INTERNATIONAL TECHNICAL COMMITTEE

Meeting

Held in Winchester 12-14th October 2024

MINUTES

Present on site:	Andy Claughton (GBR - Chairman), Alessandro Nazareth (ITA – Deputy Chairman), Antoine Cardin (FRA), Matteo Polli (ITA),), Zoran Grubisa (CRO - ORC Chief Measurer), Marcus Mauleverer (GBR), Jason Ker (GBR), Davide Battistin (ITA-ORC Programmer). Simon Forbes (UK. ORC Multihull),
Via Google Meet	Panayotis Papapostolou (GRE-ORC Programmer), Nicola Sironi (ITA – ORC Deputy Chief Measurer), Robert Ranzenbach (USA), Manolo Ruiz de Elvira (ESP),
Apologies:	David Lyons (AUS),
Observers on line:	Dobbs Davies(ORC USA), Jim Teeters (US Sailing), Chris Tutmark (US Sailing), John Victorin (GER), Johan Tuvstedt (SWE Offshore Association), Max Gurgel (GER)

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1 Submissions.

The committee discussed the submissions assigned to the ITC. The submissions and ITC decision are listed in the table below, the complete responses are presented in Appendix 1. Where a submission is related to a wider discussion about the VPP and rules this is noted in the body of the minutes.

Sub.	***Description***	***Response***
ESP 1	Stored energy, non-manual power	Not supported, but IMS Rule F9.11 will be amended. (see below)
ESP 3	Mast jack pump on board.	Supported. Rule F9.12 will be amended.
ESP 4	MHB measurement.	Deferred to measurement Committee.
ESP 5	HHB measurement.	Deferred to measurement Committee.
EST 1	Minimum Apparent Wind Angle (AWA)	Not supported
EST 2	Adjustable mast foot.	See ESP 3.
FIN 2	Life raft on board.	Supported
NOR 1	Separate runners and check stays in the aerodynamic force model	Supported
SLO 1	Furling Headsail allowance.	Supported (see below)
SWE 1	VMG downwind speeds for asymmetric vs. symmetric sails.	See below (Section 2.1)
SWE 2	Allocation of reaching sails.	Not Supported
TUR 1	Keel width (thickness) effect.	See below
TUR 2	Longitudinal crew position.	Not supported
USA 3	Appendage lateral area on high performance boats.	Not supported (see below)
USA 4	Non-manual power systems.	Supported
USA 7	VPP with TWS of 4 knots.	Supported

1.1 USA 4. Non-Manual power

The committee proposes the following revision of the non-manual power penalty, so that the penalty is sensitive to the boat length.

TOTAL PENALTY AMOUNT:

- 0.3% for 10 m LOA and below; 10-18 m LOA computed linearly between 0.3% and 0.6%;
- 0.6% for 18 m LOA and above

The total is divided 35% for non-manual power rig adjustment, and 65% for sail sheets.

The crew weight no longer affects the penalty.

1.2 SLO1. Headsail Furler.

The LP restriction on the allowance for using a furling headsail, when it is the only working headsail on the boat, will be removed. The new allowance will be based on the area of the headsail at each wind speed. The REEF parameter will be used to determine the allowance, a larger sail will be awarded a larger allowance.

1.3 TUR_1. Keel width effect upwind.

The committee acknowledged the validity of the submission. The residuary resistance of long keel hulls, which have no separate rudder, will be reviewed in 2025 with an ambition to update the force model for the 2026 VPP. This work is also pertinent to the development of the ORCj VPP.

1.4 USA3. VPP sensitivity to small keel area changes. (USA 3)

The very successful entry of a much newer design into the GL52 Fleet (Great Lakes) has raised 2 issues.

1) The newer boat has a larger keel planform area (~10%) and this is seen as a performance advantage.
2) The VPP inevitably predicts that the larger keel area will sail slower, this compounds the problem and the discussion among the fleet that perhaps the age allowance might be adjusted and/or related to the date of the keel.

During the meeting the committee ran a test to explore the changes to predicted speeds arising from a change to the keel lateral area.

The committee concluded that whilst it was possible for an increase in keel area to make the boat better balanced, or more tolerant, and therefore faster, the VPP was behaving as it should. There was no method by which the VPP could predict that an increase in keel area would increase the predicted speed.

The committee also discussed whether the introduction of an age allowance related to the appendages might address the problem. It concluded that the complexity of devising and managing such a process outweighed any potential benefit. The committee also noted its policy to ensure that the use of age allowance did not offer boats unwarranted handicap benefits.

It was also noted that the in the fleet that raised this problem (GL52) the race results show that the corrected time deltas are very much larger than any handicap adjustment, or age allowance, could confer on the lower placed boats.

1.5 USA7. Four knot wind speed added to polar table.

The submission proposes the introduction of a 4 knot wind speed into the VPP wind speed matrix, which the committee supports. This prompted a wider discussion about the definition of the s/m speed curves at each TWA.

This curve needs to be unambiguously defined throughout the sailing wind speed range so that PCS and WRS calculations are consistently applied. The committee agreed to test the VPP running at four knots. If this proved viable then it should be considered for inclusion in the VPP.

There was discussion about the interpolation of seconds /mile between 6 (or 4) knots and zero speed and extrapolation to wind speeds above 24 knots.

The ORC programmers will report on the current process prior to making changes. The goal of these changes is to:

- Ensure that the spline fitting down to zero knots TWS is robust.
- Ensure that the extrapolation of PCS above 24 knots TWS is consistent across the fleet.
- Unify the approach used for PCS and WRS
- Confirm that the PredictWind API does not introduce any deviation from our agreed process.

No changes will be made to the current scoring method until these changes have been programmed and tested to the committee's satisfaction. These minutes are also referenced in the response to the submissions.

2 ORCi

2.1 Off wind Aero force coefficients.

2.1.1 Background

During 2024 a study was made to propose refinements to the off wind aerodynamic coefficients. This was led by Robert Ranzenbach, supported by the ORC Technical staff.

The ITC reviewed the current coefficients with respect to the observed speeds captured in the Performance Database. (PDb), and revisited the relevant submission from this (EST-1,SWE-1) and previous years.

- ORC ITC review:
    1. ASYM on CL:
       predicted AWA of 170 Deg is too high based on the performance database.
    2. ASYM on CL and SYM:
       Predicted VMG is too low (performance database)
    3. The VPP may favor ASYM on CL over SYM in some conditions
- 2024 Submissions
    1. EST 1- ORC VPP at 24 knots predicts AWA too tight for ASYM on CL, proposed AWA limit as a solution
    2. SWE 1- ORC VPP favors ASYM on CL over SYM

2.1.2 Investigation,

To support the investigation a small test fleet was assembled using boats that were common in the racing fleets and also the observed data held in the performance data base (PDb) was used where possible. The boats used for the study are shown below.

- ASYM on CL:
    - XP 50 ASYM
    - Generic TP52 ASYM (in the performance database)
    - Swan 42 ASYM (in the performance database)
    - GS 44 ASYM (limited data focused on downwind VMG in the ORC Performance database)
    - Italia 9.98 ASYM
- SYM:
    - X41 SYM
    - GS 44 SYM (limited data focused on downwind VMG in the ORC Performance database)
    - Beneteau 36.7 SYM (in the performance database

2.1.3 Issues 1 &2.

Asymmetric (Asym) on centreline (Cl), apparent wind angles are too high at some wind speeds, and VMGs are too low across the wind range.

