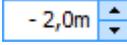


Innovations WinGPS 5 Voyager, Pro and Navigator – spring 2021

The spring update of WinGPS 5 Voyager 2021 includes some new interesting options developed in the second half of 2020. Some of it, and at least the non-sailing focused part, can also be found in WinGPS Pro and WinGPS Navigator. Screenshots provide insight to make the most of these new options for both onboard planning and navigation.

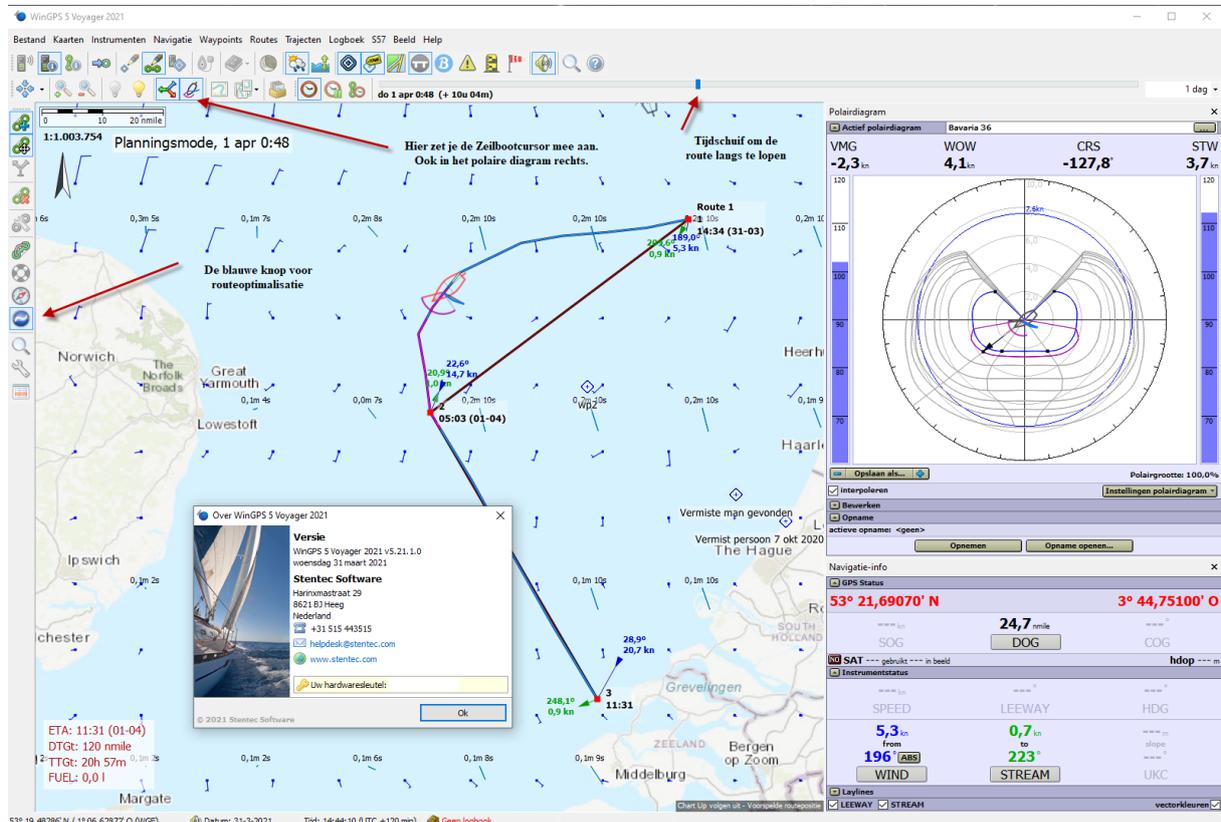
The main new options in WinGPS 2021 are:

WinGPS 2021 innovations	Navigator	For	Voyager	Inland
Display scale value below the scale bar on each map window	X	X	X	X
Update general notifications such as grib files and alarm notifications, such as collision alarm .	X	X	X	X
Easily look ahead along a route with the time slide in planning mode. Look at Course Up or Head Up tracking. 		X	X	Not yet active
Plotting loxodrome route m. (b) v. simulation with constant compass heading to the next route point. 			X	
SAR simulation route of tidal current, life raft, drowning or ship with engine or sails. 			X	
Ship Simulator now steers through the water instead of over the ground at a realistic speed up to the maximum specified speed.	X	X	Sailing simulation with polar diagram	X
Sailboat cursor with mainsail and spinnaker on the map and in polardiagram. Also along planned route and for simulation. 			X	
Electronic reporting with BICS 5.5 from Rijkswaterstaat 				X
CoVadem bIENC with correction water level prediction with time slide				X
Manual Water level correction on the diepte lines and planes of ENC/iENC/bIENC (S57) 				X
NLTides 2021 tided stream and stations supplemented by BSH tidal stations of the German Bend 		X	X	X

We would like to receive from the first users their experiences and suggestions for improvements for future updates. Please respond to helpdesk@stentec.com.

Only the innovations for Navigator, Pro and Voyager are described. For the innovations of WinGPS Inland 2021 such as BICS and CoVadem, reference is made to the Skippers Manual (Dutch) of WinGPS Inland which can be found on the Stentec website with downloads documentation or <https://www.stentec.com/nl/ondersteuning/documentatie> .

Below is a screenshot of the update of WinGPS 5 Voyager 2021 (v5.21.1.0 of 11 March). A route has been plotted on the North Sea and by pressing blue button in the route editing menu the route is optimized. It is clear that this circumvents the wind silence between route points 1 and 2. The red block route text below left, indicates that the 120nmile route will be sailed in 21h. A Bavaria 36 sailing boat is selected equipped with spinnaker.

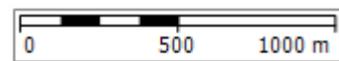


On the following pages we zoom in on the menu with new buttons and the polar diagram, but first something about the new scale value and sailboat cursor.

