

## IFDCO Technical Committee Report 2011

There have not been any suggested rule changes since last year. The following suggest that the class could reconsider the ban on GPS devices, and the introduction of sailmaker certification of sails. John Best has done a major overhaul of the measurement trailer which is now road legal in Europe. The measurement in Constanta was of relatively few boats and went smoothly together with the fundamental measurement of two hulls. John has also done an enormous amount of work in cooperation with Giorgio in preparing for regatta inspection at Malcesine where 130 boats are expected. This will entail having two parallel inspection lines, similar to Medemblik.

The following are a number of topics that have been discussed and are presented here for the class to consider.

### GPS Race Tracking

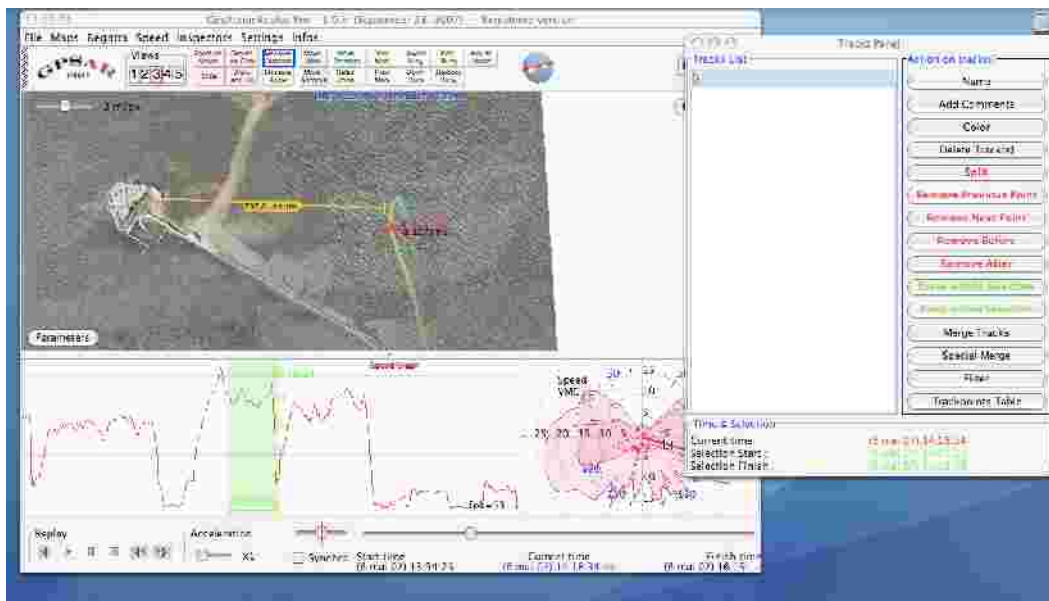
It is now common practice at many premium regattas to have each boat carry a GPS location device which transmits its position in real time so that spectators, and interested persons logged in on the internet, can follow the race, or review it later. The possibility of having a wider audience will be a great selling point for sponsors.

There are a number of competing GPS tracking systems such as a) the American Kattack system supplies by American Regatta, see [kattack.com](http://kattack.com), and maybe the system of choice for Santa Cruz, b) the Traxu system at [Traxu.com](http://Traxu.com), c) the Danish TracTrac system used at Sail for Gold, see [TracTrac.com](http://TracTrac.com). There is also a Dutch system and the sophisticated system devised by Stan Honey for the AC 34 among others.

Although these systems can also be used for individual tuning and sailing analysis there are other units on the market such as the Velocitek "ProStart" and SCI which are specifically designed for that purpose see [velocitek.com](http://velocitek.com). These units allow you to ping the committee boat and pin and then give you your distance to the start line as well as storing all the data for your track during the race. Clearly if many boats had these systems they could be used to track the race, however, as of now the FD rule 76 prohibits the use of such devices while racing and at \$600 are a bit expensive for just training. As more and more compact (i.e. wristwatch format) GPS devices become available it will become impossible to police this rule, and maybe the class should advance into the electronic age and allow them.