The figure below shows the changes to the force coefficients between the 2024 VPP and the proposal for 2025 (V10 in the legend)

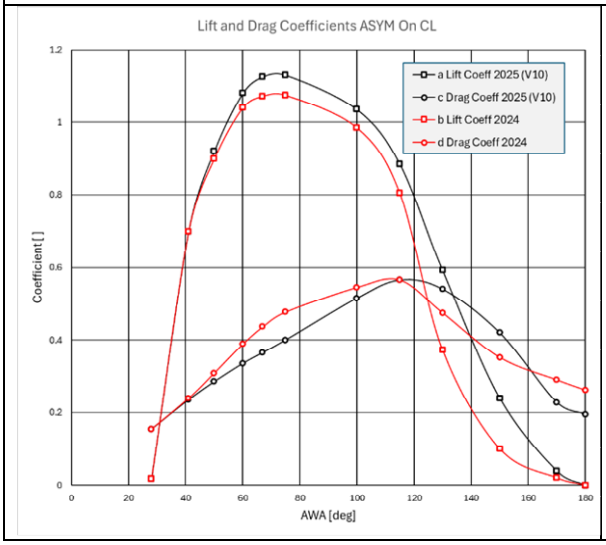
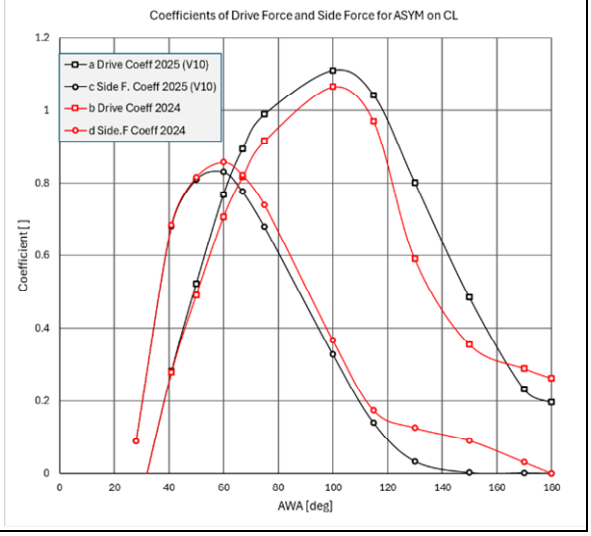
The VPP uses the lift and drag coefficients in the VPP, but it is helpful to see these transposed into drive and side force coefficients to visualize the change. The 2025 coefficients have a lower heeling force, particularly at higher AWA's and a higher drive force, whose slope is more uniform between 120 and 170 degrees of AWA.

These changes were developed by adjusting the coefficients to bring the boat speeds and apparent wind angles into closer alignment.

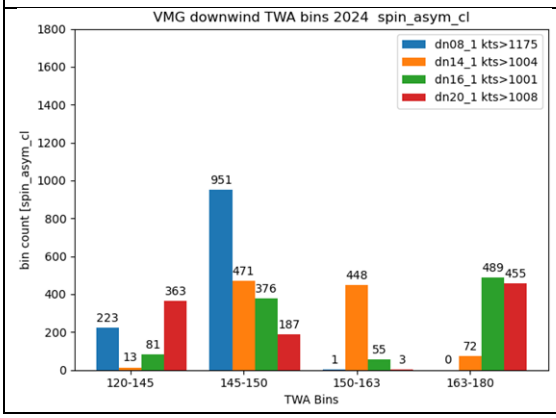
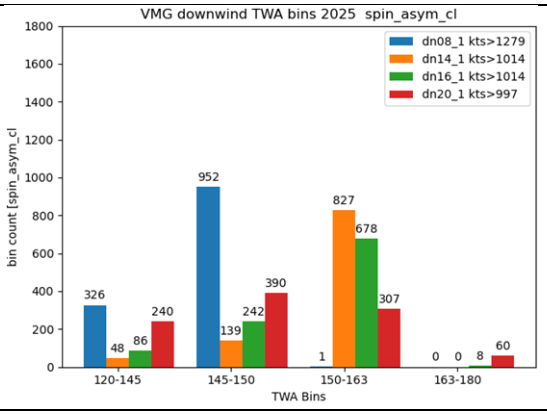
AV10 achieved objective of addressing VPP predicting solutions with 170 Deg AWA

AV10 increased VMG over the entire TWS range

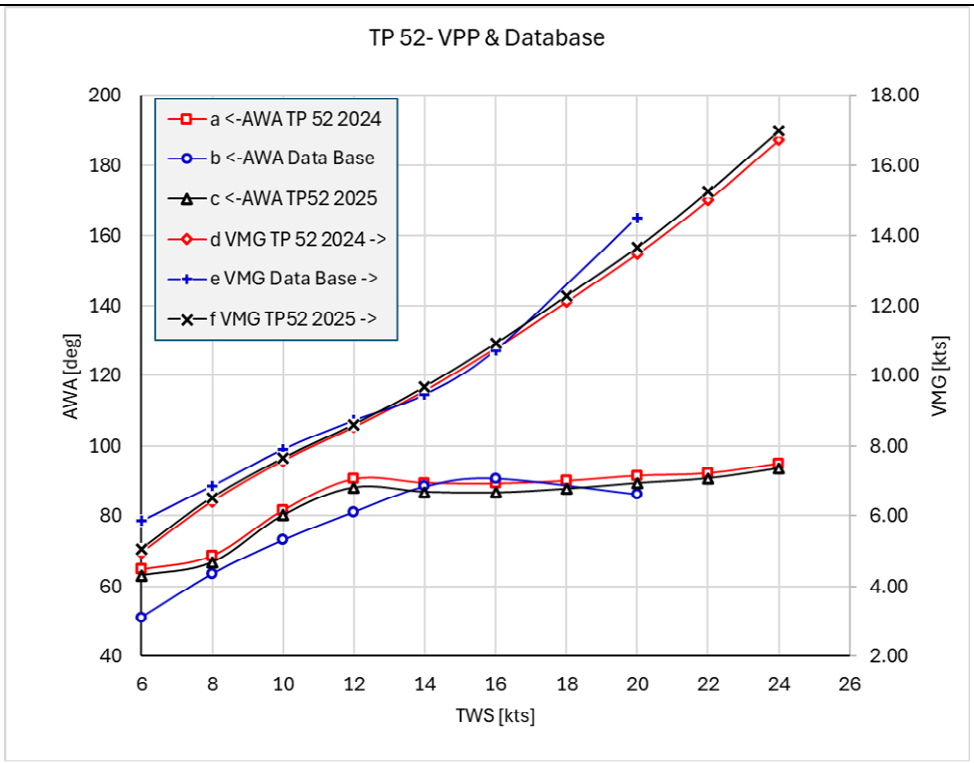
Both results are closer to the database results in accordance with the objective

85%+ Mid-Width ASYM Aero Coefficients AV10, Coeff vs. AWA	
	

The figure below shows the distribution of predicted downwind optimum true wind angles (TWA) For the 2024 (left plot) and 2025 (right plot) VPP's for boats using an asymmetric spinnaker tacked on centre line. The number of boats predicted to sail at TWA's greater than 163 degrees in winds above 14 knots has been reduced by 95 %.

