

Effects of Technology on Offshore Racing

Technology is making an enormous impact on offshore sailboat racing.

Hull design, sail construction, safety, rigging, rating systems, communications, and navigation have all been revolutionized during our sailing and race-management careers. Movable ballast, powered winches, inexpensive broadband Internet, AI, shore-based routing, and highly sophisticated autopilots are now impacting offshore racing.

The policies for these new and emerging technologies are being set by the event organizers. What issues should the event organizers consider? *What is the role of the human? On what basis do we want to compete in future offshore races?*

Effects of Technology on Offshore Racing

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Movable ballast, powered winches, prevalent Internet access, shore-based-routing, AI, and advanced-autopilots are now having a widespread impact.

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Contacting Offshore Participants

We've come a long way from SSB daily check-ins

- **Today RC/EO might want to RAPIDLY**
 - Relay Mayday/Emergency/Help Request
 - Update race instruction
 - Share a hazard warning
- **Does it have to be a phone call? Is a text enough? An email?**
 - Available tech: SSB, Iridium (Phone, GO!, InReach, Exec), Starlink
- **How reliable must this be? How immediate?**
 - Cost/Benefit
 - Will the boats notice a call?
- **Some EOs test with random calls and pre-defined penalties.**
 - Others require periodic check-in and mail check

Balancing act:

Cost	Need
Fairness	Feasibility

Detail page: Contacting offshore participants

- Offshore Event Organizers might require boats to answer the phone and monitor VHF while racing. This allows RCs to contact boats to respond to a nearby boat needing help. There can be technical challenges.
 - Some EOs test this with random calls, and pre-defined penalties. This can feel unfair if the call comes in while the boat is engaged in other noisy and/or needed work
 - VHF solutions to contact nearby boats:
 - On deck VHF speakers are sometimes hard to hear.
 - Most DSC ringers will 'wake the dead' so are a good option for getting the attention of race boats. However, few sailors and RCs are familiar with the use of DSC even though all boats are equipped.
 - Receiving satellite calls on race boats can be challenging
 - Starlink, or Iridium Go! can be flakey to receive VOIP calls, but work fine to place outgoing calls. They occasionally lose their ip connection so miss incoming VOIP calls.
 - Iridium and Certus handsets receive calls dependably but are decreasingly prevalent.
 - Some Iridium based pagers (e.g. Garmin inReach among others) receive pages dependably.
 - Is the ability to text boats and have them call the RC promptly sufficient?

Technology and offshore racing - Racing Rules

- Organizing Authorities make the policy decisions: for example, many EOs permit:
 - Non Manual Power
 - Autopilots, (amending RRS 52)
 - Canting keels, movable ballast, (amending RRS 51)
 - Powered winches (amending RRS 52)
 - Outside Help
 - For-fee weather data (amending RRS 41 and Case 120)
 - Outside routing (amending RRS 41)
- Setting and Sheeting Sails, etc
 - Outriggers (amending RRS 55.3)
 - Winches operated from below decks (amending OSR 3.11)

Autopilots

- DH boats need autopilots and want to race against crewed boats.
- Crewed boats generally don't carry autopilots but worry that autopilots might be an advantage someday, so want the right to use them if DH boats can.
- Today, skilled humans steer better than autopilots when humans can see the sea surface in front of the boat.
- RRS prohibits the use of autopilots via RRS 52, but Event Organizers routinely amend this.
- **As technology evolves, when autopilots CAN measure the surface of the sea in front of the boat, they will be able to steer better than any human, all the time.**
 - **Do we want this for our sport?**
- To address this, OSR Appendix M contains language that EOs can use to amend RRS52 to allow autopilots but prevent APs from using measurements of the surface of the sea in front of the boat.

Advice for SIs and NORs for permitting autopilots

World Sailing Offshore Special Regulations

APPENDIX M – Optional Wording for Organizing Authorities' NoRs or SIs

- 2. If an event organizer chooses to permit the use of autopilots, here are suggested wording for EOs to consider including in their Notice of Race:

- a. **Manual Power - RRS 52 is changed to:**

A boat's standing rigging, running rigging, and spars shall be adjusted and operated only by the power provided by the crew. However, autopilots may be used to adjust and operate moveable hull appendages. *The autopilots shall only use measurements of weather, wind, or sea surface within 100 millimeters of sensors that are mounted on the boat, and therefore the use of cameras, lidar, sonar, or radar to measure the sea surface surrounding the boat is prohibited.*

This approach may not be the best approach for the rules, but the overall question is do we want to continue to compete based on steering as well as tactics, steering, trimming etc.