Display scale value

Under the scale bar of the main chart viewer and the additional chart viewers, a realistic scale value is now drawn at each zoom level. This takes into account the number of pixels, pixel size and dimensions of your display. Because of the Mercator project of the spherical Earth, this is the precise scale value at half height of your screen. When sliding the map to the poles, the scale value changes.

The scale value 1:1.003.754 of the above example means that 1m on your screen is 1,003,754m in reality or about 1004km. Either 1cm on your screen is 10km.



1:27.441

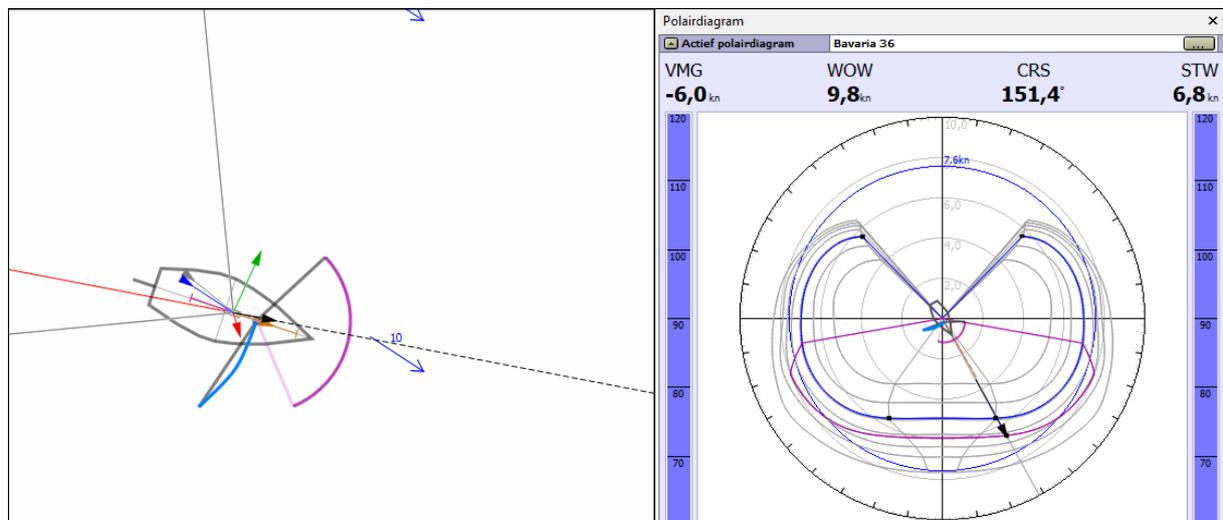
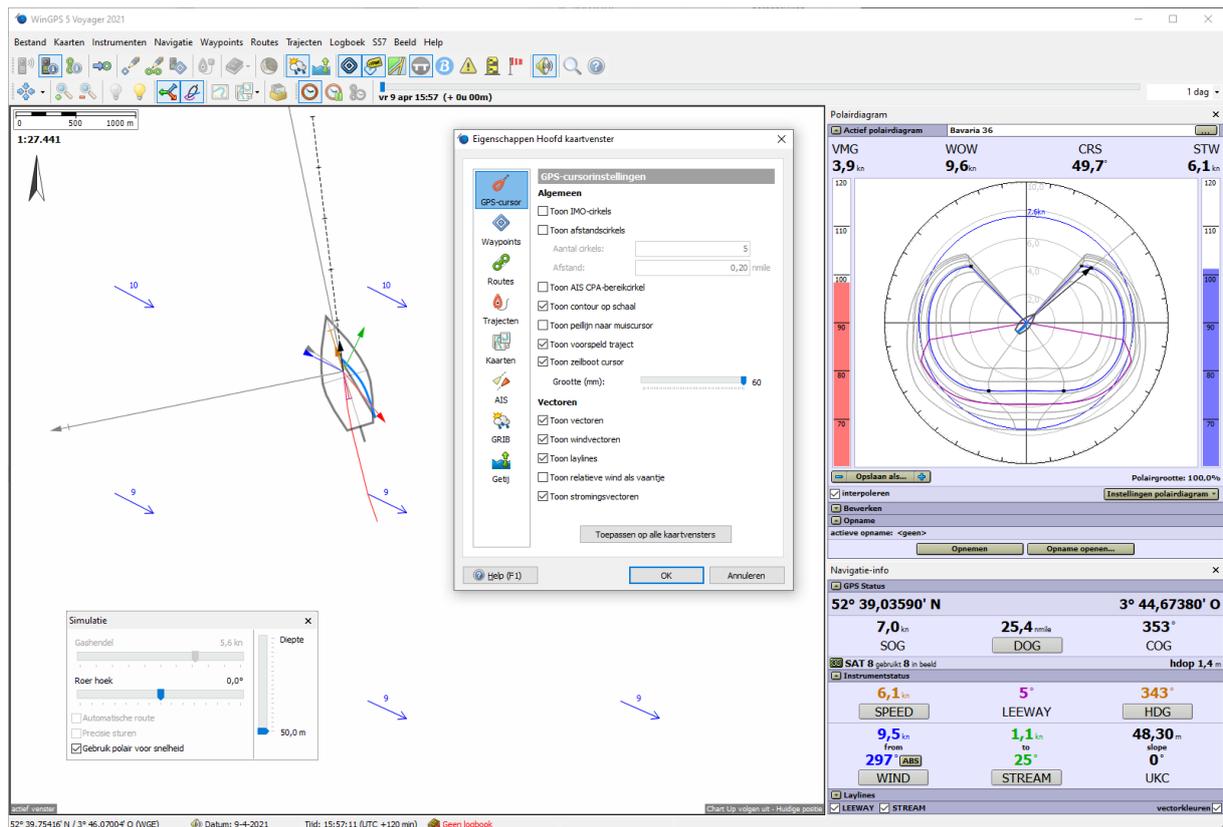


The scale value 1:27.441 on the right means that 1cm 27.441/100 or 274m. This can be measured with a ruler on the screen.

