

GPSResults V6.146

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commercial usage of the program, e.g. for evaluation of contests is explicitly **not allowed** without consent of the author.

In order to get a keycode for the program after the free 30 days trial period or information about the competition-enabled Pro-version, please request infos from:

info@gps-speed.com

The software is provided without any warranty, expressed or implied, including without limitation warranties of merchantability or fitness for a particular purpose. In no case shall the program author be liable for any loss of profits or any other commercial damage, including special, incidental, consequential or other damages occasioned by use of this software.

A. Recommended Computer Configuration:

Operation System: Microsoft Windows XP or newer (Windows 7, 8, 8.1, 10).

There is also a dedicated **Apple**-version for **MAC OSX 10.4** (or later) as well as a dedicated **PDA**-version (**Microsoft CE 2003** or later) available from the download website.

Memory (RAM): 1024MB or more

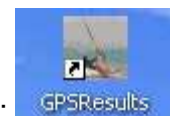
Display: XGA (1024x768) minimum, better SXGA (1280x1024) or more

Wheel Mouse

B. Installation:

Download the latest program version from http://www.gps-speed.com/download_e.html by clicking the link **GPSResults V6.146**, open or save, and install **GPSResults**:

After the installation the **GPSResults**-icon will appear on your desktop:



home description GPS-tips GPSLogIt download

Download

[Quickstart Description](#) [Detailed Description](#)

in order to download the free trial version, click one of the links below, save the file, instal and start GPSResults.exe

GPSResults V6.146 for Windows® 8, 7, Vista, XP

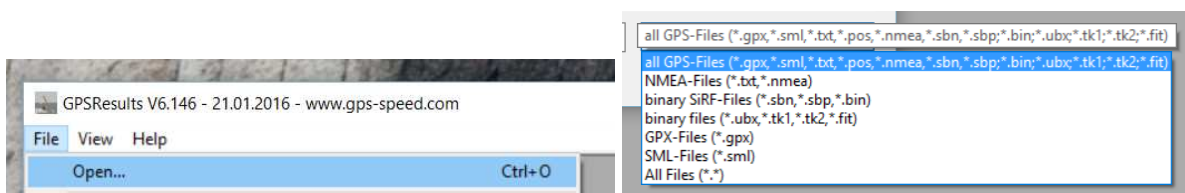
Microsoft Redistributables: VCRedist_X86

#	time	[s]	[m]	[knots]	+/-	[m/s ²]	Sats	HDOP
1787	09:38:49.000	1.0	22.0	42.687	0.233	-0.0	7	1.2
1788	09:38:50.000	1.0	22.1	42.881	0.233	0.1	7	1.2
1789	09:38:51.000	1.0	22.1	42.901	0.233	0.0	7	1.2
1790	09:38:52.000	1.0	21.9	42.609	0.233	-0.2	7	1.2
1791	09:38:53.000	1.0	22.2	43.076	0.233	0.2	7	1.2
1792	09:38:54.000	1.0	22.0	42.784	0.233	-0.2	7	1.2
1793	09:38:55.000	1.0	22.6	44.028	0.233	0.6	7	1.2

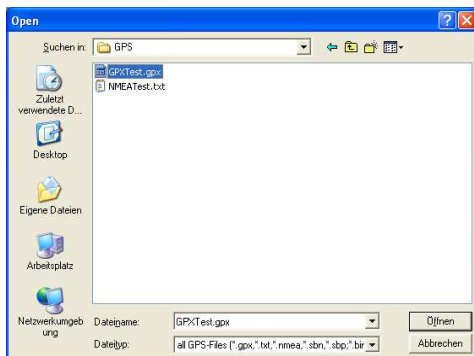
C. Start GPSResults, Select GPS-Datafile

Start GPSResults by double-clicking the **GPSResults-icon** on your desktop, click **File -> Open** to open an existing GPS-datafile: *.gpx, NMEA-format: *.txt, *.nmea, or binary datafile from the Navi GT11/GT31 *.sbn, *.sbp, *.bin. *.ubx, *.fit, *.tk1, and *.tk2-file formats are also supported.

