OFFSHORE RACING COUNCIL

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MINUTES of a meeting of the International Technical sub-Committee held on 8th-10th November 2002 at Le Meridien Spa & Resort, Limassol, Cyprus.

Present: David Pedrick (Chairman)
Friedrich Judel
David Lyons
Alessandro Nazareth
Jim Schmicker
Jim Taylor
Jim Teeters
Nicola Sironi (ORC Chief Measurer)
Ken Weller (ORC Club Consultant)
Bill Cook (ORC Programmer)

Observers: Jean-Louis Conti, Measurement Committee, Club Working Group
Peter Norlin, yacht designer, Sweden
Dan Nowlan, Offshore Director, US Sailing
Peter Reichelsdorfer, US IMS Committee Chairman
Peter Rutter, ORC Councillor
Minoru Tomita, ORC committee member, Japan
Konstadina Sfakianaki, IMS measurer, Greece
Olin Stephens, ORC Member of Honor, USA (ITC Advisor)
Marcel Wagenaar, Rating Officer, Netherlands; Measurement Committee
Hans Zuiderbaan, ORC Chairman, Netherlands

Committee members Andy Claughton and Manolo Ruiz de Elvira sent their regrets for being unable to attend due to Americaôs Cup obligations in New Zealand.

1. Minutes of September 2000 Meeting

Minutes of the previous meeting in Newport, Rhode Island, USA were reviewed and approved with minor corrections.

2. ORC Chief Measurer's Report

The Chief Measurer reported that IMS 2002 has continued to provide good racing with few difficulties. Participation in IMS Grand Prix events increased, as well as in general racing. For example, the IMS World Championship Regatta in May, sailed in Capri, attracted 86 yachts. Different sizes and types of yachts each won races in close racing on different days, reflected in the final standings. Similar experiences were achieved in many other regattas.

Italy has implemented a system of crew eligibility that has been successful in strengthening amateur racing. Spain has such an active IMS racing schedule that fewer yachts are making time to travel to regattas in other countries. The second Aegean Regatta was held this year, attracting both rally cruisers and some high profile competitors. Other committee members and observers reported good

competition in other areas, including Germany, Finland and the Bermuda Race in the US. Areas having larger fleets usually maintained the recommended separation of Racers from Cruiser/Racers.

There has been evidence of some type-forming handicapping biases. There is a perception that stability seems somewhat over-assessed for windward-leeward racing in areas having predominantly light winds. However, where yachts have experimented with keels having lower VCG, the evidence is not one-sided. A number of yachts have found greater success competitively by increasing stability. This characteristic should be watched closely for potential handicapping improvement.

It is also perceived by competitors that heavier yachts are favored over light ones. The committee has taken that into account in its work to improve the hydrodynamic model.

There were a few measurement anomalies in the beginning of the season. However, when measurements were repeated later in the season, the repeatability of measurements ï righting moment in particular ï was very good.

3. Aerodynamic Modeling (FIV 1, FIV 5, KNVW 1, KNVW 2, USSA 1, USSA 3)

3.1. Overall Goals: Based on comparing existing IMS sail force coefficients with the results of wind tunnel testing of sails as reported to Council during the past few years, the committee found several characteristics that were individually biased, although reasonably balanced in their overall effect on the relationship of fractional and masthead rigs. In addressing the improvement of coefficients for each of the different elements of the sail plan, the committee has intended to preserve the general balance of performance between fractional and masthead rigs.

The following principles guided this work:

- Sail forces on spinnakers are being over-predicted;
- Masthead rigs are favored upwind somewhat;
- Non-overlapping jibs are favored in heavy air and dis-favored in light air; and,
- The coefficients of various types of sails should not be constant, but, rather, dependent on the size and proximity of other sails being flown.

VPP test runs of the combined changes in upwind and downwind sail force coefficients were reviewed, and the committee recommends to Council that this set of changes to the sail force modeling of the VPP be approved for IMS 2003.

3.2. Upwind Sail Force Coefficients: Tests of windward sails at the Wolfson Unit showed that the induced drag of fractional rigs is under-predicted, and that the coefficients of mains and jibs are different for each combination of fractionality and overlap. The windward sail force coefficients were modified to reflect the increase in induced drag as a function of jib fractionality. Taken alone, the change in upwind prediction resulting from wind tunnel test analysis slowed the predicted performance of fractional rigs.

