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The Race Navigator Playbook

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Introduction

Today, the navigator plays a crucial role in managing the information the crew needs to race. His job begins long before the regatta and ends well after crossing the finish line.

This document is a navigator's playbook detailing his role as part of the team. It has four sections:

1. “Information and Decisions" presents questions he should be able to answer.
2. “Responsibilities and Tasks” covers tasks to ensure that these answers are timely and accurate.
3. “What should my Skills be?” details the navigator's knowledge needed for this job.
4. “Helpful Tips” presents a series of recommendations on how to meet these responsibilities.

This document does not describe the techniques for performing each task or answering each question. It presents the “what” and leaves the "how" to each navigator to solve. This will depend on his equipment, resources, and the context in which he will work. Also, the race navigator should clearly understand the “why” and importance of each presented topic.

1. Information and Decisions

In a sailing race, the crew must make correct decisions quickly. Each decision and action requires accurate information, which is key to success.

The following list is a compilation of questions that every race navigator should be able to answer.

Before each Race

From a tactician needing to sketch his strategies to a crew configuring the boat, the navigator must provide a clear picture of the expected sailing conditions. For these and many other pre-race tasks, the following questions are sure to come up:

- Which will be the racecourse as indicated in the sailing instructions?
- What are the expected current and tidal conditions?
- What are the characteristics of the direction and intensity of current on the area?
- Given the racecourse, wind, and current forecasts, what will be the expected navigation parameters on each leg?
- Which is the place and time of the start? What will be the start signals for my fleet?

Moments before the Start

To secure his strategy, the tactician must decide where to cross the line only minutes before the start. Then, the helmsman will need to execute a start with precision at full speed. These are the usual questions asked in this situation:

- What has been the behavior of the wind in the past few minutes?
- Which is the favored side of the line? How much is the benefit?
- Which will be the first wind shift after crossing the line?
- Has the race committee changed the position of the ends of the line at the last minute?
- While executing the start maneuvers, what is the time to burn before crossing the line at the selected point?
- Which is the boat position regarding both starboard laylines?
- How far is the boat's bow from the starting line?
- After the gun, has the committee announced if we have crossed the line early?

Race Performance

To steer the boat to its maximum capacity, the helmsman and the trimmers will need data on the mast displays. The navigator must ensure that this information is available to the “performance crew”:

- What is the value of the current performance parameters (speed, TWA, heel, etc.)?
- What are the corresponding optimal performance parameters ("targets")?
- If the targets are not met, why is it? For example, dragging rubbish on the keel or rudder.
- Is the presence of "wind-shear" or "wind-gradient" affecting our ability to navigate at target speed and wind angles?
- When selecting the sails for the next leg, what are the expected TWA and TWS?

Race Tactics

The tactician will frequently need the boat’s position on the racecourse and wind patterns to make his decisions. He will rely on the navigator to answer the following questions:

- Where is the boat regarding the tactic mark laylines (distance, angle, and time)?
- What is the behavior of the wind in the last minutes?
- Is there a recurring wind pattern (amplitude and time of the oscillations)?
- Is the original strategy's forecast (wind and current) happening?
- What is the time to the next mark?
- What will be the expected navigation parameters for the next leg (AWA, AWS, TWA, TWS HDG, laylines, etc.)?
- Are there any navigation risks on the chosen route?

Post-Race Analysis

During the race, the onboard computer stores a large amount of data. All ideal (optimal) and actual parameters are recorded every second. This information can answer a wide variety of questions, for example:

- How well was the start executed?
- How good was the performance of the boat in different situations?
- What was the outcome of the tactical decisions?
- Do I identify calibration issues in the instruments?

- Can I identify situations or maneuvers where there are systematic problems?
- Are there issues with the polar or other targets that need tuning?
- Produce special reports or specific data that the tactician or skipper may request.

2. Responsibilities and Tasks

The navigator collects, organizes, and presents all valuable information to the crew.

Usually, the navigator does not make decisions. He provides accurate and timely data to those responsible for the strategy and tactics so they can assess their options.

The navigator must check all information sources, from race documents to meteorological forecasts.

He must also keep the electronics (instruments and IT tools) in perfect working order. In the event of problems, the navigator should be able to solve them within his skill. If not, he should get the technical support needed.