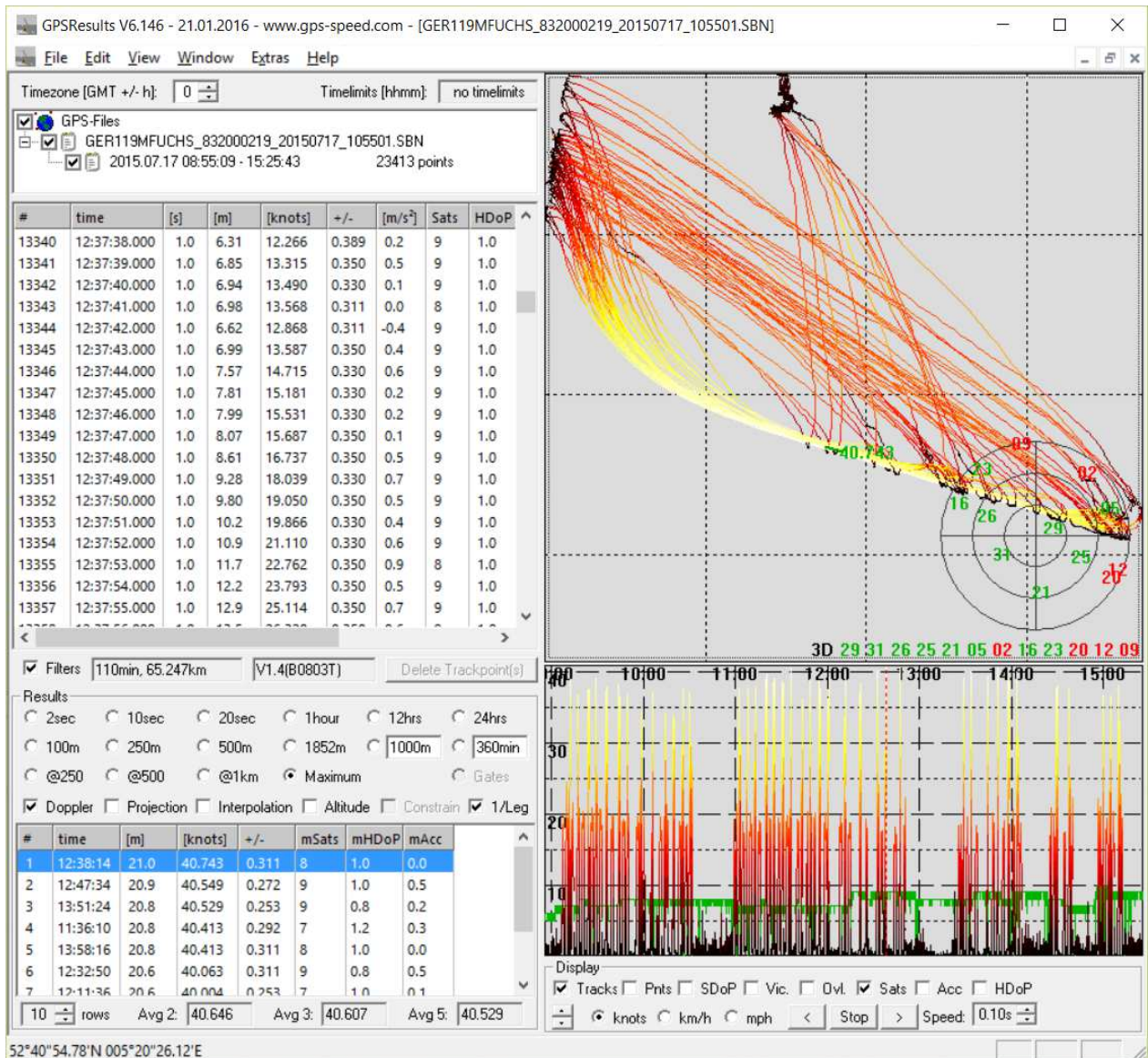
Another possibility is to drag and drop the GPS-datafile over the GPSResults-icon, this will automatically load the corresponding file.



A file-selector box will come up, select and open or double-click the file you want to analyze:



The file is read and analyzed with the program default settings:

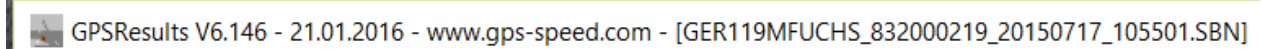


The colors of the tracks, the background, and the tick-lines can be modified by repeatedly pressing the **o**-, **k**-, and **l**-keys. The settings are saved when the program is closed.

D. GPSResults Main Window Sections

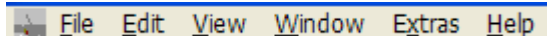
Title Bar

The title bar shows the program-name and version and in parenthesis the selected GPS-filename:

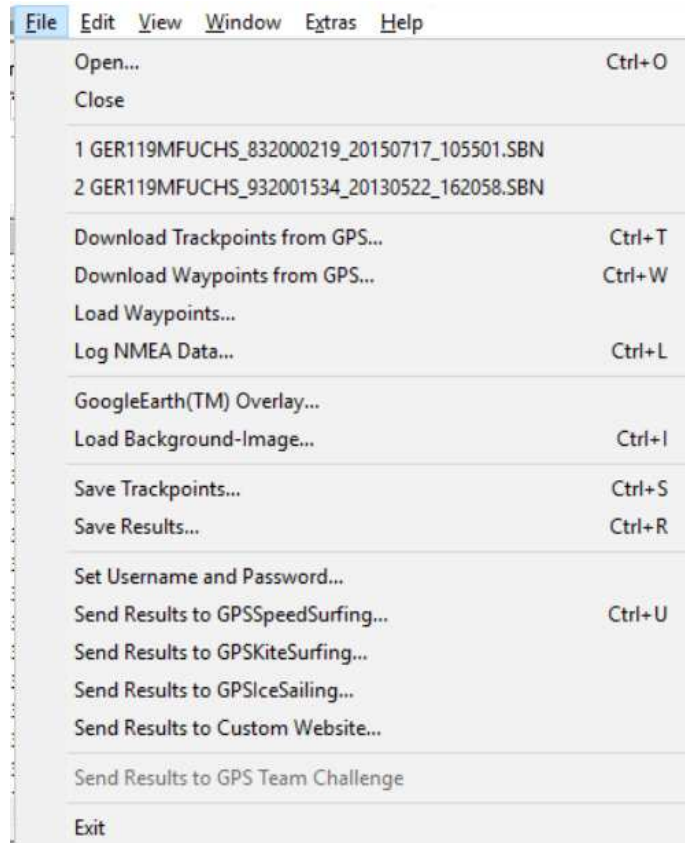


Menu Bar

The menu bar contains the datafile access- and the program-options:

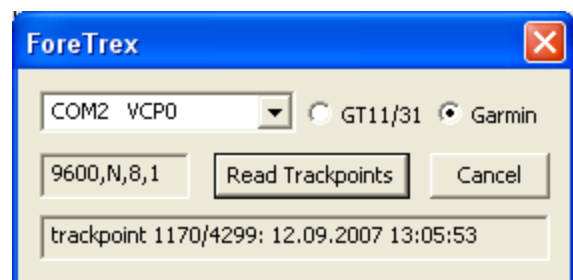
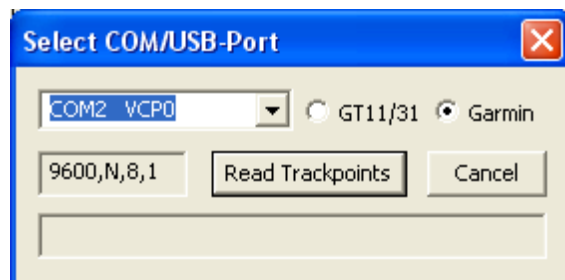


