

GPSResultsV5.37

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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

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A. Recommended Computer Configuration:

Operation System: Microsoft Windows XP (Windows 2000 and Windows 98 SE are also supported, but in these cases the gdiplus.dll-library has to be downloaded from Microsoft and put into the system-folder or the folder, where GPSResults resides). There is also a dedicated **Apple MAC OSX 10.4**-version as well as a dedicated **PDA-version (Microsoft CE 2003** or later) available from the download website.

Memory (RAM): 512MB 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 V5.36**, open or save, and install **GPSResults**:

#	time	[s]	[m]	[knots]
4794	13:10:35.368	1.0	25.6	49.724
4795	13:10:36.368	1.0	26.5	51.473
4796	13:10:37.368	1.0	27.3	53.086
4797	13:10:38.367	0.999	27.7	53.903
4798	13:10:39.367	1.0	28.4	55.147
4799	13:10:40.367	1.0	28.1	54.564

The **GPSResults**-icon will appear on you desktop:



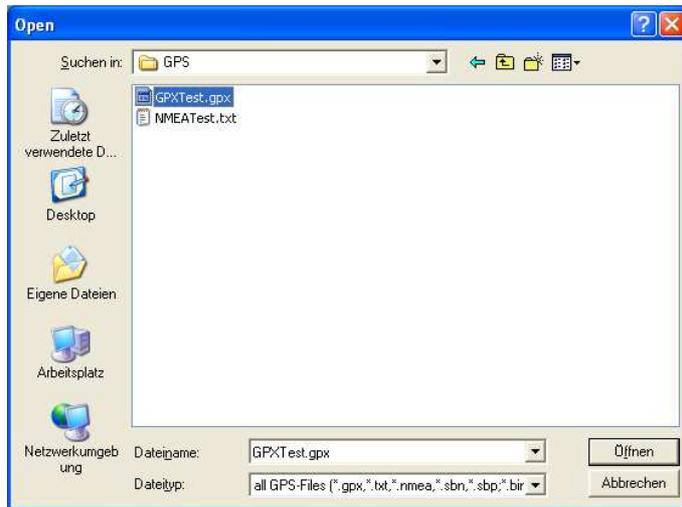
C. Start GPSResults, Select GPS-Datafile

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 data-file from the Navi GT11/GT31 *.sbn, *.sbn, *.sbp, *.bin, *.ubx, *.tk1, and *.tk2-file formats are also supported.