Sailboat cursor with sailing position

On the map menu of each chart viewer an new sailboat cursor button can be found. If you press it, the default position icon is replaced by a scalable sailboat cursor with blue mainsail and purple spinnaker. As in real life, the sailing position is determined by the apparent wind relative to the sailing ship. The mast, boom, spinnaker tree and rudder are also drawn and also the effect of suffering due to wind drift and current.

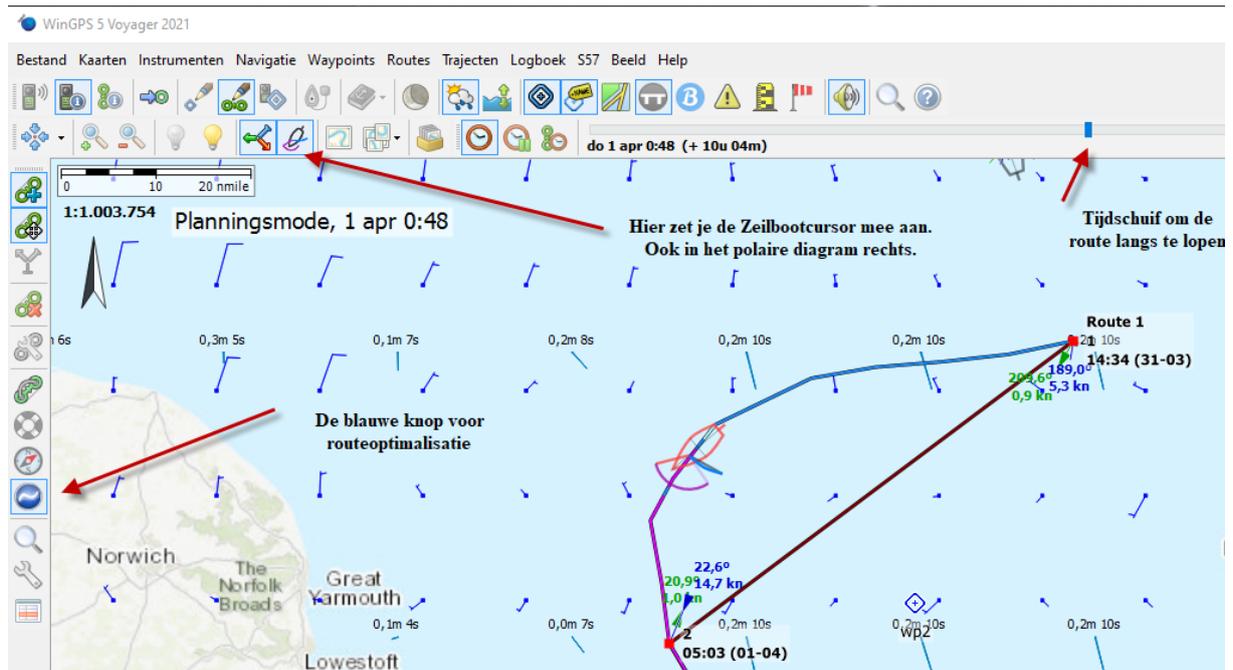
Below the sailboat cursor is displayed as large as possible by sliding the slider at Toon sailboat cursor completely to the right in the Image/Properties hoofdkaart window. At the very bottom, the ship was steered on a wide-wind course with the helm of the simulator.





With the sailboat cursor button in the map canvas menu, the Sailboat Cursor can be turned on.

With the time slider, the sailboat cursor can then sail along the plotted route. See the figure below. The sailing position automatically adjuststo the prevailing wind and current. The spinnaker is automatically hoisted and ironed below the maximum wind speed set for this purpose. The Sailing position matches the color of the route. Blue is a sailing coarse, white a close to the wind or cross course and purple is a coarse where the spinnaker can be hoisted.



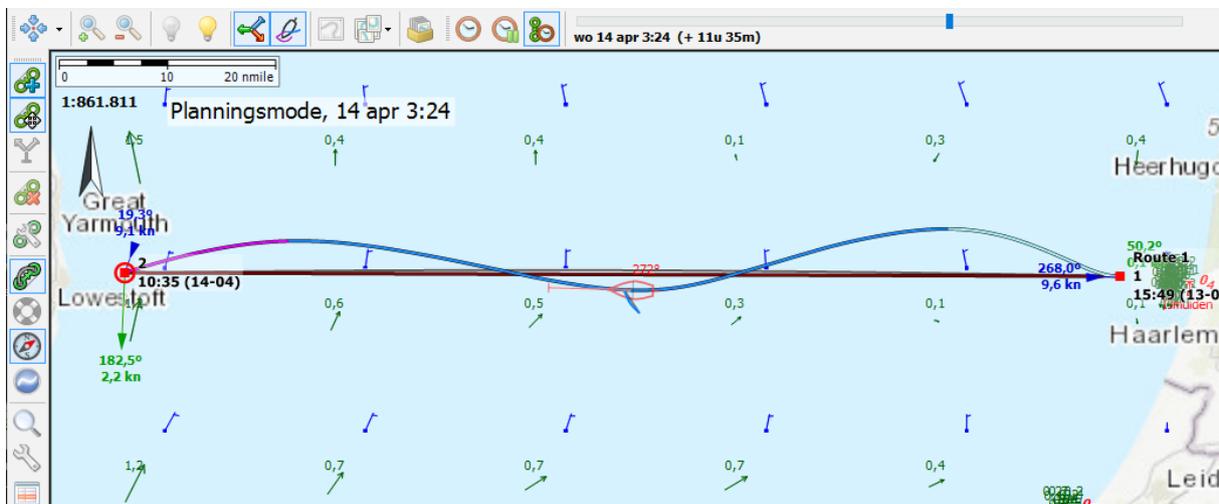


Plotting loxodrome route with.b simulation to the next route point.

