OFFSHORE RACING CONGRESS

World Leader in Rating Technology

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ITC – INTERNATIONAL TECHNICAL COMMITTEE

Minutes of a meeting of the **International Technical Committee** of the Offshore Racing Congress held on 2-4th November 2007 at the Hotel Inglaterra, Estoril, Portugal

Present: Alessandro Nazareth (Chairman)
Fietje Judel
Philippe Pallu de la Barrière
Axel Mohnhaupt (Research associate)
Nicola Sironi (Chief Measurer)
Davide Battistin (ORC Programmer)
Zoran Grubisa (ORC Technical staff)
Panayotis Papapostolou (ORC Technical Staff)

Observers: Kay Brink (Germany)
Peter Reichelsdorfer, US IMS Committee (Chairman)
Boris Hepp (DSV)
Dan Nowlan, Offshore Director, US Sailing
Jean Louis Conti, F.F.V. (France)
Christos Theodossis HYF
Veiko Rosme, Estonian rating Office
Joakim Majander, Finnish Sailing Federation
Gerwin Jensen Watersport Verbond (Royal Dutch Yacht Federation)
Michiel Woort, Watersport Verbond (Royal Dutch Yacht Federetion)

Apologies for absence were received from
Andy Claughton
Rob Pallard
Manolo Ruiz de Elvira
David Lyons
Fabio Fossati (Research Associate)
Lex Keuning (Research Associate)
Michael Richelsen (Research Associate).

1. General

1.1. Minutes of the last meeting

The minutes of the previous meeting of last September in Hamburg were approved.

1.2. 2007 season report

Apart from Middle Sea Race no major IMS regatta has been held after Hamburg Meeting in September, so nothing new emerged from the race field.

To reinforce the general perception, a lot of new interest on IMS arised, coming from the presence of very few professionals. Most of them have now migrated to TP52, GP42 and one design classes, and this has attracted a lot more boats with amateur crew. In some countries like Italy the racing division was created to just score boats with some professional on board, independently from the fact that they are Racers or Cruiser/Racers.

1.3. Chief Measurer Report

The Chief measurer took the occasion to bring to ITC attention some minor request of modifications:

- Rule 816.2 a) (definition of an asymmetric spinnaker) should be changed removing the 5% difference between luff and leech, so encompassing all spinnakers that donôt comply with the symmetry requirements specified in 816.1.
  The Committee did not see any harm in doing so, but referred the question to the Measurement Committee for a final decision.

- Rule 820. 2. c) Definition of SL for Asymmetric. After examining wide database on measured yachts with asymmetric, the committee agreed to change this rule with:
  ASL = 0.5*SLU+0.5*SLE
  The difference in area calculation is not so big, being generally smaller of a very reduced percentage, so no concern was raised and new formulation agreed.

- Rule 847. 7. b) will be changed to fix a limit in ASF that is not dependent from ASF itself as it is in the current rule. After revising the big database of measured boats with asymmetric the committee agreed the following :

  847. 7. b) For the calculation of the asymmetric spinnaker default area, ASF shall be taken as the greatest of 1.8*J, 1.8*SPL or 1.6*TPS .

- Heavy items. With reference to APPENDIX 9 Nicola Sironi reported that there are very few boats with High Superstructure (par. 12) and Radar (par. 8) credits. Being also the credit very low he proposed to cancel these two credits. Also liferaft on deck credit should be removed. Its application has a null or minor effect on GPH and other handicaps and has very seldom been applied in real fleets since its inception in 1998. Instead, it has been causing some misunderstanding leading to erroneous interpretations of the requirements of the Isaf SR and the measurement conditions for measurement. The Committee agreed on this proposal

- The Chief Measurer requested also ITCôs opinion about changing the way the non overlapping jibs (LPG<110%) are currently measured, and the committee produced a proposal for changing the present formulation for surface calculation with:

  JIB AREA = 0.1125*JL*(1.445*LPG+2*JGL+2*JGM+1.5*JGU+JGT+JH/2)

The formulation for vertical center of effort of jib will be modified accordingly in VPP.
This formulation will allow the Measurers to compute the jib surface more easily than with current formulation, enabling them to write on sail stamps also the total surface.
The committee agreed on this proposal that in part addresses to the FIV 7 Submission (see below **4. Submissions**)

2. Aerodynamic

2.1. Modifications to current aero model

After Hamburg meeting, where results of wind tunnel tests were examined and analyzed, the committee work on aero model was focused on the following items:

a) new formulation for Centre of Effort Height (CEH) based on overlap, fractionality, and wind angle based on wind tunnel results, as trends in Centre of Effort Height from actual IMS VPP formulation are generally higher than the measured values.
b) new formulation for Effective Height of mast (Heff) based also on overlap, fractionality and wind angle based on wind tunnel results. In particular the effective rig height derived for each sailset from these tests shows that the masthead configuration is more efficient in terms of induced drag than the fractional options with the bigger overlap yielding higher effective height.
c) TWIST function revision to make it more effective for fractional rigs
d) Correction for heel angle that could take into account the effective reduction with drive force when heel increases (PHIUP function).

The trend of the first stage of test runs made in Hamburg showed quite encouraging results in the direction of reducing the influence of stability, operating on heeling moment coming from sailplan.

A thorough revision of previous meeting test runs was so performed before and during the meeting.
The analysis was performed on handicap variations versus boats parameters to locate the best aero model to implement in 2008.
The committee at the end of a very deep investigation decided to implement in the aero model of 2008 VPP part of the items that were investigated (such as PHIUP function) and to continue to improve during the next year the full aero model which would include all the results of wind tunnel tests (so not only Heff and CEH but also sails coefficients and the way these are varying with overlap, fractionality, main roach and apparent wind angle).
The reason is not only to have a more complete new aero model but also to avoid undesired effects on the boats.
In fact implementing all the above items in the aero model would have helped in forcing the boats to increase their stability but would have harmed the light boats (high length/volume ratio ï LVR) that have also a lot of sail area that is heeling them too much (and so would have been penalized).
More than this the inclusion in the next VPP of the Corrected_RM formulation (see chapt. 3) is counter-balancing this partial loss of stability needs, so the committee didnôt see any harm in doing this partial modification to aero model.

In any case with this new PHIUP function the resulting trends are in the following directions:
1. boat are generally sped up an average 2.5% in upwind 12
2. boats with overlap are slightly favoured
3. increase in stability is encouraged (e.g. increasing the RM of 20% returns an handicap increase in upwind 12 that is from 1 to 4 sec/ml less than in 2007 IMS, where stiffer boats get the bigger advantage)

So the boats will not be forced at all to reduce stability to remain competitive, and conversely any increase in stability will have less handicap increase than they would obtain with the current VPP.

2.2. Code0 implementation in VPP

As already reported the ITC tested in wind tunnel also two different code 0ôs configurations.
The code0 tested were masthead with 165% LPG with mid girth at 58% and 63% of base length
A new set of CODE 0 sails coefficients have been then computed starting with an averaged set from genoa and asymmetric spinnaker ones. Final values have been compared with the measured one in the wind tunnel to obtain a consistent solution.
So the ITC is confident in implementing in 2008 VPP a new sail configuration (main+CODE 0) for boats that will be measured with such a sail.
VPP will compare polar speeds obtained with existing two configurations (main+genoa and main+ spinnaker) taking the maximum speed. In this case there will be 2 crossovers at each sail configuration change.
In implementing the code 0 it was decided to limit the minimum mid girth of code0 sails at the 65% of base length to avoid any exploitation that would have allowed at short mid girth code 0 to sail at very low windward angle. This was confirmed also by wind tunnel results where 58% code 0 had better upwind efficiency.
ITC decided also that the new sail will be recorded in the sail inventory as an asymmetric spinnaker and the VPP will automatically detect which kind of asymmetric is (if the mid girth- AMG - is between 65% and 75% of ASF, VPP will run it as a code 0).
Moreover it has been decided that CODE 0 will be tacked only on centerline at a maximum distance from forward face of mast that is the maximum between J, SPL and TPS.

It must be noted that it is the first time that these sails were tested in a wind tunnel for handicap purposes and that these tests will allow the IMS to rate boats with such sails, that are currently not allowed in any other rating system.

3. Hydrodynamics

ITC agenda and work was focused during this year in a way that that the new 2008 VPP could be substantially improved.
The committee also believes that if some typeforming in IMS still exists, it is towards heavy boats and thinks that once this trend will be balanced with light boats, the low stability typeforming will be removed somewhat automatically.

After Hamburg meeting, where many items that could affect positively those ñfast and fun boatsò that many believe are still penalized by IMS, were examined and analyzed, the committee concentrated mainly on:

- Length formulation and Truncated Sterns treatment
- Residuary drag
- Stability issue.

Length formulation and Truncated Sterns treatment
A long study on length, overhangs and truncated sterns that was on ITC table for many years was updated.
The speed of the boats with short overhangs and immersed transom could be closer to reality, taking into account the different behavior with aft turbulence and separation.
Axel Mohnhaupt worked on a procedure that takes into account additional hull parameters with a scheme for an estimation of the dynamic sailing length with consideration of the speed and generated wave in which the yacht is sailing.

Residuary Drag
The revision of the residuary drag taking into account different models to be introduced in the regression with different weights, to affect in a different way light boats was also performed.
Tank test data results with applied trimming moment when running in the tank have been taken into account too.
A more accurate data set with denser station spacing for DSYHS models for LPP calculations has been prepared and used for new regressions.
Also a modified Residuary Resistance function of LVR has been taken into account, to try to assess better the performance of light boats (high LVR)

Stability issue
The ITC concentrated also on RM and how RM is applied to the current VPP and devoted a good part of the meeting to look for a correct treatment of the boats that increase their stability but should be sped up in a fair way.

The test run performed in Hamburg were analyzed and mainly updated also during the meeting with a complete revision of the formulations drafted in Hamburg.

After long discussion it was decided to implement into the new 2008 VPP:

- A new corrected Residuary Resistance curve based on a LVR (length/volume ratio) function that could better take into account light boats characteristics and that current RR is not assessing because of the effect of many heavy models included.
- A new evaluation of the Righting Moment that is used by VPP based on both the RM measured during the floatation and on a standard RM derived by boat characteristics (Sail Area, Length, Beam, Displacement). The final RM will be a weighted average of these two values. Righting moment will be more related to sail area and boat dimensions and how crew tune the sails to reduce heel.

The combination of these two new formulations (RR and RM) joined with the aero modifications have been verified and the results is a VPP that makes light and stiff boats closing the handicap gap against the heavy and tender boats.
The decision was also helped by the very good results of the modifications implemented (see test runs)
This new VPP will finally erase any need to reduce stability and in some cases will even typeform versus stiffer and safer boats.

The committee decided also that next year further investigations will be devoted in:

1. Truncated stern treatment
2. Length assessment
3. Residuary Resistance revision

The research programmed in Delft (see chapt. 8) will be very important to improve the formulation for the above items.

3.1. Appendage Characterization

Following Philippe Pallu tests with CFD of different keel bulb configurations performed 2 years ago, ITC made a revision of 511.4 regarding winglet configuration and the effective draft formulation.
This code applies a substantially smaller increase in effective draft for winglets than it was before 2005, and a reduction of the effective draft for bulbs with no wings.

The new treatment for keel bulb was partially included in previous VPP because of the difficulty of writing a robust routine of automatic identification of keels to better address effective draft of bulbs not so flat in section.
The code now can automatically tell apart keel bulb and winglet (without the need of code 4 in offset file) and compute effective draft of both kind of keels.
In 2008 VPP bulb keel will have their effective draft reduced as a function of bulb width over the keel span, while winglet will maintain the same increased effective draft as it is computed now.

4. Submissions

RFEV 1 – Boom diameter
ITC strongly disagrees on removing the BD limit (presently at 0.05 E), this could introduce loopholes like very high booms to close the gap between mainsail and deck.
In any case the committee examined a wide database of measured boats and decided to raise the limit to 0.06*E to accommodate few boats that had BD just above the current limit.
To avoid any further increase in BD the committee decided also to apply a surface penalty to mainsails at all boats with BD>0.06*E.
The penalty will be :

Mainsail surface penalty = 2*E*(BD-0.06*BD).
This area will be added to the mainsail surface.

DSV 4 Double Handed Handicap
ITC thinks that Crew weight lower and upper limit should be removed to accommodate reduced crew on one hand and allow on the other end One Design or other classes where the crew weight is higher than the maximum allowed IMS weight. This is already possible (and used) through a software option, with a warning that the certificate is ñillegalò. The committee doesnôt believe these small modifications will promote any loophole as the typeforming of aggressive boats has converged towards the Default Crew Weight, being the experience of both reducing and increasing its value not proven to cause any advantage.
More than this the handicap for double handed crew (180 kg) will be also printed on the new certificate.

DSV 5 IMS Small Jibs
ITC believes that current formulation is not favoring too much non-overlapping jibs. With light winds they are still unfavored.
Moreover the committee is not thinking that the new formulation is getting the same handicap with more roach compared to IMS 2006.
In any case the new aero model that will be possibly implemented in next year VPP, will possibly address also the non overlapping jib fair handicap.

FIV 7 Jib/Genoa Measurement Instructions
For the non overlapping Jibs the committee believes that the new formulation for surface calculation (see par 1.3) will help the measurers in evaluating jib surface and putting it on the tack of the sail.
Regarding the overlapping genoa the committee re-assessed its disagreement on allowing roach and to verify this proposes to add to intermediate girth a portion of JH with the following scheme:

For ¼ girth from bottom, maximum girth = 0.75 (LPG + JH)
For ½ girth from bottom, maximum girth = 0.5 (LPG + JH)
For ¼ girth from top, maximum girth = 0.25 (LPG + JH)

All overlapping genoa (LPG> 110% J) with only girth in excess of the above will not be measured.

ORCAN 2 – TPS Effect
The committee made some test trials to verify if the TPS effect is correctly applied in current VPP following 804.1 c).
The results confirmed that this rule is working in the correct way, TPS has properly no effect if it is less than SPL, but it affects handicaps if bigger than SPL, as VPP takes the highest value of the twoôs when performing the calculations with the asymmetric sail hoisted.
The new way minimum ASF will be computed (see 1.3) will even improve TPS effect.

5. 2008 VPP

The new code for 2008 is completed. Only moveable ballast boats and ketches still need to be implemented. The computing time has improved, and there are some handicap differences with the old code.The programmer Davide Battistin explained that with a lack of convergence of the old optimizer in the ñbest downwindò speeds, when the wind angle approaches 180 degrees, which have been experienced in the past usually with the higher wind ranges. As a consequence, the new VPP often predicts ñbest VMGò angle of 180 degrees in strong winds (16 -20 knots), differently from the old VPP, and this makes the boats faster than the current VPP downwind, hence the negative trend in GPH numbers, that is currently in the range of few seconds.

The draft of the rating certificate was showed to ITC by ORC staff (Zoran Grubisa, Panayotis Papastolou) and minor changes were needed at this stage.

6. IMS Measurement standard New ORC Products

The Management Committee decision to launch the 2008 VPP with a new name maintaining IMS name only as a measurement platform was already discussed in Hamburg by ITC.
Regarding the new name the committee already expressed their concern about changing it, because a continuity with the past should be more accepted by the different constituencies, and this would not prevent to market the new VPP as a deeply renewed product.
Of course some caution should be used to promote it as a new GP rule, as the majority of boats currently racing in IMS are cruiser/racers. A sudden change to revert to GPs and One-Offs may cause a devastating decrease of interest from the big constituency of production boats owners, that constitutes a big amount of boats with IMS certificates

The idea to promote the IMS just as a measurement system must be supported too, together with other ORC VPP side-products (Performance Package, Stability Certificate, Scoring software for Race organizers and owners etc.).
The sailing constituency that has IMS as a ñreferenceò handicap system requires that the name must be always present in any new product that ORC will sell, to retain a sort of continuity with the past.

7. Summary of Proposals for the 2008 VPP

1. New aero Model (see chapt. 2 Aero), with a correction for heel angle that could take into account the effective reduction with drive force when heel increases.
2. Code 0 added as a new sail configuration
3. New RR curve (see chapt. 3)
4. New RM evaluation (see chapt. 3)
5. Effective draft for wings and bulb revised (see chapt. 3)
6. Boom Depth limit revised
7. Simplified jib area calculation
8. Change in SL formulation
9. Change in ASF limit
10. Removal of upper and lower Crew Weight Limit

11. Removal of some heavy items credit (High superstructures, liferaft, radar)

A test run of combined effects of 1., 3., and 4. is available.

8. Next year Research and planning for work

In June Lex Keuning gave Delft Tank Test disponibility to make some new tests free of charge for ORC. Only new models building costs should have needed to be funded and ORC already approved this.
So ITC decided to go on building two new models that have been designed by Fietje Judel starting from the lines of BOX1 and BOX2 to be closer to the last generation of IMS racers.

It was decided also to possibly perform new tank tests on some existing models:
a) On model 63 that has 3 different stern positions
b) Extend up to 30 degrees of heel the tests of 6 old Delft models that have been tested up to 20° of heel
c) Test some models up to Fn=0.9

These additional tank test will be useful also to:

- revise and expand to higher speeds (Fn=0.9) the current RR formulation, this could accommodate better lighter and fast boats. Lex Keuning was saying that Delft could consider extending the work on DSYHS with a new range of models or with a limited range to high (very high) Froude numbers
- verify more thoroughly the reformulated heeled drag currently implemented
- Utilizing the model 63 that has a set of truncated sterns at different overhangs (station 10, 10.5 and 11) to validate current length assessment under revision

More than this for the 2008 agenda the Committee is planning to:

- Revise deeply L formulation with a new concept of LSM4 and a Froude number transition for better assessment of overhangs
- Residuary Drag with evaluation of new regressions with different data set.
- New upwind Sail Model with a more complete implementation of wind tunnel tests.
- New de-powering scheme for upwind sails.

9. Next meeting

The next ITC meeting has not been scheduled as many of members were not present at Estoril. The chairman will circulate very soon a form to locate best date and location for the first meeting in February ï March 2008.
Observers are welcome