File contains:



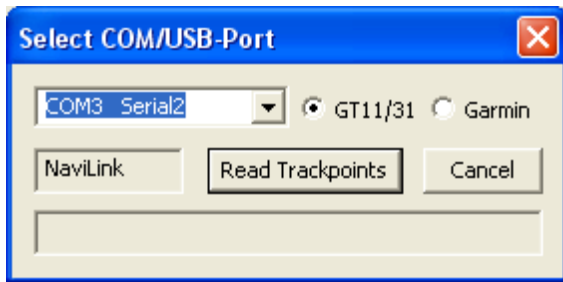
- **Open...** invokes a fileselector-box and loads GPS-files (**gpx**, **txt**, **nmea**, **sbn**, **sbp**, **bin**, **ubx**, **fit**, **tk1**, or **tk2**) from disk or SD-card,
- a **recent files list**,
- the direct **Download Trackpoints from GPS...** option for Garmin® GPS (serial port via USB-serial adaptor (Geko®, Foretrex®) or USB-port (Edge®)) or for Navi GT11/GT31® (integrated serial port emulation via USB-port and **NaviLink**).
First select GT11/31 (COM-ports only, USB-serial interface driver has to be installed first) or Garmin® (COM-ports for Geko® or ForeTrex®, USB for Edge® (USB-driver has to be installed)). In the USB/COM-port selection only existing COM-ports are displayed. USB-serial adapters show up as VCPx (VirtualComPort), select the correct port, switch GPS on, then click **Read Trackpoints**. The download of the trackpoints starts and may take a while, since due to the limited speed of the serial interface only about 20points/s can be transferred, the progress is indicated in the lower field:

Garmin® Geko® / ForeTrex®:

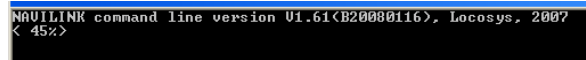


After successful download of the trackpoints you will be asked for a filename to save all points in GPX or TXT (NMEA) format.

Navi GT11/GT31 ®:



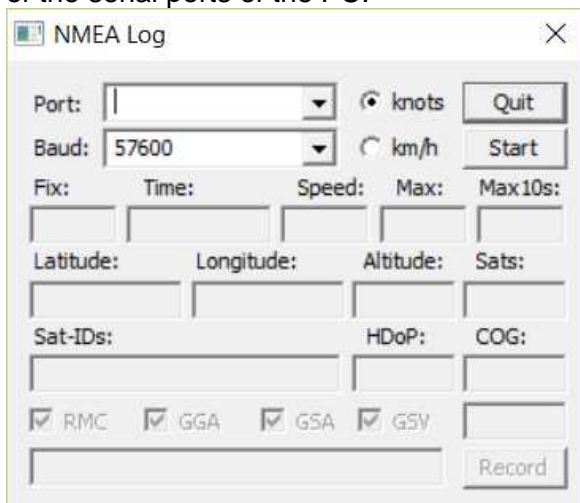
Select a filename for the **BIN**-file, **Navilink** has to be installed (**nvk.exe**, comes with the GPSResults-instalalltion) and the Navi has to be set to **NAVILINK**-mode.



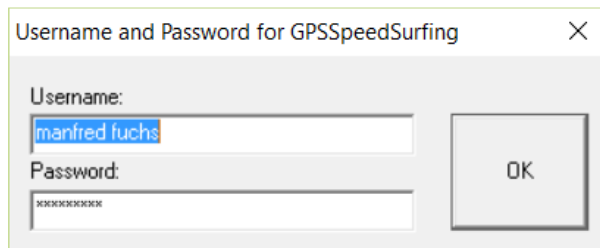
Finally, the best runs from the Navi-**SPEEDGENIE** are shown, before the downloaded trackpoints are displayed.

If you use a Garmin Edge®, select **USB** and download trackpoints (much faster: 600 points/s). First download trackpoints with Garmin Training Center® to unlock the last tracksegment which would be missing otherwise.

- **Download Waypoints from GPS...** and
- **Load Waypoints...** can be used to download or load gate-positions from a file for gated speed-evaluations or for display of waypoints.
- **Log NMEA Data....** can be used to log NMEA data from a GPS-logger connected to one of the serial ports of the PC:



- **GoogleEarth® Overlay...** start and opens GE (has to be installed and a connection to the internet is needed) with the active trackpoints (no screenshot shown due to copyright reasons).
- With **Load Background-Image...** background images in different formats (jpg, png, tif, bmp, etc...) can be selected for overlay with the GPS-tracks.
- The **Save Trackpoints...** function export trackpoints in **SBP**-, **GPX**-, **NMEA** (txt)-, **DAT**- or **CSV**-format,
- **Save Results...** saves the results of all categories to a text-file.
- **Set Username and Password...** can be used to specify www.gps-speedsurfing.com (GP3S) username and password for automated upload of the results:

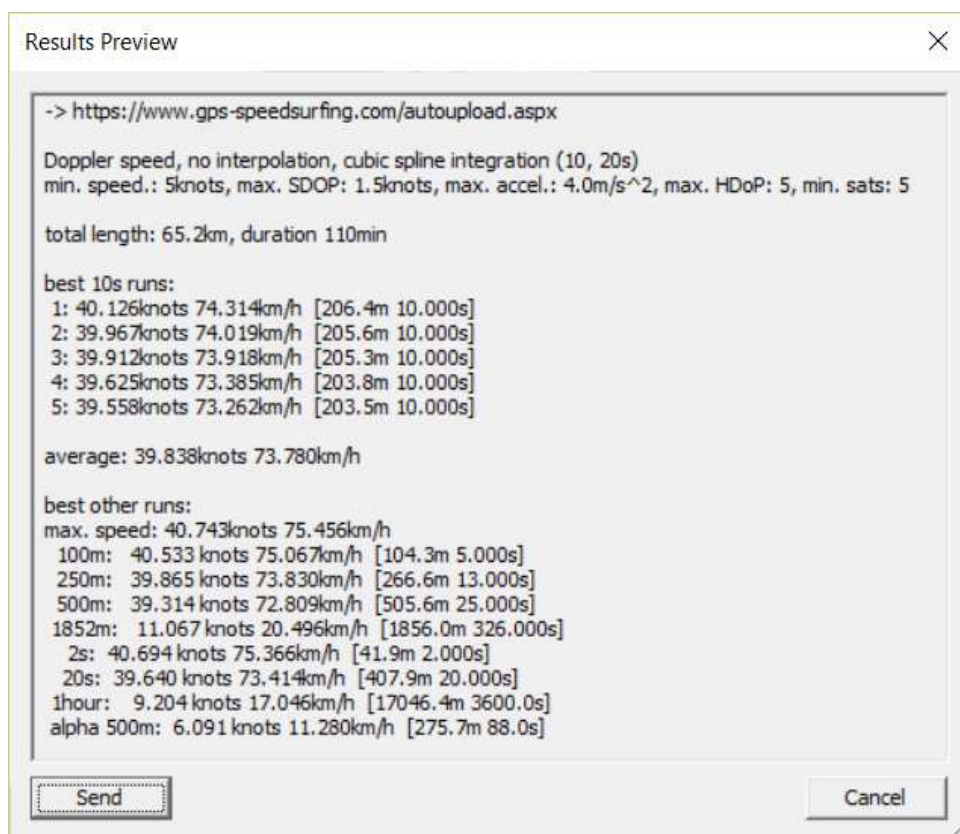


- **Send Results to GPSSpeedSurfing...** or
Send Results to GPSKiteSurfing... or
Send Results to GPSIceSailing... or
Send Results to Custom Website...

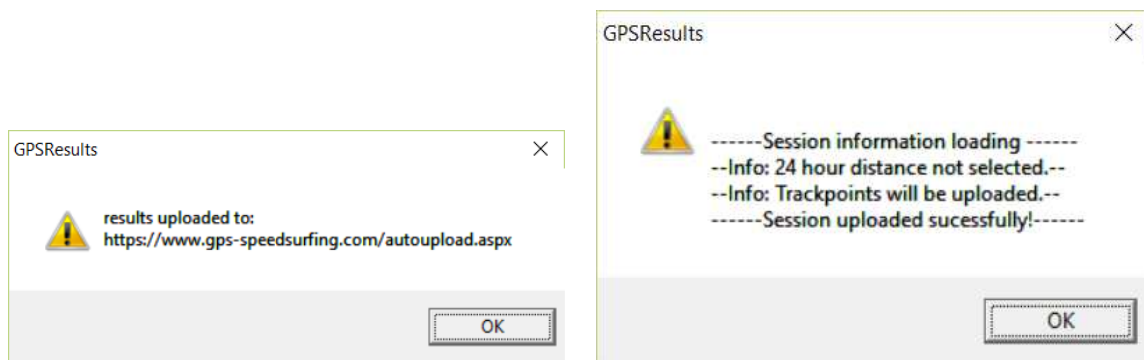
is used to upload the results automatically to the corresponding internet-servers. You have to put in the same username and password that you use for GP3S and of course there must be a connection to the internet available to upload the results:

If you send results from GPS-data containing Doppler-speeds these more accurate speeds will be transmitted automatically - independent of the setting of 'Doppler'-mode selection!

The results to be sent are listed in a resizable dialog window for review and can be sent to the corresponding server by clicking the '**Send**'-button (internet connection required!).

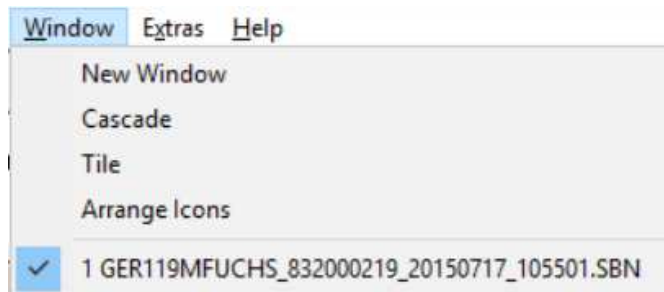


A successful transmission is indicated by the following messages:

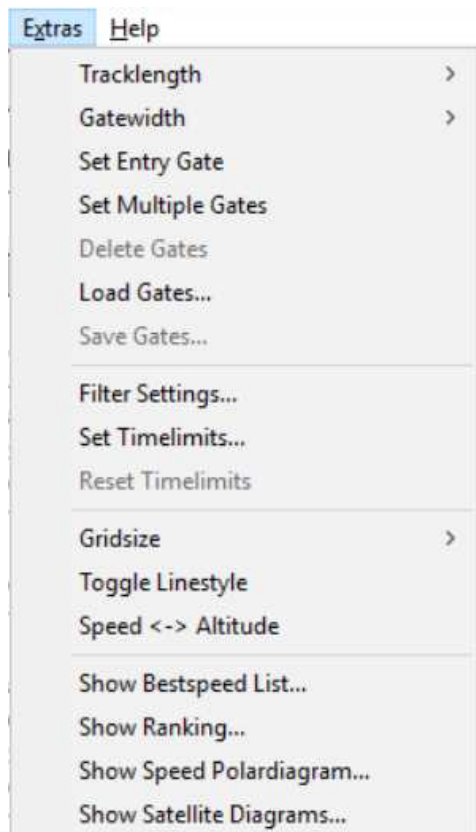


After upload of the results the log-in page of the corresponding server is invoked, log-in and add the missing fields and comments before posting the results.