At the request of users who want to optimally use WinGPS for a navigation course, an option has been developed that shows the route on the Mercator map of WinGPS if a ship with a 'constant compass course steers to the next point of a route. In cartographer terms, this is called a Loxodrome.

The compass course mentioned below is therefore the true compass **course** corrected for deviation and variation, as measured with a GPS Vector Compass. So compared to the true north.

If the above 'compass button' in the route editing menu is pressed (turned on), the route leg is no longer straight on constant ground course, but a curved loxodrome on constant compass course, as the following example shows (1 leg at compass course of 272 gr). The sailing position must always be adjusted with a white and white cross course. On the right a blue half wind sail course in the middle and a purple piece on the spinnaker on the left near route point 2 on the left side.



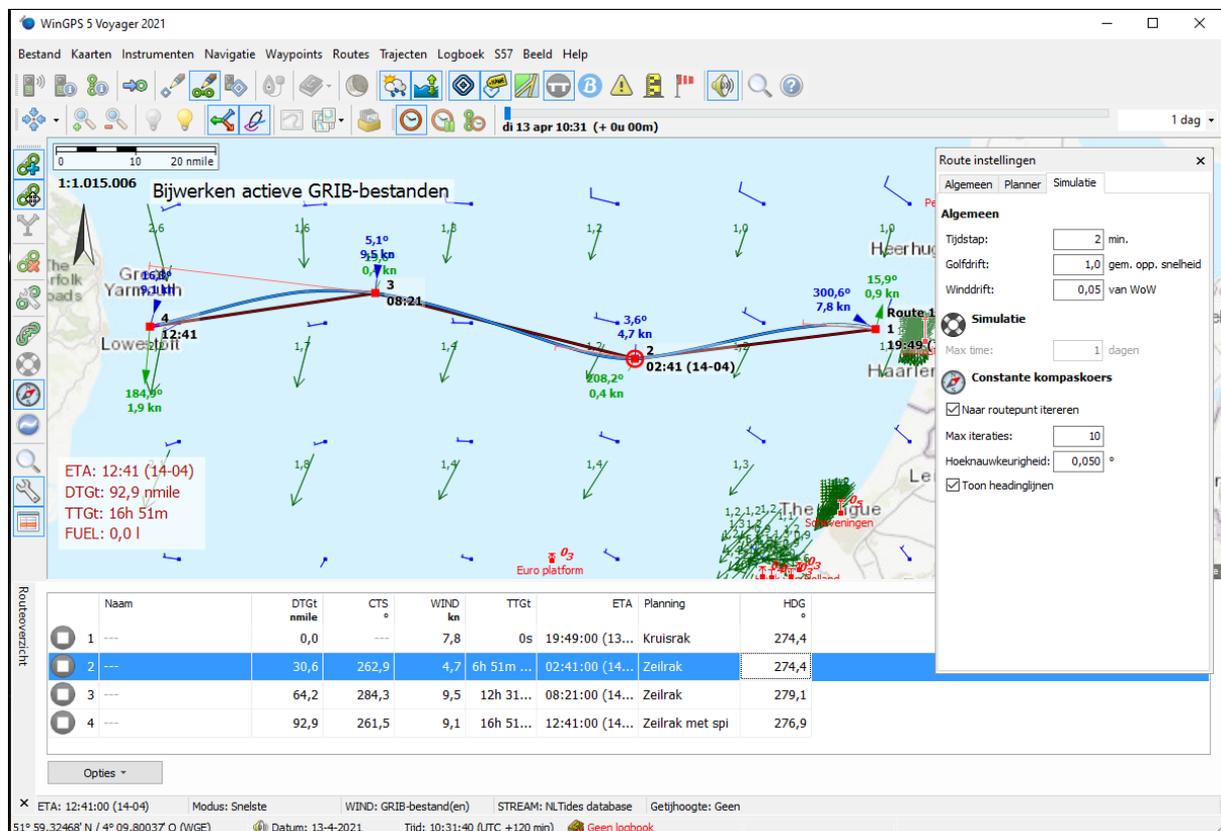
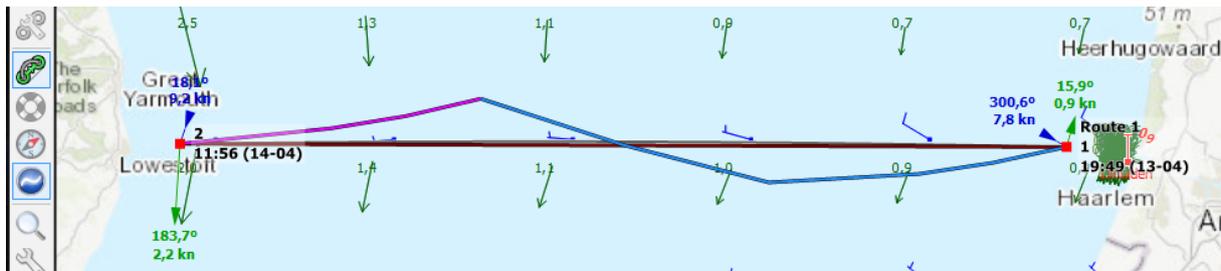
The shape of the loxodrome depends on wind pressure and especially on leeway by current. You can see this tidal effect in the sinus-like route above. This route shape therefore depends very much on the start time of the route. This effect is especially great if the ship speed is low, e.g. at low wind when the current and wind changes have more effect.

On the North Sea crossing above, the Heading (compass angle) to Lowestoft is very close to course West. However, this is not always the case. In this case, the start time is chosen in such a way that there is about 1.5 sine to tide, so that the leeway by the current almost brings the boat back to Lowestoft exactly. At other start times, the angle is much larger or smaller, often also strongly influenced by wind and flow variations. WinGPS takes all these effects into account to determine the most likely Heading based on wind and current forecast.

