GPSResultsV5.3

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**-verison 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

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(c) Claus Döpelheuer

B. Installation:

1. Download the latest version of GPSResults from **http://www.gps-speed.com** by clicking the link **GPSResults V5.3**, open or save and open (uncompress) the zip-file that contains just one executable **GPSResults.exe**:

2. Drag the program-file **GPSResults.exe** to your GPS-folder or to the desktop, the GPSResults-icon will appear in the latter case:
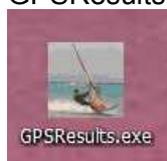
C. Start GPSResults, Select GPS-Datafile

Start GPSResults by double-clicking the **GPSResults-icon** on your desktop or the
GPSResults.exe-file in your GPS-folder, click **File -> Open** to open an existing GPS-datafile
(***.gpx**, NMEA-format: ***.txt**, ***.nmea**, or binary data-file from the Navi GT-11 ***.sbn**, ***.sbp**, ***.bin**).
Another possibility is to drag and drop the GPS-datafile over the GPSResults-icon, this will
automatically load the corresponding file.
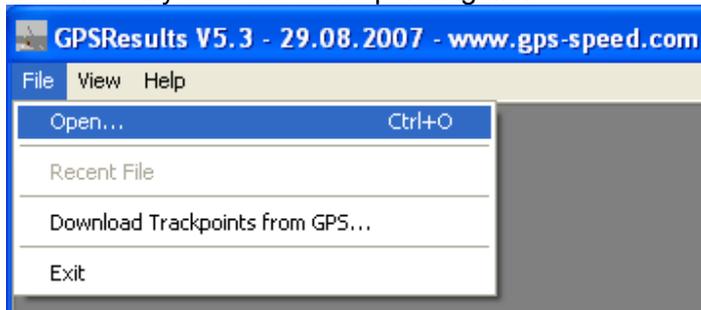
A file-selector box will come up, select and open or double-click the file you want to analyze
(example: GPXTest.gpx):
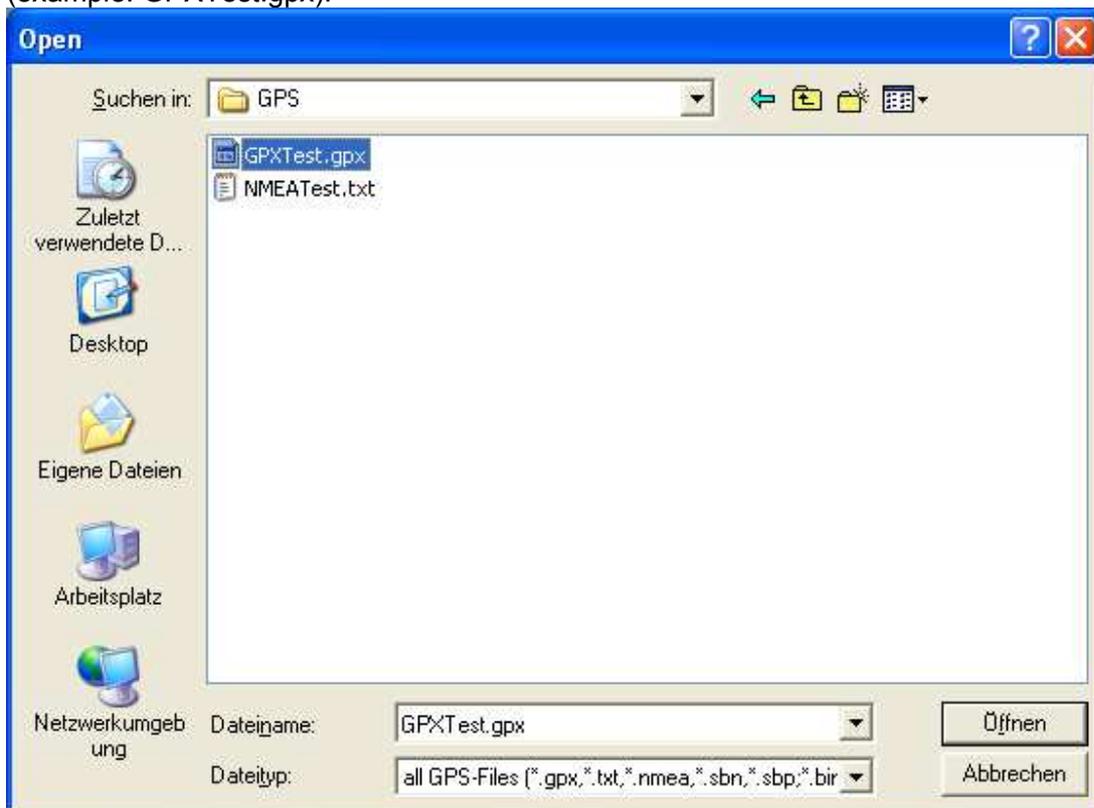
The file is read and analyzed with the program default settings:
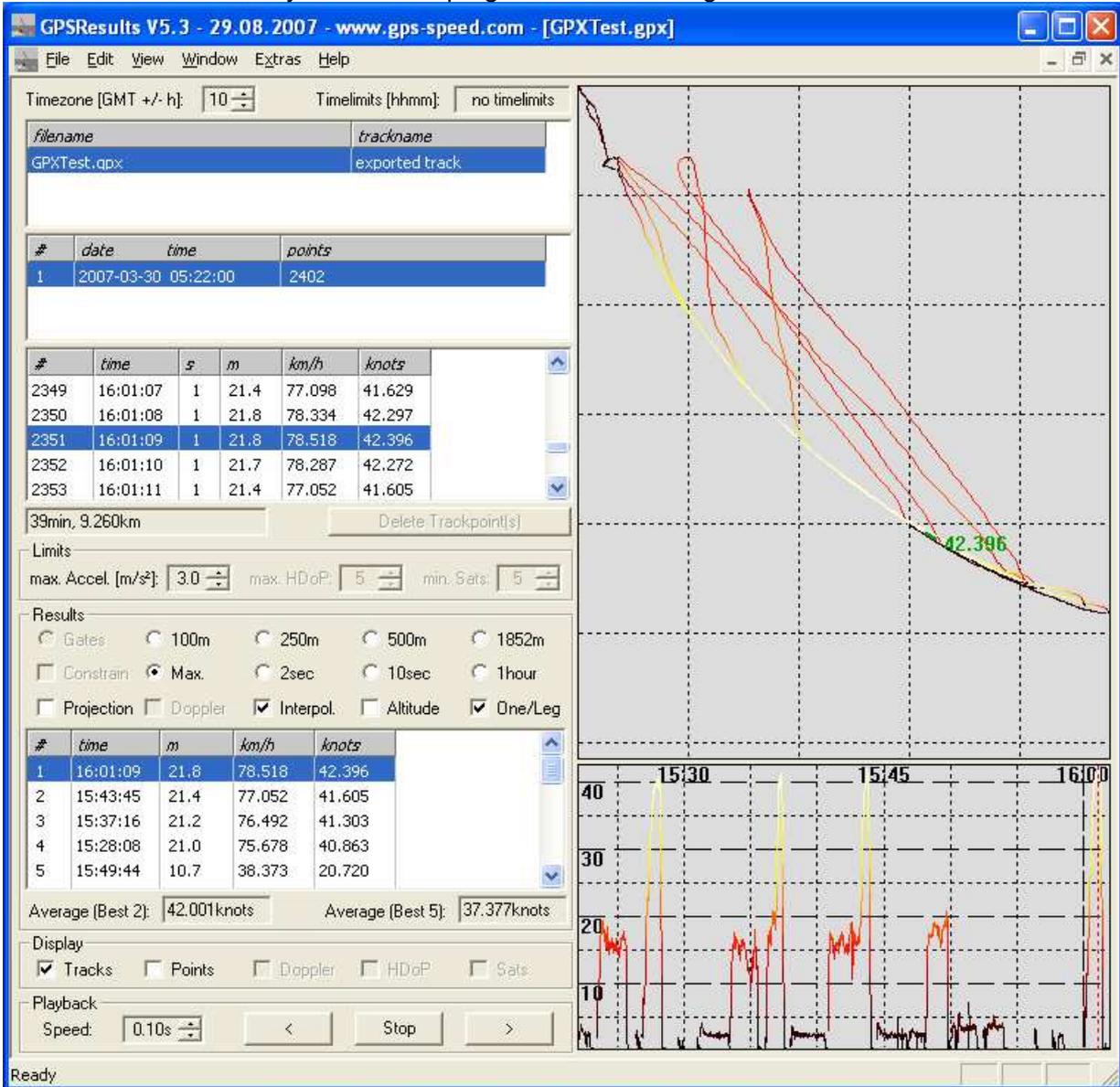
The colors of the tracks, the background, and the tick-lines can be modified by repeatedly pressing the **o**-, **k**-, and **l**-keys. The settings are saved when the program is closed.