Window (multiple GPS-files can be displayed simultaneously by selecting **Tile** or **Cascade**):



Extras contains all program-options (first section for gated evaluations, etc.):



Help - About shows a short online help text and the **machine number** of your computer that is needed for program registration and keycode generation after the 30 days trial period:



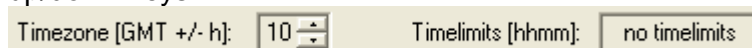
Under '**License**' the machine-number appears again and the keycode can be obtained via PayPal® payment and entered in the lower left field:



Main GPSResults-window:

Timezone and Timelimits

In the upper left the **Timezone** estimated from the mean longitude and the optional **Timelimits** for restricted evaluations (competitions) are shown and can be adjusted by the up/down-keys:

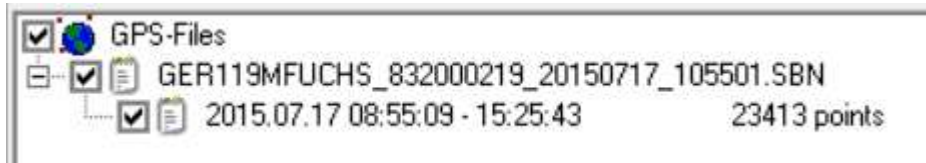


Files and Tacksegments

The **tracksegment(s)** of the loaded file(s) follow below indicated by their **filename(s)** and the **tracksegment(s)** displayed with start-date and -time and end-time together with the number of trackpoints.

GPX-tracks may contain several tracksegments from different dates, they can be selected by **left-clicking** the corresponding check-boxes in this subwindow.

In the private user version of GPSResults up to 3 files from different surfers can be loaded and processed simultaneously for e.g. 5x10seconds rankings or gated 500m rankings. The competition version can handle a virtually unlimited number of files for speedweek evaluations simultaneously:



Trackpoint-List

The second list contains the **trackpoints** indicated by their corresponding index **#**, **time**, duration in [**s**]econds, traveled distance in [**m**]eters and speed in [**km/h**], [**mph**], or [**knots**], the acceleration [**m/s²**], and the altitude **Alt** [**m**]. Resizing the height of the main window will also resize the height of the trackpoint list:

#	time	[s]	[m]	[knots]	[m/s ²]	Alt[m]
3050	16:12:48.000	1.0	21.6	41.896	-0.1	2.7
3051	16:12:49.000	1.0	21.8	42.395	0.3	2.7
3052	16:12:50.000	1.0	21.9	42.481	0.0	2.7
3053	16:12:51.000	1.0	22.2	43.060	0.3	2.8
3054	16:12:52.000	1.0	22.4	43.475	0.2	2.9
3055	16:12:53.000	1.0	22.2	43.147	-0.2	3.0

For **NMEA-** or **binary-files (SBN, SBP, UBX)** containing more information (or **GPX-files** exported from **NMEA-files**), this information is shown in the right columns (number of **Sats**, **HDOp** (horizontal dilution of precision), **COG** (course over ground) and **Doppler-speed** (and Doppler-speed-error **SDOP (+/-)**) in knots, mph or km/h depending on the **Units**-setting):

#	time	[s]	[m]	[knots]	+/-	[m/s ²]	Sats	HDOp
13374	12:38:12.000	1.0	20.9	40.724	0.311	0.4	9	1.0
13375	12:38:13.000	1.0	20.9	40.646	0.311	-0.0	9	1.0
13376	12:38:14.000	1.0	21.0	40.743	0.311	0.0	8	1.0
13377	12:38:15.000	1.0	20.9	40.587	0.311	-0.1	8	1.0
13378	12:38:16.000	1.0	20.5	39.946	0.311	-0.3	9	1.0
13379	12:38:17.000	1.0	20.4	39.635	0.292	-0.2	9	1.0

The **scrollbar** at the right side of the list or the **up/down-keys** can be used to scroll through the trackpoints in the neighborhood (+/- 250 trackpoints) of the automatically selected, highlighted trackpoint(s). Scrolling over a larger range of trackpoints can be achieved by clicking into the lower right **speed over time**-window or the **N**-(next) or **B**-(back) keys. The **selected trackpoint(s)** are **highlighted** in the position plot on the right hand side, the speed of the **first selected trackpoint** and in NMEA- or binary-data the **sky-view** (radar-plot) and **satellite strengths** are also displayed, if **Sats** is selected in the **Display**-section.

Total Travel Time and Distance

Below the trackpoint list comes the total travel time (computed from valid trackpoints only) in **minutes** and total distance in **km**:

53min, 12.832km

Firmware version (GT31)

Is displayed in the next panel:

V1.4(B0803T)

Delete Trackpoints

The **Delete Trackpoint(s)**-button becomes active, when trackpoints are selected (left-clicked) in the trackpoint list, several trackpoints can be selected by **Ctrl & left-click** or **Shift & left-click** (selects a range of trackpoints). Clicking the button will delete the selected trackpoints and a new analysis will be performed automatically. The deleted trackpoints will be removed from the trackpoint list, but not from the GPS-file. In order to permanently remove invalid points, the data can be exported via **File->Save Trackpoints...**:

Delete Trackpoint(s)

Filters / Limits for Valid Trackpoints

In the **Filter-Settings** (under **Extras**) invalid trackpoints can automatically be excluded from the analysis by defining minimum speed (**knots**), minimum speed error (**knots**), maximum acceleration (**m/s²**), maximum **HDoP**, and minimum number of **Satellites**:

Filter Settings

minimum speed [knots]: 5

maximum speed error [knots]: 1.5

maximum acceleration [m/s²]: 4.0

maximum HDoP: 5

minimum number of satellites: 5

Alpha radius [m]: 50

UBX_Doppler: U112 U111 U106

error propagation: Average Gaussian

cubic spline integration (10/20s Doppler)

number of averages for ranking: 2

split file into segments [h]: 2

Cancel OK

maximum speed error [knots]