3.3. Downwind Sail Force Coefficients: Tests of symmetric and asymmetric spinnakers at the Glen L Martin Wind Tunnel showed that forces on spinnakers are currently being over-predicted, and mainsail forces downwind are being under-predicted. This has favored fractional rigs downwind. Accordingly, spinnaker coefficients were decreased approximately 10%. Mainsail coefficients were increased correspondingly downwind and were faired into the existing upwind coefficients. This change, as indicated by wind tunnel tests, addresses concerns that have been raised about type-forming toward smaller spinnakers. Taken alone, the change in downwind prediction resulting from wind tunnel test analysis sped up the predicted performance of fractional rigs.

3.4. Asymmetric and Symmetric Spinnaker Prediction and Measurement: The committee has amended the VPP so that, when both types of spinnakers are present, the respective speeds for each type of spinnaker according to its own sail measurements and respective areas will

be computed and the faster speed taken. The measurements SL, SMW and SF apply to symmetric spinnakers, while asymmetrics use SLU, SLE, SMG and SFA. SLA is to be the asymmetric spinnaker luff length according to the formula in Rule 820.2. The matter of showing the additional terms in the DAT file and on the rating certificate is referred to the Measurement Committee. The ITC recommends this change to Council for IMS 2003.

3.5. Jib Overlap: The effect of jib overlap is complicated by the different manner of sail reduction occurring on rigs that begin with overlapping jibs and shorten sail to non-overlapping jibs in higher wind strength versus rigs that are always non-overlapping. The VPP mechanism to address this properly requires a different jib reduction procedure than currently exists. An optimizer that iterates sail optimization during the VPPôs equilibrium solution is required. Work on this has begun and is continued into the committeeôs 2003 agenda.

3.6. Simple Rig Allowances: Aerodynamic allowances for simplified rig controls were investigated. The committee reviewed the existing curves of mainsail lift and drag coefficients with and without adjustable stays below the hounds, and concluded that the credit for such simplified rigs is too great in magnitude and extends over too great an apparent wind angle. The credit for simple rigs was reduced by approximately one-third and a test run was reviewed. This change is recommended to Council for IMS 2003.

The committee also investigated the influence of an adjustable topmast backstay or forestay on fractional rigs whose backstay meets the mast by at least 0.15*IG above the forestay. A procedure to pro-rate the effect of forestay tensioning according to different topmast lengths, rather than the specific 15% limit, was developed. However, the effect would be very small and implementation of the details was subordinated to the more substantial priorities of this meeting. The project will continue on the committeeôs 2003 agenda.

3.7. Upwind Performance Prediction: The committee recognizes that the VPP under-predicts performance upwind. This is believed to be due to aerodynamic modeling rather than hydrodynamics. Sailing performance data from several, accurately instrumented yachts has been obtained to help correlate the VPP with actual performance. The committee has been working on this matter, which remains on its 2003 agenda.

4. Hydrodynamic Research

4.1. Overall Status: Several areas of hydrodynamic performance modeling and testing are being pursued by the committee. Each of these is affected by difficulties that require further time before making recommendations for the VPP. Progress in these is reported below.

4.2. Model Tests: As was reported in the minutes of the committeeôs September 2002 meeting, several tank models were tested in 2002. These include Delft models 60, 61 and 62 (midship section series based on the IMD parent model 5) and IMD models 7, 8 and 9 (beam variations on light hull). Note that Delft 60 is the same as IMD 5 (the parent model), but to a different scale. Because some anomalies appear in the revised regression when combining these various sources of data, the committee needs to confirm uniformity of tank data from the various test facilities before introducing these new models into the IMS database. Meanwhile, it is anticipated that the final three models of the US Sailing systematic series will be tested at the Instititute for Marine Dynamics (IMD), together with two new models that Delft has offered to test this year. The committee also plans to renew discussions with the Athens Technical University Towing Tank regarding some specific research.

4.3. Effective Sailing Length: The committee has studied several approaches to improve the assessment of effective sailing length during the past year. These include the means by which the immersed length LSM4, is determined, as an indicator of high-speed sailing length. The committee has also investigated a ñdynamic lengthò approach by which the VPP combines proportions of low-speed length (LSM1 and LSM2) with high-speed length (LSM4)

according to sailing speed. As of the September meeting, these were not sufficiently advanced to propose for IMS 2003, and were referred to next yearôs agenda.