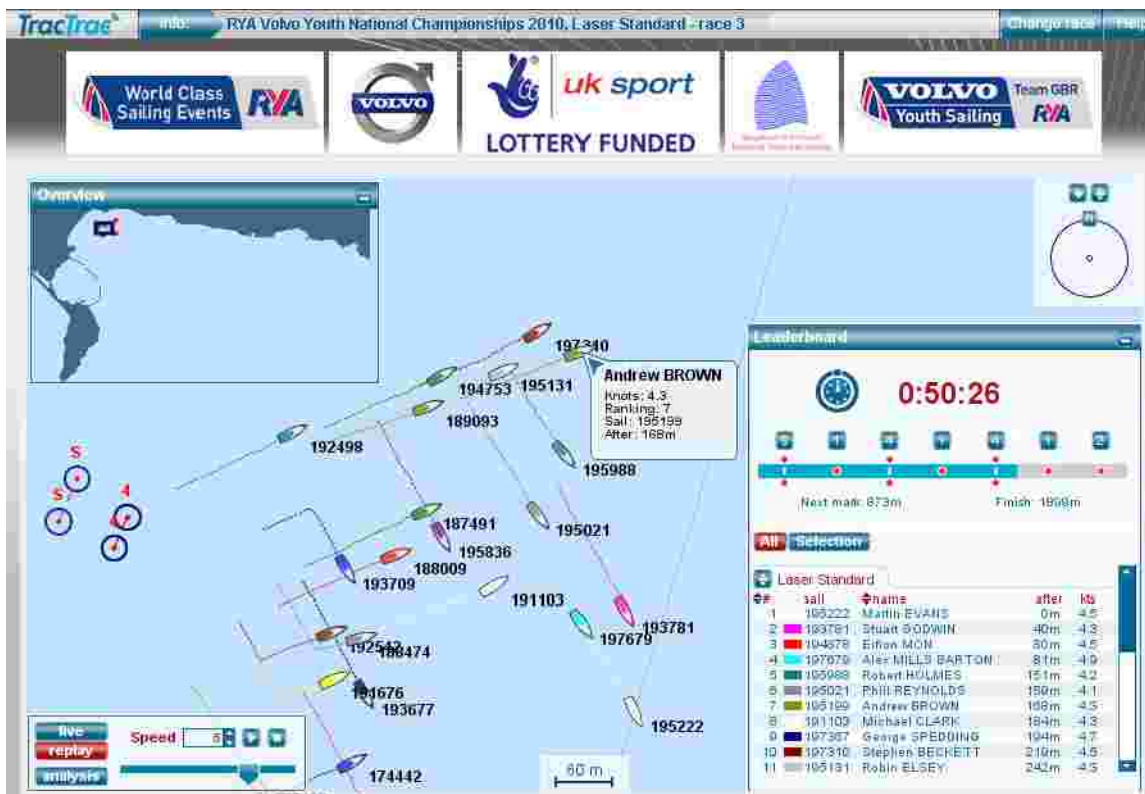


*Velocitek Pro Start*



*Data Analysis from a Velocitek ProStart*

Richard Phillips suggested that we find out costs and feasibility of using the Trac Trac system at major FD events. This could be combined with an iPhone app which can be easily created at very low cost.



*A Trac Trac display of a race*

Richard met with the Trac Trac team at the Skandia Sail for Gold Regatta at Weymouth where it was a great success. He saw how the system was operated from; issuing/recovering trackers, pre linking to the boats and the marks/ Committee boat, and

following results online. Some of the issues that need to be handled were discussed and a quote for cost if operated on site by the Trac Trac team has been received. full package includes race results service and website etc. The costs to operate without onsite support as this is a significant extra cost are being evaluated as the class must have the necessary expertise to run the service if we are loaned/ buy the kit and have a license for the tracking software and receive appropriate training. Richard is also trying to find out if Trac Trac know of sponsors looking for more major events.

The mark rounding charts that Cle used to publish in the FD Bulletin were great and this is just one of the many by products of the Trac Trac system. What is interesting in the fleet dinghy races on Trac Trac is the continuous read out of speeds of each boat and the continual ranking of the boats on all points of sailing. The amazing graphics, see above, are particularly interesting for mark roundings, great for seeing where (and why) gains/losses were made by each boat.

Yes tracking 126 boats would be complex to follow but most people are only interested in what a few of the boats are doing and it is easy to see this both visually and on rankings and compare with boats around very easy and quick to zoom in and out on parts of the fleet. Main problems at Weymouth were batteries dying during the day and huge Internet traffic due to success of the system which caused a number of glitches in the live tracking. But no issue when playing back after racing.