The following list groups and details the tasks he typically performs:

For each Regatta

1) Information about the Event.
    a) Read the Notice of Race (NOR) and Race Instructions (RI) and share their meaningful content with the team:
        - Events and meetings (dates, place, who should attend).
        - Requirements to compete, certificates, measurements, etc.
        - Place and deadlines for registration, measurements, etc.
        - Preliminary information on each race (date, place, time).
    b) Get the list of registered competitors.
2) Environmental Data and Forecasts.
    a) Check past weather records for the place and time of the year the regatta will be raced.
    b) Collect all possible local knowledge of winds and currents for the racing area.
    c) As the start date approaches, make a preliminary analysis of the weather for the race venue.
3) Instruments.
    a) Check that the instrument spare parts and repair kits are onboard.
    b) Perform a preventive maintenance routine of the devices used.
    c) Repair any problems and replace parts that are in poor condition.
    d) Calibrate and verify the compass for the competition area (deviation and alignment).

4) Computer Equipment.
    a) Check the correct operation of the tactical computer and the wireless display.
    b) Check that the most recent version of the tactical system is installed.
    c) Make backup copies of critical data.
    d) Have backup options (i.e., software and configurations).
    e) Check that the correct version of the polar curves and other settings are used.
5) Traditional Navigation Elements and Requirements.
    a) Confirm that boat and crew follow the rules and regulations of the Organizing Committee and national and international maritime authorities. Pay special attention to the requirements of the ISAF Offshore Special Regulation.
    b) Advise the skipper and tactician about possible risks in the planned route (dangers to navigation, restricted areas, adverse weather, etc.).

Before Each Race

6) Last-minute information.
    a) Check if the Race Committee has issued modification notices.
    b) Find out if there are changes to the racecourse, time, place, and start signals
7) Updated Forecasts.
    a) Get the latest forecasts for weather, waves, currents, and tides.
    b) For fixed marks racecourses, determine the expected sailing conditions at each leg.
8) Pre-race briefing (BEFORE leaving the dock and with all the crew present).
    a) Introduce all the relevant information and news about the race.
    b) Collaborate in strategic decisions if required.
9) Instruments.
    a) Verify that the batteries of the boat, VHF handy, computer, and wireless screen are charged.
    b) Check that all instruments, equipment, and software are working correctly.
    c) After leaving the dock, clean and calibrate the speed sensor.

For Each Race

10) Preparations before the start.
    a) Check for shear and gradient wind and apply corrections to the system.
    b) Determine the behavior and trends of the wind.

c) Select or enter the racecourse to sail.

d) Set the start line.

e) Assist in the definition of the starting strategy.

11) Once racing.

a) Assist the tactician by answering his questions.

b) Alert the trimmers about anomalies in the wind (shear and gradient wind).

c) Keep notes on information that may be useful after the race and that are not recorded by other means, for example, which sails were used on each leg.

12) Traditional Navigation.

a) If the electronics fail, be ready to use traditional navigation techniques. Continue to give the tactician the best possible information.

b) Advise the skipper on dangers or navigation restrictions on the planned route.

c) Keep log records (time, position, average heading, average speed, etc.)

13) During Long Duration Races.

a) Maintain the communications required by the Race Organizers and the Maritime Authorities.

b) Get updates to weather forecasts and alerts.

c) Ensure that permanent surveillance is maintained during low visibility to avoid collision with other vessels (AIS, Radar, etc.).

d) Be ready to assist in the recovery of a “man overboard”.

After Each Race

14) In the event of being involved in a protest.

a) Objectively document all the essential data of the case.

b) Assist the skipper in preparing his presentation before the Protest Committee.

15) Preserve and catalog the information obtained during the race.

a) Make copies of the information recorded by the tactical system.

b) Distribute a copy of the recordings as agreed with the skipper/coach.

16) Attend the post-race briefing (which the entire crew should attend).

a) Present all the information requested by the skipper.

b) Collaborate in the formulation of decisions and suggestions.

17) Analyze the quality of the data obtained from the instruments and their sensors. Decide if they need additional calibrations.

3. What should my Skills Be?

Accurate information depends on the correct operation of a chain of interconnected devices.

The data transmission process initiates with the sensors relaying information to the instrument's processor. This data undergoes calibration, correction, and aggregation processes to generate new data sets. Subsequently, these data sets are transmitted to the onboard computer for conversion into tactical and performance information. The processed data is returned to the instrument displays and deck tablet through Wi-Fi.

As a navigator, it is crucial to understand a wide array of topics, spanning conceptual, practical, simple, and complex areas, as each holds significant importance.

The race navigator must be proficient in the following subjects:

- What data items are crucial onboard, how are they obtained, and how and when are they used?
- Concepts of instruments, measured data, and calculated data.
- What sensors measure, and how do they do it? What anomalies affect them, and how they are corrected or calibrated?
- How does data flow through the instruments network?
- What are typical instrument problems, how are they diagnosed, and how are they solved?
- Instrument operation for calibration and control of displays.
- Interconnect the instruments to the tactical computer.
- Operation and maintenance of a personal computer. How can we recover from significant problems and preserve information?
- Knowledge of wired and wi-fi networks and their configuration using standard routers.
- Concepts and operation of the tactical software. How do I get and install the latest version?
- How and when to get technical support.
- Concepts and practical use of cartography; how to buy them for EVOLUTION.
- Concepts of climatology, meteorology, and oceanography. How to download forecasts.
- Knowledge and practice in traditional navigation (paper charts and no electronics).
- Knowledge and practice in radio communications.

Remember, there is always room to learn and improve.

4. Helpful Tips

Starting as a race navigator is a demanding and challenging role. Navigators are responsible for gathering and delivering high-quality information essential for everyone involved.

This includes ensuring all electronic components function correctly in harsh conditions, inspecting and calibrating sensors before the regatta, and preserving and analyzing essential data after each race.

Additionally, they must brief the crew on vital information for the day's race and be prepared to diagnose and solve problems as they arise.

Managing all these tasks within a limited time frame can be tiring.

Hopefully, the tips and suggestions of experienced race navigators and tacticians will help you successfully tackle these challenges.

Know Your Limits and Don't Work Under Pressure

Be methodical and develop a detailed routine. Create and use checklists and timelines to keep you on track.

Before a race, focus on verification and preventive maintenance tasks.

Keep a prioritized list of problems to solve.

Don't wait until the last minute. Arrive early at the boat. You might need time to solve any issues you might find.

Train an assistant, someone with an affinity for these tasks. But always supervise and check on his work. Remember, you bear the responsibility.

Estimate how much boat time you need to run your routines before each race. Get the skipper's time allocation and the necessary resources to prepare everything.

When testing or calibrating, take control of the situation and come aboard with a work plan. Communicate it to the rest of the crew, securing their support.

Train the delivery crew on how to use and care for the instruments. Ask them to document and report any issues.

Maintain detailed documentation of the electrical and electronic installation. Include every component's brand, model, serial number, and vendor.

Track the history of repairs; this list will help you find the most common issues.

Be clear about your priorities. If solving an unforeseen problem, keep an eye on your other responsibilities.

If it works, don't break it! Don't make unnecessary experiments or changes at the last minute.

Be an Articulate Person

Meet the tactician. He is the one with whom you will interact in the race. Agree on what information he will need and when he will need it.

Do not compromise the tactician while he makes the decisions. Discretely convey only the information he requests.

Don't get swayed by the subjective opinions of other crew members! With the skipper, clarify the division of roles while racing.

Do not get involved with the responsibilities of others aboard.

If you were wrong, don't waste time explaining what happened. Concentrate on your work. Later, you will have time for analysis and learning.

If you can't answer a question, admit it. Uncertainty is better than incorrect information. The tactician will know what to do.

Training is key. On land, get forecasts and load racecourses. On the water, encourage the crew to train on combining information and boat handling.

Be discreet about your team's information. Maintain the confidentiality of reports and the decision-making processes. Clarify your team's policies with your skipper.

Have a close working relationship with those who take care of the boat.

Have fluid contact with the organizers, measures, race committee, etc.

If you don't enjoy being the race navigator, don't do it, or you will lose the pleasure of sailing.

Always have a Plan B (BACKUP)

For each problem, have a response plan.

Be prepared to fix anything quickly, from broken instruments or computers to broken wind or speed sensors.

Keep the complete sensor repair kit and instrumentation on hand.

Keep as much information as possible on paper—routes with their bearings and distance, wind forecast, targets, calibrations, etc.

Keep a copy of the computer files with the ship's configuration and the tactical computer disk image.

You should be able to restore your computer's disk with a recent disk image and backups.

Consider having a “mirrored” computer ready for quick replacement at the dock.

Have a good relationship with your technology providers. They are your last line of help; remember that this is their job, not their hobby.

Get to know your colleagues. Although navigators do not form a league, they share the same challenges and often help each other.

Keep all necessary reference materials (manuals, notes, etc.) on hand.

Remember, there will be no excuses; managing information for the competition is yours.