4.4. Midship Section Parameters: Towing tank data of different midship section fullness was obtained during the year from Delft, but awaits the overall updating of the model database. The committee plans to test at least one further model of this series at Delft in 2003.

4.5. Transom Tails: As part of the sailing length review, the committee plans to re-visit the LPP formulation for the mathematical tail extension applied to immersed transoms. It is proposed to test a smaller-scale model of the IMD parent hull with several extents of after overhang, ranging from well immersed at low speed to aft of the wetted length at high speed. This new data for a moderate IMS hull form will be used to improve the transom tail formulation. It is expected that funding will be required for model construction through the ORC Research Fund.

4.6. Resistance Due to Heel: Study of the increment in drag due to heel at zero side force continues to be limited by insufficient test data. The committee anticipates solving that limitation by analyzing a wide range of hull forms through the SPLASH computational fluid dynamics (CFD) code. US Sailing has initiated the validation stage of the code, as well as funding the re-writing of the codeôs panelization procedure for improved accuracy in predicting wide, heeled shapes. The committee is in the planning stage of a research program for heeled drag obtained by CFD. Funding for this project will be required from the ORC Research Fund, in partnership with US Sailing and perhaps other parties, beginning in 2003 and extending into 2004.

4.7. Added Resistance in Waves: The committee investigated added resistance in waves as a means of addressing IMSôs current, apparent bias toward heavier displacement. The BTR term in the added resistance calculation ï the term most closely related to displacement while maintaining LBR ï was removed. This produced a favorable, moderate change in handicaps. Heavier boats of a given size are sped up relative to lighter boats. Furthermore, when comparing two yachts at equal handicap ï one being short and light and the other long and heavy ï the intended displacement effect remains, even after allowing for the characteristic bias of increased added resistance of smaller yachts versus larger ones. However, examination of a test run showed that yachts that are presently unfavored tended to be more sped-up than more competitive yachts, which is opposite to what is desired. Although the committee would have liked to recommend a proposal of this type to address the matter of displacement bias, the added resistance approach can not be recommended at this time. Improvements in the modeling of added resistance in waves has been included in the committeeôs 2003 agenda.

5. Wind Averaging (USSA 2)

IMS includes a wind averaging procedure to account for the variability of actual wind speeds during a race around the nominal wind strength for which a yacht is scored. The existing bandwidth of winds used in the computation of wind-averaged performance at each, standard wind speed is quite broad. While this is reasonable for long-distance races, it is inappropriate for short courses. The committee obtained actual data of true wind during races from several yachts, from which the statistical ñstandard deviationò of wind variability could be obtained. Two standard deviations encompass about 97% of all of the data. The data indicated a typical value of +/- 2.4 knots for this. The effect of wind averaging is to slow a yachtôs performance curve compared to not using wind averaging. Yachts that are heavy and have low sail area have steeper performance curves, which increases their handicaps at a greater rate than for lighter, high-powered yachts.

A test run of the proposed, inshore wind averaging scheme versus no wind averaging shows that, in general, older, heavier, low-sail-area yachts will be rated more favorably than newer, higher powered yachts when wind averaging is used. The committee recommends that the existing wind-averaging scheme be applied only to races of long duration. The proposed, narrower wind averaging basis

should be used for scoring short races, such as windward/leeward and Olympic courses. The table of handicaps remains not wind-averaged.

When single-number scoring is used, whether TMF or TOD, it is important that the appropriate single-number handicap be used. That is, the Inshore handicap, which is based on ILC with no wind averaging, should be used for short, inshore races. GPH, which incorporates the existing wind-averaging spread suitable for long races, should be used for the scoring of offshore races only, and not inshore races.

6. Scoring (DSV 2, NSF 3, NSF 4, SSF 1)

6.1. Scratch Boat for PLS: The committee supports the DSV submission to use a scratch boat that is in the approximate middle of the fleet, rather than an atypically fast scratch limit, per the submissionôs rationale. A yacht having typical characteristics at a GPH of approximately 600 is recommended. The PLS terms that correspond to such a yacht are proposed as: Offshore, PLT = 0.79, PLD = 72; Inshore, PLT = 0.95, PLD = 257.