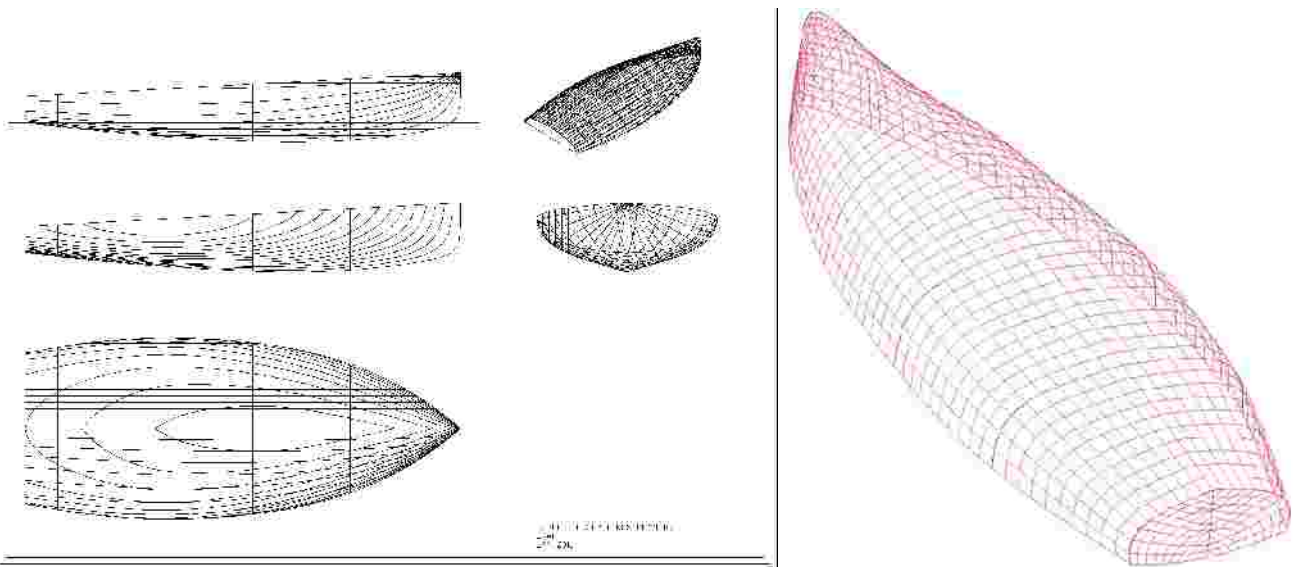
Cost is an issue but no doubt in time the units will be more affordable. A way forward could be for each boat to buy a tracker circa £150 or for the Class to buy a batch say 40 to lease out at events and put on 40 boats at Worlds, maybe switching alternate days. My experience of how the system worked at the Finn Worlds in San Francisco was that it generated a lot of interest with little or no inconvenience for the competitors, besides having to collect the device each morning. This is the way forward for many classes to increase their exposure and generate interest, so Richard's proposal merits serious discussion provided the costs are within bounds.