Maximum error of the Dopplerspeeds (+/-)-column, available only for GT31, GW52 or U-Blox-based GPS-devices..

maximum acceleration [m/s²]

Maximum Acceleration [m/s²] determines the maximum allowed acceleration in m/s², it is useful to suppress outliers (spikes) in the GPS-data. The affected trackpoints will not be deleted, but just ignored during the speed computations. The default value of 5m/s² can be lowered until all spikes are vanished.

maximum HDoP

maximum HDoP (horizontal dilution of precision – binary, **NMEA**-data or **GPX**-data with this information only). Invalid trackpoints with larger HDoP-values are not considered during the evaluation of speeds and are shown with a red background in the trackpoints-list.

minimum number of Satellites

minimum number of satellites (**NMEA**-data or **GPX**-data with this information only). Invalid trackpoints with smaller number of satellites are not considered during the evaluation of speeds and are shown with a red background in the trackpoints-list.

Invalid trackpoints (e.g. missing points, see time differences in the **s**-column) or those without valid fix (**NMEA**) are shown with a **pink** background in the trackpoint list and are ignored (skipped) in the evaluations (**orange** and **red** indicate points skipped due to the limit-settings):

Results

The next section contains the **results mode selection** and the corresponding **results list**. In the lower half up to 100 best results (**rows**) of the actual evaluation mode are shown, the mode can be adjusted by the checkboxes and radio buttons in the upper half of this section:

The screenshot shows the 'Results' window with the following settings:

- Time: 10sec (selected), 2sec, 20sec, 1hour, 12hrs, 24hrs
- Distance: 1000m (selected), 100m, 250m, 500m, 1852m, 360min
- Category: @500 (selected), @250, @1km, Maximum, Gates
- Options: Doppler, Projection, Interpolation, Altitude, Constrain, 1/Leg

#	time	[m]	[knots]	+/-	mSDoP	min	max	mSats
1	12:47:43	206.4	40.126	0.255	0.272	39.441	40.549	9
2	11:36:17	205.6	39.967	0.306	0.350	39.557	40.413	7
3	12:38:19	205.3	39.912	0.307	0.330	37.983	40.743	8
4	13:51:29	203.8	39.625	0.272	0.330	37.808	40.529	9
5	12:11:40	203.5	39.558	0.257	0.292	38.721	40.004	7
6	12:32:52	202.9	39.432	0.272	0.311	39.052	40.063	9

Summary statistics at the bottom:

- 10 rows
- Avg 2: 40.047
- Avg 3: 40.002
- Avg 5: 39.838

The first column shows the rank, the second the finish-time, the third the traveled distance, the fourth the average speed in **[km/h]**, **[mph]**, or **[knots]**, depending on the **Units**-selection. The next columns indicate the averaged error **+/-**, the maximum error **mSDoP** the **minimum** and **maximum** speed during that run in the same units. With binary or **NMEA**-data more parameters are shown in the right columns: **mSats**: minimum number of satellites, **mHDoP**: maximum HdoP, **mAcc**: maximum absolute acceleration during the corresponding run. The **average** of the **best two**, the **best three** runs and of the **best five** runs (e.g. for **GPS-SS 5x10sec** evaluation) are displayed in last row of the Results-section.

Gates

shows the best speeds (when gates are defined) within the gates for all trackpoints of the selected Tracks/ Tracksegments with the corresponding times. See below how to set the gate positions.

2sec / 10sec / 20sec / 1hour / 12hrs / 24hrs

shows the best speeds over at least 2sec, 10sec, 20sec, 1hour, 12 hours or 24 hours from all trackpoints of the selected Tracks/Tracksegments with the corresponding additional settings.

100m / 250m / 500m / 1852m and custom distance or time categories

shows the best speeds over at least 100m/250m/500m/1852m from all trackpoints of the selected Tracks/Tracksegments with the corresponding additional settings.

The **Alpha** categories **@250**, **@500**, and **@1km**, are for maxima of **250m**, **500m**, and **1km** length runs including a jibe with less than **50m** (see **Filter Settings** under **Extras**) distance between start- and end-point.

Maximum

shows the best speeds from all trackpoints of the selected Tracks/Tracksegments and the corresponding additional settings.

Doppler

uses much more accurate Doppler-speed data for all evaluations instead of the more error prone speed values from positional differences. This option is active only if Doppler-speed data are available e.g. from Navi GT11/GT31® NMEA or binary data.

Projection

controls projection of the travelled (curved) distance to a straight line instead of using the really travelled (accumulated) distance for speed computations (with and without **linear interpolation**). **Projection** results in slightly slower speeds because the travelled distance is in general longer than the projected distance.

Interpolation

With this checkbox the selected track- or time-lengths will be interpolated exactly from the GPS-data, leading to more accurate and often slightly improved results.

When **Interpolation** is switched off the track- or time-segments will be added conventionally until the selected value is reached. For example with the **500m** selection the average over at least 500m will be used (the really travelled distance is displayed as second number in the **Results** list).

When **Interpolation** is switched on, the average speed over the exact track- or time-lengths is computed by linear interpolation of the first or last trackpoints, depending on which piece was the slower one. Thus, only as much as necessary of the slower interval is used. In most cases this leads to slightly better average speeds. Only in cases where e.g. the first and the last sections were faster than the middle sections, the conventional method gives better, but more inaccurate averaged results, since then the average of the longer distance is better than the average of the really wanted distance.

Altitude

With this checkbox the often rather inaccurate elevation measurements of the GPS can be ignored for the evaluation (mostly results in rather small differences).

Constrain

allows to spatially constrain the evaluations to a defined rectangular competition area (start- and end-lines set by **Shift & Click** or **Shift & Drag**, width determined by the **Trackwidth**).