6.2. Selected Courses: The committee agrees only in part with the NSF submissions. It agrees that the existing windward/leeward selected course should remain, per NSF 3. However, the committee disagrees with the proposed change from ñOcean for PCSò to ñCircular Random.ò The IMS ocean course mix was derived after some years of experience in applying the circular random mix to point-to-point races. It was found that the circular random mix ï which is, in fact, a closed course ï has a greater windward content than is appropriate for many actual, point-to-point ocean races. The committee recommends not changing from the ocean course for either the existing ñOcean for PCSò selected course (NSF 3) or the simplified, offshore scoring option for PLS (NSF 4).

NSF 4 proposes to replace the simplified, inshore scoring option for PLS, which is now based on an Olympic course, with windward/leeward. The committee agrees with this proposal.

6.3. User-Friendly PCS Scoring Program on ORC web site: SSF 1 urges such a program. The Chief Measurer pointed out that this is best provided by the ñAlturaò program, which is DOS-based. The ORC IMS scoring program has not been maintained to be current. The committee agrees with the need to improve on this situation. The Chief Measurer noted that the authors of the Altura scoring program intend to upgrade it to the Windows environment soon, and he will monitor this development. It was reported that the German ñVelumò program is working well. Its authors plan to have a Windows version in 2004. The committee believes that the anticipated Windows version of Altura is preferable to the alternative effort that may be required to upgrade the ORC Race Management Software.

6.4. Performance Line Sort Parameter: The Chief Measurer and the US Offshore Director have recommended that a ñsortò parameter for PLS be established. W/L 12 is recommended for this.

7. Water Ballast (AYF 1)

The AYF submission requests that water ballast, which is presently accepted in ORC Club, be permitted in regular IMS racing. The committee supports this submission in principle, and has a proposal for its use, but anticipates difficulty in providing accurate handicaps for downwind sailing in true wind speeds above 16 knots. This is due to limitations that now exist in the IMS model test data, which does not extend to the high speeds that new, very fast, water-ballasted yachts can achieve. Actual speeds of such yachts in the order of Froude number (Fn) = 0.75 have been reported in a little over twenty knots of true wind. Because existing regression data does not exist above Fn = 0.6, a particular yachtôs resistance curve might have to estimated up to at least Fn = 0.75 in order to compute handicaps. The high-speed VPP database will be improved after the IMD towing tank tests the six, existing US Sailing models up to these speeds, which is planned within the next year. Until there is

data for very high Froude numbers in which the committee has confidence, it cautions that the certificate handicaps for a water-ballasted yacht will not have the level of accuracy that exists in the IMS handicaps of conventional, non-water-ballasted yachts.

The committee investigated the means to determine the righting moment contribution of water ballast according to yacht measurement, and then to apply the increased righting moment to the yachtôs sailing trim. As a quick response to this submission, a righting moment procedure was developed so that such yachts may begin to compete in IMS events whose organizers wish to be inclusive, while assuring no handicap advantage with respect to the regular fleet.

It proposes to measure and rate the use of water ballast under IMS using the following procedure:

- Water ballast tanks shall be symmetrical about the yachtôs centerline.
- For measurement, the tanks will be pressed full, and the volume of tanks on one side determined either by the use of a flow meter on all tank(s) port and starboard respectively and the average value of the two sides taken; or by comparing the freeboards with the tanks empty and dividing the displacement increase by two.
- The additional righting moment due to the water ballast will be found from the following formula: RM_water_ballast = [mean volume of all tank(s) on either side (litres)] * 1.025 * 1.25 * CRA
- The additional righting moment due to water ballast will be applied in the VPP for the prediction of handicaps. However, the water ballast weight will not be included in the yachtôs sailing trim displacement.
- Because of the behavior of water-ballasted yachts in the region of the limit of positive stability, the Stability Index is to be increased by 5 degrees for such yachts. IMS Regulation 201 is to be modified as follows:

ORC Race Category	Minimum Stability Index (without Water Ballast)	Minimum Stability Index (with Water Ballast)
0	120	125
1	115	120
2	110	115

It recommends that certificates for water-ballasted yachts be experimental for 2003, and encourages IMS race organizers who wish to include such yachts to accept their certificates for the event.

Canting-keel yachts, which are presently accepted in ORC Club, were also discussed. However, reasonable assessment of canting keel yachts for regular IMS, including their unusual appendage configuration, will require more study than this meeting permitted. Both the canting-keel and water-ballast configurations are on the committeeôs 2003 agenda for further development.

8. ORC Club (FFV 3, FFV 4, FIV 2, NSF 2)

8.1. Special Features for ORC Club: FFV 3 and FIV 2 point to a number of details, most of which are referred to the ORC Club Working Party. Sail area considerations are addressed elsewhere in these minutes, as is attention to better speed assessments for differences in displacement and stability. The committee agrees to review the keel tip definitions to identify bulb keels so that they are not counted as winged keels. The committee maintains that the allowance for winged keels remains reasonable for well-designed winglets.

8.2. Rate Sails for Their Actual Size: FFV 4 proposes to rate jib area based on luff length and LP. The committee recommends for ORC Club only, to allow for cruising headsails that are not maximized for their fore triangle limits, the actual jib luff length LL may be used. LL would replace SQRT(IG^2 x J^2) in the area calculation. Since unmeasured jibs have luff lengths less than but are assessed for that, a factor of 1.05 is to be applied to the area

calculation when LL is used, not to exceed SQRT(IG^2 x J^2). Matters of measurement data are referred to the Measurement Committee.

8.3. Difference between ORC Club and IMS Ratings: NSF 2 claims a systematic bias between IMS and ORC Club. The committee points out that ORC Club and IMS use the same VPP. If a fully measured yacht has its data processed for ORC Club, the handicaps will be the same as for IMS. ORC Club is more lenient in what is allowed and not allowed for measurement. Where some items of a specific yacht are not by full measurement, default values are a conservative estimate to assure that no advantage may be gained through lack of measurement. An owner who is concerned about any such conservative bias may submit oneôs yacht for more accurate measurement. German empirical evidence is that the handicap bias between default and fully measured values is about a half-percent, plus-or-minus a quarter percent. The righting moment by an inclining is believed to be the principal area of potential improvement in the accuracy of a yachtôs ORC Club handicaps.

9. Other Submissions (DSV3, DSV4, FFV 2, FIV 4, IMS 50 – 1, USSA 4)

9.1. IMS Typeforming (DSV 3): See Minutes 3 (in entirety) and 4.7 regarding measures recommended herein with typeforming trends in mind. In addition to the investigation of added resistance in waves to address the trend of heavier displacement, the committee attempted to improve the treatment of stability by an aerodynamic modeling detail. However, a successful result for that was not possible as of this meeting. These matters are recognized and will be worked on as part of the committeeôs 2003 agenda.

9.2. Battens in Mainsail and Large Roach (DSV 4): The committee reviewed geometric relationships of excess mainsail girth to penalty assessment, including the effect of added roach area above MGT due to a batten in the upper eighth of the mainsail. The DSV submission is recommended to Council except to change the EC penalty as follows. In the last sentence of Rule, replace the existing formula for EC from (HB/(HBLimit*E)) to (HB/(0.22*E) + 0.818*E).

9.3. Cockpit Parameters (FFV 2): The limiting parameters on cruiser/racer cockpits were developed after thorough review of production cruiser/racers at the time. The committee is reluctant to change these without careful re-visiting of data for a large number of yachts. However, it would consider a soft limit approach to the requirements of cockpits that nearly but do not fully comply with existing hard limits. Such soft limits would be confined to the cockpit only and are not to be mixed with interior accommodation regulations. The committee will welcome input from the FFV and other parties who have expressed interest in such an approach.

9.4. IMS 700 Class (FIV 4): The establishment of an IMS 700 Class is referred to the Offshore Classes & Events Committee. Once the constituents of this class are defined and a representative group of yachts meant to be included are identified, the committee can define appropriate class parameters. The committee has the opinion that such a class should have a critical mass of owners supporting this class before committing volunteer time to establish rules and parameters.

9.5. Modification of Class Limits (IMS 50 ï 1): The requests of the IMS 50 Class are also referred to the Offshore Classes & Events Committee. The committee believes that these are questions for the constituent class to answer. The committee would support increasing the rating band to 15 seconds/mile, with a range of 510-525 seconds/mile, if the Offshore Classes Committee thinks it would be helpful to increased class activity.

9.6. Spinnaker Configuration (USSA 4): This submission seems to be useful in clarifying the wording that defines alternative spinnaker configurations. The committee recommends a minor revision is in the wording of the proposed Rule 804.1.c) to read, ñAsymmetric and

symmetric spinnakers allowed, spinnaker poles allowed.ò Also, use the words ñsymmetricò and ñasymmetricò throughout.

