

## Data Export to the Instruments

Exporting data from EVOLUTION lets you display critical information generated by the system on the instrument displays.

### What is it used for?

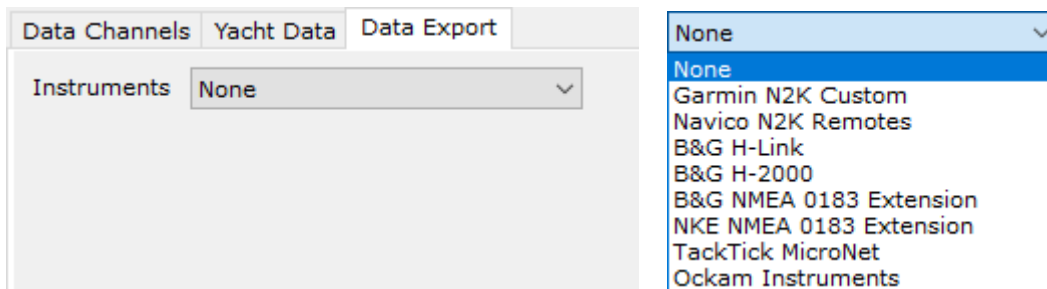
The goal is to display performance target data, critical times during starts, and simple sensor data corrected by EVOLUTION and sent to the instrumentation. These data types are primarily performance-related, although tactical information is also provided.

### How to Set Up Data Export?

To export data, EVOLUTION utilizes the same connection through which it receives data. Each instrument model includes its mechanism (protocol) for receiving and displaying data on their network.

To set up the data export, use the "Yacht Setup" form by navigating to Evolution → Yacht → Setup Active.

Next, choose the [Data Export] tab. The system will initially display the following form.

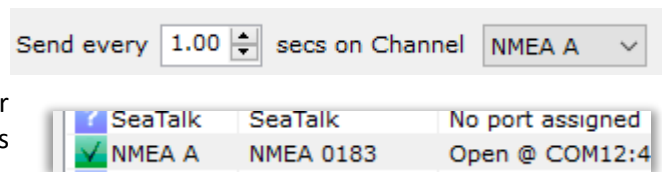


You can then select the type of instrument to which EVOLUTION is connected.

The system will respond with a form that includes several options.

The options in the first line are standard to all instrument alternatives.

- **"Send every"** specifies how often EVOLUTION will send the selected data.
- **"Channel"** specifies which channel to use for sending the data. This example shows NMEA A, as shown in the [Data Channels] tab.



The configuration process depends on the instrumentation characteristics. EVOLUTION features two categories of instruments:

**Flexible Export:** Instruments that accept generic variables and their descriptive titles for display.

**Fixed Export:** Instruments characterized by specific data types they can accept and the titles under which they will be displayed.

## Flexible Data Export

This category includes the following instrument models:

**B&G H-2000 - B&G H-2000 Processor with an additional "Performance" Processor.**

**B&G H-Link - B&G H-3000 Processor with performance-level software.**

**Navico N2K Remotes - Navico displays (Triton2, 20/20, 30/30, and Nemesis) are connected to an NMEA 2000 network.**

**Garmin N2K Customs - Displays Garmin GM-120, GNX-120, and GNX-130 on an NMEA 2000 network.**

**Tacktick Micronet - Raymarine Micronet (formerly Tacktick) with T210 and T110 displays.**

**Ockam Instruments – Legacy installations of Ockam instruments.**

Aside from minor differences, the configuration remains consistent across all these cases. Below, you will find the B&G H-Link option as an example.

When this alternative is selected, the system will show the following form.

Remote	Mode	Data Type	Caption

Display on Remote [v]  
Sailing Mode [v]  
[v]  
Caption [input]

The list on the left will contain the items you add to specify the data types you wish to export.

### Create a New Export Item

Click the following button to create a new item.



A new item appears on the list. The form on the right is active, allowing you to fill in the item's characteristics described below.

Remote	Mode	Data Type	Caption
<input type="checkbox"/>	?	Unknown	

Display on Remote [v]  
Sailing Mode [v]  
[v]  
Caption [input]

## Cómo Definir un Ítem de Exportación

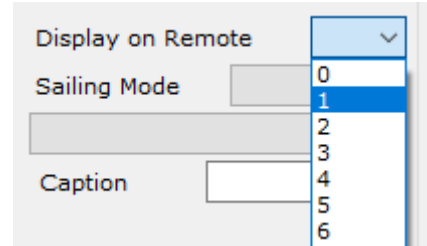
### Display on Remote

The first option lets you select which "Remote" number the instrument system will direct this item to.

