X/Y diagram

The X/Y diagram is a graphic tool for analyzing and visualizing tracks and routes. Speed and altitude can be evaluated in relation to the distance travelled or in relation to time.

At a glance, you can visualize information such as:

- Speed profile - Where and when did I reach my maximum and minimum travelling speeds?
- Altitude profile - At wihich distances or travel times from the start did I reach which elevation levels?
- How does the cumlative elevation curve look like (ascending / descending)?
- For para- and deltagliders or sailplanes: How does the plot of my vertical speeds look like? How does my elevation plot look like when it is expresses as altitude above ground?
- You can also place the cursor with a simple click on every point along the curve and select Show in x-Plorer to see the corresponding data set. map cursor will be centered at the cooresponding point along the track in the map winow and vive-vera.
- You can also plot various tracks or routes at a time, so you can also compare various competitors or various rounds of a given course. For the latter it is necessary to devide the tracklog in seoerate rounds. If you want to plot tracks over time and compare several tracks, it is obligate to convert the time stamps into time travelled since start using the Track Processor.

Generating a X/Y diagram

To generate a X/Y diagram simply mark the tracks or routes which you want to plot and click the ↳ icon in the X-Plorer symbol bar. The X/Y diagramm will open in a seperate window. You can zoom or drag-and drop the diagramm within the window wherever you like. For zooming use the webwheel of you mouse, the zoom will be centerd at the mouse position.

You find an example of an altitude profile below:

Functions

The diagram line is automatically calculated from the data available. Depending on the characteristics of the datset, various analyses can be performed.

X-Axis

You have three different units availabel along the X axis: Point number, distance traveled or time. The consecutive number and distance can always be extracted from the tracklog while time axis can only be displayed if the track or route point have a time stamp. Please not the when you plot a curve with Point number as units along the X-axis, the distance between point will always be the same. However, in ther real world, this might correspond to completely differnt distances when those are expressed in kilometers or miles. You an altitude profil may cook pretty "distorted".

Y-Axis

You have many parameter options which you can assign to the Y-axis: Horizontal and vertical speed, altitude (usually from GPS), altitude of the surface relief (according to the DEM), altitude above ground, cumulative elevation curce ascending, and cumulative elevation curve descending.

Of course, speed and altitude values mus also be available in the database (tracklog or route). The altitude according to the DEM is always interpolated from the raster of the active DEM, so this function requires a DEM to be installed an the accuracy of the values will vary with the DEM used. For further information please refer to QV System - Map Datums, Grids and DEMs.

Vertical speed is calculated from altitude and time differences of consecutive track points. Thus, this information is only available if data on altitude and time is available in the tracklog or route.

If your tracklog only includes coordinates (including elevation), you will at least be able to generate an altitude profile. If your tracklog includes time stamps but no speed and course information, you can generate these values using the Track Processor. However, please note that those values do not represent instantaneous values (as the ones from a GPS) but average values which are calculated from distance and time differences between points. This has to be considered when interpreting the results.

The diagram is always plotted according to the style definition which you have set for the plotted track or route. The scaling is automatically calibrated according to the window size. However you can zoom the diagram using your mouse wheel and you can also drag-and drop it to the desired position within the window.

Mouse function in the diagram

You can read various sets of values from the diagram using the mouse pointer. These are displayed in the status line at the bottom of the X/Y diagram window:

x=…   y=…   Shows the X- and Y- values of the mouse pointer in the units selected.

dx=… dy=…   Shows the differences in X- and Y- values between the cursor ⊙ and the mouse pointer in the units selected.

Functions of the symbol bar at the buttom of the diagram window

X axis: Point number	The numer of the points are plotted along the X-axis, i.e. equal distances between the points along the track or route.
X axis: Distance	The distances travelled are plotted along the X-axis. These distances are automatically calculated from the coordinates. For routes generated by a route planner (i.e. the QV routing function with NAVTEQ maps) this is the real distance that the routing module has determined. Inall other cases this is the line-of-sight distance between consecutive track- or route points.
X axis: Time	The time is plotted along the X-axis. For tracklogs downloaded from a GPS unit, this is the time when you have been at a specific trackpoint. For tracks or routes generated by a route planner (i.e. the QV routing function with NAVTEQ maps) it is the calculated (predicted) time when you will be at this place.
Y axis: Speed	The (horizontal) speed is plotted along the Y-axis. For tracklogs, these are the speed values as measured by your GPS receiver. Only possible if speed avlues are available in the plotted track.
Y axis: Vertical Speed(climbing / descending speed)	The vertical speed is is plotted along the Y-axis. These values are calculated from altitude changes over a certain time interval. Positive values reflect climbing speeds, negative values reflect descending speeds.
Y axis: Altitude	The is is plotted along the Y-axis. For tracklogs this is the GPS-altitude, for planned tracks or routes this is usually the altitude as extracted from the DEM.

Y axis: Altitude DEM		The altitude from the DEM is plotted along the Y-axis. The values are interpolated from the elevation raster, so this function is only possible if DEMs have been installed.
Y axis: Altitude above ground		Altitude differences between GPS altitude and altitude according to DEM are plotted along the Y-axis. This approximately corresponds to the flight altitude above ground. Only available if the tracklog includes altitudes and a DEM has been installed.
Cumulated sum increasing / decreasing		A cumulated altitude curve will be displayed. Ascents and descents have to be plotted separately.
Smooth curve ON/OFF		If this function is enabled, a spline algorith is applied to the curce. This will "smooth" the curce, so differences between consecutive points will be levelled. This icon has a switch function, so clicking again will disable the spline function.
Draw vertical lines / show WP names ON/OFF		A vertical line (anchor) will be drawn to the X axis at each point. Also, when plooting a route, the waypoint names will be shown. This icon has a switch function, so clicking again will disable the plotting of anchor lines.
Draw X/Y axes ON/OFF		The x/Y-axis will be hidden. Doing so, you can enlarge the space for the plot. This icon has a switch function, so clicking again will show the X/Y-axis one again.
Y axes: start at 0		Will rescale the Y-axis so that it starts at 0.
Line of sight ON/OFF		Draws the projection of the line of sight from any point of the plot. Points which are out of (theoretical) sight are below this line, points above this line are within the field of vision. Three option for the calculation are available: straight, earth curvature and radio wave propagation. This icon has a switch function, so clicking again will disable the line-of-sight function.

Mouse and keyboard functions in the diagram window

Mouse movements with pressed and hold left mouse button	Move the diagram
Mouse click	- Set cursor - Select a curve if more than one curve is available in the diagram. The selected curve is indicated in the status line.
Mouse Wheel	Zoom in/out
Arrows	Move diagram within the window