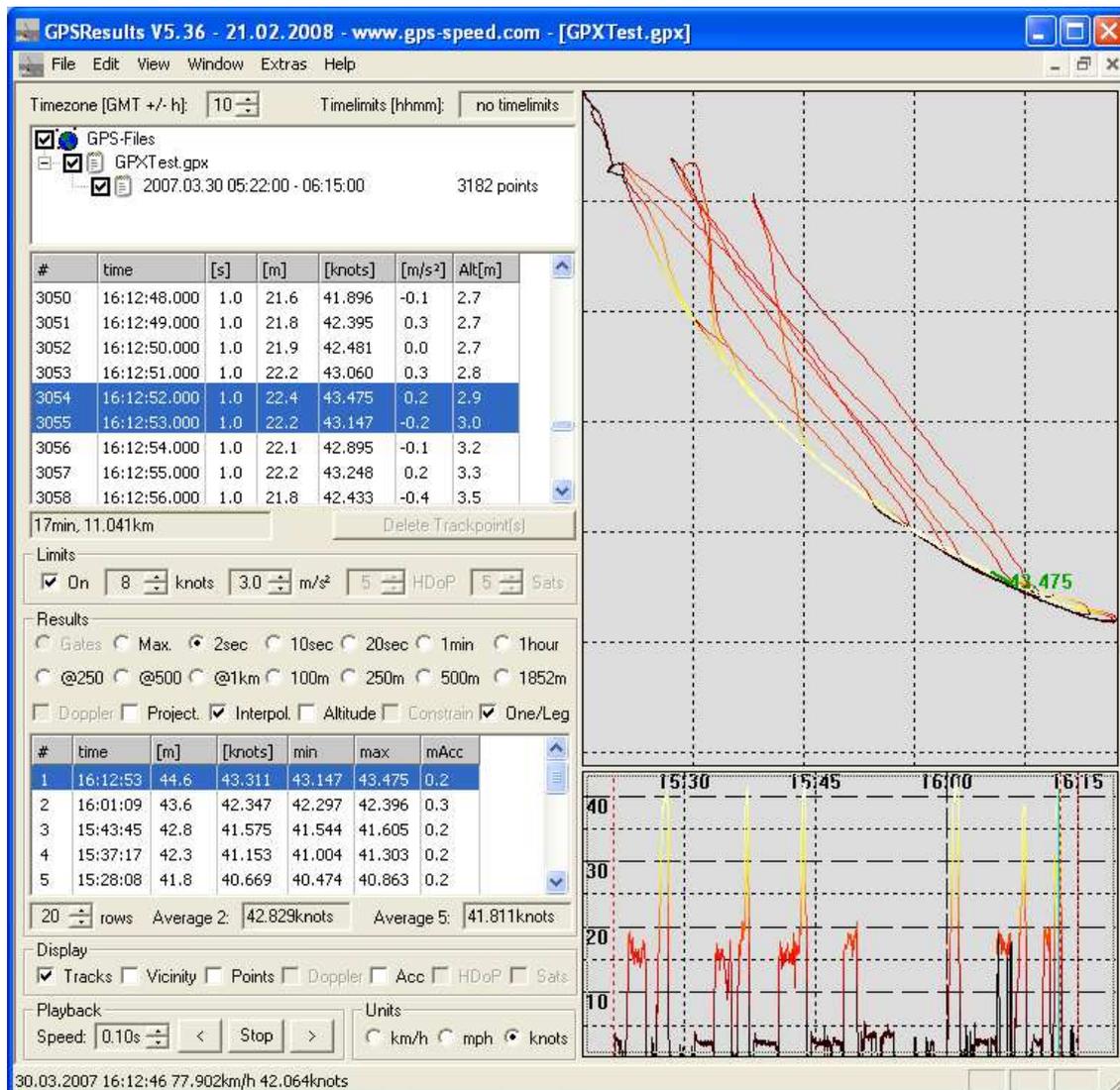
Another possibility is to drag and drop the GPS-datafile over the GPSResults-icon, this will automatically load the corresponding file.



A file-selector box will come up, select and open or double-click the file you want to analyze (example: GPXTest.gpx):