You must also select this "Remote" number on the instrument's displays to view the data type associated with this item.

The remote will be listed in the display menu alongside the other internal data (e.g., TWA, Boat Speed, Depth).

This example uses Remote 1, selected from the drop-down list.



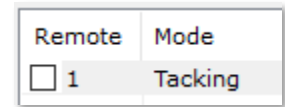
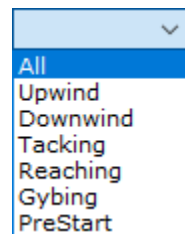
### Sailing Mode

This option indicates the boat's sailing mode in which EVOLUTION will send this item to the instrumentation.

Aside from the "Prestart" mode, all other modes pertain to the TWA on which the boat is sailing.

As you'll see later in the examples, this option allows you to present data types for different sailing contexts using only a few displays.

For instance, if you want to view a specific data type only when sailing upwind, this item must include the Sailing Mode option set to "Tacking". For more details, refer to the [Sailing Mode Combinations](#) section.



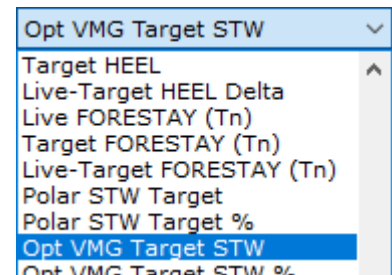
Here are the possible sailing modes and when they are active:

All	Sailing in any TWA.
Upwind	Sailing with a TWA < 90°
Downwind	Sailing with a TWA > 90°
Tacking	Sailing with TWA < target OVMG TWA (upwind) + 5°
Gybing	Sailing with TWA > target OVMG TWA (aft) - 10°
Reaching	Sailing between Tacking and Gybing TWA limits.
PreStart	When the race timer shows that there is still time for the start signal.

### Data Type

Each export item is linked to a data type. If the item is active (its sailing mode matches that of the ship at that time), EVOLUTION transmits the corresponding values at the frequency of "Send every."

Several data types are available, with a complete list at the end of this document. The following example uses the target boat speed at optimum VMG by selecting the data type "Opt VMG Target STW."



When you select the data type, EVOLUTION automatically fills in the "Caption" shown above the data values. You can modify this field to specify a different caption.

Finally, you should check the box in the item's list row so that EVOLUTION considers it for export.

Display on Remote	1
Sailing Mode	Tacking
Opt VMG Target STW	
Caption	OVMG SPD

Remote	Mode	Data Type	Caption
<input checked="" type="checkbox"/> 1	Tacking	Opt VMG Target STW	OVMG SPD

### Example 1 – Displaying Multiple Data Types with a Single Remote

Through "Remote 1" send:

- While tacking the speed target for optimum VMG.
- While reaching the polar speed target.
- While gybing the TWA target for optimum VMG.

The settings in the data form will be as follows:

Remote	Mode	Data Type	Caption
<input checked="" type="checkbox"/> 1	Tacking	Opt VMG Target STW	OVMG SPD
<input checked="" type="checkbox"/> 1	Reaching	Polar STW Target	POLR SPD
<input checked="" type="checkbox"/> 1	Gybing	Opt VMG Target TWA	OVMG TWA

### Example 2 – Display Different Data Types Toggling

Expand example 1 to show the target boat speed at optimum VMG while gybing.

Remote	Mode	Data Type	Caption
<input checked="" type="checkbox"/> 1	Tacking	Opt VMG Target STW	OVMG SPD
<input checked="" type="checkbox"/> 1	Reaching	Polar STW Target	POLR SPD
<input checked="" type="checkbox"/> 1	Gybing	Opt VMG Target TWA	OVMG TWA
<input checked="" type="checkbox"/> 1	Gybing	Opt VMG Target STW	OVMG SPD

When two or more items use the same remote and are active, EVOLUTION will send each data type alternately every 3 seconds.

In this scenario, on Remote 1, two items with "Gybing" mode will be active when the boat sails under those conditions. The two data types, captions and data, will alternate on any display showing Remote 1.

### Example 3 – Pre-Output Mode

Include a few items in example 2, also on Remote 1, to display the remaining time to the gun and the burn time, all while in pre-star mode.