10. Summary of Proposed VPP Changes for IMS 2003

Principal VPP Changes:

- Windward sail coefficients revised for fractional rig induced drag per wind tunnel tests
- Downwind sail coefficients revised for decreased spinnaker and increased mainsail forces
- Windward sail coefficients revised for simple, fore-and-aft mainmast stays
- Experimental IMS certificate enabled for water-ballasted yachts

Certificate and Scoring Matters:

- Revise wind averaging for short duration race constructs
- Change Inshore Performance Line course to 50%/50% Windward/Leeward
- Use Windward/Leeward 12 as sort parameter for PLS
- Provide for asymmetric spinnaker data
- Various additional ORC Club certificate details

11. Dynamic Allowance

The Dynamic Allowance appears to be in reasonably good balance with observed performance in short course racing, but is perceived as too generous in longer races, when yachts are in a steadier state condition than during short-course sailing. The correction for this is intrinsic to the way that the DA was originally established as a single, external multiplier to the table of handicaps. In fact, it is calculated using individual components over the full matrix of wind speeds and angles before reducing the overall DA to a single number. The internal factors for the DA are greatest in the windward region, lowest in the reaching range, and a little greater running than when reaching. The committee believes that the desired result will occur by reporting the table of handicaps as the individually computed values that already exist, which can then be applied to particular course constructs in the intended proportions. The DA number as presently calculated should remain only as a relative measure of a yachtôs Dynamic Allowance credits. The programming effort to make this change is greater than has been available for this meeting and will be completed in 2003.

12. VPP/LPP Documentation

The committee has reviewed Andy Claughtonôs draft version of a documentation report of the LPP and VPP. Final comments have been received during the past two meetings, and the committee recommends that the ORC proceed with publishing the report.

13. ORC Research Fund

The committeeôs work this year relied primarily on wind tunnel tests that had been funded in prior years through partnerships of the ORC Research Fund, US Sailing, North Sails, Quantum Sails, the Wolfson Unit and the Glenn L Martin Wind Tunnel. At last yearôs AGM, the committee anticipated initiating several IMS research projects during 2002 with an anticipated budget in the order of GBS 30,000, which was approved by the Management Committee last year. However, the anticipated projects have been postponed until 2003, and no requests for research funding were made during the year.

Projects now planned for 2003 include: development of hullforms and computational fluid dynamic (CFD) runs to study dynamic length effects, residuary drag and heeled drag effects; construction of a towing tank model to study after overhang truncation; and code programming for real-time sail force optimization. These projects are expected to cost in the in the same order as estimated last year for a similar scope of work (approximately 50,000 euros).

Additionally, the difficulties of making revisions to the existing, twenty-five-year-old Fortran VPP code and the amount of code improvements that are planned for next year make this a suitable time for a major re-writing of the VPP code. The scope of specifications for re-writing the code have not been sufficiently defined to suggest a firm estimate of costs, but the ORC Programmer anticipates it to be in the order of a 50,000 euro project. He has identified additional sources of talent to assist in the project, which would be accomplished in about six months. He has kindly offered to work out a way to spread reimbursement over a longer period of time, however. The committee urges Council to allocate the funds to undertake this long overdue modernization of the ORCôs principal technological tool.

14. ITC 2003 Agenda

The ITCôs principal projects for next year are:

- Develop real-time aerodynamic optimizer
- Continue to investigate jib overlap effects
- Investigate mainsail girth effects
- Investigate spinnakers having SMW or SMG less than current default value
- Revise assessment of effective sailing length, including tail effects
- Integrate new model data into residuary resistance database
- Develop new models for residuary resistance
- Investigate ñdeltaò based residuary regression method
- Begin heeled drag database using CFD
- Review the assessment of added resistance in waves
- Revise DA distribution to correspond to course content

Additional projects include:

- Review factors influencing windward performance assessment
- Introduce soft-limit assessment of adjustable forestay tension
- Investigate soft-limit approach for cruiser/racer cockpits
- Revise keel tip parameters to identify and properly rate bulb keels
- Develop performance evaluation approaches for water ballast and canting keels

Note that the ITC will also be supporting the proposed re-writing of the VPP/LPP code, provided that this project is authorized by Council.

15. Next Meeting

The next meeting of the ITC is planned for March 22-24, 2003 in Annapolis, Maryland, USA. This is timed to coincide with the Chesapeake Sailing Yacht Symposium on March 21-22.