D. GPSResults Main Window Sections

Title Bar

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

GPSResults V5.3 - 29.08.2007 - www.gps-speed.com - [GPXTest.gpx]

Menu Bar

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

File Edit View Window Extras Help
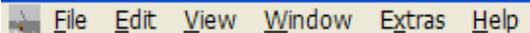
File contains **Open...** (load GPS (gpx-, txt-, nmea-, sbn, sbp, bin-file from disk or SD-card), a **recent files list**, the direct **Download Trackpoints from GPS…** option for Garmin GPS (serial (USB-serial adaptor, Geko, Foretrex) or USB-port (Edge)) or for Navi GT-11 (serial port emulation via USB-port). **Download Waypoints…** (Garmin GPS only) and **Load Waypoints…** can be used to define Gates for gated speed-evaluations. With **Load Background-Image…** background images in different format (jpg, png, tif, bmp, …) 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 all results to a text-file. **Set Username and Password** can be used to specify 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:

File	Edit	View	Window	Extras	Help

Open...   Ctrl+O
Close

1 C:\GPS\NMEATest.txt
2 C:\GPS\GPXTest.gpx

Download Trackpoints from GPS...
Download Waypoints...
Load Waypoints...
Load Background-Image...

Save Trackpoints...
Save Results...

Set Username and Password
Send Results to GPSSpeedSurfing
Send Results to GPSKiteSurfing

Exit

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

Window	Extras	Hel

New Window
Cascade
Tile
Arrange Icons

✔ 1 GPXTest.gpx

Extras contains all program-options:

Extras   Help
Tracklength   ▶
Gatewidth   ▶
Delete Gates
Load Gates...
Save Gates...

Set Timelimits...
Reset Timelimits

Gridsize   ▶
Toggle Linestyle
Speed <-> Altitude
knots <-> km/h

Show Bestspeed List...
Show Ranking...
Show Polardiagram...
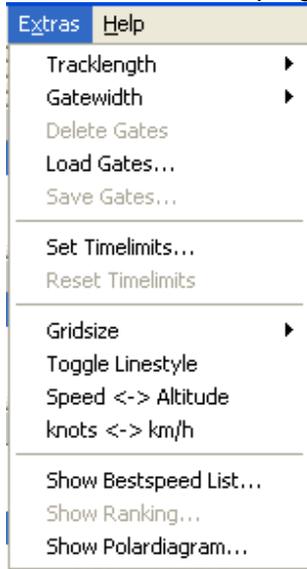
Help - About shows an online help text and the **machine number** of your computer that is needed for program registration and keycode generation after the 30 days trial period:

GPSResults - max. number of files: 3

GPSResults Version 5.4 - 05.09.2007

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questions, suggestions, and bug reports:
please contact: info@gps-speed.com

program description:

http://www.gps-speed.com/description.html

machine number:

96F88A2D833F676A

acellerator keys

scale traces (coarse):   + - keys, mouse wheel
scale traces (fine):   Shift & + - keys,
                           Shift & mouse wheel
shift traces: drag left mouse button

scale BG-image: z: zoom, u: unzoom

set gates: Shift & left mouse button
move gates: Shift & drag left mouse button

next timepoint: n
previous timepoint: b
highlight trackpoints: cursor keys

toggle line-style: o
toggle tick-color: l
toggle BG-color: k

Timezone and Timelimits

In the upper left the **Timezone** estimated from the averaged longitudes and the optional **Timelimits** for restricted evaluations (competitions) are shown:

| Timezone [GMT +/- h]: | 10 ▲▼ | Timelimits [hhmm]: | no timelimits |

Files and Tacks

The **tracks** of the loaded file(s) follow below indicated by their **filename**(s) and the **trackname**(s).
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:

filename	trackname
D:\GPS\GPXTest.gpx	exported track

Tracksegments

Below the tracks subwindow comes the **tracksegments** list.
The tracksegment-**number**, **date**, start-**time**, and number of track-**points** are displayed. GPX-tracks can contain several tracksegments from different dates, they can be selected by **left-clicking** the corresponding row(s) in this subwindow, several tracksegments can be selected by **Ctrl & left-click** or **Shift & left-click** (selects a range of tracksegments):

#	date	time	points
1	2007-03-30	05:22:00	3182

Trackpoints

The third list contains the **trackpoints** indicated by their corresponding index **#**, **time**, duration in **s**econds, travelled distance in **m**eters and speed in **km/h** and **knots**. Resizing the main window will also resize the trackpoint list:

#	time	s	m	km/h	knots
3051	16:12:49	1	21.8	78.515	42.395
3052	16:12:50	1	21.9	78.675	42.481
3053	16:12:51	1	22.2	79.746	43.060
3054	16:12:52	1	22.4	80.515	43.475
3055	16:12:53	1	22.2	79.908	43.147

For **NMEA**-files containing more informations (or **GPX**-files exported from **NMEA**-files), these informatoins are also shown in the right columns (number of **Sats**, **HDOP** (horizontal dilution of precision), and **Doppler**-speed in knots or km/h depending on the context menu setting):

#	time	s	m	knots	Sats	HDOP	Doppler
3051	16:12:49	1	21.8	42.395	6	1.2	42.35
3052	16:12:50	1	21.9	42.481	6	1.2	42.47
3053	16:12:51	1	22.2	43.060	6	1.2	43.25
3054	16:12:52	1	22.4	43.475	6	1.2	43.03
3055	16:12:53	1	22.2	43.147	6	1.2	42.68

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 (+/- 100 trackpoints) of the automatically selected 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-data the **sky-view** (radar-plot) and **satellite strengths** are also displayed there.

Total Travel Time and Distance

Below the trackpoint list comes the total travel time in **min**utes 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 deleted the selecered 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 exportred 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 **max**imum **Accel**eration (**max**imum **HDoP**, and **min**imum number of **sat**ellites - **NMEA**-data only):

Limits
max. Accel. [m/s²]: 3.0   max. HDoP: 5   min. Sats: 5

max. Accel. [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.

max. HDoP

maximum HDoP (horizontal dilution of precision - **NMEA**-data or **GPX**-data with these informations only). Invalid trackpoints with larger HdoP-values are not considered during the evelution of speeds and are shown with a red background in the trackpoints-list.

min. Sats

minimum number of satellites (**NMEA**-data or **GPX**-data with these informations only). Invalid trackpoints with smaller number of satellites are not considered during the evelution 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 reddish background in the trackpoint list and are ignored (skipped) in the evaluations:

#	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**:

Results

○ Gates   ○ 100m   ○ 250m   ○ 500m   ○ 1852m
           ○ Max.   ○ 2sec   ● 10sec   ○ 1hour

☐ Projection   ☑ Interpolation   ☐ Altitude   ☑ One/Leg

#	time	m	km/h	knots
1	16:12:54	219.8	79.121	42.722
2	16:01:13	214.6	77.270	41.723
3	15:43:49	210.3	75.698	40.874
4	15:37:19	206.8	74.459	40.205
5	15:28:08	205.9	74.120	40.022

Average (Best 2): 42.222knots   Average (Best 5): 41.109knots

With **NMEA**-data more parameters are shown in th right columns: **mSats**: minimum number of satellites, **mHDoP**: maximum HDoP during that run (the slight diffences here are due to the fact that GPX-data can handle full seconds only, where NMEA-data have a resolution of 1ms (0.001s) and the GPS-file was exported from original NMEA-data):

Results

○ Gates   ○ 100m   ○ 250m   ○ 500m   ○ 1852m
           ○ Max.   ○ 2sec   ● 10sec   ○ 1hour

☐ Projection   ☑ Interpolation   ☐ Altitude   ☑ One/Leg

#	time	m	km/h	knots	mSats	mHDoP
1	16:12:55	219.8	79.137	42.731	6	1.2
2	16:01:13	214.6	77.270	41.723	6	1.2
3	15:43:49	210.3	75.698	40.874	8	0.8
4	15:37:19	206.9	74.474	40.213	7	1.4
5	15:28:08	205.9	74.120	40.022	7	1.6

Average (Best 2): 42.227knots   Average (Best 5): 41.112knots

In the lower half of the left panel the up to ten best results 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 **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 howto determine the gate positions.

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 measures.

Max.

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

2sec / 10sec / 1hour

shows the best speeds over at least 2sec, 10sec oder 60min from all trackpoints of the selected Tracks/Tracksegments with the corresponding additional measures.

Projection

controls projection of the travelled 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.

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 GT-11 NMEA or binary data.

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 then 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 elvation measurements of the GPS can be ignored for the evaluation (mostly results in rather small differences).

One/Leg

shows one result per run only. Run start and end are defined by velocities below 5km/h or direction changes larger than 30degrees (not possible together with Gates or Max.).

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 5x10s**ec averages).
If one of the result rows is clicked with the left mouse button, the corresponding trackpoints are are highlighted and the zoomed timernage in the speed over time window is automatically readjusted.

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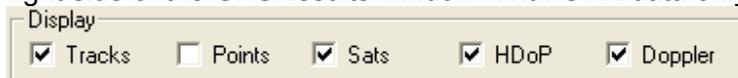
Tracks connects neighbored valid trackpoints by colored lines, the line color depends on the speed and can be changed via the context menu or **Extras**.

Points shows valid trackpoints by little 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.

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).

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).

Doppler shows the Doppler speed in the speed over 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.
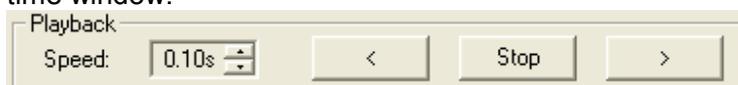
Status Bar

Depending on the mouse position different informations are displayed. Mouse over tracks-graphics: distance from origin (upper left corner), longitude and latitude:

363.99m / 1104.11m, 146.160410° / -38.854698°

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

30. 15:43:44 77.052km/h 41.605knots 40.91Dop 0.8HDoP 8Sats

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).
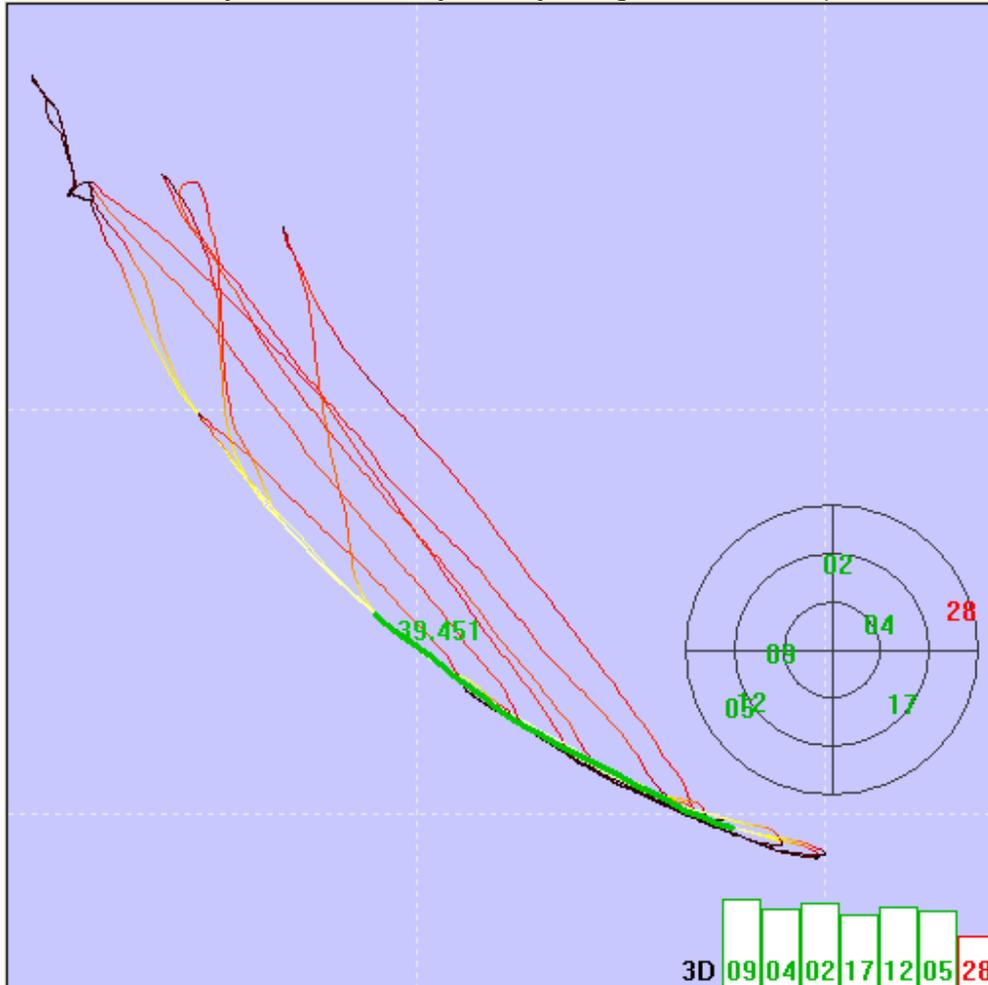
Background images (jpg, gif, bmp, tif, png, etc.) e.g. from Google-Earth screenshots can be loaded via the **Extras** or the context menu (**Load Background-Image…**), scaled and shifted and aligned (co-registered) by pressing Ctrl & F.

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.

Show Bestspeed-List

Show Polardiagram