VMG Downwind. Distribution of Optimum TWA. 8-20 knots TWS	
2024 VPP 16 & 20 knots ~480 boats in 163-180 bin	2025 VPP 20 knots ~60 boats in 163-180 bin
	

AV10 has slightly increased VMG Both AV10 results are generally closer to ORC Performance Database



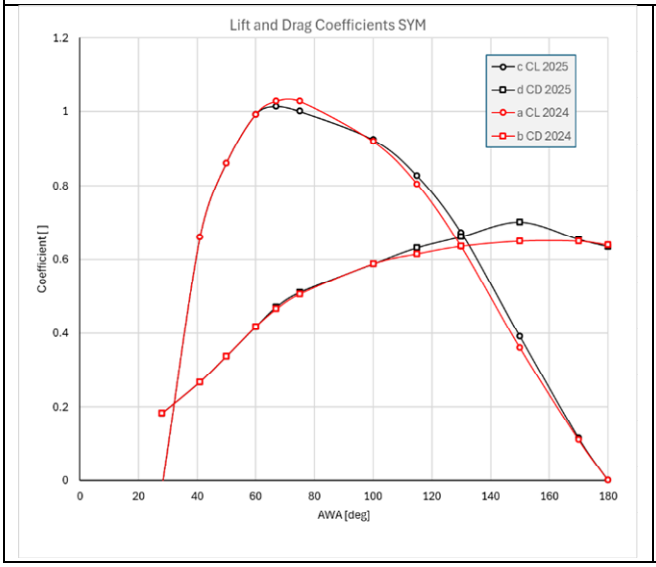
2.1.4 Issue 3 & 5:

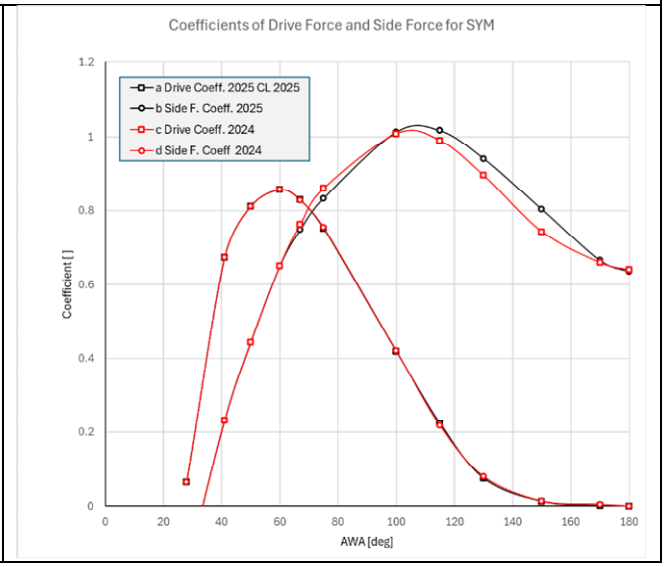
ORC VPP Favors ASYM over SYM

- Once satisfied with results from introducing AV10 for ASYM on CL, using the mini test fleet, we explored small modifications to the aerodynamic coefficients for SYM spinnakers
- The primary objective was to slightly increase predicted downwind VMG of SYMs (as observed in the ORC performance Database) but not greater than increases to ASYM performance predicted by AV10
    - Emphasis on small relative increases to 2024 SYM VMG mostly in the range of 8-12 knots TWS
- Secondary objective to reduce SYM AWA at higher TWS to be closer to ORC Performance Database Results

The proposed coefficients (SV8) are shown in the figure below.

SYM Aero Coefficients SV8





SV8 has, on average, slightly increased VMG (about 0.25%)
SV8 has decreased AWA at higher windspeeds
Both SV8 results are generally moving closer to ORC Performance Database.

2.1.5 Observations and Recommendations related to ASYM favored over SYM

- SV8 has slightly increased VMG, over almost the entire TWS range (not at 6 knots TWS) but not greater than increases in ASYM on CL performance resulting from AV10 with emphasis on relatively small changes in the 8-12 knots TWS range in accordance with the objective
- SV8 has decreased AWA at higher windspeeds in accordance with objective
- Both SV8 results are closer to ORC Performance Database
- AV10 in combination with SV8 appears to reduce perceived ASYM favor over SYM (ASYM predictions on average sped up more than SYM predictions on average across entire TWS range)

2.1.6 HSF adjustments required by updating ASYM on CL

No specific adjustments were intended for HSF Coefficients but HSF Coefficients at the 85% mid-width ordinal are designed to match ASYM on CL, so ……

Had to update the 85% ordinal HSF Coefficients

This required adjustments to the 78% mid-width ordinal HSF coefficients to maintain smooth transition along the entire mid-width range (50% to 85%)

This also required to adjust the ordinal from 78% to 80% to maintain linear relationship between mid-width and the AWA at maximum Drive Force

2.2 Heel Limit.

The discussion of the submissions prompted the committee to look at the predicted heel angles when running and reaching in strong winds, and whether introducing a heel limit would be beneficial. Test runs were made during the meeting. For optimum downwind VMG angles the introduction of a heel limit of 18 degrees made little difference, boats were rarely predicted to reach this angle. For TWA's around 90 degrees the predicted heel angles were generally higher than the limit.

The committee concluded that a single fixed limit would not improve the handicapping. But the matter was added to the 2025 research agenda to investigate a more sophisticated approach which would not involve introducing a yaw moment balance into the VPP.

2.3 Proposed Changes for 2025

The following changes are proposed for the 2025 ORCi VPP

a) Adjustment to off wind sail coefficients to improve TWA predictions.
b) Revised credit for furling headsails based on REEF parameter and remove LP limit.
c) Improved force model for yachts fitted with lifting foils. 1.
d) Use of non-manual power revised penalty.
e) Introduction of 4 kts TWS.
f) Life raft position

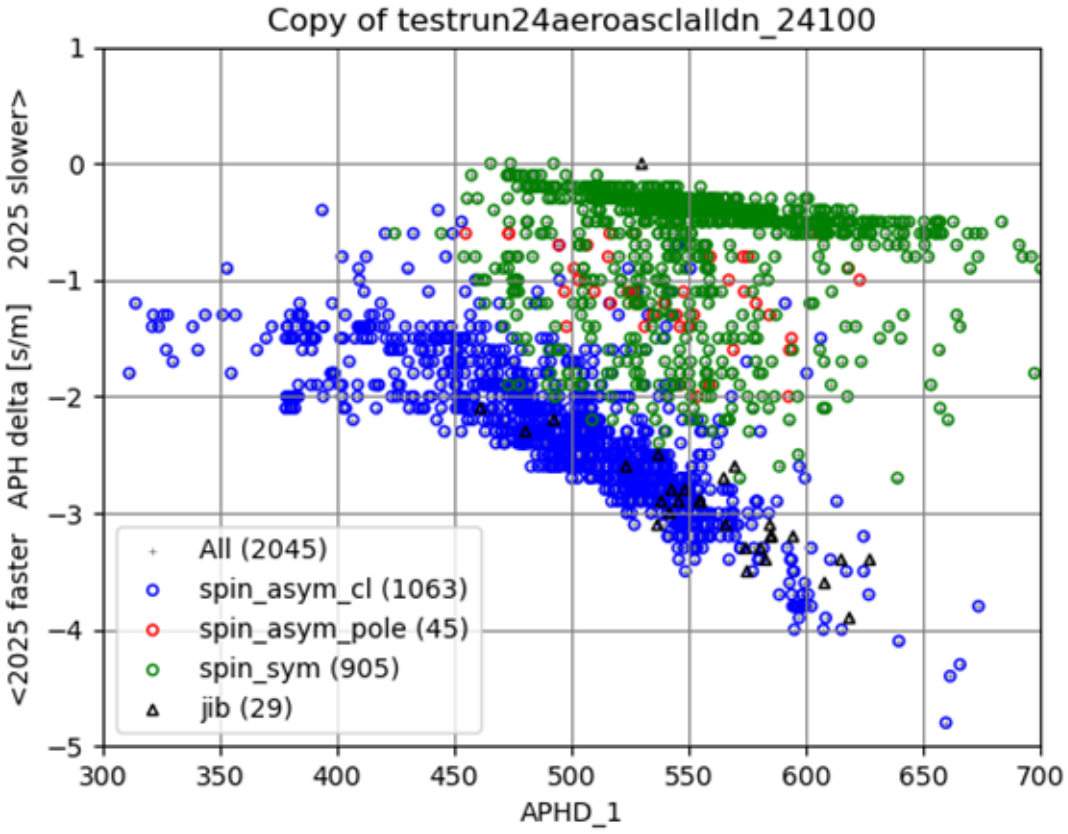
2.4 Test Runs

2.4.1 Prediction of Down wind True Wind Angle (TWA).

The test run output was analysed to show the predicted downwind optimum VMG TWA as True Wind Speed (TWS) changed. TWA ranges (bins) were set up and the number of boats sailing in each bin was determined. The results for the 2024 VPP and the proposed 2025 VPP are shown in the figures below.

2.4.2 Overall changes.

A plot of the All-Purpose Handicap (APH) (2025) against the difference between the APH 2024 and APH 2025 is shown in the figure below. As anticipated, with the change to the aero coefficients, the boats with asymmetric spinnakers are accelerated in 2025, by approximately 0.4 % on average.

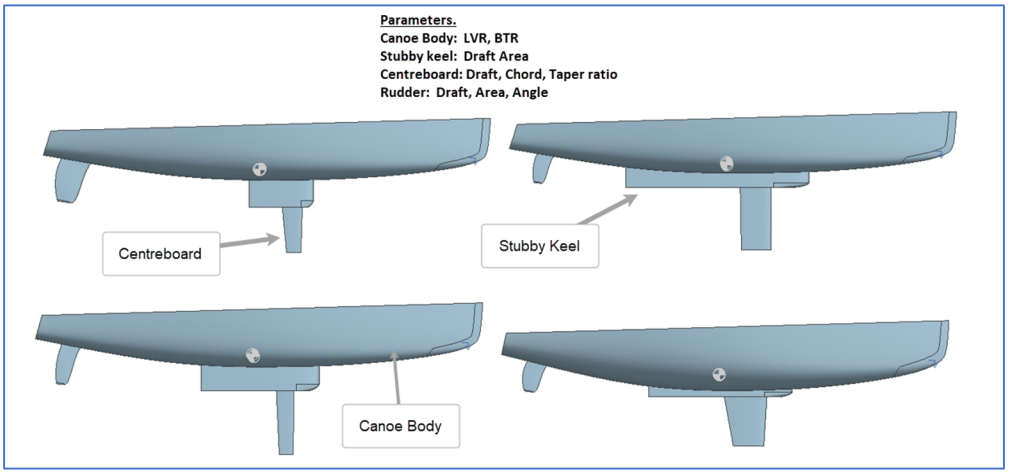


3 ORCsy.

During the 2024 season 10 successful events were held (MILLENNIUM CUP, ANTIGUA, BUCKET, ARMANI CUP, CYCLADES, PALMA SY, MYRC, SWAN CUP, IBIZA, AMERICA'S CUP regatta) with the ORC_{SY} technical group almost always on site watching the races.
The proposed improvements to the VPP are discussed below.

3.1 Centreboards

The existing super yacht fleet exhibits a wide variety of keel types. To support a revised mathematical model of effective draught a series of parametric CFD studies were carried out. The basic model comprises the canoe body, a stubby keel above the retractable centre board. A Sobol[1] sequence of hull and keel configurations was designed using the following the parameters shown in the figure below.



The results of the CFD tests were analysed to isolate the sensitivity of the effective draught to the chosen parameters. These data will be used to construct a revised model of effective draught for the 2025 VPP.
The CFD studies showed that there was still a fundamental relationship between the effective draft and the yachts physical maximum draft. But where there is a sharing of sideforce (lift) between the stub keel and a shorter chord centreboard the disturbance of the vertical lift distribution gives rise to an increase in drag, i.e. a reduction of effective span. The CFD also showed a sensitivity to length/volume ratio (LVR) and beam/draft ratio (BTR), such that a deeper canoe body relative to the maximum draft also reduced effective span.
The new model for effective span will not be based on a neural network but will be implemented by adjustments to existing model. The KCDA factor, first conceived in 1978 will also be removed. This legacy measurement designed to capture this effect which no longer has relevance to the fleet
The same parametric hull model will be used to update the calculation of the drag of the open centre board case.

3.1.1 Mid-Season Fix

During the season a fix was introduced to correct some VPP routines that created an unwarranted advantage for some boats. The new VPP was used in MYRC, IBIZA JOY OF SAILING, AC SY REGATTA
The amendments related to:

3.1.1.1 Dynamic Allowance.

In the Dynamic Allowance formulation there is a term (DA is composed by 4 different terms,

[1] A distribution of parametric variations configured to give the best training set to the neural networks.

see ORCSY VPP documentation par. 5.1) that was intended to reward heavy boats (over 120T) for their poor acceleration capabilities. We noticed that boats with a good SA/DSPL ratio don't deserve this allowance, so, after looking at fleet composition, we have limited its application only to those with a SA/DSPL ratio lower than 5.2.

3.1.1.2 Tacking Allowance

Also, in the Tacking Allowance there was a term (TA has various terms, see ORCSY VPP documentation par. 5.2) that was based only on the DSPL above 120T. Its application has been kept unchanged only to boats that have a SA/DSPL lower than 5.2.
Very few big boats with high SA/DSPL are accelerated, especially in light winds while in strong winds the effect is null.

3.1.1.3 Spinnaker Pole

In the current VPP ORCSY there is a correction of the downwind sails coefficients that takes into account the presence of a Spinnaker Pole.
Some of the boats with pole were observed to have a much better capability to go downwind very deeply, so working with the ORC$_I$ VPP we compared the two set of coefficients with and without spinnaker pole, and slightly corrected the coefficient curves.

3.1.1.4 OVERLAPPING SAILS

The current VPP when the biggest headsail is an overlapping one (more than 110% of J) makes two runs, the first with the overlapping with a limited depowering and then passes to the second run with a smaller blade.
We saw that in the second run the aero routine retains all the features of the overlapping (lower effective height, sheeting angle) so we corrected it.

3.2 NEW 2025 ORCSY VPP

For 2025 the following items are under revision and possibly will be implemented into 2025 VPP.

1. New Centreboard hydro model. and C/B slot resistance
2. Ketches
   a) Revision of high mizzen mast treatment
   b) Revision of high masts separation
   c) New mizzen staysail treatment, especially at tight reaching angles
   d) Introduction of Mizzen roach effect
3. Schooners – correction of Effective Height
4. Dynamic Allowance (DA)
   a) - Revision of its formulation considering real sail area used in that moment
   b) Additional term based on RM
5. Tacking Allowance

   No Tacking allowance with big blades instead of a staysail
6. Winch speed allowance model for:
   a) Jib sheet
   b) Spinnaker sheet
   c) Spinnaker Halyard
7. D/L draft/length ratio) allowance reduction for intermediate draft boats
8. Gaff rigs reduction of Effective Height
9. Sail Inventory penalty –
   a) Same weight of sails on board computation when 1 or 2 sails are declared
   b) Verification if applying sails inventory penalty only upwind or downwind

10. Test for NO spinnaker boat to use downwind jib coefficients.
11. Furler windage, based on observations from Rob Doyle Design.

4 ORCmh

4.1 Residuary Resistance

The VPP focus in 2024 has been to update the residuary resistance model. The 'Molland' data has been developed into a force model that can replace the existing formulation which is difficult to manage. Preliminary tests with the Molland data suggest that this force model is better behaved across the fleet when looking at the smaller MOCRA style boats compared to the maxi class.
Before making a change to the residuary resistance formulation the technical team will study the performance database data and launch a CFD study. Once this analysis is complete an update to the residuary resistance formulation will be introduced.

4.2 VPP.

Current analysis of the performance database suggests that the upwind performance of the boats is overestimated. At present the calculation of the aerodynamic drag of the hulls and cross structure follows the monohull and superyacht approach. For the multihulls the prediction of the projected area as heel and AWA change needs to be improved. Also, the drag coefficients associated with the various components need to be verified.
Work continues to implement: the effect of horizontal rudder foils used for trim control, the influence of curved and cambered daggerboards, the effect of canting the rig, both aerodynamically and in terms of righting moment, tacking allowance when a headsail set flying is the optimum upwind VMG sail sails are used, pitch inertia.

4.3 Up take of ORCmh

This year ORCmh was used at the Multihull Cup and the IMA world championships. Although these fleets were small the racing using PCS with a constructed course (PCScs) was close. The feedback from the competitors was that the PCScs process was much more equitable than using the single number handicaps.
Currently the ORCmh database contains over 400, most of which currently race under the MOCRA handicap. Currently MOCRA favours the longer heavier maxi multihulls. The ORCmh does a great deal to eliminate this inequality.

5 ORCJ

During 2024 the ORC in collaboration with the J Class Association (JCA) Technical Group devised a version of the ORCi VPP that was tailored to the J Class fleet. The JCA and ORC have agreed a protocol for the management and development of this rule. This ORCj rule was successfully used, in conjunction with PCScs scoring at two regattas in Palma, and the world championships in Barcelona.
During 2025 the ORC will explore improvements to the following aspects of the rule:

a) Drag of the propeller aperture, using CFD simulations on a generic J Class hull
b) The effects of pitch inertia.
c) The effects of shroud envelope on the aerodynamic coefficients.

The sailors and owners in the fleet are pleased to have the ORC manage the handicapping at arm's length from the JCA.

6 Data viewer

The committee discussed progress towards a common data viewer. For ORC technical staff and ITC members there is an increasing need to be able to view the VPP output and the force variables.

To date this has been facilitated by the VPP saving a csv file after each run. However, this has been superseded using an xml file. This is difficult to deal with easily.
Marcus Mauleverer has written a python script that interrogates the python script and saves specific data to an xlsx file. This work will continue to create a suite of data plots that capture data from the xml files.
There was some discussion about making the manager the portal to the python script. It was agreed that it was better to keep the viewer as a standalone process. There is a balance to be struck between having close control of output, and the ease of use from using preset output.
This work continues.

7 Weather Routing Scoring (WRS).

The ORC WRS system, powered by PredictWind has been used to score or shadow score 50 regattas during 2024. The process is handled from within the ORC manager and can now offers the ability to select from the grib files available in the area. Making this selection is not mandatory as the PredictWind API has access to the complete online method that chooses the best forecast and current model available for each locale.
Whilst the handicapping process starts with a simulated race for every boat using her scoring polar table, the input to the scoring system is a distribution of TWS and TWA experienced during the race. This is then used to create a PCScs. This is then used to calculate a predicted elapsed time, and a scratch sheet based on the average PET for the division. To date the ratio of PET/ET has been used as the KPI. On this metric the WRS system always outperforms the APH. A better metric would be the comparison of the TWA TWS matrix from the WRS and that observed onboard. This data is much more time consuming to a gather as it needs the boats log data.
Our analysis of the race results some logged data shows that when the weather forecast matches the race conditions the WRS system is very effective. Boats that finish the course several hours apart are handicapped for the wind they see throughout the race, so the cases where the breeze drops or builds for the later finishers is captured. Something that a single number can never do.
A typical trace analysis is shown in the figure below. A more detailed description can be found at ORC.org.
The process of capturing the predicted wind conditions from the race simulations, and creating the pre-start handicap Tables is a very fast and reliable process. The ORC thanks our partners PredictWind for their support.

7.1 Web App Development.

Whilst the ORC will continue to offer WRS as a remote service for race organisers, the ORC wants to make the system available via a machine agnostic Web App. During 2024 the ORC have developed a Web App which is close to being available as a beta product.
The web app gives the user the ability to use a laptop or tablet with an internet connection to:

1) Assemble a fleet from the certificates on the ORC database
2) Define a course, start time etc.
3) Run the PredictWind routing engine
4) Check the predicted tracks
5) Publish TCF's

7.2 WRS 2025

The ORC will continue support for race organisers that want to use WRS.
The web app will be tested in conjunction with this.

8 Offshore Special Regulations Rule 3.04 Working Group.

During 2024 a working group (Dan Nowlan (Chairman), Richard Hinterholler and Andy Claughton) were tasked to investigate possible improvements to section 3.04 of the OSR's.
This relates to stability requirements for qualification for Offshore races.
The existing rule offers 3 methods of demonstrating compliance, ORC Stability Index, ISO STIX number and the IRC SSS.
The first two of these are based on the determination of a VCG position and the calculation of a righting arm curve to define an angle of vanishing stability (AVS).
The ORC SI is derived from the result of an inclining test, and a verified geometry for the hull and keel.
An ISO STIX calculation may be made using the designers' calculations instead of an inclining test.
SSS is part of the IRC calculations and uses the boats principal dimensions to calculate a SSS value.

8.1 Stability Working Party Terms of Reference

1.To review the requirements of The World Sailing Offshore Regulations section 3.04. Stability – Monohulls with the objective of improving offshore safety.
2.To study the implications of any changes to the regulations on existing fleets and events around the world.
3.If deemed beneficial, draft a Submission for potential changes to the OSR and present to the Chair of the Oceanic and Offshore Committee and Special Regulations Sub Committee by 01 September 2024.
4.To provide a written report on the findings including the implications of any suggested changes before 01 September 2024 to be circulated with the Special Regulations Sub-Committee and the Oceanic and Offshore Committee.

8.1.1 Recommendations

a. For offshore categories 2 and 3, make no changes.
b. For offshore categories 0 and 1, require the most stringent requirement of ISO 12217-2 or ORC Stability Index.
c. For offshore category 0 and 1, measured displacement and stability shall be used for the ISO and ORC calculations.
d. Make access to ISO, ORC and SSS values easier:
    i. Host a list on the World Sailing website.

The report of the working group is available on the World Sailing Website.
(m) Submission SR13-24 – OSR 3.04 regarding stability from OOC Chair Matt Allen on behalf of the stability working party.

8.1.2 Next Steps

In the weeks after the submission deadline the working party drafted a more concise proposal for the revised text. This has been submitted to the World Sailing sub committee as a 'friendly amendment', which the ORC hopes will find favour when the Special Regulations sub-Committee meets on November 6th 2024 at the World Sailing Conference.

9 2025 Research Agenda.

Following the meeting a 2024 Research Agenda was compiled.

9.1 • Aero

The revisions to the downwind sail force coefficients have brought the predicted speeds and angles into closer alignment with the observed data. But the basic premise of the aerodynamic model, combining separate coefficients for mainsail and foresail is now 50 years old. It is being asked to simulate sail types that did not exist when it was devised. We now have mainsails with sophisticated mast control and wide headboards, jibs, headsails set flying and symmetric and asymmetric spinnaker set on a pole or a centreline sprit. Whilst the approach can be made to work, as demonstrated by this year's work it is naïve to expect it support another 50 years of sail and rig development.

We have the following matters on next year's agenda, which can be handled using the existing approach.

- Headsail depowering strategy
- Spinnaker depowering, single spinnaker coefficients
- HSF sheeting and rig envelope

But committee strongly feels that a root and branch revision of the aerodynamic force model is required. Thanks to the collaboration between the ITC and Ker Design the VPP now uses neural networks derived from targeted CFD tests as the engine of the hydrodynamic force model. The ITC are confident that a similar approach to the aerodynamics would create a more robust and appropriately sensitive force model for the fleet. In previous years this approach was used to improve the de-powering routines and provided insights that the simple coefficient curves could not provide. The committee will seek to specify the program of work and seek funds from Council.

9.1.1 Reaching heel angle.

Comparing predicted and observed data it is clear that the VPP overpredicts the heel angle reaching in stronger winds. Defining an allowable heel limit might work for one boat type, but it is unworkable for the diverse ORC fleet of 10,000 plus boats.

The high heel angles reflect the lack of a yaw moment (Mz) balance in the VPP, whereas the yacht is constrained by the limits of the rudder's ability to keep the boat on track.

The ITC do not propose to introduce an extra Mz degree of freedom into the VPP, but a heel limit based on a hydrostatic prediction of rudder immersion seems an achievable outcome. Work will begin on this in in 2025.

9.1.2 • Weather Routing Scoring

In collaboration with PredictWind the software to simulate races has been developed at a pace and scale that surprised many. The next task is to make WRS attractive and available to fleets around the world. This task has two threads

- A concerted effort to develop an evaluation process that demonstrates to the lay person how the system works, the benefits it can bring, and a clear protocol to decide whether WRS is appropriate for a particular race.
- Software that is machine agnostic and compatible with the non-ORC regatta management and scoring systems

9.1.3 CFD

Further hydrodynamic CFD testing for multihulls and long keel yachts.

9.2 • Multihulls

There are still significant tranches of work outstanding.

- Revise the residuary resistance model.

- Develop improved windage calculations
- Daggerboards, slot drag and induced drag calculations.C
- Cruiser Racer allowance and inertia effects.H
- SF and rig envelope.
- Heel Fly angle

9.3 • Performance Database.

- Process 4 new boats
- Data Viewer and Polar comparator

10 Next Meeting

The next meeting is March 1st and 2nd to be held in Northern Europe.

11 Closing remarks.

The chairman thanked the committee members for their work during the year, and the observers for their diligent support.

12 Appendix 1 Submissions.

Submission: ESP 1

Reporting committee: ITC

STORED ENERGY

PROPOSAL

To clarify the use of the “electric winch handles.”

RATIONALE

The use of products such as the “electric winch handles” is becoming increasingly popular, especially among the solo and double-handed sailors. IMS F9.11 is quite clear, but most sailors only connect the term “non-manual power” with the use of electric or hydraulic winches, not with the use of this type of winch handle.

ITC Conclusion.

The submission is not supported as the rule is clear, electric winch handles are “NON-MANUAL POWER”.

However, IMS Rule F9.11 will be amended for 2025 based on experiences during 2024.

F9.11 If non-manual power can be used this shall be recorded as follows:

a) SAILS: when non-manual power is used for controlling sails

b) RIG: when non-manual power is used for adjusting backstay, vang or outhaul

c) YES: what include a) and b) above used together

d) NO: when there is no non-manual power used.

See also submission USA 4.

Submission: ESP 3

Reporting committee: ITC

MAST JACK PUMP ON BOARD

PROPOSAL

To penalize boats with the mast jack pump on board.

RATIONALE

Having the mast jack pump on board gives the crew the ability to adjust the rig while racing. The rule, as it is currently written, mentions only the “possibility” to adjust the

base of the mast, but it does not address having the chance to carry the pump on board because an owner can declare that they do not use it while racing, only between races.

Having no means to control use of the pump while racing gives the opportunity for a team to use it against their declaration, and thus against the rule.

In order to avoid this situation it should be clear that carrying the mast jack pump on board should be associated with a proper penalty.

ITC Conclusion.

The submission is not supported . Rule F9.12 will be amended as follows:

F9.12 If the base of the mast will be adjusted while racing, this shall be declared by the owner and recorded
as “YES” and if not as “NO”.

Submission: ESP 5

Reporting committee: **ITC**
MEASUREMENT COMMITTEE

HHB MEASUREMENT

PROPOSAL

If ESP 4 is not supported, and thus IMS G2.2 is not deleted, then to apply the same concept of measuring MHB, or in the case of a batten over MUW, to measure HHB.

RATIONALE

It is not very common, but we can find this sometimes on an HSF (Headsail Set Flying). If we apply this rule to mainsails, why not also to apply this to headsails?

ITC has good reasons to keep the rule as it is but defer the final decision to MEASUREMENT COMM if some rewording should be necessary

Submission: EST 1

Reporting committee: **ITC**

MINIMUM AWA

PROPOSAL

Establish a minimum AWA for 24 knots of windspeed for windward/leeward courses in the 2025 VPP. For 35–40-foot boats this minimum AWA could be 130-135° or for high performance planning boats it could be smaller.

RATIONALE

In 2024 ORC introduced 24 knots in the time allowance table. Adding a new time allowance turned many *displacement boats* with asymmetric downwind sails to be *high performance planing* boats.