### **Digitization of the FD lines**

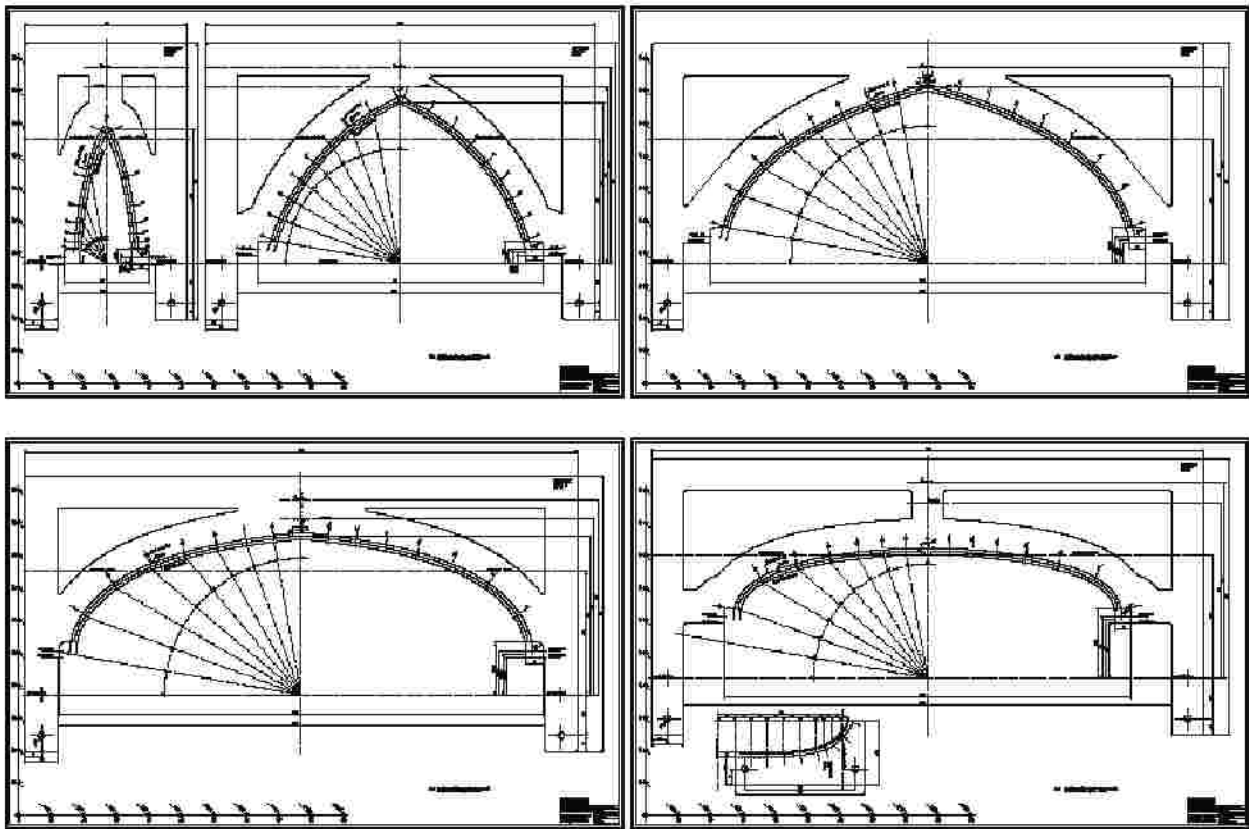
At the AGCM in Rumania it was agreed that the digitizing of the FD lines should be implemented. Although we still have the original aluminum plate on which the master lines are drawn because Cle stored it, the Fill class lost theirs and this could happen to us. A digital record and AutoCad drawings would ensure that the lines would be preserved independently of any material records.

Enquiries were made with Piet Hein Noordenbos, of Damen Shipyards, who copied my questions to Paul Drion who works with Stork Fokker and informed his CEO Sjoerd Vollebrecht, an ex FD sailor about it. Sjoerd asked for more details about the "where is and in what format " the lines are available and I believe got in contact with Fred Schaaf about the location of the Aluminum plate with the original FD lines, which I rescued from Cle's house and gave to Peter Van Nooyen (?) for safe keeping. This avenue has not been followed up futher but would of course have the advantage that everything would remain in Holland.

A second approach has been initiated through the Niki Nocke of the Europe class who had Jarek Plaszczyca digitize the Europe lines and is interested in doing this for the FD. He produced a lines model as well as a detailed Excel spreadsheet of the data, both original and smoothed as outlined below.



*Digitized Lines of the Europe Dinghy developed by Jarek Plaszczyca and the Finn Hull lines record developed by Gilbert Lamboley.*



*Europe Dinghy template drawings produced from the digitized data. This data can be accurately zoomed to full size.*

The existing table of Europe offsets was used as primary data source (there is no problem with using digitized or measured actual templates or drawings). All calculations were

made using Excel (with help of some custom written functions). Excel was chosen mainly because it gives full control over the math used (e.g. to decide about the lines parameterization method and splines boundary conditions), also, results can be published as a platform independent set of data (not to mention that I have no free access to really professional surface modelling packages). For line drafting AutoCad. was used (this is the ISAF standard I believe). As a first step, the table of offsets points were transferred to a spreadsheet and natural cubic splines were calculated through sections and diagonals (any other set of lines could be used assuming they are regular).

Measurement station lines have been put into AutoCad plotted in full scale and compared with original drawings to confirm that there is no general discrepancy. After that, lines were reproduced again on film (by photocopy method) and compared with actual templates, then again corrected until agreement within few tenths of millimetre has been reached. The Europe lines are at the final check stage. In the meantime some work on a 3D surface model has been done resulting in a surface representation as a set of bicubic Bezier patches smoothly joined together. That model still need some work to be considered mature: bow shape needs to be tweaked, as well as the model itself need to be improved (evergreen problem with twist vectors at patches corners).