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

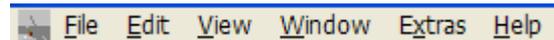
Title Bar

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

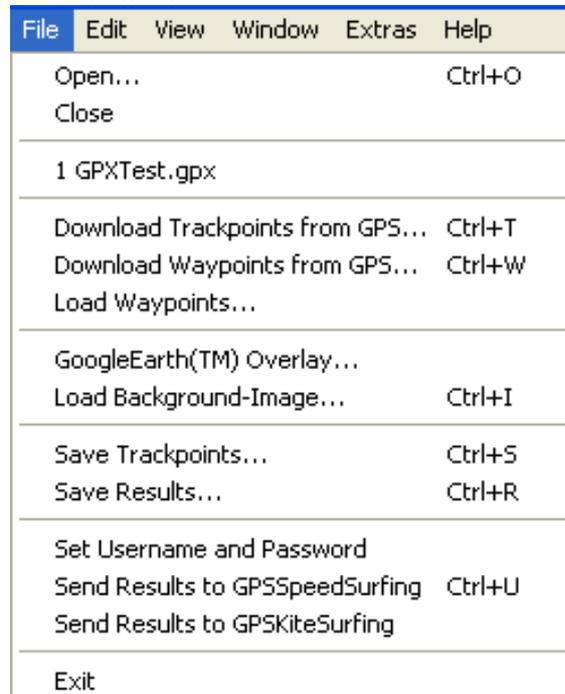


Menu Bar

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

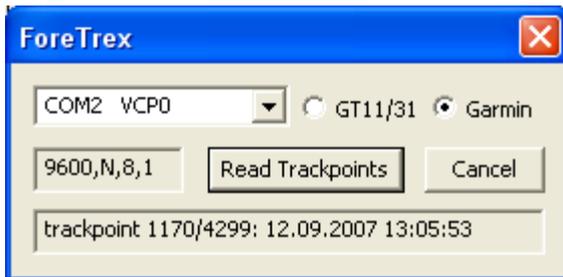
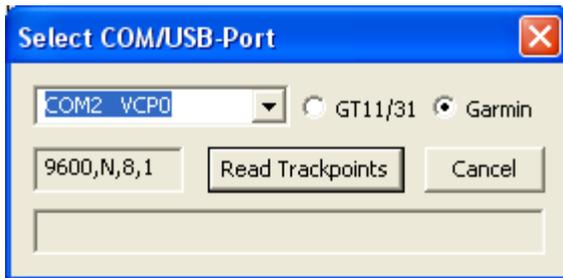


File contains:



- **Open...** invokes a fileselector-box and loads GPS-files (**gpx**, **txt**, **nmea**, **sbn**, **sbp**, **bin**, **ubx**, **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®:

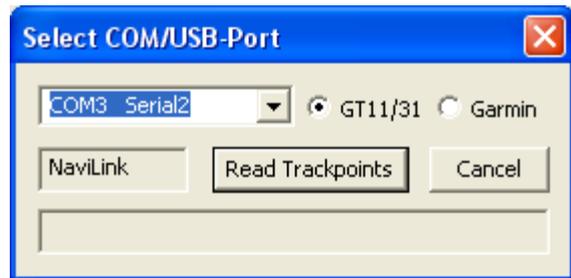


After successful download of the trackpoints you will be asked for a filename to save all points in GPX or TXT (NMEA) format.

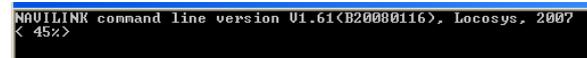
If you use a Garmin Edge®, select **USB** and download trackpoints (much faster: 600 points/s). First download trackpoints with Garmin Training Center® to unlock the last tracksegment which would be missing otherwise.

- **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.
- **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 **GPX**-, **NMEA** (txt)- or **CSV**-format,
- **Save Results...** saves the results of all categories to a text-file.

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.

- **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** 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 message:

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.

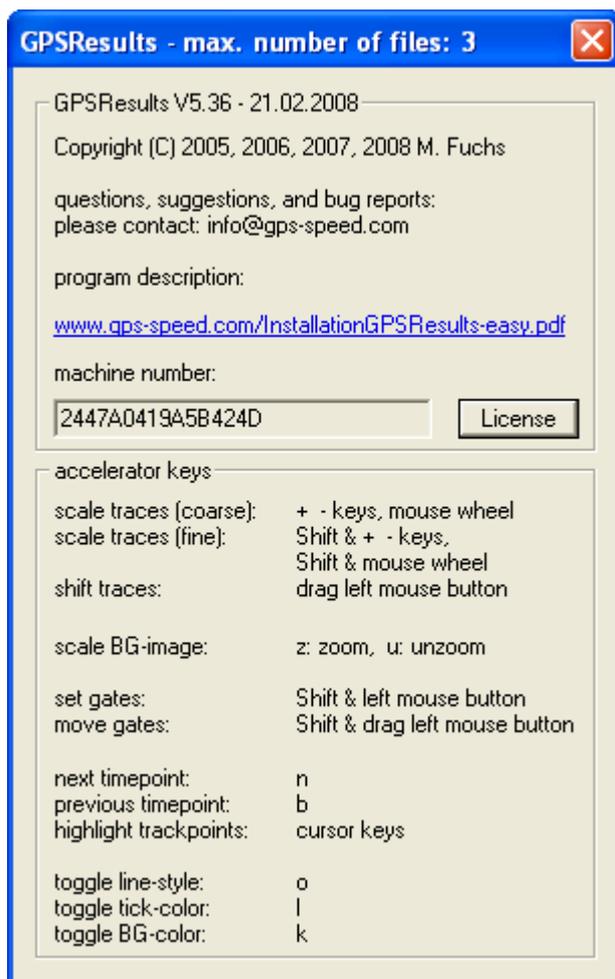
Window (multiple GPS-files can be displayed simultaneously by selecting **Tile** or **Cascade**):



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:



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:

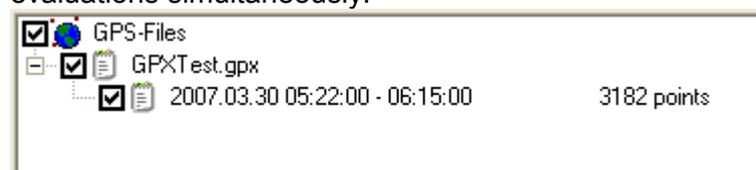
Timezone [GMT +/- h]: Timelimits [hhmm]:

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

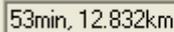
For **NMEA-** or **binary-**files containing more information (or **GPX-**files exported from **NMEA-**files), this information is shown in the right columns (number of **Sats**, **HDOP** (horizontal dilution of precision), **COG** (course over ground) and **Doppler-**speed in knots, mph or km/h depending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

#	time	[s]	[m]	[knots]	[m/s ²]	Sats	HDOP
3050	15:12:48.914	1.0	21.7	42.170	0.2	6	1.2
3051	15:12:49.914	1.0	21.8	42.350	0.1	6	1.2
3052	15:12:50.914	1.0	21.8	42.470	0.1	6	1.2
3053	15:12:51.914	1.0	22.2	43.250	0.4	6	1.2
3054	15:12:52.914	1.0	22.1	43.030	-0.1	6	1.2
3055	15:12:53.914	1.0	22.0	42.680	-0.2	6	1.2

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

Delete Trackpoints

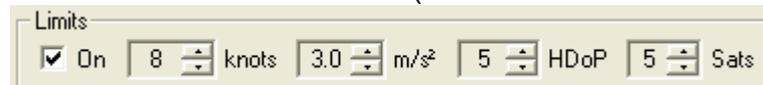
The **Delete Trackpoint(s)**-button becomes active, when trackpoints are selected (left-clicked) in the trackpoint list, several trackpoints can be selected by **Ctrl & left-click** or **Shift & left-click** (selects a range of trackpoints). Clicking the button will delete the selected trackpoints and 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)

Limits for Valid Trackpoints

In the **Limits**-section invalid trackpoints can automatically be excluded from the analysis by defining minimum speed (**knots**), maximum acceleration (**m/s²**), maximum **HDoP**, and minimum number of **Satellites** (last two criteria for **NMEA**- or **binary**-data only):



Limits

On 8 knots 3.0 m/s² 5 HDoP 5 Sats

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 3m/s² can be lowered until all spikes are vanished.

maximum HDoP

maximum HDoP (horizontal dilution of precision - **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):

#	time	s	m	knots	Sats	HDOP	Doppler
2729	16:07:27	1	0.7	1.452	6	1.2	0.00
2730	16:07:28	1	0.1	0.281	6	1.2	0.00
2731	16:07:29				4	1.6	0.00
2732	16:07:30				4	1.6	0.00
2733	16:07:31				0	50.0	0.00
2734	16:07:32	4	0.1	0.070	6	1.2	0.00
2735	16:07:33	1	0.0	0.000	6	1.2	0.00

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:

Results

Gates Max. 2sec 10sec 20sec 1min 1hour
 @250 @500 @1km 100m 250m 500m 1852m

Doppler Project. Interpol. Altitude Constrain One/Leg

#	time	[m]	[knots]	min	max	mAcc
1	16:12:54	219.8	42.722	41.896	43.475	0.4
2	16:01:13	214.6	41.723	41.285	42.396	0.3
3	15:43:49	210.3	40.874	39.882	41.605	0.3
4	15:37:19	206.8	40.205	38.993	41.303	0.6
5	15:28:08	205.9	40.022	38.821	40.863	0.5

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 two columns indicate the minimum and maximum speed during that run in the same units. With **NMEA**-data more parameters are shown in the right columns: (with Doppler-speed a preliminary correction of the averaged speed **C[knots]** is also shown) **mSats**: minimum number of satellites, **mHDOP**: maximum HdoP, **mAcc**: maximum absolute acceleration **[m/s²]** during the corresponding run:

Results

Gates Max. 2sec 10sec 20sec 1min 1hour
 @250 @500 @1km 100m 250m 500m 1852m

Doppler Project. Interpol. Altitude Constrain One/Leg

#	time	[m]	[knots]	C[knots]	mSats	mHDOP	min
1	15:12:55	219.0	42.573	42.447	6	1.2	41.700
2	15:01:13	213.9	41.581	41.454	6	1.2	41.060
3	14:43:49	208.2	40.480	40.353	8	0.8	39.360
4	14:28:08	205.9	40.019	39.892	7	1.6	38.630

20 rows Average 2: 42.077knots Average 5: 40.872knots

The **average** of the **best two** 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.