WinGPS turns off the blue route optimization button when the compass button is pressed. After all, both cannot occur at the same time. The optimal route is always faster than the loxodrome, at least if the fastest route has been chosen as an optimization criterion in route settings/planner.

What can be done is first to make an optimal route (upper fig.) and place route points on it (middle fig.) and then press the compass button(lower fig. with route table). This allows the sailor to change his compass course at each route point. If you select Properties/ Main Map Window/Routes check the Show distances and course check mark, the HDG will be displayed below the route point you are sailing to.

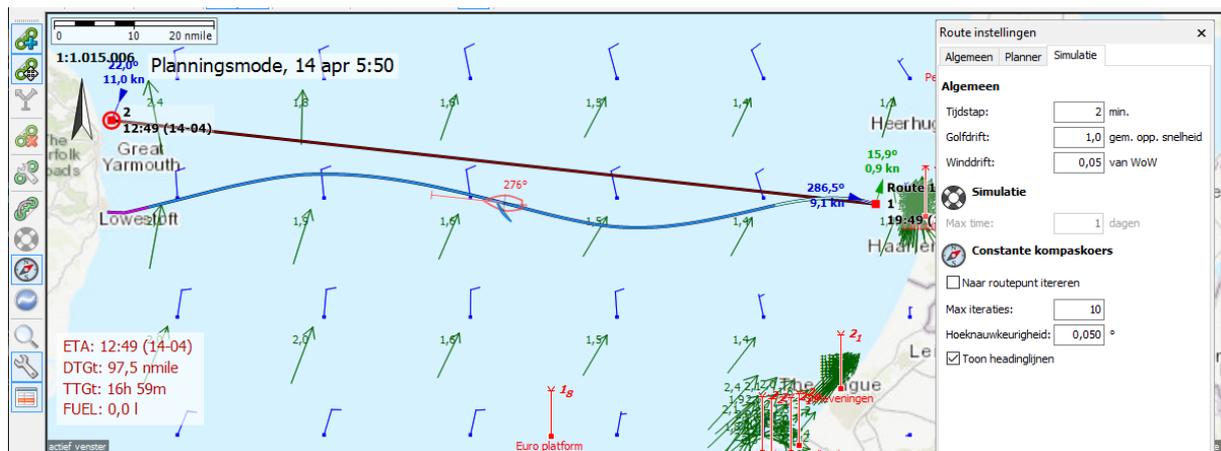
In the bottom figure, the red course lines are turned on with Show heading lines in Route Settings. The HDG of this is located on the right side of the route table where the HDG is selected via Options at the bottom left.



To calculate the shape of loxodrome route and the compass course to be sailed, a simulation method is used as is also used in Sail Simulator (www.sailsimulator.com).

From route point 1, with a set time step and taking into account all current and wind conditions and polar diagram, the often curved shape of a loxodrome is simulated at a constant compass course. Of course the simulation will not end at the desired route point 2, but after a few iterations it will.

Iteration can also be turned off. In that case, the Heading used for simulation is equal to the ground course to be steered (CTS in the table) to the next route point, never reached exactly. Turning off the Iterate option results in the figure below. Plotting is useful for a 2-point route to see where you'll end up if you're sending constant compass heading. You can also change route point 2 to achieve the optimal HDG to reach your destination (see bottom figure).



About Route Settings tab Simulation

The time step and the maximum number of iterations are chosen in such a way that an accurate HDG is obtained. If you are going to play with this: A good setting is the one where the resulting HDG is no longer dependent on the time step or the number of iterations.

New in WinGPS is that the wave drift is also taken into account as a factor of the surface flow caused by waves, (the so-called drowning effect). This is not yet included in route plans and optimization, only in the loxodrome and the lifebuoy simulation. Wind drift is the movement of a floating object like a life raft with the relative wind over the water (WOW). In version 5.21.1.0, the wind drift must be set to zero when sailing because it is already implicitly taken into account in the polar diagram. In an upcoming update, setting wind the drift parameter to zero will go automatic.

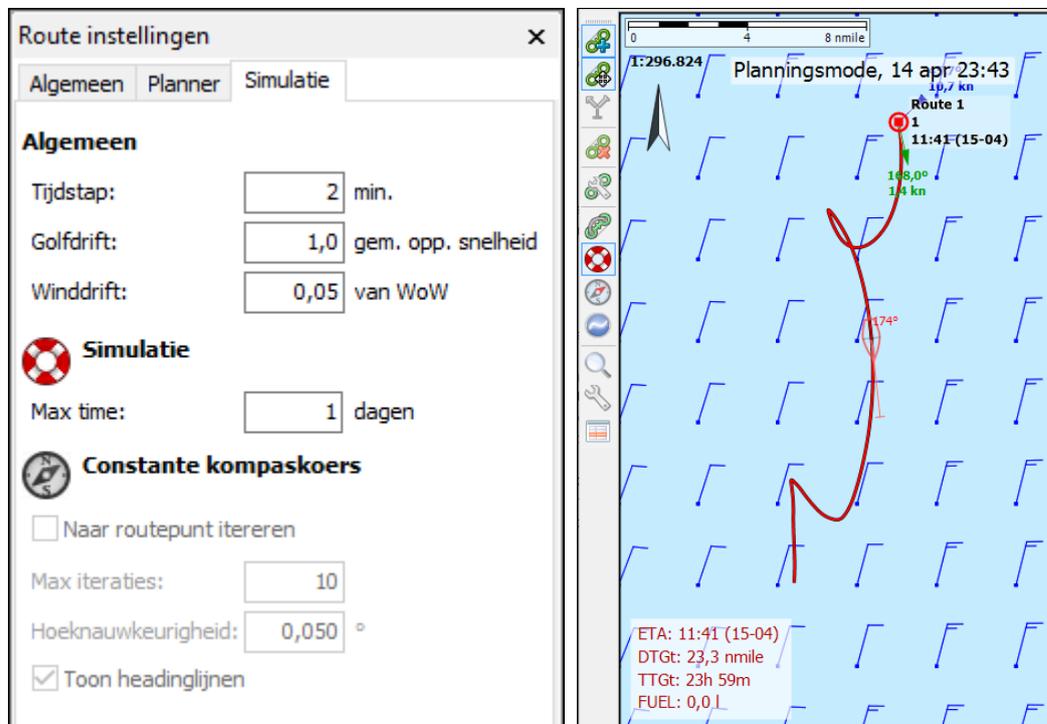


SAR simulation from a route point.

The simulation method used for the above described loxodrome proved to be perfectly usable for simulating the predicted route of a floating object such as a life raft, drowning or (not sailable) ship with engine failure.

This SAR route button is available if you have only 1 route point on the map. At 2 or more route points, this option in the route editing menu turns grey and is unreachable.

The simulation takes into account currents, wind and waves which influences can be set in the Route edit menu via the Simulation tab of Route settings (fig. below). These are the time step, wave drift and wind drift as discussed in the previous paragraph and also the maximum simulation time in days up to a maximum of 365 days. See below a ship in case of engine failure and its one-day route. The curls come from the tidal current changes.



For a good simulation, it is with the current version 5.21. 1.0 still important to strike sail with unstepped mast at Route settings/Planner or choose a motorboat. This will be adjusted in an update.

The SAR simulation can also be used in the detection of drownings and MOB.

NLTides current simulation

It is also possible to simulate the NLTides current in the North Sea. At Route settings/General the default data source of the wind to None, do set the source of the Stream to NLTides database. A long simulation will show an irregularity which is caused by the monthly spring tide cycle. These were called Moonwaves by us after discovery.

For analysis shift the route point with the mouse. Below a flow simulation of 261 days which shows the North Sea circulation. The Moonwaves are clearly visible in front of the Eemsmond in the German Bend.





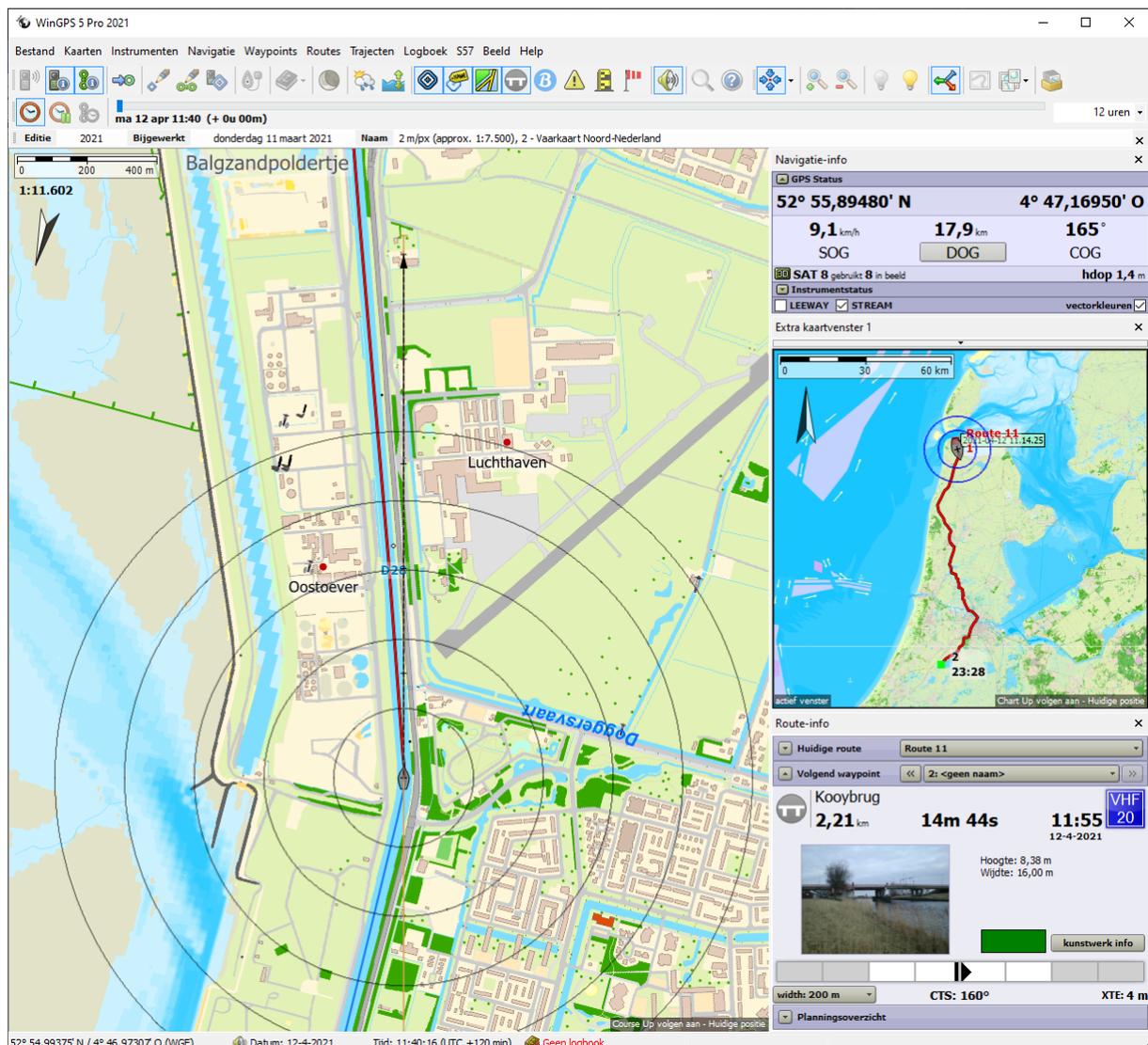
In tracking mode, looking forward along a started route

A nice new feature is to look ahead with the time slider the route you sail along.

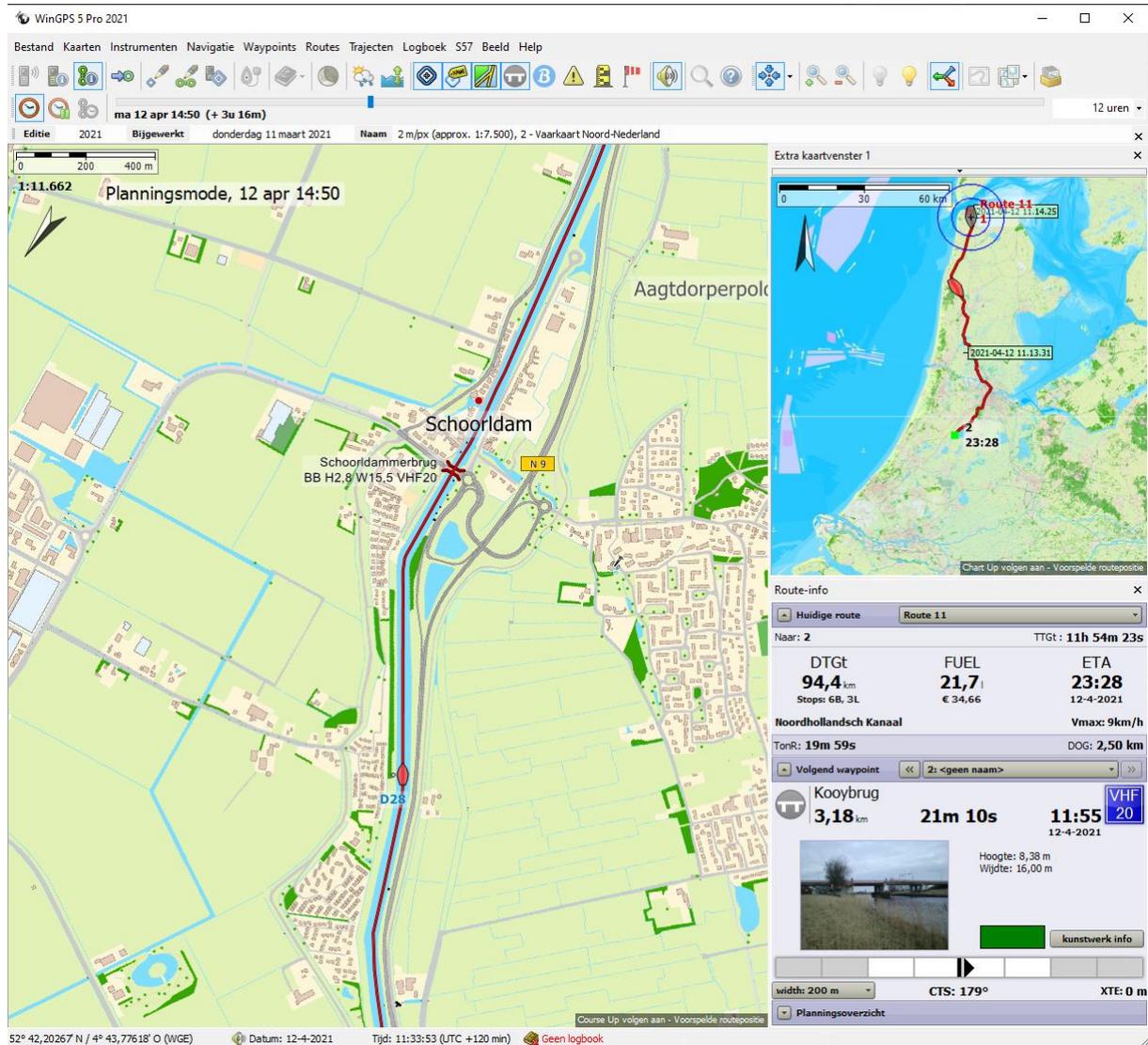
During navigation, the time slider is on the far left so that the map image incl. grib wind real-time is. When scrolling the time slider to the right, the chartviewer content immediately adapts to the time. At the top left of the map a Planning Mode notification is displays the time. This is to warn you that the map image is not real-time.

In addition to NorthUp and ChartUp- tracking, commonly used on open water, CourseUp and HeadUp tracking are now also supported, creating a valuable and hopefully widely used functionality for sailing along the route network of the European inland waterways.

The tracking mode can be set per chartviewer as usual. A common setting when navigating the inland waterways is to set the Main chartviewer CourseUp, or HeadUp if you have touched a compass, and open an Extra chartviewer with an overview in NorthUp mode. Below you can see a 2 screenshots of WinGPS 5 Pro 2021 with respectively navigation and planning mode. The ship is still there in Den Helder but the skipper is already looking ahead in Planning mode to a village called Schoorldam where he wants to moor at 14:50 to have a bite to eat (screenshot next page).

