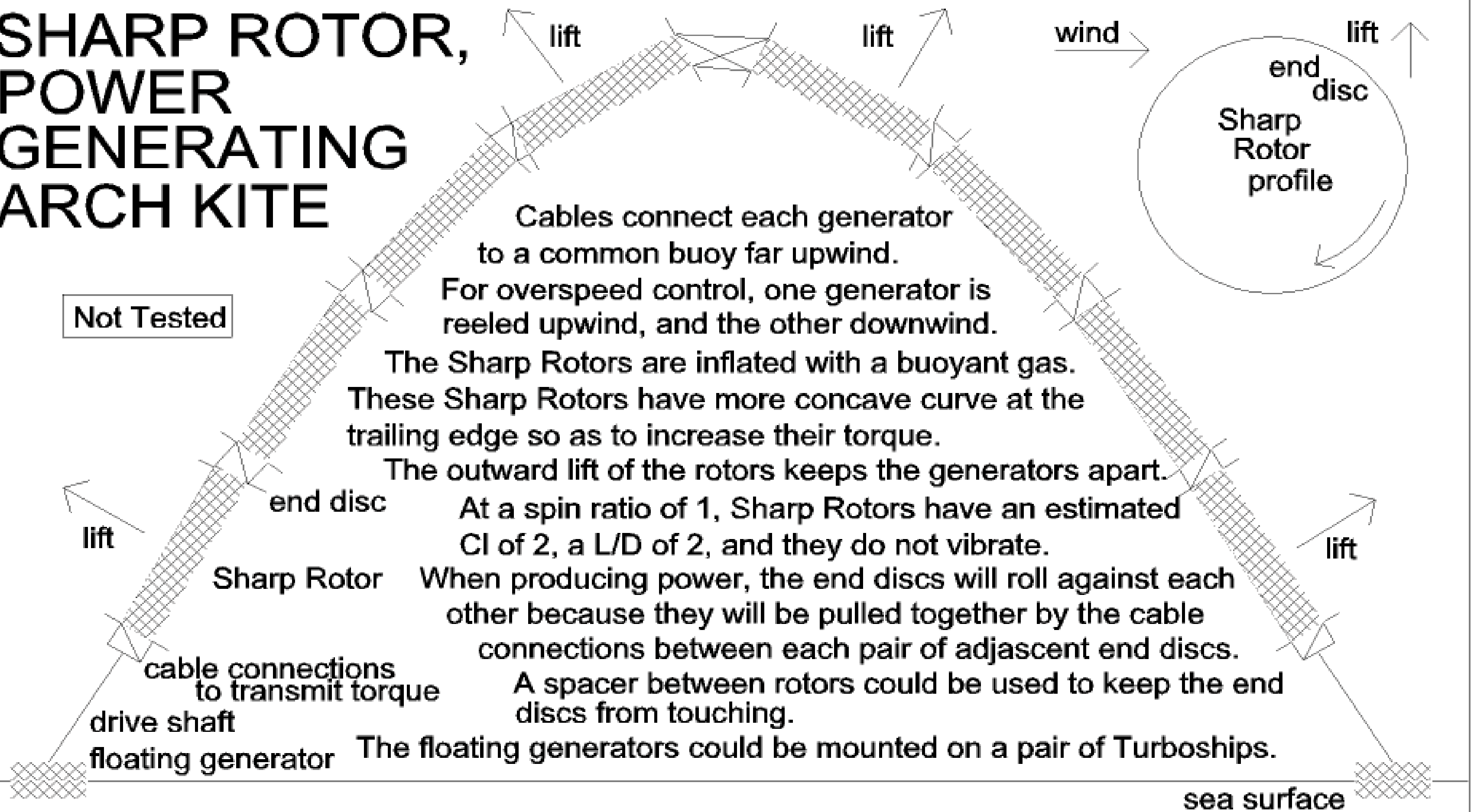
The revenues to the cities could easily replace property taxes, and a large percentage of the land currently devoted to roads and parking could be used for housing and shops so as to increase city densities and to thereby reduce urban sprawl onto valuable crop lands. By eliminating the costs of owning an automobile and property taxes, far more people could qualify for home loans. Automobiles would still be readily available from local car sharing cooperatives.

The first Skybikes should be built, for example, in the "tourist triangle" of San Francisco – bounded by Market Street., the Embarcadero, and Van Ness Avenue. — as a major tourist attraction, and then steadily expanded to the whole Bay Area using its own revenues.

Since Skybikes stations would be as ubiquitous as bus stops, and because Skybikes would eliminate transfer delays, schedules, stops, baggage claims, and security checks, they could transport people moderate distances, as from San Francisco to Los Angeles (400 miles; 640 kilometers) in about the same amount of time, door to door, as high speed Bullet Trains and commercial airlines, and for a much lower cost. Tourists could stop along the way, anywhere they wished to dine and see the local sites, thus greatly enhancing tourism.

SHARP ROTOR, POWER GENERATING ARCH KITE

Not Tested



Cables connect each generator to a common buoy far upwind.

For overspeed control, one generator is reeled upwind, and the other downwind.

The Sharp Rotors are inflated with a buoyant gas.

These Sharp Rotors have more concave curve at the trailing edge so as to increase their torque.

The outward lift of the rotors keeps the generators apart.

At a spin ratio of 1, Sharp Rotors have an estimated Cl of 2, a L/D of 2, and they do not vibrate.

When producing power, the end discs will roll against each other because they will be pulled together by the cable connections between each pair of adjascent end discs.

A spacer between rotors could be used to keep the end discs from touching.

The floating generators could be mounted on a pair of Turboships.

Higher torque could be achieved by placing Savonius Rotors between the Sharp Rotors.

The Savonius Rotors should be about half the diameter of the Sharp Rotors. That will increase the lift of the Sharp Rotors by spinning them at a spin ratio greater than one.

At a spin ratio of one, Sharp Rotors create lift due to the Kramer Effect, not the Magnus Effect.

As the spin ratio increases, the lift is due increasingly to the Magnus Effect.

Savonius Rotors have an L/D of 1.

Variations of the Savonius Rotor, such as the Banesh and the Rahai, should work better.

Non air-buoyant rotors might use inflatable end discs to self start on water.

Peter Allen Sharp 8/08

POWERSAIL

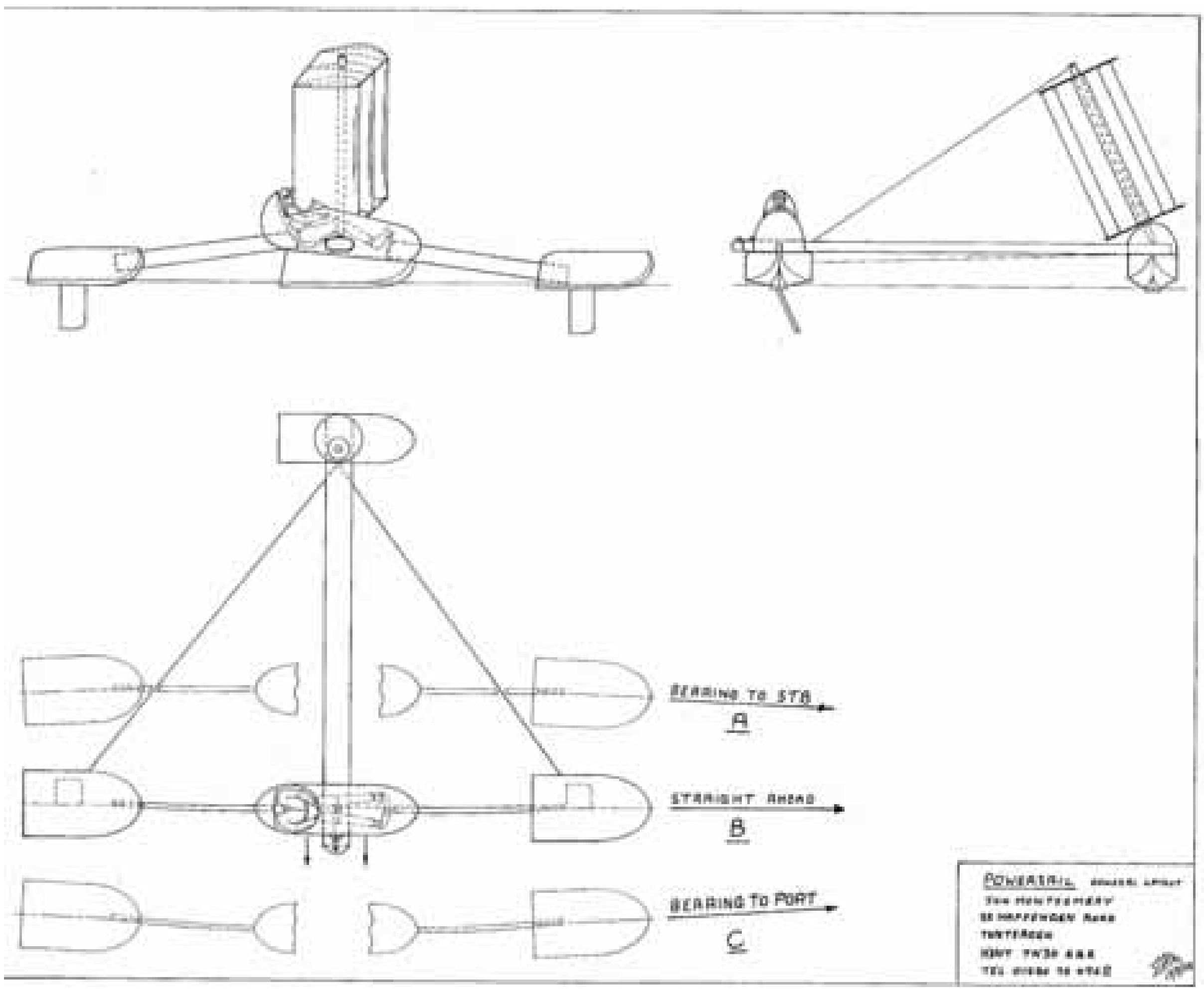
Jon Montgomery

This article focuses on speed sailing and has come about as there are, at the time of writing, three teams struggling with their boat designs to achieve the magical 50 knots over a 500 metre course.

Currently, kites are hitting 50 knots, with boards not far behind, but the boats are finding it much harder to match these speeds. Boats are load carrying as opposed to a few Kg of kite equipment, which cannot float a crew. Therefore the boat challenge is far greater.

My Powersail design offers two new principles for consideration.

1. Bow steering.
2. Three element hard foil sail with end fences.



Bow Steering

Steering at high speed requires small, precise adjustments to foil alignment. The drawing shows a three-hulled boat that is set up for starboard tack. The leeward hull carries the sail unit, and is attached to a beam, which is allowed to slide through the crew nacelle.

The twin windward hulls are attached to the nacelle via beams, whose section allows them to bend in a horizontal plane only. These are set into the hulls at a 3º angle. The windward hulls are secured by rigging to the leeward hull and in a static position (A) (see drawing). The craft would naturally bear to starboard.

Position B

Straight ahead steering requires that the nacelle be pulled to windward via a block and tackle operated by a foot bar. So the windward hulls are brought into alignment.

Position C

Bearing to port is achieved by added adjustment of the nacelle to windward.

Three element hard foil sails with end fences

Keeping the centre of the sail effort low is essential in producing a well balanced craft. I propose a three element hard foil sail with end fences which rotates on a fixed mast and is operated by a main sheet, so giving the crew only two simple controls to adjust whilst sailing.

Were I lucky enough to have a spare £1000, I would produce a scale radio controlled model to prove the principles of the bow steering.

The sail unit would require special development and whilst I might attempt a crude version, I suspect efficiency could only be achieved by an aerodynamicist and a wind tunnel, set up to handle 50 – 60 knots of apparent wind and capable of delivering enough power to overcome boat drag.

Jon Montgomery
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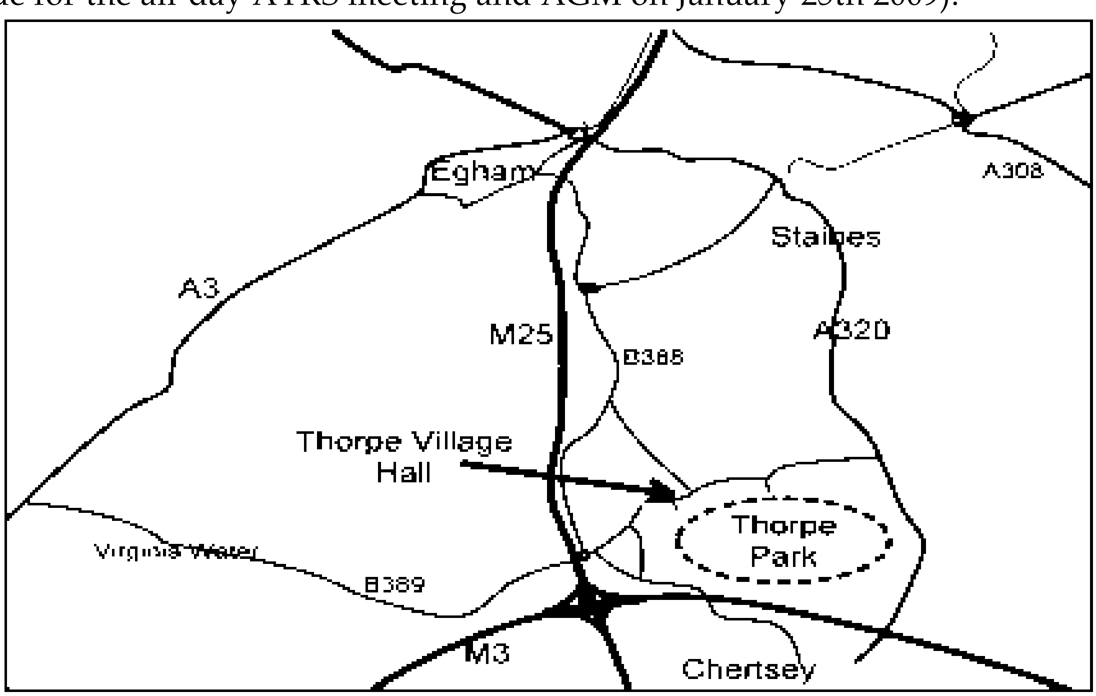
September 2008

(Continued from page 10)

How to find Thorpe Village Hall

(venue for the all-day AYRS meeting and AGM on January 25th 2009).



Chairmans Notes

As I was otherwise occupied for most of the May Day Bank holiday weekend I only managed a day trip to Barton Broad where thanks to Simon and Sheila an excellent time was being had by all those there. My day was made by being invited to sail with Alex on his catamaran which had disc wheels instead of centreboards, she performs well on the water and I really enjoyed taking the helm (for most of the afternoon) and the return to base was quite dramatic as we were seen on the slipway and disappeared from view in a moment on her built in “wheels”.

The later May meeting in Weymouth was interesting and fun thanks to the organisation of Norman Phillips and the hospitality of Castle Cove Sailing Club , only four boats attended; Torix Bennett with his latest version, Alan Blundell with Variswift Johnathan Barton with his variable geometry boat with low aspect ratio rig and my mini tri kite boat, Slade Penoyre was also present with his o/b powered Catapult as support boat.

Beale Park Thames Boat Show also was a great weekend where Graeme Ward and I manned a stand on behalf of AYRS

With regard to selling AYRS at shows it would help if we could have brief details of your projects with some photos: the most often asked FAQ is “What do you do” and a file with lots of examples could provide a good answer and help the sales team sell the society.I also have managed to visit Seawork, a commercial exhibition in Southhampton where interesting things and boats were seen and managed to have a guided tour of HMS Blazer while she went on a short trip along Southampton Water.

Project rusty steel has been retrieved and is now sitting at home reminding me that I must write a full report soon; the most dramatic degradation is of the paint on the hulls especially where they are in full sunlight where it is peeling away from the plywood in sheets, maybe a pucker underwater primer should have been used instead of acrylic exterior primer/ undercoat

I’ve even been sailing with my son Julian in his Leisure 17, life is hectic and leaves no time for AYRS!

CIRCULAR BOAT

My circular boat was constructed with the thought that it would be a way of experimenting with dagger boards where the hull would only act as an end plate and not provide any lateral resistance.

It was built mainly of plywood and was 6 feet in diameter with the lower edge gently rounded off; an inner drum 4 foot in diameter and 1 foot deep with two dagger board slots and outside this semicircular wedges of polystyrene covered with a sheathing of epoxy and glass cloth.

I was planning on sailing it with a kite or sailboard rig and the photo shows the result, a horrendous bow wave.

As it was fully decked I found it almost impossible to climb on board while flying a kite as soon as my weight went on the edge it heeled and slid away from me, maybe I should have jumped athletically backwards as do the pilots of the Lynn Kite boat.

The result of the short experiments is the conclusion that this boat develops so much drag that it is totally unsatisfactory as a sailing vessel and unlikely to produce any useful data with regard to foil performance

I regret that I can’t remember who took the photo but it was probably Slade Penoyre or Roger Glencross.

LOW ASPECT RATIO HAPA

Fred Ball

This was built to provide the hapa for Roger Glencross to try the Hagadoorn sailing technique.

The requirement is for a drag device to be used during take off which can then become a form of lateral resistance as the kite and flyer move across the wind and even to permit tacking upwind.

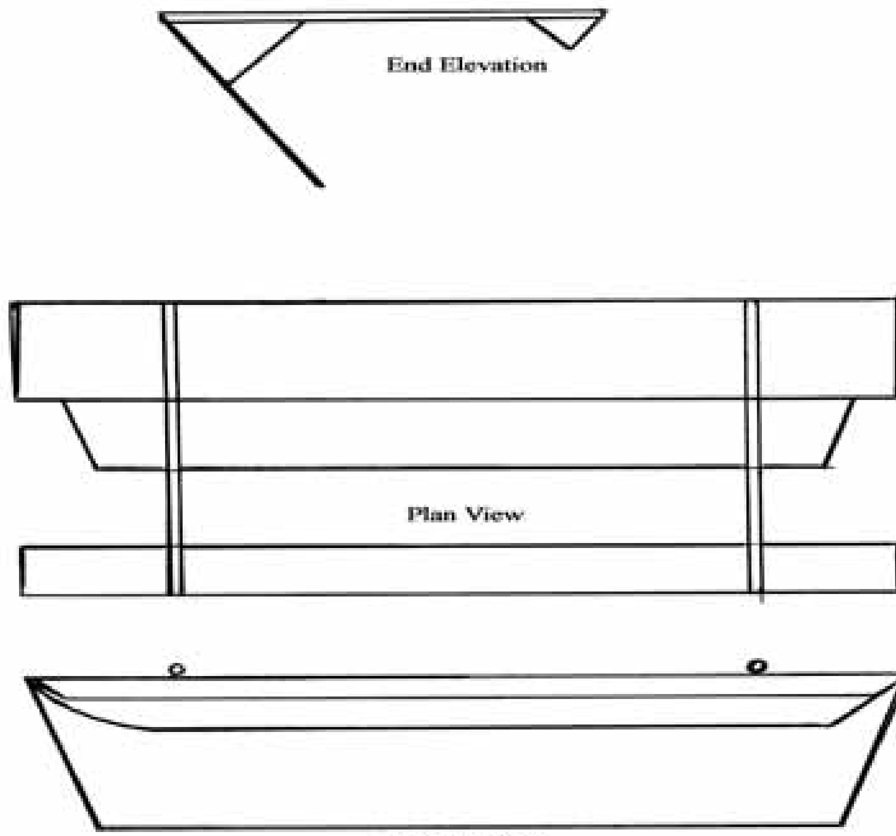
The illustrated form is a 2 foot long test model with a blade area of approximately 1.25 square feet and is deployed using ropes attached to the arms; when the lines are equal in length it behaves as a drogue gently oscillating from side to side.

The first design was made with a pair of foils like this about 1.5 feet apart but when in drogue mode the one nearest the load did all the work and lifted the other out of the water so it was decided to accept the increased draught of a single foil.

The small float towards the load is just to maintain the resting attitude and provide some rigidity to the arms when the load is one sided ie. when sailing

While its design is not very efficient it is very stable and does seem to behave in a predictable way.

When working it does tend to become bow heavy indicating that the inclined flat foil is generating a force acting at right angles to its surface somewhere ahead of the midpoint this would become a problem at speed but probably the lack of efficiency will prevent this happening and hopefully prevent leaving the water in spite of the kite and pilot being high in the sky.



Side Elevation
Low Aspect Ratio Hapa

At the moment it would appear easier to arrange control by increasing the length of the control lines than by expecting the pilot to winch in or out to change the direction of progress, dropping a length of line would allow the hapa to move in the direction of the short line, dropping the next would return the hapa to drag mode, alternate side lengthening after returning to drag mode would allow shunting and sailing to windward in the way that a proa does.

I did try one without the float and attached the lines directly to the foil at what I believed to be a reasonable point in relation to the forces acting but the end result was instability and the foil either disappearing into the depths or surfacing and loosing grip

I have also tried one with an ogival section ie. flat on one side and the arc of a circle on the other however at very low speeds (as would be the case when changing from drag mode to sailing mode) it turns towards the load and would therefore dump the kite and pilot!