Considerations for permitting Non-Manual Power (NMP)

- PRO

- Some big boats are designed to run on NMP and can not compete if NMP is prohibited.
- Lighter, cheaper, and practical powered systems are now being designed for smaller boats.
- Powered systems make the sport more accessible to smaller and aging crews.
- Rating systems are starting to assess the impact of powered systems.

- BUT

- High speed, reverse winding reel-type winches can be a significant advantage for which it is challenging to measure and accurately assess the performance impact.
- Rating systems must accurately assess the performance advantage of NMP in order to keep boats using manual power competitive.

Outside Help - Effects of plentiful and affordable communications

- **Prevalent Internet access from coastal 5G and worldwide Starlink introduces potential for inadvertent cheating. Examples include:**
 - **Uninvited advice sent to crew via social media (e.g. “gybe at 1400” or responding to a liv stream, “look on deck”).**
 - **Crew members who have PW accounts unknowingly checking the box to request a PW route.**
- **EOs may choose to communicate to entrants of the dangers of inadvertent cheating via their pre-start communications and skippers’ meetings.**

Outside Help - For fee weather data:

- **Many EOs permit boats to receive weather data for a fee. (e.g. Hobart, Fastnet, Bermuda, TransAtlantic, MiddleSea, C600 etc).**
- **Some EOs stick to the rigorous RRS 41 and Case 120 (e.g. Transpac and Pacific Cup).**
- **Nearly all EOs prohibit boats from receiving customized weather or advice for the boat.**
 - **Exceptions include WSSRC records, some RdR and TJV classes, and the Chicago-Mac.**

Outside Help -EO considerations for permitting for-free weather data:

PRO

- **Most big boat events throughout the world allow it, sailors expect it.**
- **For-free PW, SailFlow, and Tidetech subscriptions are common, leading to unintentional cheating if the use of paid data is prohibited.**
- **The best data for the US is free anyway, but easier to retrieve via PW or SF. There's an argument that PW and SF selling "communications" and not data. (PWE & PWG not incl.)**
- **Free high resolution mesoscale data not available for common race destinations like PV and Cabo. PWE and PWG are.**
- **Easier access and viewing of forecast data enhances safety.**

CON

- **Tradition.**

Outside Help - EO considerations for permitting outside routing:

- **PRO**
 - PW routing is easy and cheap for budget programs.
 - Who cares where the computer is, aboard or ashore?
 - Outside routing permitted now by TJV & RdR for some classes, and by the Chicago-Mac.
- **CON**
 - Might lead to costly 10-person shore teams as in some TJV and RdR classes now.
 - Seamanship concerns. The crew should have the forecast and make route selection decisions based on seastate, wind, and safety, not just follow provided waypoints.
 - **What do we want as the basis for future offshore competition?**
 - Just the mechanics of sail changes, tacks, gybes?
 - Or continue to compete on tactics, strategy, trimming, and steering, as today?

Many Event Organizers amend RRS41 to permit for fee weather data but keep prohibition on shore routing or outside advice.

World Sailing Offshore Special Regulations

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- **2. If an organizing authority chooses to allow competitors to pay for weather data, here are suggested wording for OAs to consider including in their Notice of Race:**

- **b. Outside Help - Add to RRS 41:**

However, in exception to rule 41(c), weather information that is available to all boats for a fee may be received, *but it shall not include specific weather or routing advice customized for the boat or a group of boats.*

Event Organizers considerations for Entry Restrictions

Some have observed that technology is splitting our sport to some extent.

- **Explicitly “traditional” technology events are emerging, e.g. Golden Globe, Ocean Globe races.**
- **Conventionally navigated, crewed, trimmed, and steered race boats remain the most common. TP52s and Maxi 72s prove that “conventional” boats can be fast, fun, and exciting.**
- **Intermediate technology boats are emerging with autopilots, canting keels, movable ballast, powered winches. Most Event Organizers include these boats.**
- **An emerging high-tech segment (e.g. America’s Cup, SailGP, Imocas, Ultimes. All include various elements of foiling, powered systems, and computer control.**

Policies for acceptance of new technologies in offshore racing are set by the Event Organizers

Movable ballast, powered winches, prevalent Internet access, shore-based-routing, AI, and advanced-autopilots potentially have a significant impact.



How do we harness the power that technology enables, while keeping what we love about the sport?