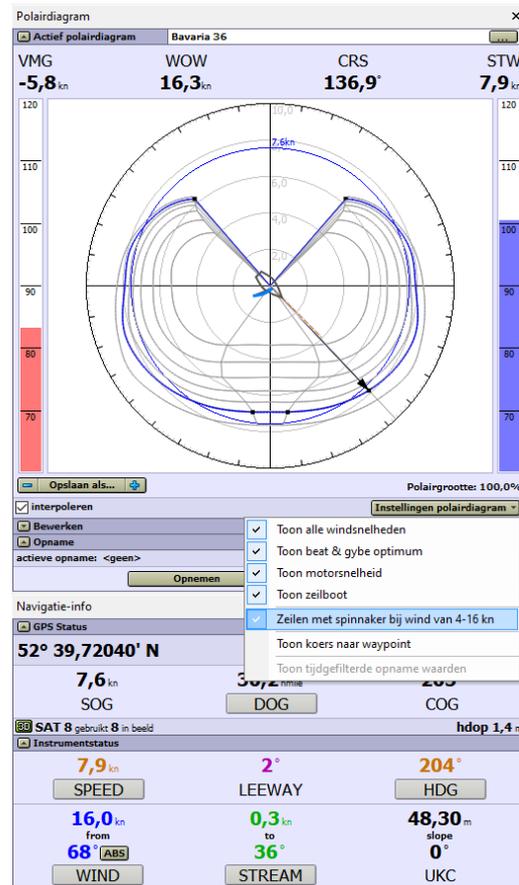
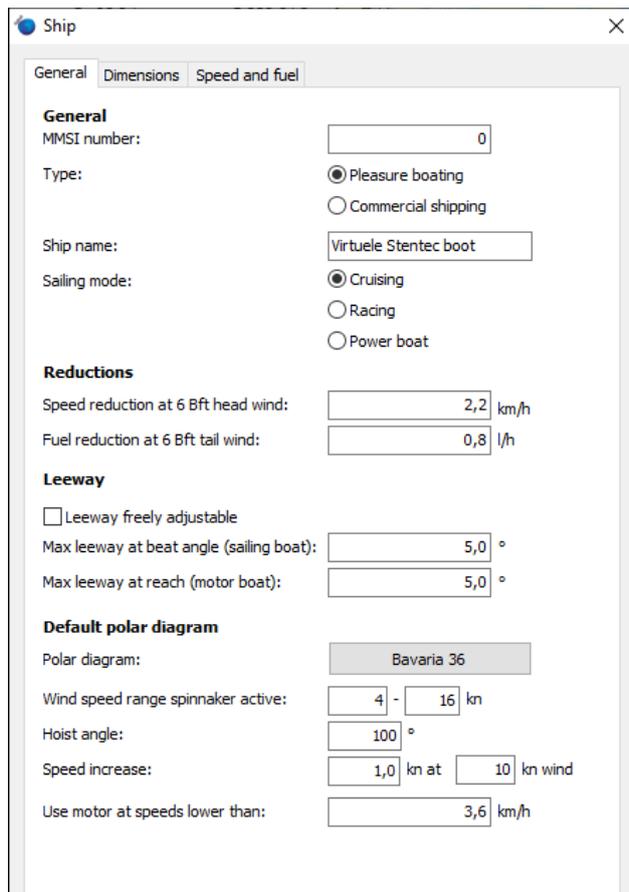


Looking ahead along a route. The route boat is your position in Planning mode 12 Apr. 14:50.
The Route info with bridge photo at the bottom right is not in planning but in navigation mode.



Sailing with Spinnaker

Sailing with or without spinnaker is easy to set with the menu under the Set Polar diagram button at the bottom right of the polar diagram. See figure on the right. Note that the spinnaker is not drawn in the sailboat cursor in the middle of the polar (and therefore not on the map), because the WOW (wind speed over the water) is just larger than 16kn. To much wind for a spinnaker. The spinnaker wind speed range settings can be set to File/Properties/Ship/General. See figure at the left.



At the bottom of the figure left at Ship/General the Leeway model used can be selected. Default Leeway freely adjustable is NOT checked and maximum leeway angles can be entered for a sailing (at beat angle) and power (half wind). Under sailing boat, the leeway- or drift angle is maximum at the wind (at beat angle) and runs linearly to zero in-wind and head wind course. With a boat sailing on the engine, the leeway angle is maximum at half-wind course and declines with a sinus curve to zero at in-wind and head wind course. Both angles are default set at 5 degrees. The leeway angle is the angle difference of the wake behind the boat compared to the midship line and can be easily be determined by bearing from the aft deck.

If the Leeway freely adjustable check mark is checked, the previous method to determine the leeway is used. It runs through the instrument status, where you can enter the leeway angle sailing half wind. For a sailboat it always runs via a sine with maximum at half wind. Typing is not necessary if your compass and log are properly calibrated. The leeway can then be determined directly from the instruments. Unfortunately most logs are not perfectly calibrated under heeling conditions.

Alarm- and general Notifications

WinGPS supports notifications, which are displayed as a communication text at the top left of the map of the main card window. Alarm notifications and general notifications are distinguished.

Alarm notifications inform you what type of alarm is associated with the sound alarm.

General notifications are mainly intended to be informative.

Alarm notifications, where applicable.

- AIS (T)CPA alarm (collision alarm with an AIS ship)
- AIS SART alarm(MOB or ship in distress)
- Alarm zone alarm (if you come in or out of an alarm zone polygon)
- Anchor guard alarm (if the ship comes outside the alarm circle)
- Depth alarm (if the measured depth is less than the set alarm depth)
- GPS position fix lost alarm
- Proximity waypoint alarm (if you come within the proximity circle of a waypoint)
- XTE alarm (if you deviate more than the set limits from your route)

General notifications, where applicable

- Update Active GRIB file (set at Navigation/GRIB manager)
- Daily update notification CoVadem bENC (bathymetric chart)
- Update notification CoVadem water level prediction (every hour).
- Changing the S57 ENC information density (e.g. with menu button)
- Notification when passing route point (in case of audible signal gunshot)
- Planning mode with date and time display map image when using time slider

The XTE alarm, pronounced Cross-Track Error alarm, has a possibility to temporarily suppress its sound alarm by clicking on the speaker next to it. There'll be a dash. See the bold text below. Suppressing turns off when you press the speaker again or automatically when you enter again the XTE limits of the route. In edit mode, this sound alarm can't be changed manually.

Cross-track error alarm! 

The NLTIDES 2021 Tidal flow arrows (green) and tidal stations (red) can be seen in the figure below. On the right the 2021 addition of the current BSH tidal stations of the German Bend is shown. Using at the time slider, the vertical red tidal height levels move along with the tidal wave that runs from SW to NE along the North Seacoast and Waddensea.