1/Leg

shows one result per run only. Run start and end are defined by velocities below min. speed (Limits section) or direction changes larger than 90degrees in less than 20 seconds (not possible together with Gates, Alpha-, or 1hour-categories).

rows

This setting determines how many results per category are computed, displayed, and saved in the results-list. If one of the result rows is clicked with the left mouse button, the corresponding trackpoints are highlighted and the zoomed timerange in the speed over time window is automatically readjusted.

Avg2

shows the average of best and second best speed in knots or km/h, depending on the context menu setting.

Avg3

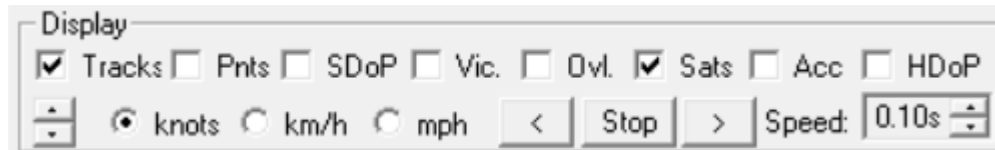
shows the average of best three speeds in knots or km/h, depending on the context menu setting.

Avg5

shows the average of best five velocities (important for **GPS-SS 5x10sec** averages).

Display

The checkboxes in the display-section control what is displayed in the graphical windows on the right side of the GPSResults-window. With GPX-data only **Tracks**, **Pnts**, and **Acc** can be activated.



Tracks connects neighbored valid trackpoints by colored lines, the line color depends on the speed and can be changed via the context menu or **Extras**.

Pnts shows valid trackpoints by small circles, in the case of **NMEA**-data with **HDoP** the radius of the circle is the **HDoP**-value indicating the confidence of the individual trackpoints (bubble-plot), if **HDoP** is switched on. **Waypoints** with their corresponding labels are also shown if **Points** is switched on.

SDoP shows the error limits of Dopplerspeeds (if available).

Vicinity shows valid trackpoints in the vicinity of the selected trackpoint only (+/- 60sec).

Ovl. displays / overlays the best runs of the selected category (number of rows is taken into account).

Sats displays the number of satellites in the speed over graphics and activates the **sky-view** (radar-plot) and satellite **strength** display in the tracks-graphics (**NMEA**-data only).

Acc displays the acceleration over time centered and enlarged, the broken line indicates zero acceleration (= constant movement).

HDoP displays the Horizontal Dilution of Precision in the speed over graphics and activates the **bubble-plot** in the tracks-graphics, if **Points** is switched on (**NMEA**-data only).

Units

Selects what units **km/h**, **mph** or **konts** are used in the trackpoint and results-list:

Playback

adjustable delay time to control the playback speed for replay **>** or reverse replay **<** of the trackpoints. The start timepoint has to be selected first by clicking into the lower right speed over time window.

Status Bar

Depending on the mouse position different information is displayed, mouse over tracks-display: longitude and latitude

52°40'52.48"N 005°20'15.87"E

Mouse over speed-graphics: date, time, speed (km/h, knots, Doppler[knots], HDoP and number of satellites:

17.07.2015 12:38:11 75.420km/h 40.724knots 40.72Doppler 1.0HDoP 9Sats

Speed over time window

In the lower right section the speed is display over the time. If one clicks with the left mouse button into this part of the window, the corresponding time is selected, the trackpoints are highlighted and shown as bold lines. The **B-** and **N-** keys can be used to jump the previous or next timepoint. The **zoom** factor can be adjusted by the **mouse wheel** or the **+** and **-** keys. The whole window content can be shifted by dragging with the left mouse button pressed.

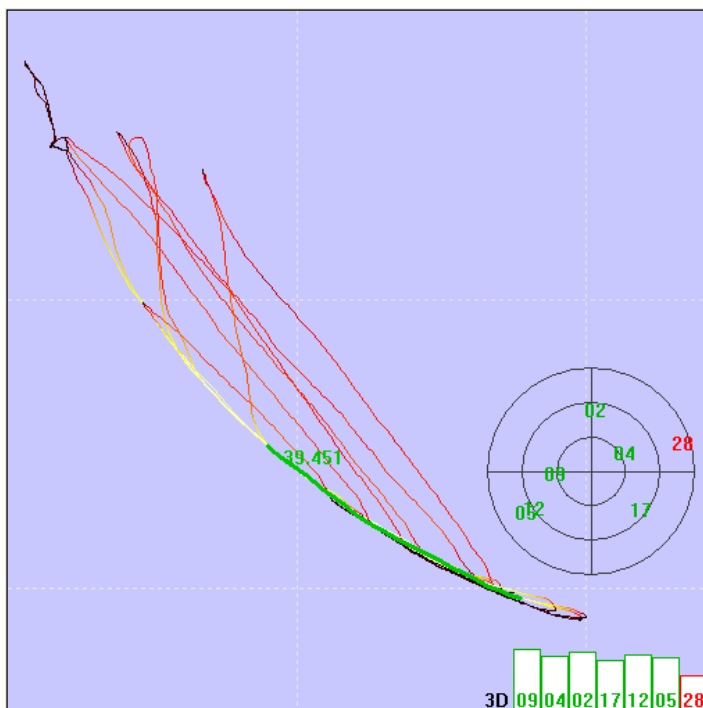
The speed-scale (y-axis) can be changed by **shift & mouse wheel**,

Time constraints can be set by **shift & left click** first for the begin- and then for the end-timepoint (reset timelimits via the context-menu).