Jarek has sent me the following proposal for the FD:

### **Proposal**

1. I will create splines through the table of offset points to create cross sections, sheerline, waterlines and keel + stem. If I will be tempted to adjust table of offset to avoid line irregularity, I will discuss it with you. That work is to be done in Excel.
2. I will create lines as a graphic file (PDF and Auto Cad).
3. Lines needs to be plotted (be aware of plotting accuracy) and compared with original templates. That needs to be organized - I'm not sure if sending templates to PL is the best way.
4. Then we can discuss tolerances and differences. Improve the splines and go back to point 3. until everything looks right enough.
5. Then final corrected table of offsets, hull lines as a set of electronic data and template drawings will be prepared.

### **Timescale:**

My time is rather limited, especially during summer - I can outline entire project at few months at least. From my experience most time consuming part is data comparison with physical master standards and dealing with funny things that could be hidden in old papers. I can prepare first version of point 1 above within few weeks - hope before Jul 10.

### **Facilities:**

Most important is access to accurate plotting (on film). I have access to one facility, but the size is limited to 1075x778 mm - should be enough for half sections plot. To avoid sending full size plots or templates, it would be nice to have one close to templates location. Hint: pre-press facilities for the printing industry can typically prepare films by photocopy method with an accuracy well below 0.1 mm.

**Cost:**

My time is free, other costs is mainly plotting (up to 50 Euro for full size plot on film) and postage. I can estimate entire project budget at level of 100 - 200 Euro if we can organize things to avoid travelling.

**Product:**

Attached please find sample of almost final result of Europe dinghy work - hull templates drawings (you need to zoom in several times to see details in the PDF file). I understand that the final product for the FD would be:

1. revised table of offsets
2. hull lines given as a mathematical formula (Bezier curve segments control points)
3. full size hull lines plot (Auto Cad + PDF)
4. full size template drawings (Auto Cad + PDF)
5. 3D numerical hull model for future work - that could have some imperfections - sounds silly, but creating accurate and smooth 3d model from set of lines is not easy and for some cases that problem has no satisfactory solution.

Regards,  
Jarek

The idea is to have a record similar to the Europe data or that produced by Gilbert Lamboley for the Finn class. The original Flying Dutchman lines are recorded full size on an aluminum plate and there are also Mylar reproductions of these lines but it would be better to go back to the aluminum plate if possible. The table of offsets was presumably taken from these lines and recorded in the class rules together with reproductions of the aluminum plate. The class also has precision templates for hull measurement at a number of stations and these are 12.5 mm outside the design lines. It would be interesting to compare these with the lines on the aluminum plate. Again there are sets of these templates in Holland and a set of these items could be shipped to Jarek for digitizing in more detail, but this would entail extra expense.

The FD was intended to be built by amateurs and hence the hull tolerance is  $\pm 12.5$  mm. Needless to say the Olympic sailors took advantage of these tolerances to develop a faster hull shape, so modern FD hulls are significantly different from the original lines. There are currently essentially two builders of FDs, both in Germany, Mader in Bavaria and Bogumul in Berlin. It would be fun to scan these modern hulls, or develop their hull shape from records of their template gaps and keel rocker, and compare them with the original lines, but that is another project for a later time. Initially we should concentrate on producing a digital file which precisely reproduces the original copyrighted design of the FD. Arrangements for getting the aluminum plate to Jarek, or alternatively to get an FD sailor in Holland to do the comparison with the digitized lines are currently underway.

**IHC of sails,**

Some European countries have adopted certification of sails produced by sail makers in their countries thus eliminating the requirement for sails to be fundamentally measured by an independent official measurer. The ISAF have introduced a system of "In House Certification" (IHC) for sails which it is anticipated will be adopted by sail makers world wide, and there are ISAF plans to extend this to masts and maybe eventually to whole boats, but that is sometime in the future. The ISAF scheme requires someone from the sail loft to attend

an ISAF training course and for the lofts quality assurance to meet certain standards, and some lofts therefore do not find it advantageous to subject themselves to this process.

However, a number of classes have changed their class rules so that sails from specified lofts, which the class has approved may self certify sails for that class. A case in point is the Etchells class which has the following rule:

#### G.2.2 CERTIFICATION

(a) The **official measurer** shall **certify** mainsails and headsails in the **tack** and spinnakers in the **head** and shall sign and date the **certification mark**.

(b) The IECA or ISAF may appoint one or more persons at a sailmaker's loft to measure and **certify sails** produced by that manufacturer.

With modern sail production methods it is possible to consistently produce sails to a high degree of reproducibility and for the sail loft to confirm that the sails are in compliance with the class rules without the need for an independent fundamental measurement. This would relieve the purchaser of the sails from having to have the sail fundamentally measured, and be an advantage to the loft when selling the sails. After all one does not need to have a tennis racket or golf clubs fundamentally measured before using them.

The class technical committee would have to investigate each loft which applies to be allowed to certify their sails in house, but this should not prove too onerous.

It is therefore proposed that the class consider a modification of rule 86, namely:

**86** The **official measurer** shall **certify** mainsails and headsails in the **tack** and spinnakers in the **head** and shall sign and date the **certification mark**.

**87** The IFDCO or ISAF may appoint one or more persons at a sail maker's loft to measure and **certify sails** produced by that manufacturer.

#### PBO Rigging

Some FD sailors have started to replace stainless wire rigging with PBO and the question of its class legality and advantages have been raised. The relevant class rules are Rules 62 and 63 which govern the rigging do not specify the material, and even say material equivalent to stainless steel wire (because everyone has a line at the tack end of the forestay). It could be argued that PBO is an expensive material, rule 112, but as FD specific PBO rigging is now available it is hardly exotic any more and so PBO is class legal.

The advantages of PBO is that it has less stretch than stainless wire and is significantly lighter. However, considering that the mast weight and CG include the rigging I do not see much advantage in using lighter rigging, except that the extra weight can be put into optimizing the mast spar. On the down side is that PBO rigging has a protective sleeve which must remain in tact and one has to be aware of the fact that knots are significantly weaker than the line. There are also questions regarding the fatigue when used as a Genoa halyards going round a block. Some sailors have used PBO for trapeze lines and find they sometimes "sing". The more flexible nature of these trapeze lines may cause difficulties in a capsized, but with quick release hooks this may not be a problem

Easy Rigging which manufacturers PBO FD rigging cautions:

*While rigging your boat, take care there are no turns, kinks or sharp bends in your rigging, this will reduce the live span and safety of your rigging. Check your rigging every month on chafe in the places were lines are running. It is very important to protect the stay against chafe. When the black plastic cover is damaged or*

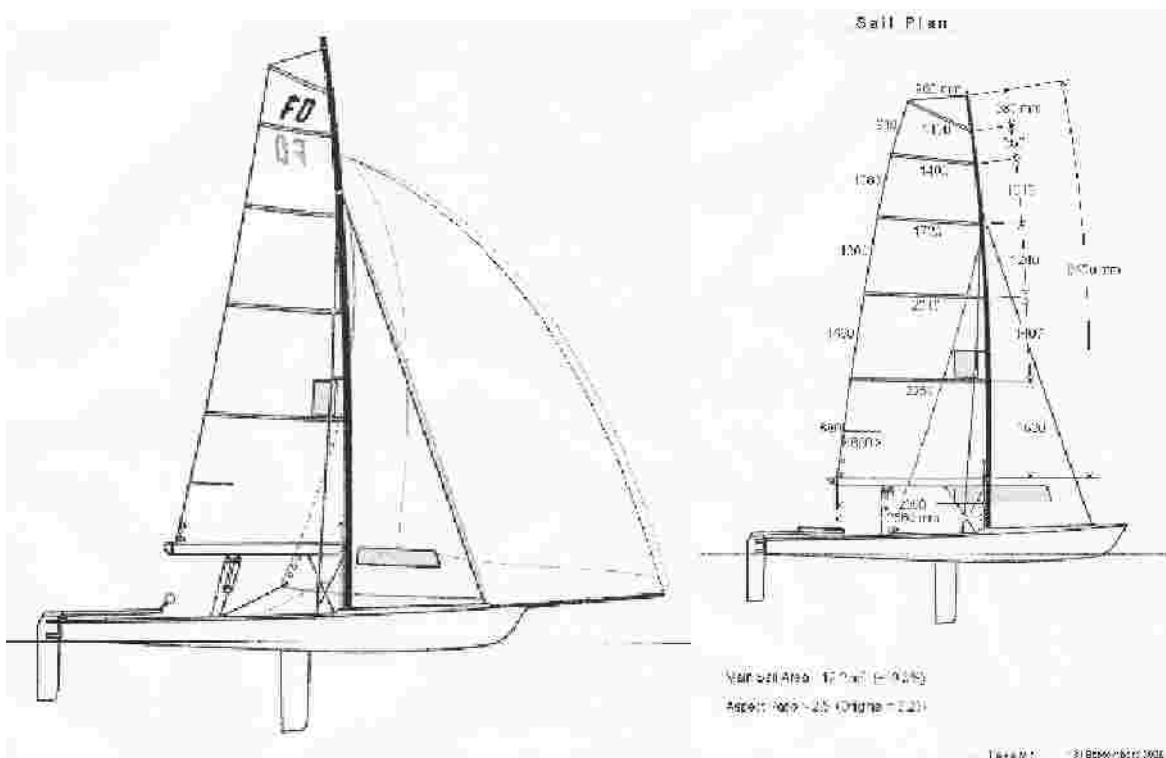


chafed through (and the gold colored PBO is visible) the stay has to be repaired or replaced.

They supply 4mm external diameter PBO forestay \$415. Double-impregnated braid cover for additional durability under torsion. Overall length: 5435mm. 4mm external diameter PBO side stay set. Including T-ball terminations at mast. Overall length: 5350mm. Spreader reinforcing: 2300mm from t-ball, \$920. see <http://www.sailingbits.com/home.php?cat=17> and [http://www.allspars.co.uk/easy\\_rigging.html](http://www.allspars.co.uk/easy_rigging.html). Thanks to Toby Barsley-Dale for this information.

### Asymmetrical Spinnakers, 505

The 505 class is a sister class to the FD designed at more or less the same time and competing with us for dedicated sailors of traditional dinghies. It is therefore of interest to see that the 505 is experimenting with possibly introducing asymmetrical spinnakers. Hideo has also I believe been experimenting with the FD rig but at present there is no data on his experience with his rig.



*Hideo's proposed Flying Dutchman rig*

The following is an excerpt of the 505 experience some of which could apply to the FD.

The 505 class is looking for ways to make the boat less expensive, simpler, more versatile for crew and determined that converting the boat to a sprit pole and an asymmetric spinnaker would accomplish these goals. The retrofit alone from the symmetric spinnaker and current pole system to a sprit takes 40 fittings off the boat.

With the 505 being a two man symmetric spinnaker boat with the crew on trapeze, the crew has their hands full with this very critical job of gybing. I think with this change, the boat becomes easier to sail, makes the boat less expensive, and easier to rig. And now that we have tested it with the sprit that Larry Tuttle built and the asymmetric spinnaker from Ethan Bixby, we have found that the boat sails great in this format.

Some may contend that we will lose tactical 'sit down sailing', but we actually only sail deep downwind angles in a 3 knot zone (around 8 knots). If it's light air, you're sailing tight angles. If it is windy enough to be trapezing, you're sailing tight angles. And I contend that the tighter angle sailing typical of asymmetrics is more tactical. You still need to call shifts but you also are choosing sides, whereas deep running you might be aiming close to the downwind mark the whole time.

Additionally, the class has long been committed to using reaching legs in their championship course. The Worlds course is now windward, leeward, windward, triangle, windward, leeward. The reaching legs are a lot of fun, and while some people consider them less tactical, I have passed a lot of people over the years on the reaches.

The primary system in the class for years had been a single pole on a trolley. But when the class approved carbon spinnaker poles a couple years ago, the weight savings allowed for a double trolley pole to be used. I was opposed to the move to carbon because we had a boat handling advantage with the single pole, but now the double pole has made gybing easier so that more teams are proficient. So the development of the system has helped equalize the fleet, but it also added a lot of complexity and cost to the boat.

Ethan Bixby on sailing the reconfigured 505 with a sprit and asymmetrical spinnaker:

We tested an Asymmetric spinnaker on a 505 at this year's mid winters. Larry Tuttle and I have discussed this occasionally, and after many hours of fiddling with a dual pole system I decided to give it a try. We sail the boats like skiffs now, with the exception of wind speeds from about 5-10 knots where we sit run. Larry agreed to make up the carbon bowsprit and I would do the sail, so Larry and I worked with Steve Calder of North Sails' Performance Resource Group to model up an appropriate sail. Our goal was to make a test platform that could be easily bolted onto any existing 505, and work with the existing launchers. So this test is with a fixed bowsprit that is 48" past the bow. It attaches with 4 bolts through the gunwale and a Spectra or Vectran bobstay that secures just above the waterline. The sail area is sized to be of similar surface area to our existing spinnaker, and perform in the 80-90 degree apparent wind angles.

The mid winters have traditionally been a testing time – new teams, new sails, etc. Actually Ali Meller and Larry Tuttle raced one mid winters with the first American 6m luff spinnaker! We thought that including it in a fleet race would be the best way to evaluate the performance. We had all the components ready and bolted it on Thursday morning before the regatta and went for a sail in 8-13 knots of wind. Then we raced with it in wind speeds from the high of maybe 25 to a little bit of sit running conditions. Our racing time was limited by breaking a rudder one day and pulling the bobstay fitting out of the bow, but we were able to compete in all the races on Sunday. To use the kit we needed a longer spinnaker halyard due to the double dousing patch. We also got some longer spinnaker sheets but I am not positive that was necessary. We used a tack line and just lead it to the starboard pole launcher cleat. Also 4 ¼" bolts and nuts, and some scrap spectra for a bobstay. I drilled a hole through the bow to mount an eye strap as a temporary fixture. This part did not go well and it was truly temporary in 20+ knots when the sprit wants to lift the bow!

My impression is that it is really easy to use, and it is impossible to run over a spinnaker sheet! Jibing is very easy as the boat speed seems stays up when the crew comes in off the wire, and you just turn the boat with no hesitation and the boom comes over with less load. The crew just eases into the jibe, and trims out the other side. Consequently, I felt more able to jibe any time needed, without worries of a swim test.

Performance wise, it seemed the harder it blew the faster we were relative to the standard spinnakers. And the interesting thing was that the boat seemed to track better and was more stable in the changing windspeeds. It just felt right and rock solid. In moderate conditions the performance was similar, and maybe just slightly faster. Effective angles were the same. As it got lighter it changes, but we were impressed at the range of angles you could sail. In the very light air on Thursday we just eased the tack line up and soaked down well. You had to steer carefully.

We did try wing and wing and that would be a tactical option too. With the nice separation of the sail plan provided by the long sprit, the sail seemed surprisingly effective in light air.

I think the size of the sail we tested would match well with the courses we currently sail. If we were to go to 100% windward leeward courses you would certainly look at a larger sail. We opted to keep the halyard at the same height to avoid further rig issues. The permanent sprit takes a few minutes to get use to, but you quickly adapt to the change in length of the boat in crossing situations. Onshore, I would release the bobstay so we could center the boat on the dolly. The class could look at a retractable pole and I understand that it would not be hard to make retrofit kits. Ours could have been a little higher to clear more waves, but we punched it through a few and it didn't seem an issue. I was chasing one wave downwind to see if I could put the sprit through it, but Erik discouraged me



Proposed 505 configuration - sprit pole and asymmetric spinnaker

A show of hands at the 505 AGM was 60% in favour and 40% were against but then again, that was people at the Worlds who are generally more progressive than the people who don't go to the Worlds, so it's still pretty on the fence. It's going to make the boat easier to sail so it'll make finding crew easier, it's probably going to make the boat more tactical because its easier to jibe and it's going to make the boat cheaper because fewer fittings are required.

Some remarks from our chief measurer John Best on this subject:

When the initial call came to me about Hideo and the Kiwi's playing and Hideo being dramatically faster with the asymmetric kite I was not in the least surprised. My RS 800, ( a twin Trapeze asymmetric with slightly less attitude than a 49er). It was difficult to keep on song upwind, but downwind it was truly awesome, amazing speed and sometimes fingertip control. I'm very glad that I caught up with modern technology with that boat, it was seriously challenging, and at times, the most enormous fun. There were, and are huge seamanship issues with visibility on those boats, but that seems to be the way of the world. The Laser SP 3 is much the same, mind crushingly boring upwind, but 23 knots downwind on a 21ft keelboat!! AWWWESOMMME!!

We can provide the evidence but have to let the membership decide and many FD sailors will not want to go the asymmetric route at present, if ever. What cannot, absolutely cannot exist, if it does go ahead, is a fixed 6 or 8 ft long proboscis sticking out in front of the

FD. That is for the criminally insane. The bowsprit must be retractable, and we must have a rule that insists that the bowsprit is retracted by the time the bow passes the leeward mark. The Laser SP 3 now has one, which is rarely enforced, otherwise some crews would use the un retracted bowsprit to force a passage on port tack going upwind, and there are plenty of them in the RS 400 and Laser SP 3 classes. Fortunately we don't seem to have many or any that I can think of, really!!

But fixed bowsprits are lethal, even the RYA has realised that fixed Probosci are insane, and get used as weapons. It only took them 13 years to realise that asymmetrics with aluminum masts are truly dangerous to the crew, if they capsize, they turtle instantly, folk can and do get trapped under them, the Laser 4000 has been responsible for one fatality in UK waters, if one digs just a little, one finds that near fatalities are legion, yet the RYA has only just come up with some guidelines.

This should afford some food for thought for the class in 2012

Peter Hinrichsen  
Chairman IFDCO Technical committee

20 June 2011