According to figures from the 2024 Speed Guide, a displacement boat should sail 110 AWA and 15-17 degrees heel angles in downwind VMG mode, which is too optimistic. In reality these boats are sailing in 20+ knots of wind (as observed in the 2023 ORC Worlds in Kiel) at deep angles, approximately TWA 155-160, with an AWA 135-140. However, the new 2024 VPP, there should be minimum AWA 130-135 in 24 knots to avoid VPP to assume excessive true wind angels and VMG boat speeds in downwind run.

Table 1 provides an example for 4 boats. According to the 2024 speed guide in TWS of 20 knots of wind, SUGAR 3 (Italia 11.98) has the fastest VMG speed (8,13 Kts). If we look at best performance in 24 knots of wind speed, the Italia 11.98 has the lowest VMG speed on a downwind run, 0,52 slower than the similar sized boat J-112. If we look at the boat's performance in 24 kts at 150 TWA (more realistic in windward/leeward races), the fastest boat is the Italia 11.98, 0,09 knots faster than the J-112.

Boat	Sail	TWS	Condition	TWA	BTV	VMG	AWS	AWA	Heel	Reef	Flat
Sugar 3 EST-792	BestPerf	20	run	175,70	8,16	8,13	11,88	172,75	10,14	1	1
Sugar 3 EST-792	BestPerf	24	run	140,19	12,21	9,38	16,58	112,05	17,10	1	1
Shadow EST-113	BestPerf	20	run	175,48	8,02	7,99	12,02	172,46	7,05	1	1
Shadow EST-113	BestPerf	24	run	140,53	12,82	9,90	16,29	110,50	15,31	1	1
Katariina II EST-646	BestPerf	20	run	175,48	7,84	7,82	12,20	172,57	9,91	1	1
Katariina II EST-646	BestPerf	24	run	139,74	12,76	9,74	16,47	109,69	15,90	1	1
Sugar EST774	BestPerf	20	run	175,70	7,81	7,79	12,23	172,95	13,95	1	1
Sugar EST774	BestPerf	24	run	139,74	12,42	9,47	16,59	110,82	15,43	1	1

1. Speed Guide of best performance with the 2024 VPP

Boat	Sail	TWS	Condition	TWA	BTV	VMG	AWS	AWA	Heel	Reef	Flat
Sugar 3 EST-792	BestPerf	20	run	175,70	8,16	8,13	11,88	172,75	10,14	1	1
Sugar 3 EST-792	BP 150	24	reach	150,00	9,98	8,64	16,15	132,00	4,86	1	1
Shadow EST-113	BestPerf	20	run	175,48	8,02	7,99	12,02	172,46	7,05	1	1
Shadow EST-113	BP 150	24	reach	150,00	9,95	8,61	16,17	132,09	2,36	1	1
Katariina II EST-646	BestPerf	20	run	175,48	7,84	7,82	12,20	172,57	9,91	1	1
Katariina II EST-646	BP 150	24	reach	150,00	9,65	8,36	16,37	132,85	4,56	1	1
Sugar EST774	BestPerf	20	run	175,70	7,81	7,79	12,23	172,95	13,95	1	1
Sugar EST774	BP 150	24	reach	150,00	9,67	8,37	16,36	132,81	1,45	1	1

2. Speed Guide, where in 24 knots the TWA is set 150

Table 2 shows the differences in speed on a VPP run with the 2024 VPP. If we compare data from the 2023 Kiel Worlds Race 4, where the Race Committee measured wind speeds at 22-25 knots over a distance of 5 nm, Sugar 3 won the race when scored with the 2023 VPP.

However, with new 2024 VPP the margin in corrected time would be even larger over the J-112`s, such as in Race 5, where the wind was measured at 20-24 knots over a distance of 5,8 nm. SUGAR 3 also won this race by 55 seconds over two J-112`s, with the 2024 VPP scoring margin even larger.

There are other odd figures, such as when comparing the downwind VMG ratings of the Italia 11.98 SUGAR 3 EST-792 vs those of the Italia 9.98 SUGAR EST-774. In 20 knots

TWS the Italia 11.98 is rated be faster than the Italia 9.98 by 19,7 sec/mile, but in 24 knots the results are vice-versa, with the smaller 9.98 faster than the 11.98 by 3.8 s/NM.

Downwind run			
Boat	**20 kt**	**24 kt**	**Delta**
Sugar 3 EST-792	442,6	383,8	-58,8
Shadow EST-113	450,5	363,7	-86,7
Katariina II EST-646	460,5	369,7	-90,8
Sugar EST-774	462,3	380,0	-82,3

1. Downwind run comparison of best performance.

Submission is not supported.

For 2025 the sail force coefficients will be modified to bring the predicted AWAs closer to observed values. The ITC always seeks to match observed and predicted performance by improving the force models, not by the application of arbitrary performance boundaries.

Submission: EST 2

Reporting committee: **ITC**

ADJUSTABLE MAST FOOT

PROPOSAL

If there is a mast pump on board while racing then the Adjustable Mast Foot switch should be “on” for Adjustable Mast Foot.

RATIONALE

There are many boats measured with a mast pump on board in measurement trim and recorded under “Measurement inventory“ but on the certificate “Adjustable Mast Foot“ is recorded as “No“.

Therefore the 2023 ESP 2 submission rationale is still valid and the problem has not been corrected. The current practice is not according to the 2023 ITC Minutes if the Adjustable Forestay is in use while racing and not declared by the owner. If registered during measurement then the mast pump should also be treated accordingly.

ITC

The submission is not supported , see submission ESP3.

Submission: FIN 2

Reporting committee: **ITC**
MEASUREMENT COMMITTEE

LIFERAFT

PROPOSAL

Allow boats to be measured with a liferaft on board and included in the inventory.

RATIONALE

Modern boats designed for offshore sailing are often designed to be equipped with liferafts. With ORC measurement rules not allowing the liferaft to be onboard during freeboard measurements and an inclining test, this may result in sailors compromising on safety by leaving the liferaft on shore unless required by the NoR.

A liferaft mounted in a fixed position should be weighted, added to the inventory and marked with an inspection sticker by the measurer like sails are done now. The weight penalty of carrying a liferaft especially in lighter boats is not in line with other factors considered to make the sport safe.

Submission supported.
ITC agrees to record the weight and position of the liferaft on board when racing and calculate the sailing displacement with this weight added.

Submission: NOR 1

Reporting committee: **ITC**

SPLIT RUNNERS AND CHECKSTAYS IN VPP CALCULATIONS

PROPOSAL

Change the Runners calculation to runners or checkstays.

RATIONALE

Some boats have no runners but only checkstays to support the mast. Today, ticking of 1 runner/checkstays treats this as a running backstay at IM and not a checkstays far below IM.

The checkstays on J/120's is one example.

ITC supports the submission.
ITC will add this matter to the 2025 research agenda. In the meantime we will begin to issue new 2025 certificates differentiating between checkstays and runners so as to build a database of the fleet. Then we will test a new formulation
A questionnaire will be circulated when a new certificate is requested with a description of runners and checkstay and a drawing explaining the differences.

Submission: SLO 1

Reporting committee: **ITC**

HEADSAIL FURLER

PROPOSAL

To delete in IMS rule F9.8 the sentence ..." which has HLP greater than 110% of J."

RATIONALE

IMS rule F9.8 already limits the credit for the headsail furler to one headsail only. More and more boats have headsail furler with jibs smaller than 110% of LPG and some of them have only self-tacking jibs. The rating credit for having a headsail furler should be the same for all sizes of furling headsails (from small self-tacking jibs to large 130 or 150% genoas).

ITC:

IMS rule F9.8 is intended to provide handicap relief for boats with a roller furling headsail that is used in a partly furled state, and therefore loses aerodynamic efficiency. The LP limit was put in place to prevent the credit being used by boats with a roller furling sail that was never used in the reefed condition.

To extend the credit to non-overlapping sails the ITC propose to link the handicap credit to the area of the sail set using the value of the REEF parameter.

ORC Rule 206.1 will be modified accordingly.

Submission: SWE 1

Reporting committee: **ITC**

VMG DOWNWIND SPEEDS FOR ASYMMETRIC VS SYMMETRIC SAILS

PROPOSAL

Revise the VMG downwind speeds for asymmetric set-up vs. symmetric to stop type-forming the fleet and to make the playing field level regardless of which sail type is used.

RATIONALE

The development of asymmetric downwind sails the last 20 years has been significant in terms of VMG ability and stability at high apparent wind angles so the rating coefficient between a symmetric set on a pole and asymmetric set on a sprit is not anymore correct and needs to be revised.

The current fleet is becoming more and more prone to racing with asymmetric sails which in itself is not a bad thing but there should not be a built-in bias in the VPP.

This submission is addressed by the changes to the downwind sail coefficients described in the minutes.

Submission: SWE 2

Reporting committee: **ITC**

ALLOCATION OF REACHING SAILS

PROPOSAL

Revise the VPP to allow boats with a symmetric spinnaker set up as well as an asymmetric set up to have a level playing field regarding a reaching sail.

RATIONALE

A boat with an asymmetric set-up (A2, A3, A4…) automatically get a free reaching sail (>85% SHW). The same sail set on a boat with a symmetric set-up is given a rating hike, even if the sail is smaller than the biggest S sail and >85% SHW.

The submission is not supported as the VPP is working correctly when a small Asymmetric - sail is added to a full symmetrical inventory. When this sail is added to a full asymmetrical inventory it is seen as part of the process of de-powering the asymmetric sail. This is a consequence of the VPP taking only the area of the largest downwind sails

Submission: TUR 1

Reporting committee: **ITC**

KEEL WIDTH EFFECT

PROPOSAL

Review the effect of keel width on windward performance.

RATIONALE

We feel that there is still an unwanted rating advantage of Folkboat type of boat (see 2023 ITC Minutes – Item 9) and previous submissions on this matter.

The submission is supported. The ITC will introduce a new residuary resistance model for this type of boat in 2026, as discussed in the minutes.

Submission: TUR 2

Reporting committee: **ITC**

LONGITUDINAL CREW POSITION

PROPOSAL

To add an optimization of speed using a longitudinal movement of a crew. For this purpose, the center of gravity of the crew shall be calculated as follows:

1) Maximum crew trimming moment (MTcrew) is calculated considering maximum forward crew position aft of the mast and area 0.5 x 0.5 m2 for each crew member:

   Xcrew = (J+SFJ) + (0.5*0.5*CrewNumber)/(2*MB)

2) For any given wind condition (TWS, TWA) the sailing trim and boat speed (Vs default) in sailing trim is calculated, as usual.

3) If transom height is less than zero (Y < 0) then longitudinal trimming moment (MT) needed to get Y=0 is calculated using Moment Unit Trim (MUT).

4) If MT > MTcrew then sailing trim and corresponding speed (Vs trimmed) with maximum forward crew position is calculated.

5) If MT < MTcrew then sailing trim and corresponding speed (Vs trimmed) with Y=0 is calculated.

6) Maximum of (Vs default; Vs trimmed) is used for further calculations

RATIONALE

For light boats with flat bottom in the aft part the optimization of trim has great importance. Currently, VPP does not consider such possibility.

The submission is not supported. The current formulation does contain a crew position optimization. This issue remains as work in progress with the new RR based on neural networking that is continuously monitored and under development

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Submission: USA 3

Reporting committee: ITC

APPENDAGES SHAPE ON HIGH PERFORMANCE BOATS

PROPOSAL

Review rated performance effect of varied appendage shapes on high-performance boats.

RATIONALE

There is a recent trend in TP 52 appendage designs towards favoring keel and rudder blades with more area than in previous generations. These new shapes are proving to have a significant and noticeable advantage in lower speed conditions on the race course, such as when hitting wave chop or through downspeed maneuvers. This design trend is also noticeable in the current 52SuperSeries fleet.

Since most TP 52's competing in ORC events are unmodified from their original designs of a few generations ago, those teams that can re-configure to the latest trend have a significant unrated advantage in performance, and this threatens to de-stabilize the fleet's current balance of fair and competitive racing. For example, the GL 52's in the US are considering imposing unilateral rating penalties to offset this problem.

We ask ITC to re-evaluate the formulations in appendix leeway, lift and drag to examine if this observed performance difference can be more accurately defined in the VPP.

The submission is not supported.
The VPP responds appropriately to changes in keel area and planform, i.e. increasing the wetted surface area reduces the predicted speed. In situations where an increase in keel area appears to improve performance, this must be ascribed to a change in behavior that is not captured by the VPP, for example a change in lift share between keel and rudder, or a more tolerant behavior in dynamic situations.
The ITC looked at the speed changes associated with making a 5% change to keel area, the predicted change in performance is very small, much smaller than the differences in corrected times between race winners and losers.

Submission: USA 4

Reporting committee: **ITC**

NON-MANUAL POWER SYSTEMS

PROPOSAL

Re-evaluate the rating penalties assessed on boats equipped with non-manual power systems.

RATIONALE

In recent years the technology for powered systems has continued to improve with features such as remote buttons and improved line speeds in both trim and reverse directions. Battery technology has also improved to where these systems are more powerful and durable at lighter and lighter weight footprints.

The result is that these systems are growing in popularity because a crew can now actively and remotely trim sails in windy conditions without any change in windward crew weight position. This is tool is particularly powerful for boats with high SA/DSPL ratios, with observed performance gains of up to several sec/mile compared to sisterships without these systems.

Currently the rating assessments to not seem accurate, especially since they result in less penalty with more wind, and it should have the opposite effect.

We therefore ask that a re-evaluation be made of the rating assessments made in VPP Documentation 3.7 to reflect these observed performance advantages, and more appropriate definitions of these systems in ORC rule 204. For example, now the certificate designations for Non-Manual Power are just Rig, Rig & Sheets, and None. It would be useful to more clearly specify which control lines fit in these categories.

Also, while the equation 3.16 correctly minimizes the penalty for boats with less crew weight, we feel the pw coefficients should be re-examined: why should Cruiser/Racers get more penalty than Performance division boats when they are more likely to have these systems installed? should this not be reversed?

The submission is supported and the adjustments for the use of manual power will be modified for 2025, as described in the minutes.