I will probably make another with double ogival section to see if the problem can be resolved, one would hope that a more efficient hydrofoil shape would permit the use of a smaller hapa and allow more efficient sailing

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**

October 2008

4th – 10th Weymouth Speedweek
Portland Sailing Academy, Portland Harbour, Dorset UK. See www.speedsailing.com.

8th AYRS Weymouth meeting
Speedsailing: 19.30 for 20.00hrs at the Royal Dorset Yacht Club, 11 Custom House Quay, Weymouth. Location Map: www.rdyc.freeuk.com. Contact: AYRS Secretary, BCM AYRS, London WC1N 3XX; email: office@ayrs.org

November

2nd London Area All-day Meeting
9.30am to 4pm Sunday 2nd November 2007, Thorpe Village Hall, Coldharbour Lane, Thorpe, near Staines & Chertsey. Location map via the AYRS website www.ayrs.org. Details from Fred Ball,
tel: +44 1344 843690; email frederick.ball@tesco.net

26th-30th Sail Power & Watersports Show
Earls Court, London, UK. Upstart rival to the London Boat Show in January (see below)! AYRS will NOT be there unless someone gives us a free stand, but we would welcome feedback from those who go as to whether we should be there in 2009. Details from http://www.earlscourtboatshow.com.

December 2008

No AYRS London meeting

January 2009

9th - 18th London International Boat Show
EXCEL Exhibition Centre, London Docklands. AYRS will be there, in the Boulevard. (Stand B7N) 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

25th 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). Details from Fred Ball, tel: +44 1344 843690; email frederick.ball@tesco.net

25th AYRS Annual General Meeting
4pm, Thorpe Village Hall, Coldharbour Lane, Thorpe, Surrey (as above). Details from the AYRS Hon. Secretary tel: +44 (1727) 862 268; email: secretary@ayrs.org

Note: Items to be considered by the AGM, including nominations for the Committee MUST be received by the AYRS Secretary before 22nd December 2008 (post to AYRS, BCM AYRS, London WC1N 3XX, UK, or email: secretary@ayrs.org)

March 2009

7th AYRS Southwest UK Area Meeting
2pm 7 Cross Park Road, Wembury, PL9 0E near Plymouth. A short coastal walk (not more than three miles, less if the weather is bad) setting off at 14:30hrs; back by 16:00ish, so if you don't want to come on the walk join us then. After tea we will show slides and talk about boats. Details from John Perry, +44 1752 863730 email: j_perry@btinternet.com (note the underscore in that email address).

April

26th Beaulieu Boat Jumble
The National Motor Museum, BEAULIEU, Hampshire, UK. AYRS will be there!

May

2nd – 4th *Broad Horizons* – AYRS Sailing Meeting
Barton Turf Adventure Centre, Norfolk UK, NR12 8AZ. Contact AYRS Secretary AYRS Secretary, BCM AYRS, London WC1N 3XX, UK; email: office@ayrs.org. Note: All boats limited to 1.2 metre max draft!

Date to be fixed
Meeting at the Castle Cove Sailing Club in Portland Harbour, Dorset, UK. We are looking towards the end of May or possibly the beginning of June.

"Percy" Westwood, 1947 - 2008

Peter "Percy" Westwood, Editor of AYRS Catalyst, died suddenly on 5th August 2008. He was 61.

Nicknamed "Percy" at school, where his class included 12 others named Peter, he made his professional career initially in engineering (British Hovercraft Ltd), and eventually owning a small printing company on the Isle of Wight, UK. He was a great enthusiast for whatever he did, including editing Catalyst, although away from boats his passion was for the jazz band he founded with a few friends in which he played the Sousaphone!

He joined AYRS in 2001, and volunteered to help with the editing of Catalyst two years later. He assisted in the editing from Catalyst No 10, and took full responsibility from No 25. His last full edition was No 30 and he had outlined a draft for No 31 when he was taken ill suddenly, admitted to hospital and died within a few days.

AYRS extends its condolences to his widow, Janet, and to his colleagues and friends.

We shall miss him.

Simon Fishwick
AYRS Honorary Editor

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

On the Horizon . . .

The Tazmaran - oscillating mill-prop craft
Split junk sails
Sailboat speed vs wind speed
Aquaplaning wheeled sailing yachts
Flexfloil wind generator
Yuloh theory & practice
Experimental platforms
More sources and resources: reviews, publications and Internet sites

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Amateur Yacht Research Society
BCM AYRS, London WC1N 3XX, UK

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