Remote	Mode	Data Type	Caption
<input checked="" type="checkbox"/> 1	Tacking	Opt VMG Target STW	OVMG SPD
<input checked="" type="checkbox"/> 1	Reaching	Polar STW Target	POLR SPD
<input checked="" type="checkbox"/> 1	Gybing	Opt VMG Target TWA	OVMG TWA
<input checked="" type="checkbox"/> 1	Gybing	Opt VMG Target STW	OVMG SPD
<input checked="" type="checkbox"/> 1	PreStart	Time to Start (Gun)	TT START
<input checked="" type="checkbox"/> 1	PreStart	TimeToBurn	TT BURN

When the race timer has extra time before the start signal, the boat is in pre-start sailing mode. If one or more items are marked with "PreStart" mode, they will automatically suppress other items assigned to the same remote until the start signal.

In this example, no matter which TWA you sail to, the first four items will not be exported. If the start timer has not reached zero, EVOLUTION will only use the last two items to send their data types to the instrumentation. Since two active items are in PreStart mode on the same remote, they will alternate in the display.

### Example 4 – Using More Than One Remote

The above examples use a single "Remote," the typical scheme for dedicating a single mast display to present the data sent from EVOLUTION.

However, you can use other remotes to present more data types on different displays.

This example includes "Remote 2" to display the difference between the actual and target heel, utilizing the "Live-Target HEEL Delta" data type. Note that the item's mode is set to All and is active when sailing at any TWA.

Remote	Mode	Data Type	Caption
<input checked="" type="checkbox"/> 1	Tacking	Opt VMG Target STW	OVMG SPD
<input checked="" type="checkbox"/> 1	Reaching	Polar STW Target	POLR SPD
<input checked="" type="checkbox"/> 1	Gybing	Opt VMG Target TWA	OVMG TWA
<input checked="" type="checkbox"/> 1	Gybing	Opt VMG Target STW	OVMG SPD
<input checked="" type="checkbox"/> 1	PreStart	Time to Start (Gun)	TT START
<input checked="" type="checkbox"/> 1	PreStart	TimeToBurn	TT BURN
<input checked="" type="checkbox"/> 2	All	Live-Target HEEL Delta	HEEL DLT

## Sailing Mode Combinations

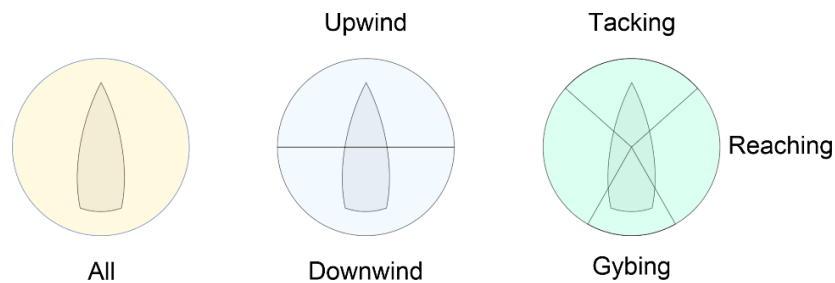
In the first two examples, you've seen how you can combine export items with different sailing modes so that EVOLUTION automatically controls what a particular remote will display.

The second example presents the possibility that two or more items are active simultaneously and displayed alternately on the same remote.

The system does not limit how to configure multiple items on the same remote. However, you should be careful to avoid undesirable conditions. For example:

- EVOLUTION cannot locate active items, preventing data from transmitting through the remote.
- An overlap in sailing modes leads to multiple active items, causing unexpected alternating behavior.

Remember, "Downwind" can overlap with "Reaching" or "Gybing"; and "Upwind" can match "Reaching" or "Tacking".



Considering that EVOLUTION offers these three TWA sector schemes, follow these basic rules:

- If you combine multiple items for the same remote, use the "Upwind-Downwind" or the "Tacking-Reaching-Gybing" scheme. Avoid mixing these two schemes.
- For any remote, include items with sailing modes to cover all TWA.

## Exportación Fija de Datos

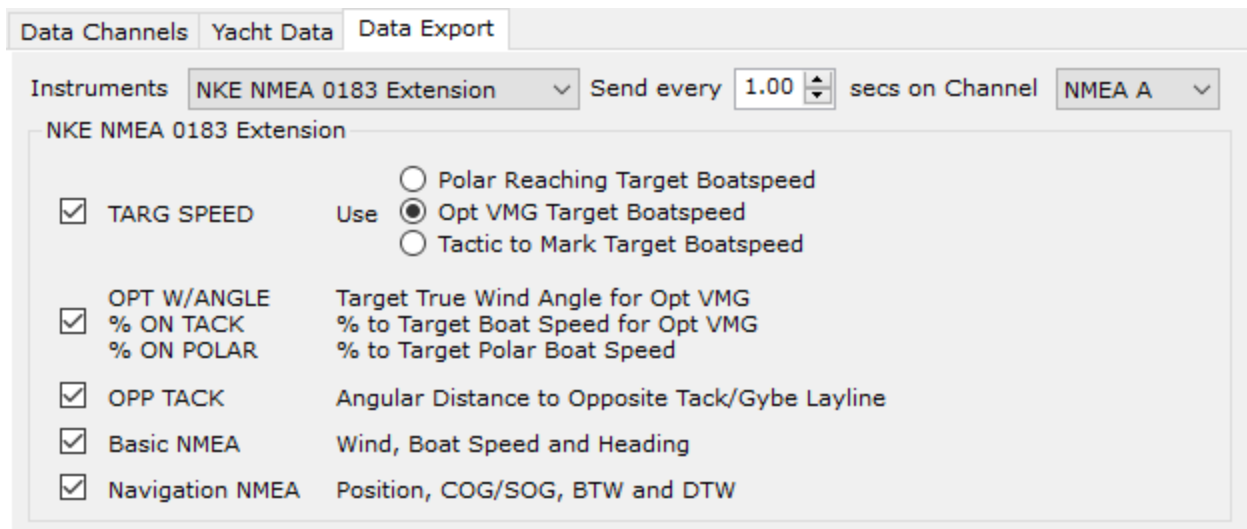
Specific instrument models can only accept data in a preset format. In this category, EVOLUTION encompasses the following cases:

- **NKE NMEA 0183 Extension** Instrumental from the French firm NKE with an NMEA 0183 interface.
- **B&G NMEA 0183 Extension** is used by: a) B&G H-2000 processor that does not have the Performance Processor, or b) B&G H-3000 Hercules level processor.

In both cases, the data transfer protocol is NMEA 0183. EVOLUTION must be connected to send and receive data to the instruments through the appropriate NMEA data channel. Please refer to the “Data Channels” tab.

### NKE NMEA 0183 Extension

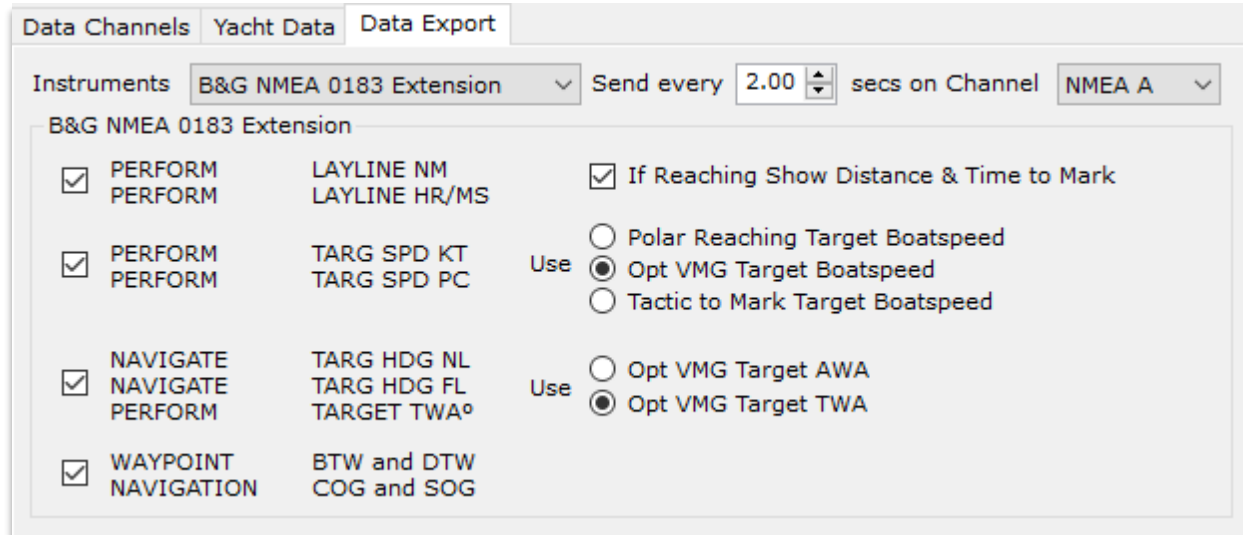
The data the NKE system accepts are fixed and limited.



1. **TARG SPEED.** EVOLUTION allows you to select which type of speed target to use:
  - a. "**Polar Reaching Target Boatspeed**" is the polar target speed. Based on the TWS and TWA. It is handy when you are reaching
  - b. "**Opt VMG Target Boatspeed**" is the target boat speed for optimum upwind or downwind sailing. If the TWA is  $< 90^\circ$ , the target data will be for optimum VMG tacking; if the TWA is  $> 90^\circ$ , the target data will be for optimum VMG gybing.
  - c. "**Tactic to Mark Target Boatspeed**" is the target speed sailing from the boat's position to the tactic mark. The tactic mark should always be positioned as the immediate destination when using this option.
2. **OPT W/ANGLE, % ON TACK y % ON POLAR.** This is the TWA, the percentage of real speed to the optimum VMG target speeds, and the percentage of real speed to the polar target speed.
3. **OPP TACK.** Heading in the opposite tack or gybe.
4. **Basic NMEA.** Live wind, speed, and heading. Basic instrument data corrected by EVOLUTION, sent in standard NMEA 0183 format.
5. **Navigation NMEA.** Navigation data in standard NMEA 0183. EVOLUTION acting as a chart plotter.

## B&G NMEA 0183 Extension

The data types that EVOLUTION can send to displays are the following:



1. **LAYLINE NM** distance and **LAYLINE HR/MS** time to the opposite layline. The Tactic Mark must be correctly placed as the immediate destination.
2. **TARG SPD KT** represents the boat speed target, measured in knots, while **TARG SPD PC** compares the actual speed to the target as a percentage. EVOLUTION lets you choose which type of boat speed target to use:
  - a. "**Polar Reaching Target Boatspeed**" is the polar target speed. Based on the TWS and TWA. It is handy when you are reaching
  - b. "**Opt VMG Target Boatspeed**" is the target boat speed for optimum upwind or downwind sailing. If the TWA is  $< 90^\circ$ , the target data will be for optimum VMG tacking; if the TWA is  $> 90^\circ$ , the target data will be for optimum VMG gybing.
  - c. "**Tactic to Mark Target Boatspeed**" is the target speed sailing from the boat's position to the tactic mark. The tactic mark should always be positioned as the immediate destination when using this option.
3. Target heading ( $^\circ M$ ) for the laylines. When sailing with a TWA  $< 90^\circ$ , the data pertains to the upwind laylines, and when sailing with a TWA  $> 90^\circ$ , it pertains to the downwind laylines. **TARG HDG NL** corresponds to the layline of the tack that the boat is on. **TARG HDG FL** refers to the layline on the opposite tack.  
**TARGET TWA**, angle to the wind to sail at optimum VMG, when either tacking (TWA  $< 90^\circ$ ) or on gybes (TWA  $> 90^\circ$ ).



## Data Types Available for Flexible Export

Data that EVOLUTION receives from the instrumentation and, in some instances, corrects or compares with the internal tables in its data model.	
Live AWA	Apparent Wind Angle. Data provided by the instruments.
Live AWS	Apparent Wind Speed. Data provided by the instruments.
Live TWA	True Wind Angle can be provided by instrumentation or calculated by EVOLUTION. The effective wind angle adjustment tool can correct it (see menu "Race→Wind Adjust").
Live TWS	True Wind Speed can be provided by instrumentation or calculated by EVOLUTION. The effective wind speed adjustment tool (see menu "Race→Wind Adjust").
Live TWD	True Wind Direction in magnetic degrees. It can be provided by the instrumentation or calculated by EVOLUTION. The effective wind speed adjustment tool can correct it (see menu "Race→Wind Adjust").
Live GWD	Geographic Wind Direction in magnetic degrees. It is calculated by EVOLUTION based on TWD, subtracting the wind induced by the current.
Virtual TWA	Virtual TWA. Calculated by EVOLUTION as the difference between the TWD and the boat heading.
Live HDGM	Magnetic Heading. Data provided by the instruments.
Live HDGT	True Heading. Data provided by the instruments.
Live STW	Speed through Water. This data is provided by the instruments or directly from the sensor. The linearity table may correct it (see Calibration and Settings for the "Speed through Water" data).
Live DEPTH System Units	Depth in units as configured on instrumentation. This option is only available for Garmin displays; the instruments provide this data.
Live DEPTH in Meters	Depth in meters. Data provided by the instruments.
Live DEPTH in Feet	Depth in feet. Data provided by the instruments.
Live HEEL	Heel in degrees. Data provided by the instruments.
Target HEEL	Heeling target in degrees. Data provided by EVOLUTION (see Calibration and Settings for the Heel Angle Target).
Live-Target HEEL Delta	Difference between the actual heel and the heel target, in degrees.

Live FORESTAY (Tn)	Forestay Load, in tons. Data provided by the instruments.
Target FORESTAY (Tn)	Forestay Load Target, in tons. Data provided by EVOLUTION (see Calibration and Adjustments for the "Forestay Load Upwind Target" data).
Live-Target FORESTAY (Tn)	Difference between the actual forestay load and the forestay tension target ("Target FORESTAY") in tons. Data provided by EVOLUTION.

Polar Speed Targets. EVOLUTION provides these based on the polar curves and the average wind (TWA, TWS) from the last 10 seconds.

Polar STW Target	Polar Speed Target provided by EVOLUTION from the boat's polar curves and the TWA and TWS.
Polar STW Target %	Percentage of actual STW compared to the "Polar STW Target."

Targets related to sailing at the optimum VMG points. When sailing with a TWA < 90° corresponds to the upwind optimum VMG point, and with a TWA > 90° corresponds to the downwind optimum VMG point. Provided by EVOLUTION based on the average TWS of the last 10 seconds.

Opt VMG Target STW	Speed Target sailing at the optimum VMG point.
Opt VMG Target STW %	Percentage of the actual STW compared to the "Opt VMG Target STW."
Opt VMG Target TWA	TWA targets when sailing at the optimum VMG points.
Opt VMG Delta TWA	The difference between the actual TWA and "Opt VMG Target TWA". Expressed in +/- degrees.
Opt VMG Target AWA	AWA Target for sailing at the optimum VMG points.
Opt VMG Target HDGM	Heading Target for sailing at the optimum VMG point on the actual tack or gybe.
Opt VMG Tack HDGM	Heading Target for sailing at the optimum VMG point on the opposite tack or gybe.

Targets and data for sailing to the Tactic Mark. These numbers make sense only if this mark is set as the immediate destination. The data types in this group also appear on the "Tactic" tab. Tactic targets serve as guides when sailing from the boat's position to the tactic mark.

Tactic Target STW	Speed Target. Depending on the sailing mode to the mark, this could be optimum VMG (tacking and gybing) or polar if reaching.
Tactic Target STW %	Percentage of the actual STW compared to the "Tactic Target STW."

Tactic Target TWA	TWA targets when sailing to the mark.
Tactic Target AWA	AWA Target when sailing to the mark.
Tactic Target HDGM	Target Heading when sailing to the mark, considering both current and leeway.
Tactic Tack HDGM	Target Heading on the opposite tack or gybe, if any, considering both current and leeway.
Tactic Time to Port LL/Mark	Time to the port layline yacking or gybing, or time to the mark on direct sailing.
Tactic Time to Stbd LL/Mark	Time to the port layline yacking or gybing, or time to the mark on direct sailing.

Targets and data for sailing at maximum VMC to the Tactic Mark. These numbers make sense only if this mark is set as the immediate destination. The data types in this group also appear on the "Tactic" tab when the "Max VMC" box is checked. These targets serve as guides when sailing from the boat's position to the tactic mark using the maximum velocity on course strategy.

Max VMC Target STW	Speed Target on Max VMC mode.
Max VMC Target STW %	Porcentage del STW real en relación al "Max VMC Target STW".
Max VMC Target TWA	TWA targets when sailing on Max VMC mode.
Max VMC Target AWA	AWA Target when sailing on Max VMC mode.
Max VMC Target HDGM	Target Heading when sailing at Max VMC, considering both current and leeway.

Data related to the race start. Explicitly used in pre-start sailing mode.

To determine the "**possible/optimal**" point of the line, EVOLUTION uses the following priority rules:

1. Sailing on starboard, a **direct start** at OVMG.
2. Sailing on port, **tack, and then a direct start** at OVMG.
3. Sailing on port, a **direct start** at OVMG.
4. Sailing on starboard, **tack, and then a direct start** at OVMG.
5. Start at the nearest perpendicular point.
6. Start at the point in the line where the bow points.
7. Start at the nearest end of the line (in time) PIN or RC.

Time to Start (Gun)	Time to the start signal – Based on the start timer.
Time To Line	Time to Reach the first possible/optimal point of the line.
Time To Burn	time Burn starting at the first possible/optimal point of the line.