Max.

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

2sec / 10sec / 20sec / 1min / 1hour

shows the best speeds over at least 2sec, 10sec, 20sec, 1min oder 1hour 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 distance between start- and end-point.

100m / 250m / 500m / 1852m

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

One/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.

Average[2]

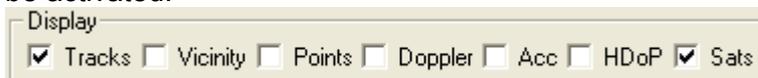
shows the average of best and second best speed in knots or km/h, depending on the context menu setting.

Average[5]

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**, **Points**, 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**.

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

Points 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.

Doppler shows the Doppler speed in the speed over time 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).

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).

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.



Units

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



Status Bar

Depending on the mouse position different information is displayed. Left-Click over trackpoint-graphics: distance from origin (upper left corner), longitude and latitude:

200.05m / 797.52m 146°09'30.68' -38°51'06.97'

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

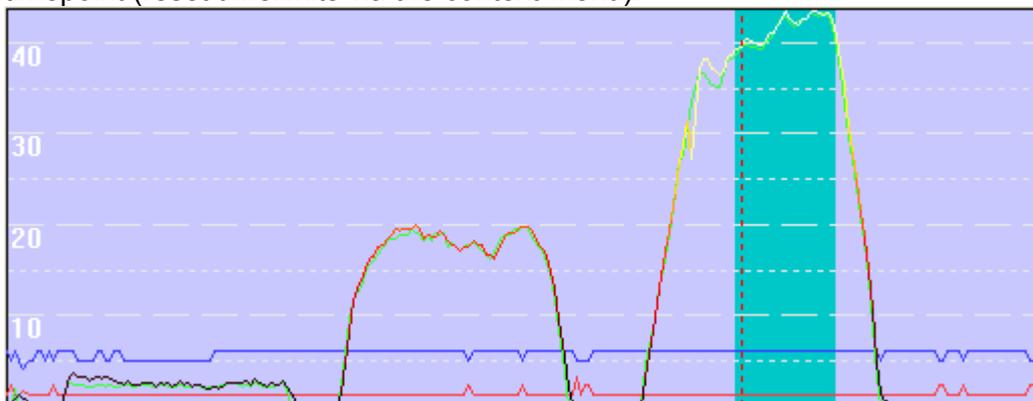
30.03.2007 15:12:49 78.515km/h 42.395knots 42.35Doppler 1.2HDoP 65ats

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.

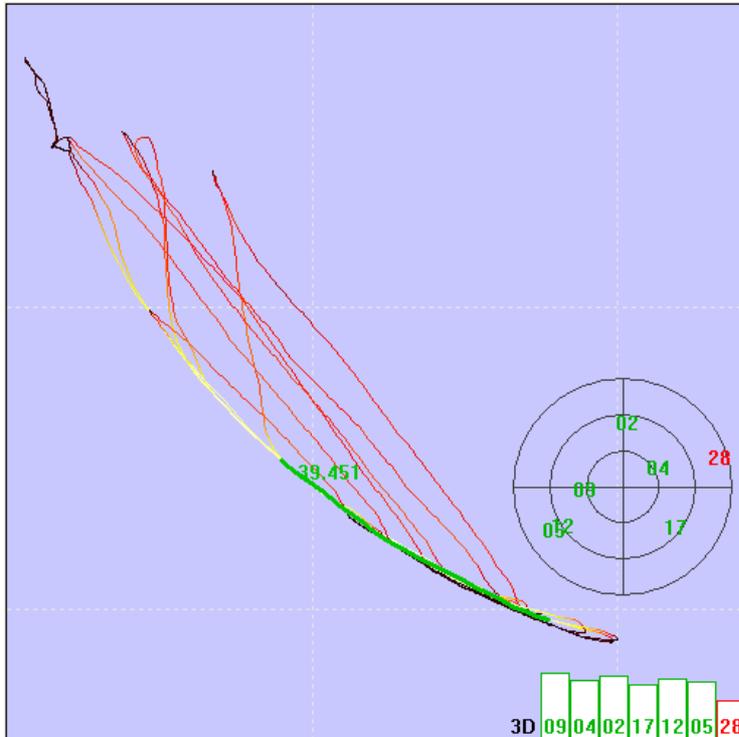
The speed-scale (y-axis) can be changed by **shift & mouse wheel**,