Tracks window

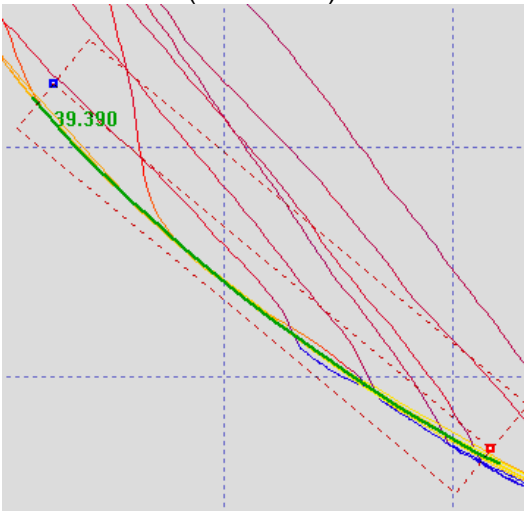
The display of the tracks is automatically scaled to fit the upper right window area, the **zoom** factor can be adjusted by the **mouse wheel** or the **+** and **-** keys. The whole window content can be shifted by dragging with the left mouse button pressed or by using the arrow keys (press **Shift & arrow** keys simultaneously shift by one gridline distance).



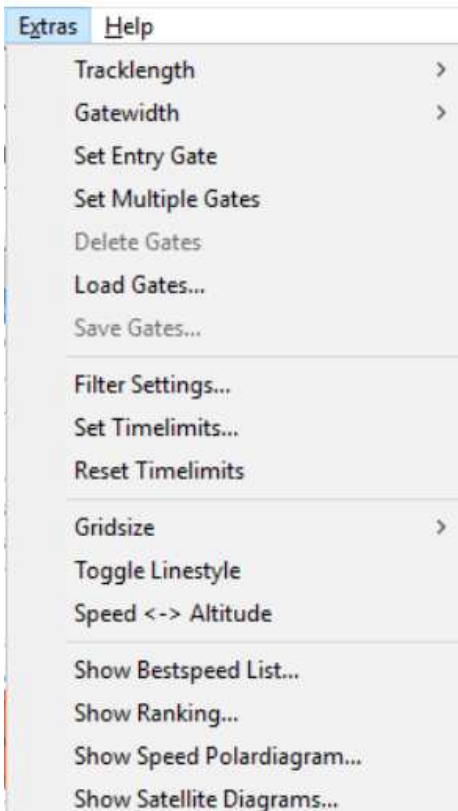
Background images (jpg, gif, bmp, tif, png, etc.) e.g. from Google-Earth™ screenshots can be loaded via the **File** or the context menu (**Load Background-Image...**), scaled, shifted, and aligned (co-registered) by pressing **Ctrl & F** (not shown here due to copyright reasons).

With **Shift & Click** first the Start (blue)- and next the Finish (red)-gate positions can be set which determine the center-line of the speed-course. Both points can interactively dragged by pressing **Shift** over the symbol and left click.

Tracklength and **Gatewidth** are set by the context menu (see below).

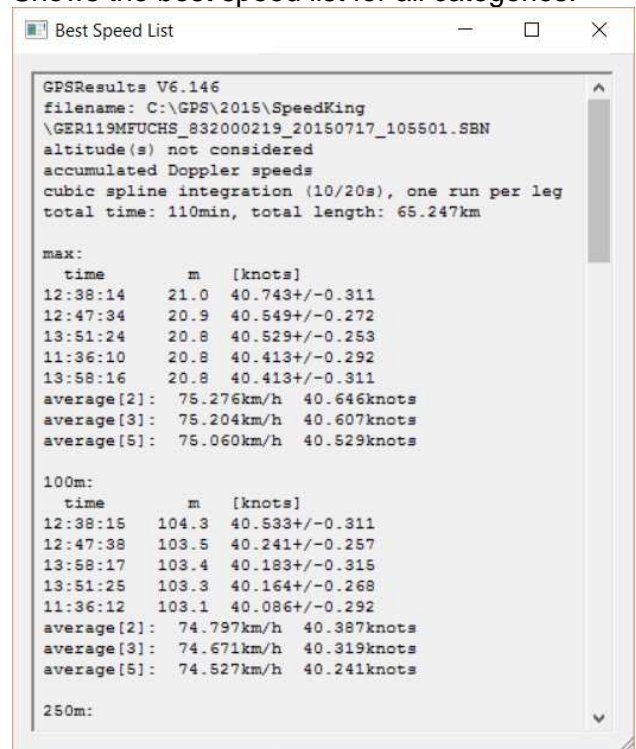


By right-clicking over the trackpoints window the **context menu** can be invoked offering a selection of the **Extras**- and the **File**-menu topics:



Show Bestspeed-List

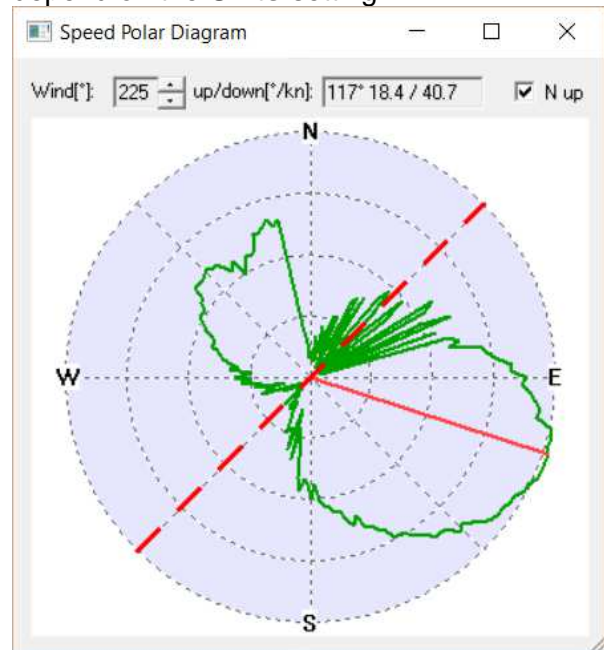
Shows the best speed list for all categories:



Show Speed Polardiagram

Shows speed and direction for all track-points and estimated wind direction (red line).

Selected trackpoints are highlighted, the units depend on the **Units**-setting:



Show Satellite Diagrams

Shows satellite positions on the sky (polar plot) or sat-IDs over time:

