OFFSHORE RACING CONGRESS

World Leader in Rating Technology

Secretariat:
YCCS, 07020 Porto Cervo
Sardinia, Italy

Tel: +39 0789 902 202
Fax: +39 0789 957 031
ORC@compuserve.com

UK Office:
Five Gables, Witnesham
Ipswich, IP6 9HG England

Tel: +44 1473 785 091
Fax: +44 1473 785 092
ORCclub@compuserve.com

www.orc.org

MINUTES of a meeting of the International Technical Committee held on 3rd -5th November 2006 at the Marina Congress Center, Helsinki, Finland.

Present: Manolo Ruiz de Elvira (Chairman)
Nicola Sironi (ORC Chief Measurer)
Ken Weller (ORC Consultant)
Davide Battistin (ITC Programmer)
Friedrich Judel
David Lyons
Alessandro Nazareth
Rob Pallard
Fabio Fossati (Research Associate)

Observers: Dan Nowlan, Offshore Director, US Sailing
Peter Reichelsdorfer, US IMS Committee Chairman
Jean Louis Conti, F.F.V. (France)
Flemming Nielsen, Danish Sailing
Minoru Tomita, ORCAN-Japan
Masakazu Takagaki, ORCAN-Japan
Enrique Molinelli, RFEV (Spain)
Pablo Ferrer, RFEV (Spain)
Marcel Wagenaar (Holland)
Jussi Mannenberg, Finnish Sailing Federation
Timo Sarainmaa, Finnish Sailing Federation
Joakim Majander, Finnish Sailing Federation
Karl-Johan Strahlmann, Finnish Sailing Federation

Committee members Andy Claughton, Michael Richelsen, Jim Taylor and Philippe Pallu de la Barrière sent their regrets for being unable to attend.

1. Minutes of October 2006 Meeting

Minutes of the previous meeting in Valencia, Spain were reviewed and approved with minor corrections.

2. Chief Measurer report

As in the last ITC meeting, Chief Measurer Nicola Sironi reviewed the 2006 racing season.

IMS has been used in many races at varying competition levels. No big problem emerged during the season, except for the case of some boats featuring an adjustable forestay on swept-back spreader rigs having also a backstay, and several #3 and #4 jibs that had to be trimmed at measurement checks because they had a small amount of jib roach. Both issued are addressed among the Submissions. Measurement checks performed at the highly exposed events showed a good consistency with the certificates.

The TP52 Class, which requires to the IMS measurement a very high degree of precision and repeatability has been satisfied with the results, although in some cases the IMS displacement is not matching exactly the weighed one. Some facts suggest an improper placement (or a higher than the normal error) of the freeboard marks relative to the offset files defined ones.

The fleets have expanded including several new fleets and boats more at the Club/cruiser end than at the top racing end. A new one-off was designed and built for IMS, and was very successful in the small Division of the Italian IMS Championship in Cagliari, having characteristics completely different from the recent IMS "rule-beaters".

The giant sailing ships of the "Perini Navi" fleet chose the ORC Club for their races in Sardinia and also the new Maltese Falcon was rated accounting for the same area of the three-masted rig as of a ketch/schooner with masts of the same height. The results were very close, and so are the predicted vs real polars, according to the competitors.

Nicola reported also about the recent meeting of the Management Committee in Athens and the perspective to have a number of "services" not really associated with obtaining a rating certificate to be used for racing, such as stability certificate, performance package, residuary resistance and aerodynamic plots, all offered for a small fee, and also the possibility to derive the measurements necessary for other handicap rules, as IRC, IRM or national handicap systems as the Spanish RN or the Danish Handicap.

The Committee discussed at length the matter, concurring on the fact that this service would establish a real leadership, given no other system could offer the same transition to IMS, lacking some fundamental parameters of the boats.

3. Aerodynamics.

3.1. Upwind aerodynamics Update.

As reported at the ITC meeting in Valencia last October, some additional wind tunnel tests in the Politecnico di Milano were scheduled for last summer in order to complete upwind data and test code 0 sails. Unfortunately there was some damage in the tunnel and the whole testing schedule had to be postponed with the result that the expected additional data would not be available to be used for next year's changes to the VPP.

Over the past few months some of the modifications proposed last March for the current aerodynamic model for upwind sailing have been tested with different results, showing the depowering scheme as a common problem. At this stage the proposal of a completely new model has been tested and it certainly needs additional data, as well as some detailed algorithms regarding depowering.

Some corrections to the current model were coded and tested showing some improvements over the current overlap and mainsail roach calculations, however since the depowering procedure in practice is really dependent on the degree of overlap at this point it looks dangerous to consider it because it would produce an unfair penalty for sailplans with overlap when fully powered.

On the other hand some of the results with the mainsail roach tests showed some unexpected trends so additional tests will be performed before recommending any changes.

At this point the ITC intends to perform more complete wind tunnel tests early next year as a base for two parallel projects: a completely new approach for the sail model and an updated version of the current model with the already mentioned improvements in overlap and mainsail roach treatment as well as depowering, especially in configurations with overlap compared with no overlap ones. Both approaches are expected to be a significant improvement, with the new one opening some new ways to calculate performance prediction for the future.

The proposed new tests will include as well runs with different heel angles in order to have a better understanding of the light air aerodynamics which is the most likely responsible for the low stability typeforming of the IMS VPP, which however has been corrected to a significant extent with last years changes.

3.2. Adjustable Forestay (FIV3):

After some discussions and test runs the ITC decided to allow the use of adjustable forestay in boats with adjustable backstay provided the mast is set up with swept back spreaders that prevent the use of the forestay to cause forward mast rake. This situation will be coded as "3" in the dat file adjustable headstay field and that will (in addition to the derived effects of the adjustable forestay per se) trigger the use of

mainsail coefficients that are 40% between the ones for mainsails with no runners and those with runners considering that this allows a better control on the rigging tension improving the control of the mast bend and thus mainsail shape.

At the same time the situation of boats with runners was reviewed and it was decided that for those the windage drag due to the rigging wire would be increased by 10% to account for the extra exposed area. This is less than the actual area of those elements but the ITC agreed that the measure of this does not create a design driver because it was detuned to discourage its use to improve the handicap.

3.3. Sails default minimum size (FIV5):

After a long discussion and some test runs the ITC agreed to propose come changes in the treatment of sails whose measurements less than the default ones.

In the case of the LP the proposal is to reduce the minimum value to 90% of J in order to provide a more fair treatment to self tacking jibs, present in a number of modern designs maintaining the JL limits at its current value.

For downwind sails the ITC proposes for those sails having an area below the default one to use for the VPP calculations an area corresponding to the average between the real measured area and the default one. In order to avoid problems with the existing dat files where mistaken input data or blank values would trigger the default sail it was agreed to apply this correction only to sails with a measured area between 50 and 98% of the default area. For sails below 50% of the area the 75% of the default area will be considered for calculations but in this case (basically the case of no spinnaker on board) the type of spinnaker should be set to "3" to indicate that this not exist, and take advantage of the 75% instead of the full default sail area (this is to avoid the case of many dat files where no spinnaker data is input assuming the default ones are being used)

3.4. Input of Sail Areas and use of multiple headsails in the VPP (FIV6, KNWV 6):

The direct input of the individual sail areas instead of their individual measurements was discussed but some issues make this a difficult problem to deal with. Independently from the complexity of the measurement checks and sail inventory on board, in the case of upwind sails the height of the center of effort would have to be calculated since this is relevant, not only the area.

Therefore the ITC proposes to leave the mainsail and genoa/jib input as they are and add lines to the dat file to input the different available sails downwind. However just the sail with the highest sail area of each type will be relevant for the calculations in the VPP (symmetrical spinnaker, asymmetrical spinnaker on pole and asymmetrical spinnaker tacked in centerline). As part of this proposal, and in order to simplify the certificate, just the maximum area of each of the present downwind sails would be printed instead of the actual measurements used in the calculations. For measurement checks the measurer would calculate the area of the sail with the appropriate formula (from the rule book) and compare that area with the maximum one reported in the certificate.

In addition to this it is proposed that the VPP would use internally the same calculated sail areas displayed in the certificates, modifying the corresponding sail coefficients so that no changes in performance happen due to this "formal" change.

3.5. Jib Roach measurement (FIV7):

Regarding the Jib Roach measurement the ITC proposes:

- To allow the use of jib roach for boats with LPG of more than 110% only for those sails not exceeding that percentage of overlap.
- To replace the JR measurement by girth measurements at 1/4, 1/2, 3/4 and 7/8 of the leech. This last measurement near the top was added in order to provide a more accurate evaluation of the upper area of the sail as a consequence of the allowed 4 battens equally spaced along the leech that would leave one above the 3/4 girth

For the current boats in which JR has been measured and input in the DAT file default values of the girth measurements (in excess of the triangular sail) as follows:

1/4 girth	3/4 JR
1/2 girth	4/4 JR
3/4 girth	3/4 JR
7/8 girth	5/8 JR

No negative girth excess (compared to the triangular sail) will be considered,

A detailed calculation of the area and center of effort based on the measured roach will be performed in the VPP using IG as the leech default length. In those cases where the luff length is shorter than the default one the leech measurement will be reduced by the same amount for the calculation of the area and center of effort.

3.6. Change in wording in rule 804 (ORCAN5):

The proposal to change the rule 804.1 wording as follows (see also Measurement Committee minutes):

1. The yacht's spinnaker configuration shall be declared by the owner and recorded as one of three permitted types:

a) Symmetrical spinnakers only. Any spinnaker to be tacked on the spinnaker pole or the centerline of the yacht.
b) Asymmetrical spinnakers only. No spinnaker pole allowed aboard the yacht while racing. Any spinnaker to be tacked only on the centerline of the yacht.

c) Both asymmetric and symmetric spinnakers. Any spinnaker to be tacked on the spinnaker pole or the centerline of the yacht.

In order to clarify the wording is supported by the ITC.

3.7. Use of TPS value for asymmetric spinnakers (ORCAN6):

In the case of symmetric spinnakers (using SPL) or gennakers tacked on centerline (using TPS) there is a clear situation but for the case of asymmetric spinnakers on pole for yachts in which both, a spinnaker pole is present and a tack point on centerline is present and declared the ITC proposes to support the submission and take the highest value of the two to be used when performing the calculations with the asymmetric sail hoisted.

3.8. LPIS input (ORCAN7):

In the case that LPIS+FS is bigger than LPG then this value should be input instead. Otherwise it is not relevant for the calculation

4. Hydrodynamics.

4.1. Drag correction for immersed transoms:

The ITC will generate a model to deal with the effect of immersed transoms for the 2008 VPP based in experimental data in a double way: the effect on effective length and thus residuary drag at high speeds and the added viscous drag at low speeds

4.2. Resistance added in waves (Seakeeping) :

The model for resistance added in waves currently implemented in the VPP was discussed and compared with some experimental data. The main conclusion is that the trend of the model is basically correct although the values are approximately one third of those calculated with a Pierson-Moskowitz for the same true wind speed. Although this is in principle a discrepancy comparing with fully developed seas offshore the current model seems a reasonable representation of the environment in which more yacht races take place (inshore or coastal) so although the difference is known it seems the current "detuned" model provides a fair representation for performance prediction.

4.3. Appendage characterization:

The ITC reviewed the appendage characterization implemented last year with the intention to have a more robust routine of automatic identification on existing offsets files in which sometimes no correct flags have been set. However this involves low level changes in the VPP and therefore this task should be performed at the time when the LPP is being fully rewritten. In the meantime the ITC wants the NA's to be aware that the current identification is not perfect and that any anomalous results should be reported to the Chief Measurer so in case of doubt a coherent identification can be performed.

4.4. Centerboard Treatment:

Some analysis were performed in the centerboard frictional drag in which the usually thin foils used in this elements showed a significant increase in their drag coefficient in presence of lift compared with the thickness/chord ratio of fixed appendages. The ITC proposed to increase the current frictional coefficient for centerboards by 50% in order to provide a more fair evaluation of their frictional drag in presence of lift.

4.5. Canting keel (FIV8):

The ITC reviewed the current treatment and proposed the following changes to it (some of them involving a better identification of some of the appendages involved:

<u>Forward rudder configuration</u>

Current treatment:
- 1st run with canting keel on CL without adding any RM increase
- 2nd run with canting keel fully canted adding an RM increase
(both runs are done with reduced D computed with fwd or aft rudder only)

Proposed treatment:
- 1st run with canting keel on CL without adding any RM increase
  (D computed with the keel on CL)
- 2nd run with canting keel fully canted adding an RM increase
  (D computed on maximum between the two rudders and keel canted)

<u>Forward daggerboard in CL</u>

Current treatment:
- 1st run with canting keel on CL without adding any RM increase
- 2nd run with canting keel fully canted adding an RM increase
(both runs are done with reduced D computed with aft rudder only)

Proposed treatment:
- Include daggerboard in the offset file with special code for daggerboard
- 1st run with canting keel on CL without adding any RM increase, no wetted surface for daggerboard added (daggerboard up)
  (D computed with keel on CL)
- 2nd run with canting keel fully canted adding any RM increase, wetted surface of daggerboard taken into account only to windward (daggerboard down)
  (D computed with maximum depth between keel canted, fwd daggerboard and aft rudder)

<u>Forward double bilgeboard</u>

Current treatment:
- 1st run with canting keel on CL without adding any RM increase
- 2nd run with canting keel fully canted adding an RM increase
  (both runs are done with reduced D computed with aft rudder only)

Proposed treatment:
- Include bilgeboard in the offset file with special code for bilgeboard (angle and lateral position should be defined input too)

- 1st run with canting keel on CL without adding any RM increase, no wetted surface for bilgeboard added (bilgeboard up)
  (D computed with keel on CL)
- 2nd run with canting keel fully canted adding an RM increase, wetted surface of bilgeboard taken into account only windward (bilgeboard down).
  (D computed with maximum depth between keel canted, fwd leeward bilgeboard down and aft rudder)

Some of these proposals involve some changes in the codes used in the offset files and the LPP identification routine that will be implemented for the IMS 2007 VPP.

4.6. Trim Tab (FIV4):

After reviewing the current situation of the trim tab treatment the ITC agreed to reduce to one third of the current value the reduction of frictional drag associated with keels that have a trim tab. It was acknowledged that there is a reduction of the friction coefficient due to the tab deflection however the currently implemented reduction was considered excessive for the usual keels in which this element is present (and the CL at which they normally work) so the value was reduced to the one used during the 2006 season for the IMAX fleet (where this correction seems to be considered still slightly punitive) .

At the same time this reduction of the drag coefficient will be applied only for values of true wind angle of 60 degrees and below disappearing at 70 degrees with a linear transition between these two angles.

5. Age allowance (FIV1):

As it was already discussed in the last ITC meeting, it is acknowledged that there is an "ageing" factor even in pure one design classes and a more significant effect in those cases in which the construction or appendages of the boat have been updated through time. However, none of those factors can be addressed in a purely "technical" way based on using one or another date for the age allowance (a non technical factor by itself). From this point of view the ITC believes this is more a topic belonging to the area of handicap management rather than performance prediction itself. So no specific advise is given.

6. Further development of IMS (SWE1)

The ITC acknowledges that there are some technical aspects in which there is special "room for improvement" and efforts are put into those areas with the available resources trying to have a better understanding of the problems with the result of a better performance prediction and thus handicaps. However there will always be conflicting situations, specially when trying to provide the best possible handicap estimation for existing older and in general slow boats and more aggressive modern designs. From this point of view the ITC would suggest that the Congress provides some guidance on the matter.

7. Use of PBO in standing rigging (KNWV4):

From the performance prediction point of view the ITC does not see any problem with the use of this type of materials since the weight of the rigging is measured with the mast for the determination of the pitch gyradius, and is accounted for in the stability test so the committee does not have any technical objection to extend its use for boats with LOA below 20 meters.

However some members showed some concern regarding its longevity so the general recommendation in case of acceptance would be to extend and limit the use of composite standing rigging not only to PBO but also other solutions and materials which are commercially available for rigging systems.

Considering that this type of rigging needs a bigger diameter than the metallic one there is a windage drag disadvantage that would prevent the permission of these materials from being a design driver.

8. Stability certificate:

The ITC agreed to propose a stability certificate based on the values calculated by the LPP including some estimated ISO12217-2. The idea is to provide stability information for those yachts with an IMS measurement independent from the rating certificate itself that could be used by race organizers and others as a way to address the stability of a given yachts, even when rated under different handicap systems than IMS or ORC club.

As a development of this, alternatives to measured lines and stability (as designer generated offsets and estimated VCG) would be provided, indicating in the certificate the origin of the data used for the calculations.

9. Scantlings

Due to the fact that ABS is not willing to maintain the ABS guide for building and classing offshore yachts for boats below 24 m LOA any longer, ITC has considered several options and recommends to use the relevant parts of ISO standard 12215 as soon as in a final stage for yachts below 24 m LOA. For yachts above 24 m there are several classification rules available and it is recommended to require compliance with one of the these rules.

ITC does not see the need to require plan approval. The previous years have shown that designers and builders declaration works satisfactorily.

10. LPP/VPP rewrite status

As reported at the last ITC meeting in Valencia, it was agreed to generate the IMS 2007 VPP with the current code while the new one is updated in parallel in order to have a proven reference for a Beta testing period during 2007. It has not been considered prudent nor effective to embark at this stage a "crash" project to make the software operational and bug free / user-friendly by the beginning of 2007.

The connection between the code itself and potential stand alone and web user interfaces will have to be defined in more detail within the more general ORC software development project.

The current coding is being developed in a way that should facilitate a more modern, flexible and portable program in order to easily generate different data presentations using subsets of information for different purposes (stability certificates, performance package, etc.)

11. Summary of Proposed VPP Changes for the 2006 VPP.

- Revised adjustable forestay and inner backstay treatment
- Modification of the centerboard drag coefficient.
- Change in the effective draft calculation for canting keel boats (in come cases)
- Minimum sail areas used for calculations changed.
- SPL/TPS use for asymmetric spinnakers
- Modification of the Trim tab treatment

12. Recommendations on GPH Class limits

The proposed changes to the VPP result in a minimal change in speeds for just some yachts compared to the 2006 version and for this reason there is no advice for the National Authorities to change the limits of those classes where the GPH value is used for their definition

13. ORC Research Fund

For the incoming year one of the ongoing projects, the LPP/VPP rewrite should continue but within a more general software re-write project so the ITC understands it will have to be included in a separate funding from the research one.

Beside this project the ITC plans to perform CFD calculations and some Wind Tunnel tests (in addition to the ones scheduled for last August that could not be performed) with an anticipated cost and in any case would not exceed 25.000 Euro, being this the funds that the ITC kindly requests the Congress to allocate for next year.

14. ITC 2007 Agenda

The ITC's principal projects for next year are:

- Finalize the rewrite of the IMS VPP and extend it to the LPP as well as interfacing with other tools. Revise appendage characterization as a part of the LPP rewrite
- Propose a model to deal with the immersed transoms effect in length and drag in general.

- Revision of the heel drag model and residuary drag at high Fn values with a possible test of tank test models.
- Wind tunnel tests and performance evaluation of “code 0” sails.
- Complete proposal and implementation of a new upwind sail model, including additional wind tunnel tests.

19. Next Meeting

The next meeting of the ITC is planned to take place in Annapolis March the 3rd-4th the same weekend than the Chesapeake Sailing Yacht Symposium. Observers are welcome.