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

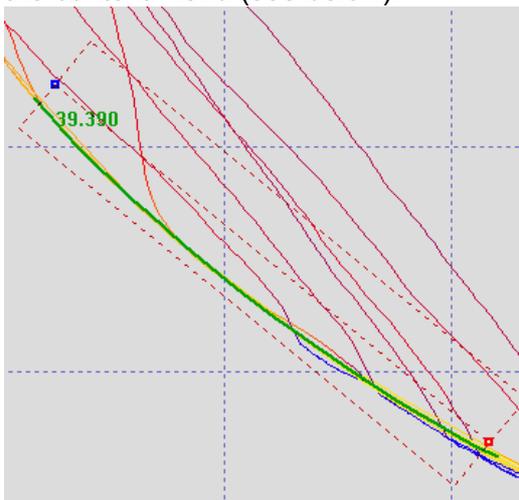
The display of the tracks is automatically scaled to fit the upper right window area, the **zoom** factor can be adjusted by the **mouse wheel** or the **+** and **-** keys. The whole window content can be shifted by dragging with the left mouse button pressed or by using the arrow keys (press **Shift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

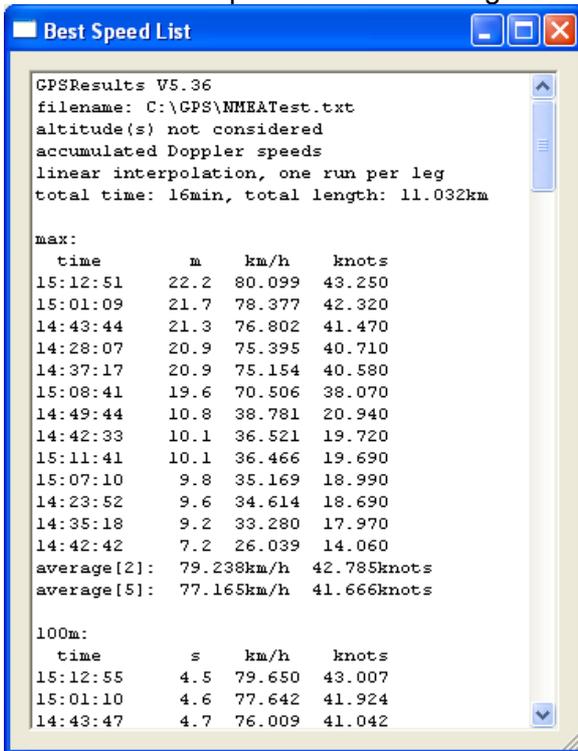


By right-clicking over the trackpoints window the **context menu** can be invoked offering a selection of the **Extras**- and the **File**-menu topics:

Tracklength	▶
Gatewidth	▶
Delete Gates	
Load Gates...	Ctrl+G
Save Gates...	
Load Waypoints...	
Download Waypoints from GPS...	Ctrl+W
Set Timelimits...	
Reset Timelimits	
Gridsize	
Toggle Linestyle	○
Speed <-> Altitude	
Show Bestspeed List...	
Show Ranking...	
Show Polardiagram...	
Load Background-Image...	Ctrl+I
Save Results...	Ctrl+R
Set Username and Password	
Send Results to GPSSpeedSurfing	Ctrl+U
Send Results to GPSKiteSurfing	

Show Bestspeed-List

Shows the best speed list for all categories:



Show Polardigram

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:

