fr/MikroKopterTool-OSD

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1 Prolog

The **MikroKopterTool-OSD** can **only** be used in connection with the **GPS-System** (NaviCtrl with Compass + MKGPS).

The range in which you can use the the WayPoints is by about **250mtr.** around the start-point.
This radius around the start position can be set per parameter (Link: GPS max. Radius).

INFO: The range around the start-point is only active with the WayPoint-Flight or while using a FollowMe-Transmitter.

You can set a maximum of **200 WayPoints and/or POI** (**P**oint **o**f **I**nterest) on a map.*
Thereof you can transfer max. 32 for the WayPoint-Flight to the NaviCtrl .*

To see the datas from your MikroKopter in the **MikroKopterTool-OSD** a data link between the Kopter and PC is **absolutely necessary**!
Here you can use i.e. the **Wi232**-Modul (Link) or the **Bluetooth**-Modul (Link).

* From Software version: FlightCtrl > V0.88 / NaviCtrl > V0.28 / KopterTool > V1.78

IMPORTANT

Before using the Waipoint-Function it is necessary that the user clarifies wether such a mode of operation is permitted in the country / to the respective site or by legal, insurance or other terms.

The Waypoint fly can be used only if a GPS-System is available on the Kopter and a Sat-Fix is present!

2 Open the MikroKopterTool-OSD

In the main-window of the **KopterTool** you will find the button **"OSD"**.
A "click" on the button **"OSD"** is enough to open the **MikroKopterTool-OSD**.

3 OSD

With the built-in **"OSD"** in the KopterTool it allows you to display the telemetry datas of the Kopter.
Also you are able to load a map in the "OSD". In this map is i.e. the position and the direction of the Kopter visible and can be tracked throughout the flight.
In addition you can set in one of those maps WayPoints or so called **P**oint **o**f **I**nterest (POI).
Those WayPoints / POI can be set and flown with different properties like altitude, delay time, view direction and so on.

After a "click" on the button **"OSD"** you will see this window:

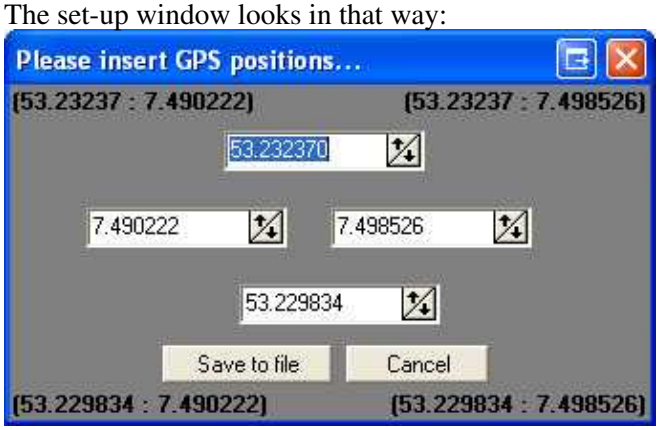
4 The Menu Bar

Over the menu bar you can choose various functions.

4.1 File

Over the menu item **"File"** you can choose three functions.

- **Load image...**
  - ♦ Here you can open saved maps in the OSD i.e. saved as .jpg files.
    A description of that you will find further down under Load maps in the OSD.
- **GeoTag...**
  - ♦ If a JPEG-image of a map has been loaded, the GPS position itself can be viewed or been entered by yourself.
    Those Geo-Datas are necessary so that the position of the displayed map can be determined and the received GPS-datas from the Kopter displayed properly.
    The set-up window looks in that way:



Info: If, i.e., a map was saved over the website **GeoMapTool** those GeoTag-Datas are already contained in the image and been displayed here.
(A description of that you will find further down under Load maps in the OSD.)

Tipp: In the four fields you can enter the parameters by yourself.
With a "click" on the button **"Save in File"** those information will be saved in the displayed image.

- **Instructions...**
  - ♦ A "click" on this entry opens that Wiki-page (an existing internet connection required).

4.2 Data Link

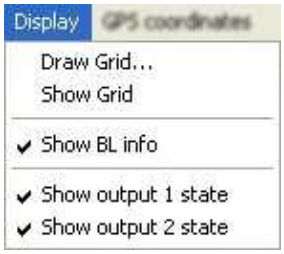
Over the menu point **"Data Link"** you can choose the function **"receive only"**. You can receive now datas from the Kopter but you can't transfer datas to the Kopter.
This may be necessary if the datas (the position) of the Kopter should be displayed on two PC's to the same time. To avoid interferences you must set one PC to "receive only".
This PC can "see" the datas of the Kopter but cannot "send" datas to the Kopter.

4.3 WayPoints Editor / WayPoints Generator

Over the menu point **"WayPoints"** you can choose three functions.

- **Editor...**
  - ♦ Over this entry the WayPoint-Editor will open. Here now you can display and edit the settings of each WayPoints/POI.
    A description you will find further down under WayPoint-Editor.
- **Generator...**
  - ♦ With the **Generator** you can set automatically different WayPoint pattern with duifferent settings to the map.
    - ◊ A describtion of the **Generator** you can find here: **WayPointGenerator**
- **Add MK-Position F9**
  - ♦ This function allows you to enter the actual position of the MikroKopter as a WayPoint in an already loaded map.
    This is only possible with an existing data link between Kopter and "OSD".
    With this function you can fly the Kopter to a specific spot and mark the actual datas on the map.
    Those created WayPoints you can save and transfer to the Kopter at any time to fly along those points.

4.4 Display

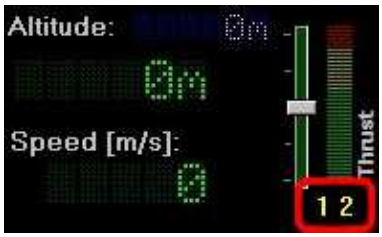


- **Draw Grid**
  - ♦ With this function you can display either way a grid or one/two circles on the map. The grid or the circles you can set in any size.
    A grid/circle can help you to determine the distance. A describtion you will find here: Grid.
- **Show Grid**
  - ♦ With this function you can show/hide created grids/circles.
- **Show BL info**
  - ♦ Here you can see the temperatur and the current of each BL-Ctrl V2.0 in the Map.
    (A view with BL-Ctrl V1.2 or older is not possible)

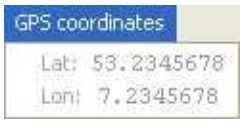
The Number of I2C errors are displayed when you move the mouse over it.

If the display is not clear enough, you can change the fontcolor of it.
Here you can see how: Fontcolor

- **Show output 1/2 state**
  - ♦ If you activate this you can see the switching state of OUT1 and OUT1.



4.5 GPS Coordinates



In this view the actual position of the MikroKopter will be displayed with Longitude and Latitude and also in decimal degree.

5 Display Datas

In the upper range of the "OSD" you will see the telemetry display. Here you can get several datas of the Kopter i.e. the current consumption, the speed etc.:

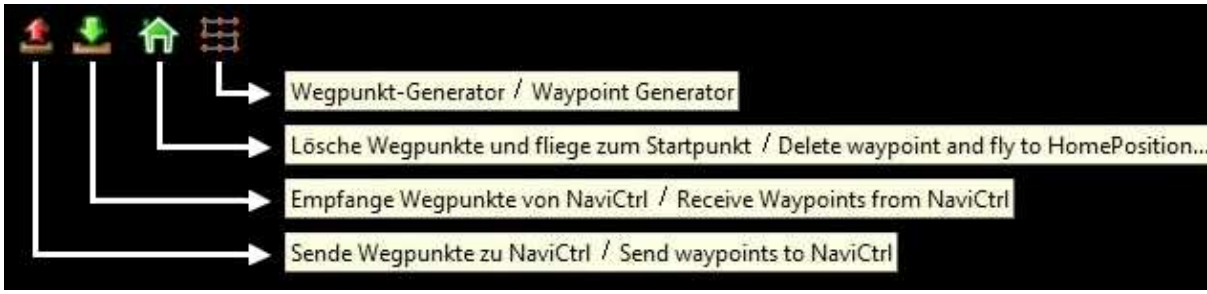
On the left side you will have the display for:

	- (#Sat7) Number of received satellites - (Data link:OK) Data link active/passive - (Mode) Switched Mode - (Time) Actual Flight time - 4 Function-Button

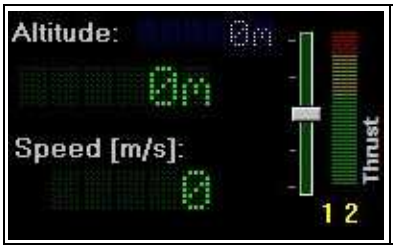
- **Number of received satellites**
  The number of satellites being received can be read here.
  For a "Satfix" and for an accurate determined position of the MikroKopter you need to have at least 6 satellites.
- **Data link ative/passive**
  Here you can check wether this connection exists or not.
  To display the datas of the Kopter at all you need to make a data link for example over a Wi232 or a Bluetooth module.
- **Switched Mode**
  With the GPS-System you can use and set different modes.
  Those are:

◊ **PH(manual)** will be only displayed if the function **PositionHold** is activated and you fly the Kopter manually.

- **Actual Flight time**
  From the beginning of the start the actual flight time will be displayed.
- **Funtion-Buttons**
  Here you can switch quickly to following functions:

♦ 

Next to it you will find following displays:

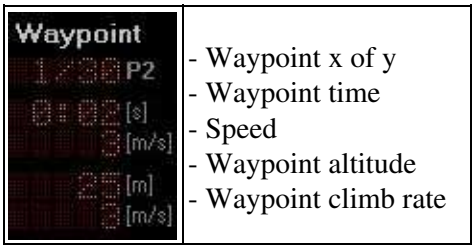
	- Nominal value (in blue) - Actual altitude (in green) - Flight Speed (Speed [m/s] - Thrust - Display transistor outputs

- **Nominal value**
  As soon as the switch for the altitude on your transmitter is switched to "ON" you'll get displayed the **nominal value** in blue.

  Is the altitude-switch on the transmitter been switched speed will be no longer given with the throttle-stick. The speed of the motors is now automatically controlled.
  If the throttle-stick will be moved now up and down, throttle will be not given. The nominal value of the "Nominal altitude" will be shifted instead.
  Here now the engine speed is automatically adjusted and the copter rises or falls.
  The same happens during a WayPoint-Flight. Now the set up altitude of the WayPoint will be taken as a "Nominal value" and shown in the blue background screen.
  The Kopter will fly automatically into the displayed nominal altitude and tries to hold it. The actual height/altitude will be displayed in the underlying green screen.
- **Actual altitude**
  The actual Kopter altitude will be displayed in big green numbers.
- **Flight Speed**
  Display of the actual speed in m/s

- **Thrust**
  On the right you can see with the graphic bar the movement of the throttle-stick and also the appropriate thrust.
- **Display transistor outputs**
  Here you can see which transistor output is aktiv or not.

Information about the WayPoint-Flight you can find here:

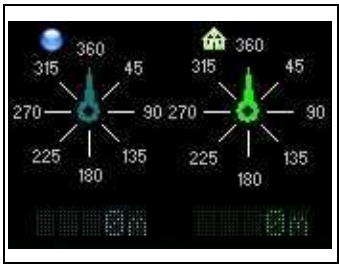


- Waypoint x of y
- Waypoint time
- Speed
- Waypoint altitude
- Waypoint climb rate

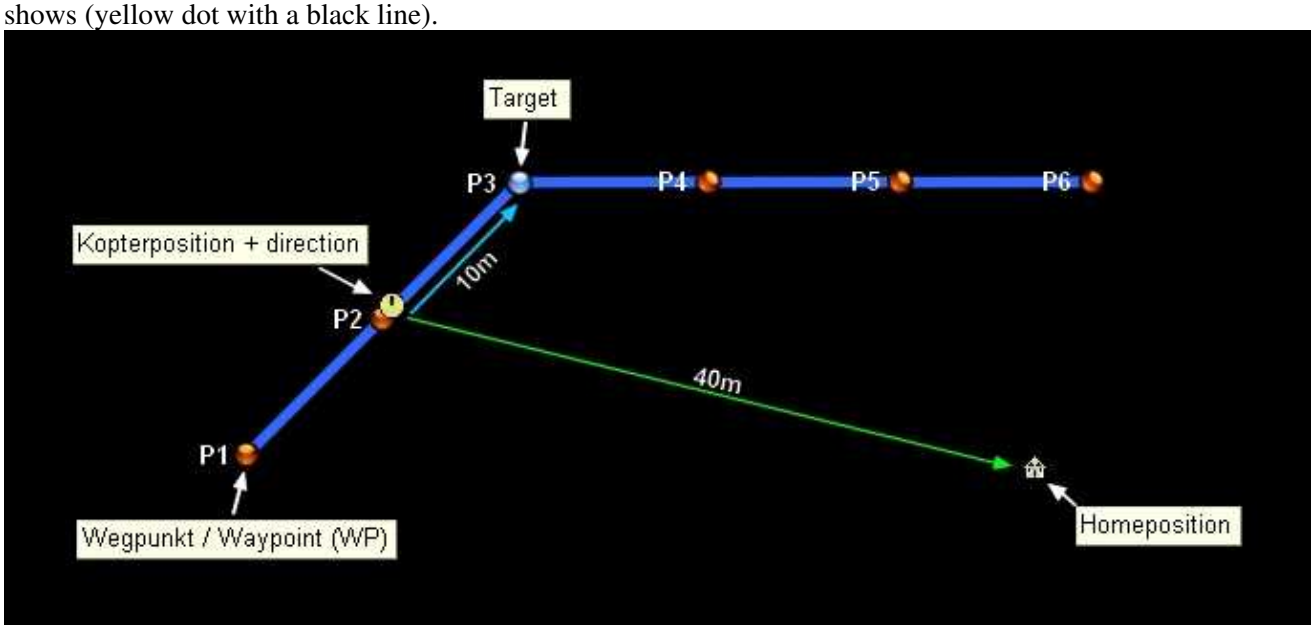
While the WayPoints are flown informations are displayed for each WayPoint:

- **WayPoint x of y**
  Here the total number of entered WayPoints are displayed (right) as well as the actual flown WayPoint (left).
- **WayPoint-Time**
  To each WayPoint a delay time can be assigned. During that time the Kopter will stay at the WayPoint.
  The delay time starts already with reaching the WayPoint-Radius and counts down from there.
- **Flight-Speed** The flight-speed in which the next WayPoint should be flown can be set individually for each WayPoint.
  Here the speed will be displayed.
- **Altitude** Here the altitude of the actual WayPoint will be displayed.
- **Climb rate** Is the following WayPoint higher or lower than the actual one the altitude can be changed with a set speed (climb rate) before.
  That will be displayed here.

The view of directions:

	**Blue direction view:** Shows the actual direction in degrees (°) / Distance to the next WayPoint (Target) **Green direction view:** Shows the actual direction in degrees (°) / Distance to the Homepoint (Start point).

In this example you will see the positions on a north-oriented map. On the right nthere is the homepoint (Start point) of the Kopter.
On the left and on the blue line you will see the position of the Kopter and the direction in which the Kopter shows (yellow dot with a black line).

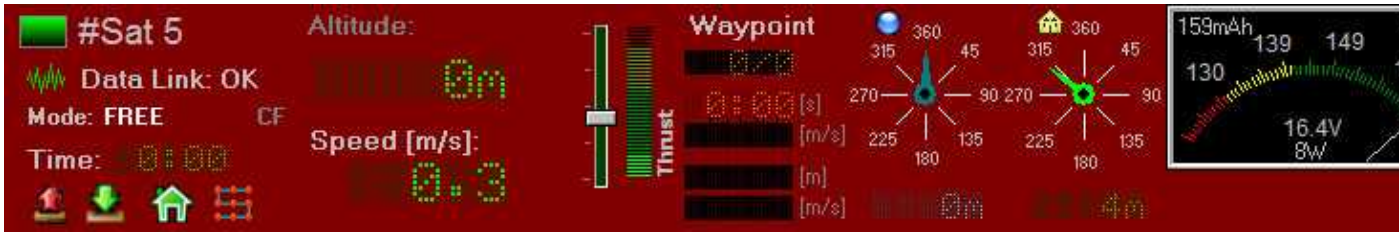


Consumption values:

	**Voltage of the Lipo.** Besides the actual voltage of the Lipo and in addition the actual consumption values in mAh / A and W will be displayed. If the Lipo reaches that in the KopterTool set low-voltage warning an additional warning sounds over the PC.

5.1 View of failures

In case of an error on the Kopter the OSD will display that. Here the color of the telemetry display will change to red:



In addition the error message will be displayed in the underlying map. Some examples of the messages:

The exact meaning of those error codes can be found in the Wiki: ErrorCodes

6 Use of maps

In the **OSD** of the KopterTool you can load a map. As a map you can use any image saved in JPEG-format. In order to have an exact positioning of the map it should contain the appropriate coordinates (See GeoTag) . In one of those maps the actual position of the Kopter can be detected. In addition you can set WayPoints / POI and they can be flown.

6.1 Create maps

There are different ways to create a map for the OSD.

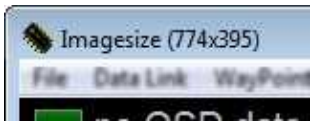
- **Option 1:** Create a map by our **MapTool**: Link
- **Option 2:** Copy a map over the website **GeoMapTool**: Link
- **Option 3:** Copy a map over the website **OpenStreetMap**: Link
- **Option 4:** Create a map over the **Wp-Generator**: Link

(In all three options the appropriate GeoTag-coordinates will be saved into the already saved maps.)

6.2 Size of the map

The window of the OSD and resized such as under the normal regular Windows. For that reason that already created maps should be displayed with the correct aspect ratio also the size of the display should be considered.

In the title bar of the OSD and the top left the current size of the window is displayed:



If you change now the size of the window the actual size will be displayed. This displayed size you can take now to create maps in the right size.

- Example in connection with the website **GeoMapTool**:
  - ♦ Open the website "GeoMapTool" and start the program. Above the map view is a bar for settings.
  - ♦ To get the right map size choose **"User def /Benutzer def."** in the upper settings.
  - ♦ Is that chosen you can enter in the white box below the size (i.e. 774x395) and with the button **"Set"** it can be taken over.
  - ♦ The map automatically adapts to this size.
  - ♦ Next choose with the button **"Geo-Suche"** the desired location.
  - ♦ If the desired location is shown you can set with the slider the size of the map.
  - ♦ Is the desired map detail visible, the map can be saved over the button **Save**.
  - ♦ When you save the image it'll be given to it automatically the appropriate coordinates. Those are necessary for the display in the OSD.

- Example in connection with the website **OpenStreetMap**:

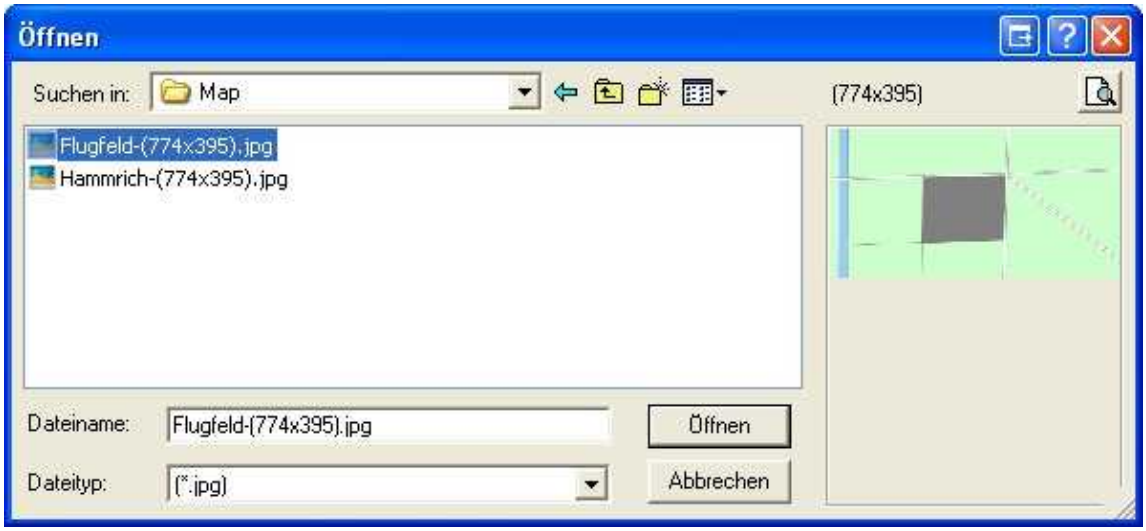
  - ♦ Open the map view of "OpenStreetMap".
  - ♦ On the left side enter under **"Search"** the desired location and start the search with **"GO"** . A search result appears and you can click now on the appropriate place.
  - ♦ In the map you can set and adjust now the size of the map.
  - ♦ The following step is to click on the upper tab on **"Export"**.
  - ♦ Now you will see the 4 coordinates of the displayed map detail.
  - ♦ After that you choose the required format for the export of the image - **"Mapnik-Image"** and the format in which the image should be saved - **"JPEG"**.
  - ♦ Underneeth the 4 coordinates you will find the script **"Select manually a different region"**. That need to be "clicked" to define the map-size.
  - ♦ After the "click" on the script you will see now **"Bring up a frame over the map to select an area"**. That will be done with the left mouse-button.
  - ♦ The selected area in the map will be highlighted throughout a framed box with circles at the edges.
  - ♦ On the left side and under the format JPEG the size of the selected area will be displayed.
  - ♦ The framed box with the circles at the edges can be changed in it's size. In that way you can set the needed map-size (i.e. 774x395).
  - ♦ Is the desired map detail visible you can save the map over the button **"Export"**.
  - ♦ When you save the image it'll be given to it automatically the appropriate coordinates. Those are necessary for the display in the OSD.

- **TIPP:**
  Helpful is also an extra folder to Collect/Organize your maps. The folder can be placed in the directory of the KopterTool.
  Make sure you give the maps a **unique name** (i.e. airfield_(774x395).jpg or farmersfield_(774x395).jpg).

6.3 Load maps in OSD

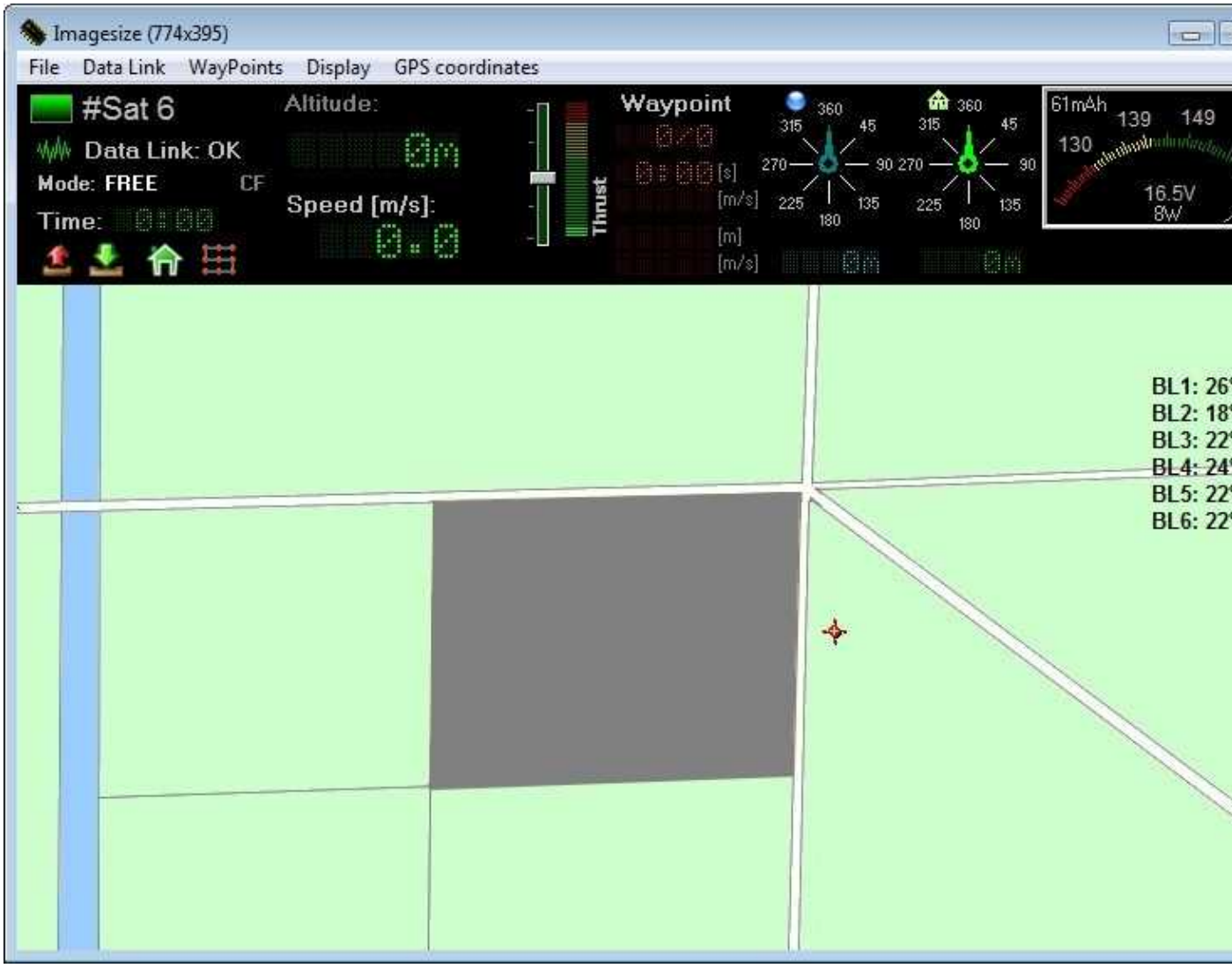
To open a map in the OSD is described as follows:
In the menu bar of the OSD you need to "click" on the tab **"File"** and then on **"Load image..."**.

It opens up now the "OPEN"-window:



In this example the maps were saved in a folder named **"Map"**. After you have chosen the folder you can see the saved maps listed in the white field.
If you "click" on it you will see on the right a small preview. Over the small preview appears the size of the image.
That is the size the image was downloaded (See **"Map size"**).

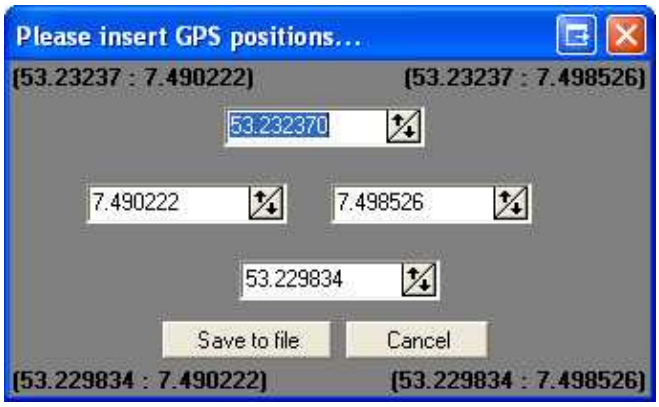
A "click" on the button **"OPEN"** takes now the image/map into the OSD.


Imagesize (774x395)
File
Data Link
WayPoints
Display
GPS coordinates
#Sat 6
Data Link: OK
Mode: FREE
CF
Time:
Altitude:
Speed [m/s]:
Thrust
Waypoint
[s]
[m/s]
[m]
[m/s]
61mAh
139
149
130
16.5V
8W
BL1:
BL2:
BL3:
BL4:
BL5:
BL6:

(Example view with a self-created map)

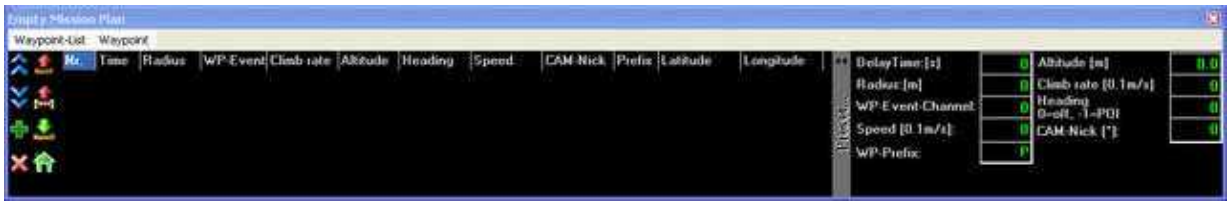
6.4 Coordinates of the map

If an image has been loaded you can watch or enter over >File >GeoTag the GPS-Positions.
Those coordinates are necessary so that the received datas of the GPS from the Kopter been displayed correctly on the map.
The set up window looks in that way:



7 WayPoint-Editor

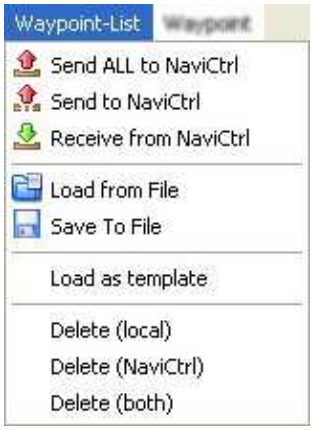
In the **WayPoint-Editor** you can set, check, move WayPoints and POI and also been transfered to the Kopter. The **Editor** will be opened as described over the menu bar **>WayPoints >Editor...**.



7.1 Editor - menu bar

Over the menu bar various functions can be executed.

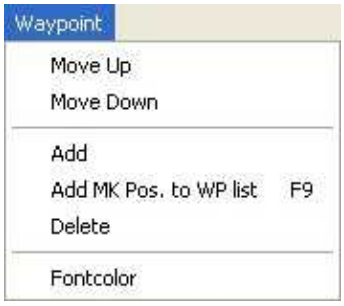
WayPoint-List



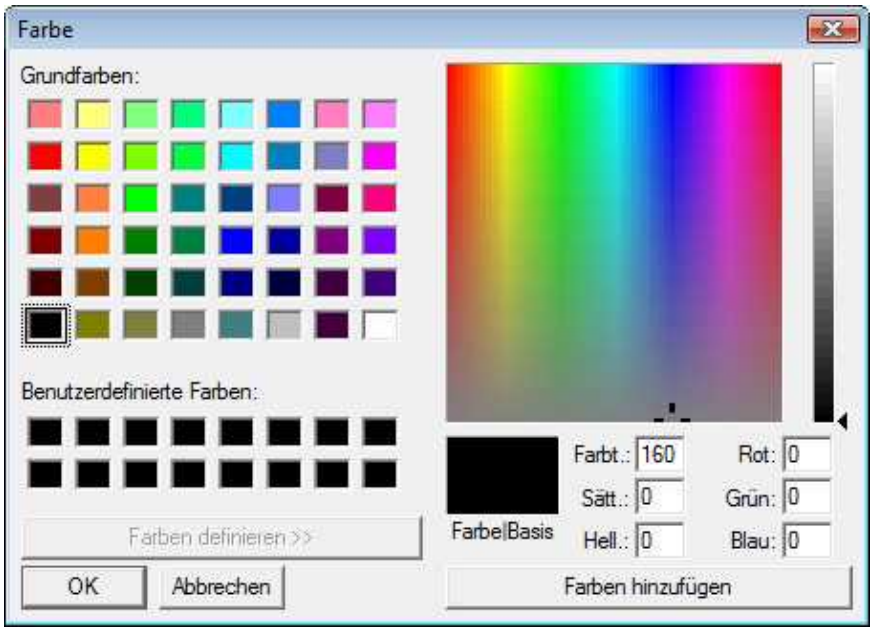
- **Send ALL to NaviCtrl**
  - ♦ Sends all in the map entered WayPoints / POI to the NaviCtrl.
    - ◊ Max. 32 WayPoints possible.
- **Send to NaviCtrl**
  - ♦ Sends a part of !WayPoints/POI to the NaviCtrl:

- **Receive from NaviCtrl**
  - ♦ Already transfered !WayPoints/POI to the NaviCtrl can be read.
- **Load from file**
  - ♦ Opens already created and saved !WayPoints/POI.
    The !WayPoints/POI will be placed into the map exactly at that spot where they have been created.
- **Save to file**
  - ♦ Saves the created !WayPoints/POI on a map.
- **Load template**
  - ♦ Opens already created and saved !Waypoints/POI.
    The !WayPoints/POI will be merged at that spot on the map where the marking point is placed.
- **Delete (PC)**
  - ♦ Deletes all !WayPoints/POI in the actual view.
- **Delete (NaviCtrl)**
  - ♦ Deletes all transfered !WayPoints/POI to the NaviCtrl .
- **Delete (both)**
  - ♦ Deletes all !WayPoints/POI in the actual view **and** Deletes all transfered !WayPoints/POI to the NaviCtrl .

WayPoint

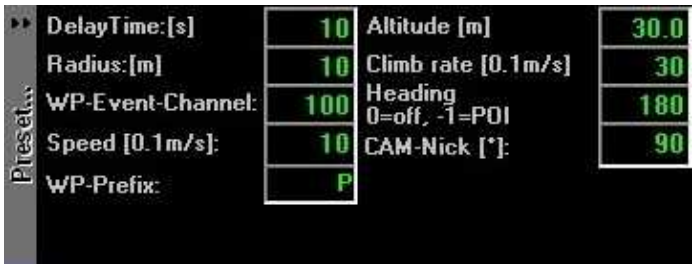


- **up**
  - ♦ To move the selected WayPoint in the operational plan upwards.
- **down**
  - ♦ To move the selected WayPoint in the operational plan downwards.
- **add**
  - ♦ Add WayPoint on the marking point in the map.
- **Add MK-Position F9**
  - ♦ Applies to an existing data link between the Kopter and the OSD the current position of the Kopter as a WayPoint into the map.
- **Delete**
  - ♦ Marked WayPoint in the operational plan will be deleted.
- **Fontcolor**
  - ♦ Choosing the WayPoint-Fontcolor in the map (P1, P2, P3,...) and the BL-Ctrl-Fontcolor.



7.2 WayPoints - Defaults

On the right side you will find the settings for each !WayPoint/POI which can be determined by yourself:



Describtion

- **Delay Time: [s]**
  - This is the delay time of the Kopter at the WayPoint. To each WayPoint can be assigned a seperated delay time.
    The delay time begins to count as soon as the Kopter enters the radius of the WayPoint.
    After the delay time is over the next WayPoint will be flown.

    If you use a delay time of "0" the Kopter will not stop on the Waypoint. The Kopter fly in this case further without stop to the next Waypoint.
    In this case the "WP-Event" is for 2 seconds on each Waypoint activand the camera can trigger.
    If this time is to short, you can use a SD-Card in your NaviCtrl and set a other time for "MIN_EVENT_TIME" (Link).
- **Radius: [m]**
  - That is the radius around the WayPoint. That radius should not be too small so that the Kopter can reach the coordinates of the WayPoint.

    While it is calm or windless the Kopter can reach a WayPoint easily in a small radius.
    If the Kopter reaches the coordinates (+/- of the specified radius) of the WayPoint it will be acknowledged with a tone of the program.
    As soon as that is recognized the "delay time" begins. After the "delay time" is expired the next WayPoint will be flown.

    It'll be way more difficult to reach a WayPoint during windy/stormy weather.
    Under those circumstances with very windy weather the Kopter cannot really reach the WayPoint.
    In that case the Kopter would try to reach the coordinates of the WayPoint until it's done.
    That may be takes a long time. Mostly that means a malfunction but although the copter just struggling against the wind.
- **WP-event-Channel**
  - With the "WP-Event" (Waypoint-Event) it is possible that i.e. a ShutterCable attached to the FlightCtrl to trigger a camera can be controlled.
    The here entered number determines the time in which the switch-output been operated.

◊ A describtion of the settings of the **WP-Event** you can find here: **Waypoint-Event**

- **Speed [0.1m/s]**

♦ Here you can set the speed for the Kopter to fly to eacch WayPoint.

◊ Enter speed via a fixed value.

Input	Flight Speed
0	No speed adjustment. The Kopter will fly with the maximal possible speed to the next WayPoint
1 - 247	Specification of the speed. Value x 0,1m/s = Speed

◊ Adjust continuously speed via the function POTI1-8 and with a potentiometer at the transmitter.

Input	Flight Speed
255	The function **POTI1** is selected
254	The function **POTI2** is selected
253	The function **POTI3** is selected
252	The function **POTI4** is selected
251	The function **POTI5** is selected
250	The function **POTI6** is selected
249	The function **POTI7** is selected
248	The function **POTI8** is selected

INFO

- With the under Navi-Ctrl set up basic settings a maximum speed of ~6m/s is possible.

If you enter the **Value** "60" the maximum speed will be reached.
If you enter a higher number instead it will not have any influence of the maximal reachable speed.

By using the **Function POTI** you can adjust the speed over a potentiometer at your transmitter, also during the flight.
The maximum speed is here also ~6m/s.

If you want to get a higher speed you must change the values for GPS-P and GPS-D in the settings under Navi-Ctrl.
ATTENTION: When changing the values GPS-P and GPS-D there is a possibility that the Kopter flies faster but sinks also in the same time!
Here you need to find the appropriate values so that the Kopter is not sinking while increasing the speed.
Changes should be made cautiously and in small steps!

- **WP-Prefix**
  - ♦ Each Waypoint or POI has a letter in front of the number. This is in the basic settings a "P" (P1, P2, ...).
    If you want to fly Waypoint in different patterns, you can chose for each patter a different letter.
    In this field, you can set a letter you want.
- **Altitude [m]**
  - ♦ Here you need to make a difference between a WayPoint and a POI:
    - ◊ WayPoint: The entered altitude determines in which height the Kopter flies to the WayPoint.
      POI: The entered altitude determines in which height the POI is. This height will be used as the "View direction" for the camera (see also "Camera tilt").
- **Climb rate [0.1m/s]**
  - ♦ Are the WayPoints in different heights you can determine how fast the Kopter should climb/fall to reach the desired height.
- **Direction (0=off, -1=POI)**
  - ♦ To each WayPoint a "View direction" can be given. After reaching the WayPoint the Kopter looks into the set direction.

    The Settings:
    - ◊ **Entry = 0** (In the list appears under "Direction" not a "0" but "--" instead.)
      The Kopter is not adjusting the direction and will keep the actual view direction.

      Entry = 1-360
      Depending on the set degree (1-360°) the Kopter will look into that direction.

      Entry = -1, -2, -3, ... (or P1, P2, P3, ...)
      Each WayPoint or POI has in the map its own term. This term consists out of the letter "P" and a number.
      Here rules: No matter in what order waypoints and / or POI were set those are consecutively numbered (P1, P2, P3, P4, ...)

      If the Kopter (the camera) has to look into the direction of a POI after reaching a WayPoint that WayPoint must be entered under "Direction" for the appropriate POI.
      Example: The POI with the designation "P6" should be entered. Here you need to enter under "Direction" **P6** (alternatively you can enter also **-6**).
      INFO: It is also possible to enter a WayPoint as "direction".

- **Camera tilt** [°]

  - ♦ To each WayPoint a "Camera tilt" can be assigned. After reaching the WayPoint the Kopter looks into the set direction.

    The Settings:

    Entry = 0-255
    Depending on the selected degree the camera mount tilts.

    - ◊ **INFO:** The set Nick-Position of the camera mount will give you the 0°-Position during the start.
      If the camera looks straight forward during the start is that the 0°-position.
      If the camera looks a little bit up- or downwards instead is that position the 0°-position.


0°
90°


0°
90°

- (Depending on the camera mount different tilts are possible. Usually degrees in the range from 0° up to ~130° are rational.)

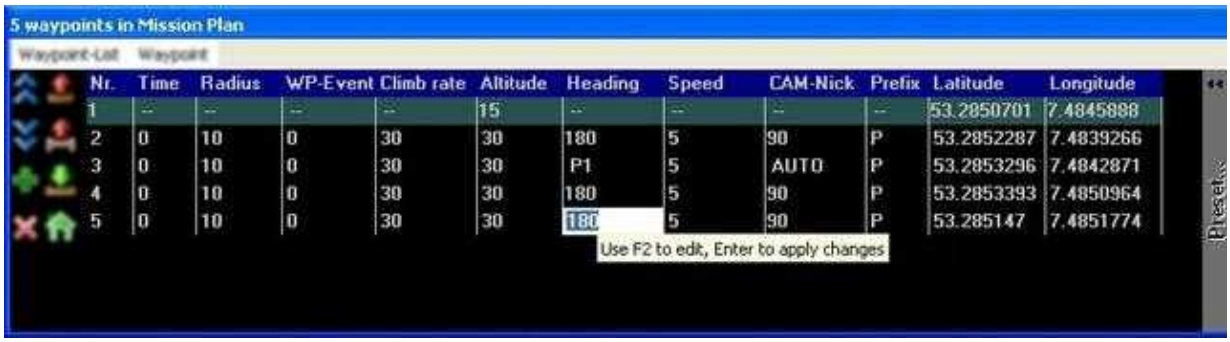
Entry = -1 or "AUTO
In fact that under "Direction" a POI has been entered you can set here "-1" or "AUTO".
Then you will see in the flight plan an "AUTO".
After reaching the WayPoint the camera mount looks then automatically into the set height of the POI.

- **Preset...**
  - ♦ with the gray bar "Preset..." the presets panel can be shown or hide.

7.3 The operational plan

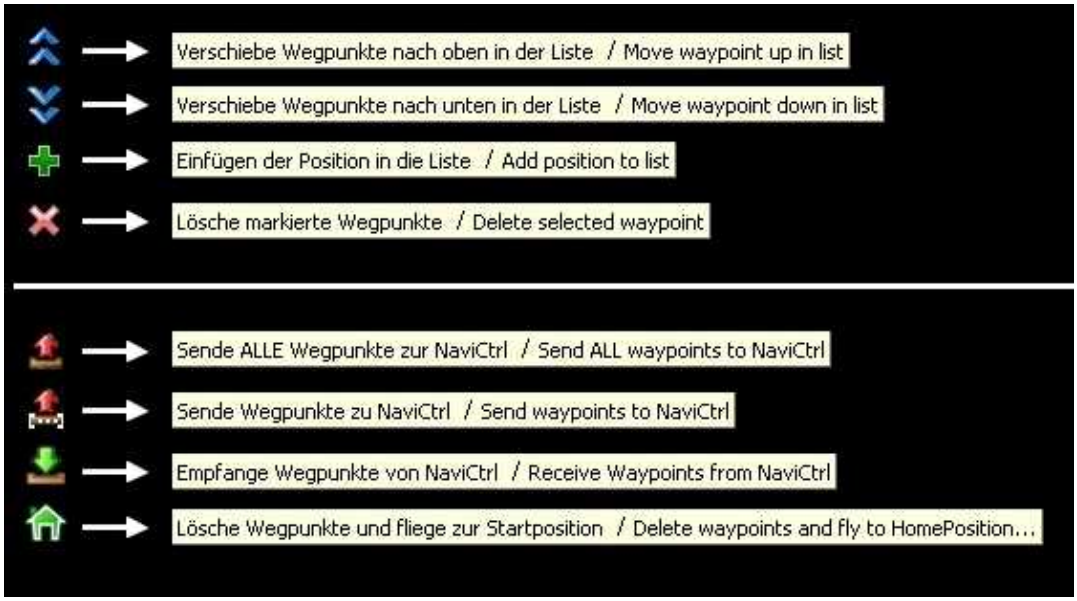
All created WayPoints and POI are in the order in which they were created. In this order they are entered into the "opeartional plan".
In addition to the settings i.e. height or direction the exact position will be displayed in decimal degrees.

In the "operational plan" each WayPoint and each POI can be changed afterwards.
For this the appropriate value of the WayPoint / POI which need to be changed has to be chosen (marked) and will be opened with the botton **"F2"** for processing.
Now you can change the appropriate value and finish it with the button **"Enter"**.



7.4 Operational plan - Symbols

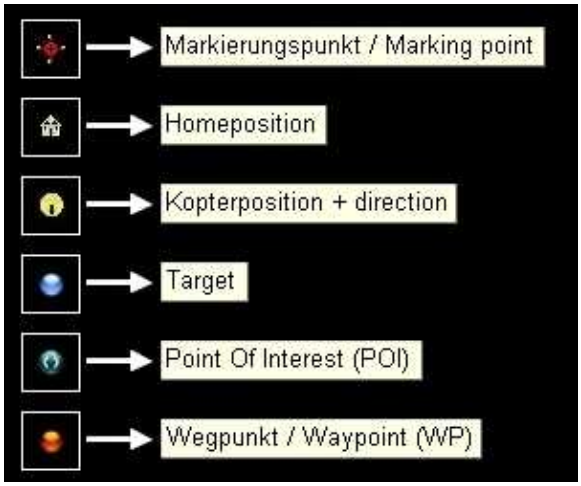
On the left next to the "Operational plan" you will find different symbols.
The functions of the symbols are:


Verschiebe Wegpunkte nach oben in der Liste / Move waypoint up in list
Verschiebe Wegpunkte nach unten in der Liste / Move waypoint down in list
Einfügen der Position in die Liste / Add position to list
Lösche markierte Wegpunkte / Delete selected waypoint
Sende ALLE Wegpunkte zur NaviCtrl / Send ALL waypoints to NaviCtrl
Sende Wegpunkte zu NaviCtrl / Send waypoints to NaviCtrl
Empfange Wegpunkte von NaviCtrl / Receive Waypoints from NaviCtrl
Lösche Wegpunkte und fliege zur Startposition / Delete waypoints and fly to HomePosition...

8 WayPoints, POI and other symbols

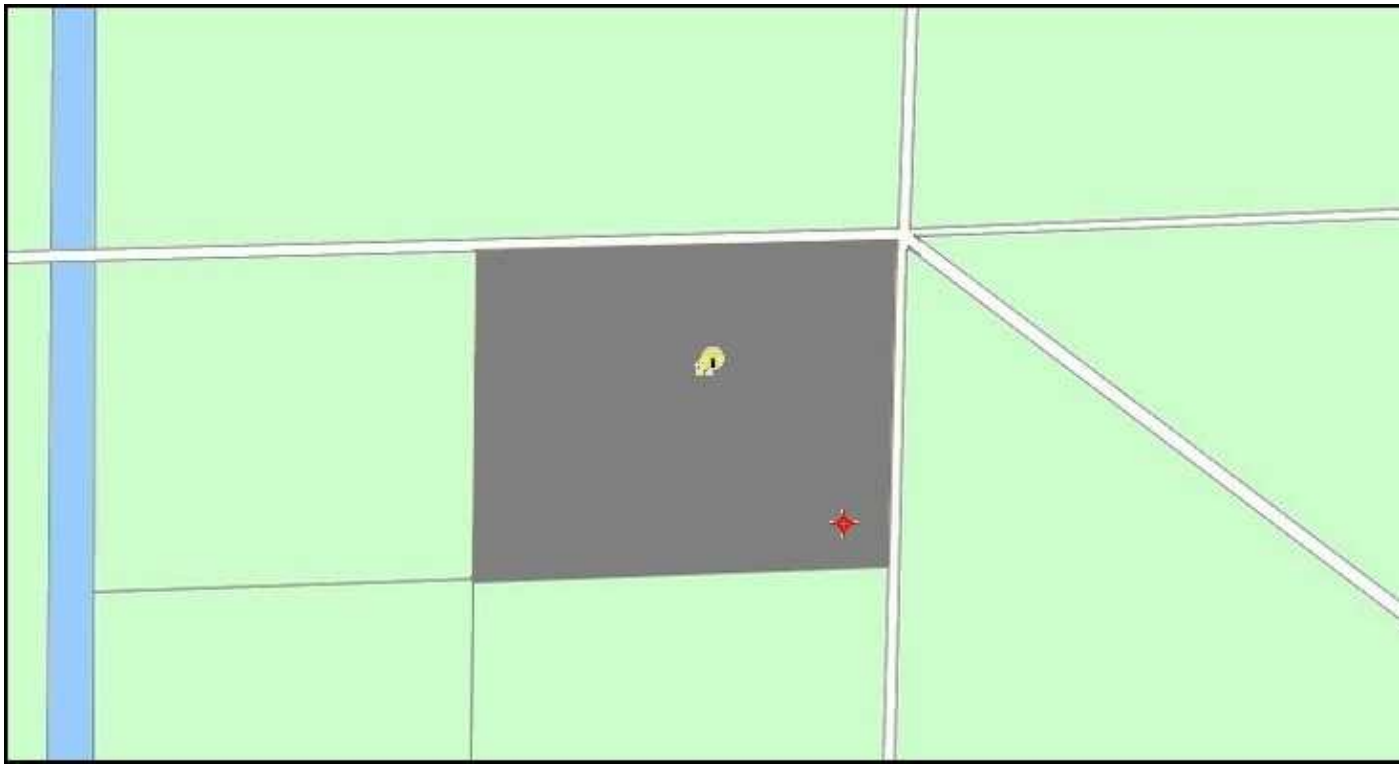
If you have loaded a map different symbols can be displayed.

Those symbols are:

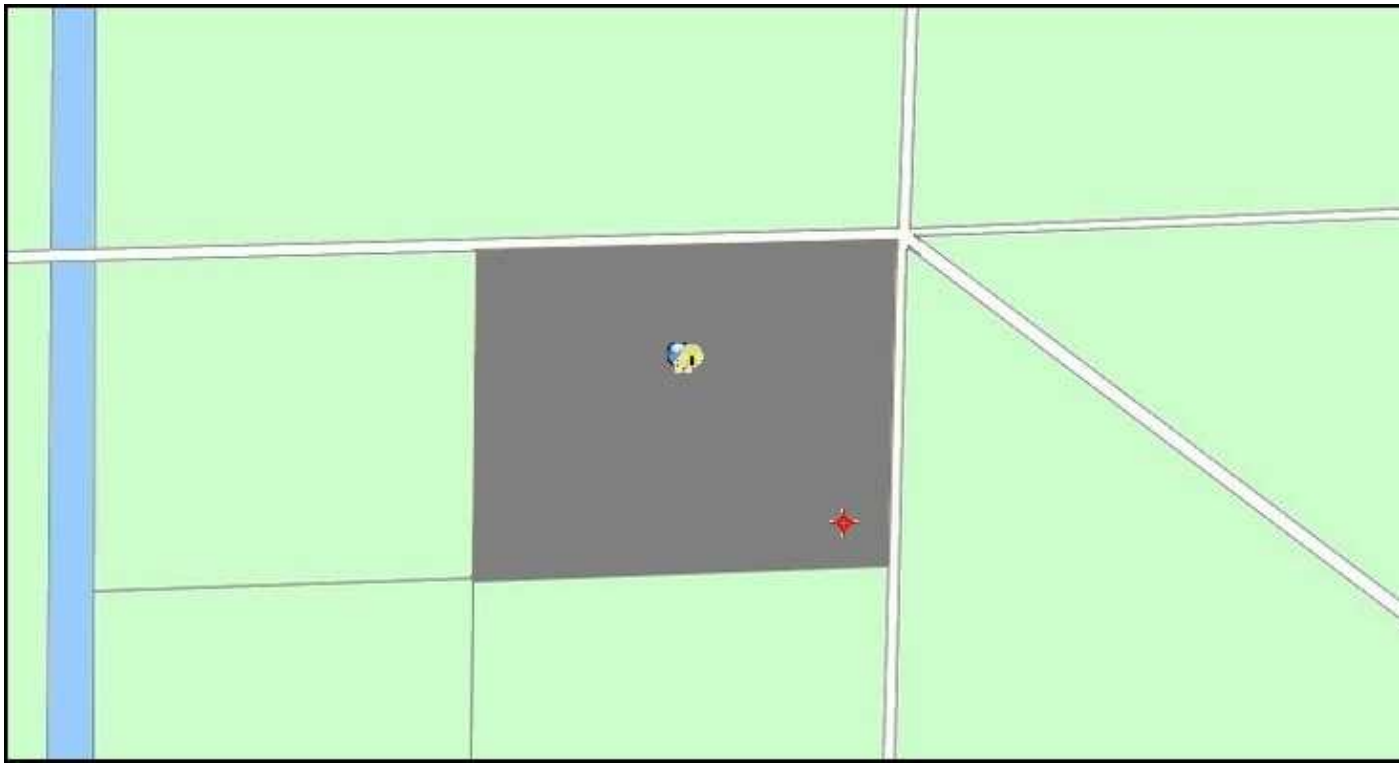


If there is a data link to the Kopter and has also a Sat-Fix the position will be displayed in the map.
Visible on the map is as follows:

- **Homeposition** = Position of the Kopter while starting the engines/motors.
- **Kopterposition** = Actual position and view direction of the Kopter. This symbol follows the actual position of the Kopter.
    - ♦ (This symbol can, depending on the quality of the received satellites, move around even if the Kopter stands!)
- **Marking Point** = That is the spot in the map where with the left mouse button has been clicked one time.



If the GPS-button will be switched at the transmitter the "Target"-Symbol appears in addition.
This "Target"-Symbol follows in the map the "Kopterposition"-Symbol, if the Kopter flies i.e. with an active function "PositionHold".
If you do not move the control-stick during a flight and with an active function "PositionHold" the "Target"-Symbol and the Kopter will stand at the actual position.



8.1 Radius for the WayPoint-Flight

The WayPoint-Flight (without license) is only in a radius of 250mtr. around the start-point possible.
To see in which radius you can set WayPoints you are able to place a coloured circle around the nstart-point.
How this works is described here: Circle

If you use the !Waypoints you should make sure that you set the WayPoints within the radius.
Are the WayPoints on the border of an area, direct on or outside the 250mtr. border the !Waypoints cannot be reached.

In that case the Kopter will stop at the 250mtr. border and will not continue to fly.
Also - the next !Waypoint will be not flown if the previous WayPoint cannot be reached!

8.2 Set WayPoints

If you want to place WayPoints into the map you have two opportunities.

- **Opportunity 1**
  - A "Right-click" on the map sets a WayPoint. After that the WayPoint-Editor opens automatically with the datas of the set WayPoint.
- **Opportunity 2**
  - In the WayPoiont-Editor nyou need to make first the settings for each WayPoint. After that you mark the spot in the map and place the WayPoint.

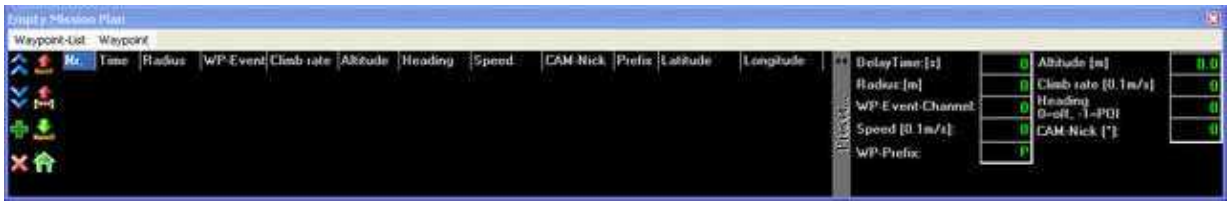
Example with "Opportunity 2"

In this example the Kopter should:

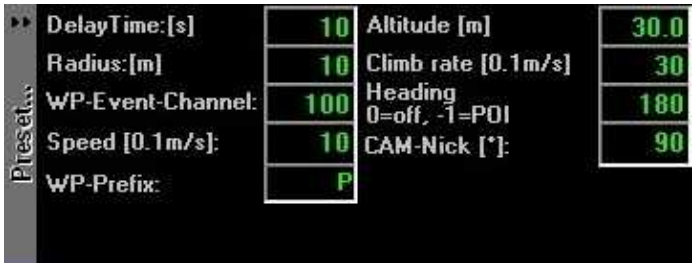
- fly in an altitude of 30mtr.
- wait for 10sec. at each WayPoint
- fly to the WayPoints with a speed of 1mtr/sec.
- point/look southwards
- point the camera tilt downwards
- and take photos at each WayPoint

First at all you need to open the WayPoint-Editor (>WayPoints >Editor...).

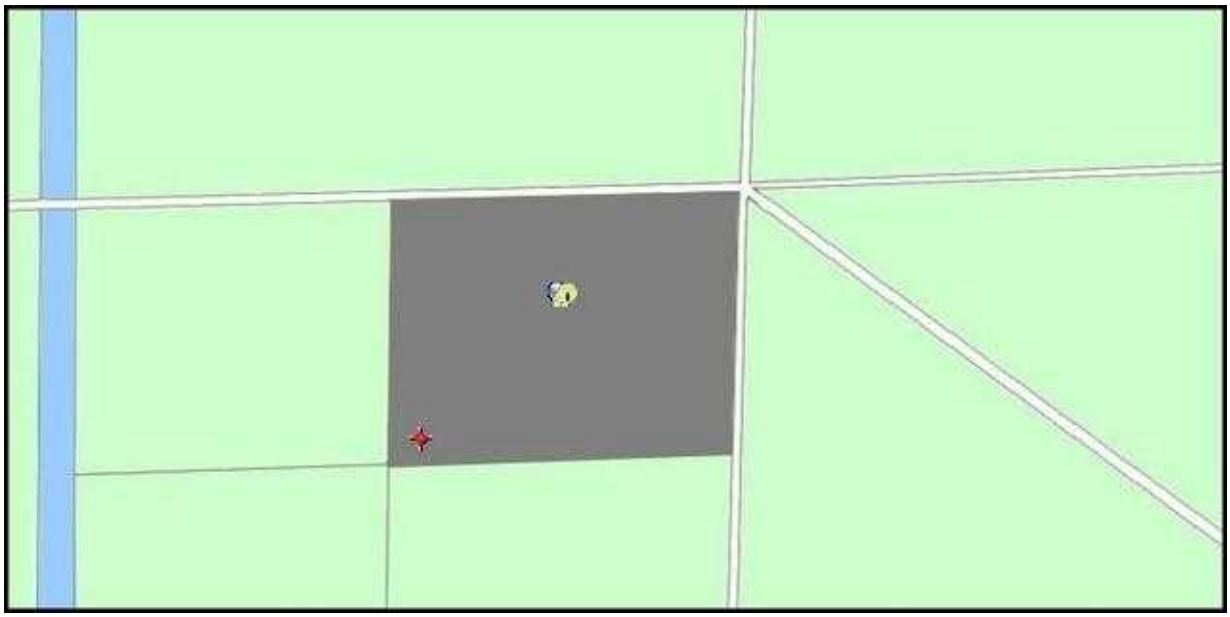
The WayPoint-Editor is still empty:



Now you can enter on the right side in the WayPoint-Editor the required values.
The **Radius: [m]** gets in addition a safety-radius of 10 mtr. and a climb rate of 3mtr/sec:

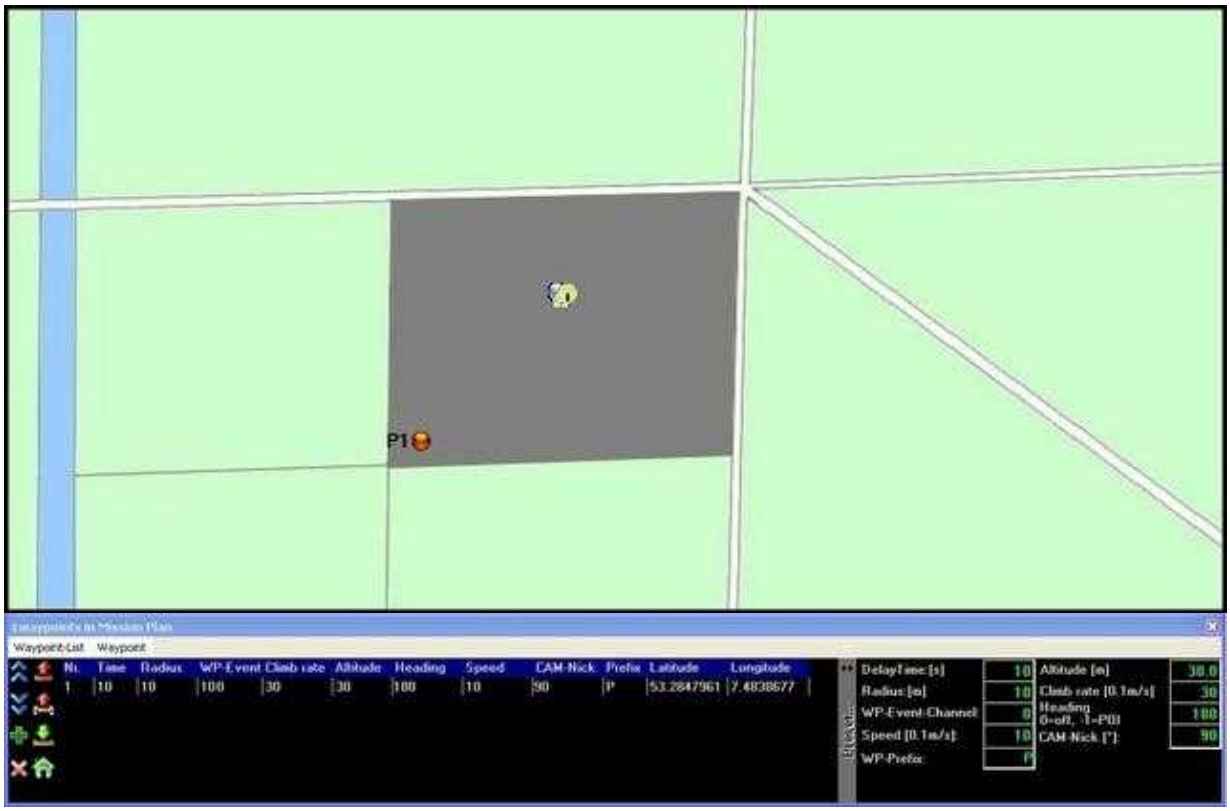


Now you can mark the spot where the first WayPoint should be placed. That will be done with a "click" on the left mouse-button:



To set the WayPoints with the settings at that spot a "click" on the green PLUS-sign in the WayPoint-Editor is enoug:

Now a WayPoint with the designation **P1** appears. In the WayPoint-Editor you will see the first WayPoint with the set datas in the list:

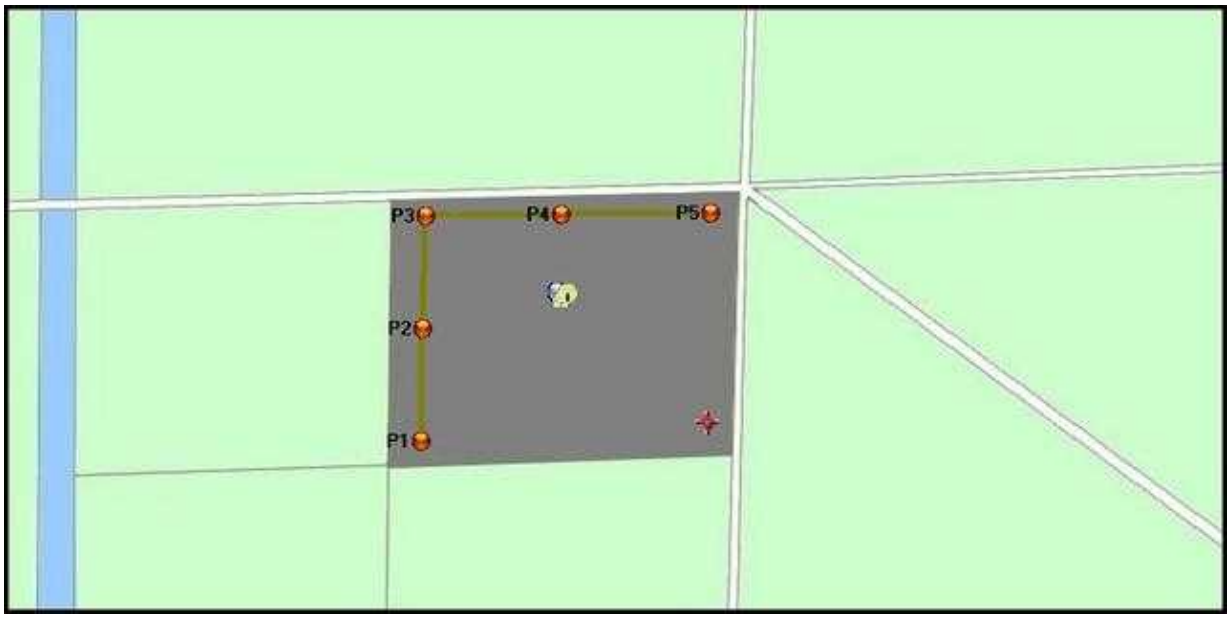


For each WayPoint more you can adjust the settings in that way and enter into the map.

If you want to place another WayPoint on the map with the same settings a re-set of the position into the map is enough and just "click" on the green PLUS-sign.
Each placed WayPoint with its settings will be entered into the list of the !wayPoint-Generator.
(With a "right-click" a WayPoint will be placed on the map with the previous settings.)

Info:

A numbering of waypoints will be automatically done in the order in which they are placed.
Each WayPoint will be connected throughout colored lines to show the sequence of the flight.
This line can be colored differently depending on the background of the map.

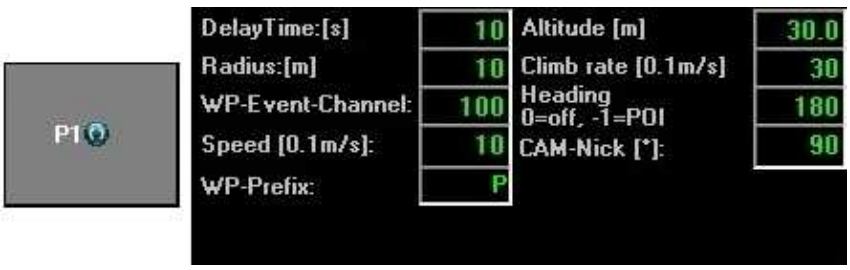


8.3 Set POI

The settings for POI (**P**oint **o**t **I**nterest) are pretty much similar with the settings of WayPoints.

Here you need to hold down the **"STRG"**-Button (Ctrl-button) and with a "right-click" on the map you set the POI.

A POI appears on the map and the WayPoint-Editor opens up.



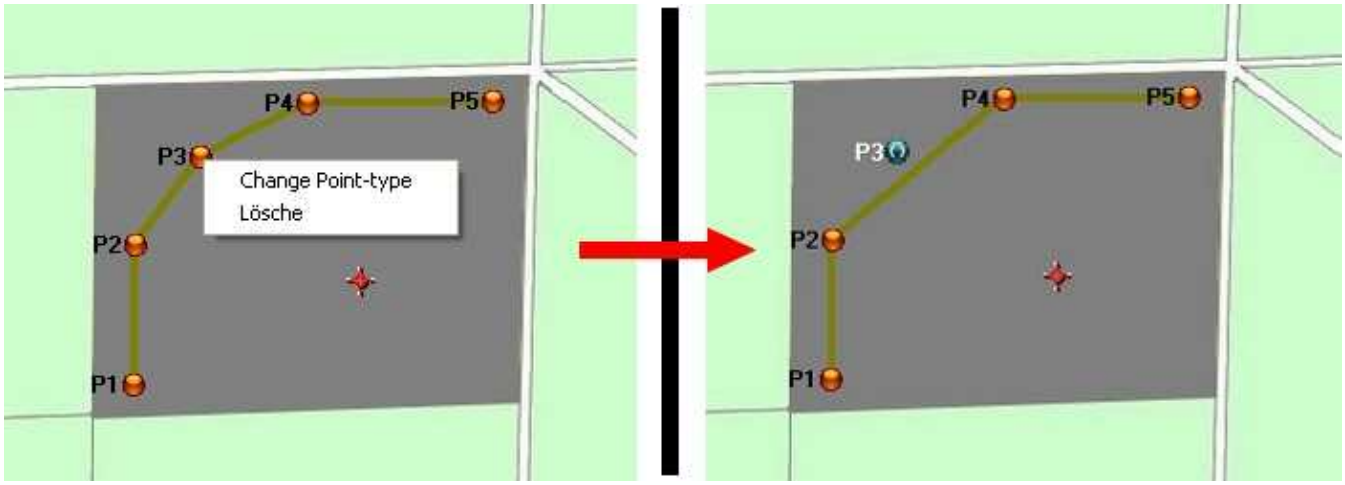
As a POI is a viewing direction no values such as "Time", "Radius" etc. are required. Only the height/altitude can be entered/changed here and been used as a viewing direction.
In the editor only the set altitude and the coordinates will be displayed:

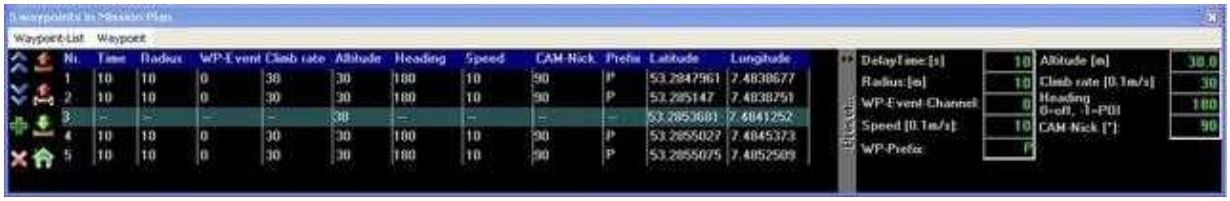
8.4 Switch WayPoint into POI

It is possible to switch/change any (also several) WayPoint into a POI. On the other side you can switch a POI into a WayPoint.

Here you need to make a click with the **right** mouse-button on the appropriate WayPoint.
In the context menu which appears you can make a click with the **left** mouse-button on **"Change Point-type"**.
The desired WayPoint is now a POI.

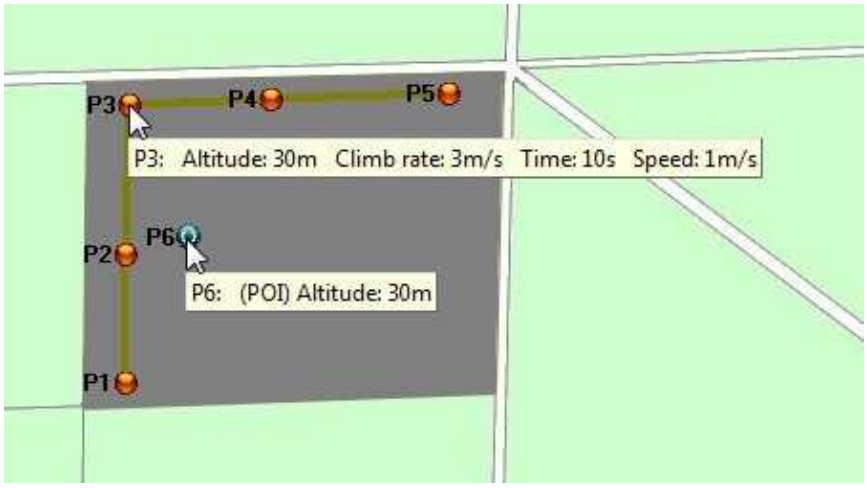
The trajectory will be adjusted automatically and changes the appropriate WayPoint in WayPoint-Editor into a POI:





8.5 WayPoint and POI information

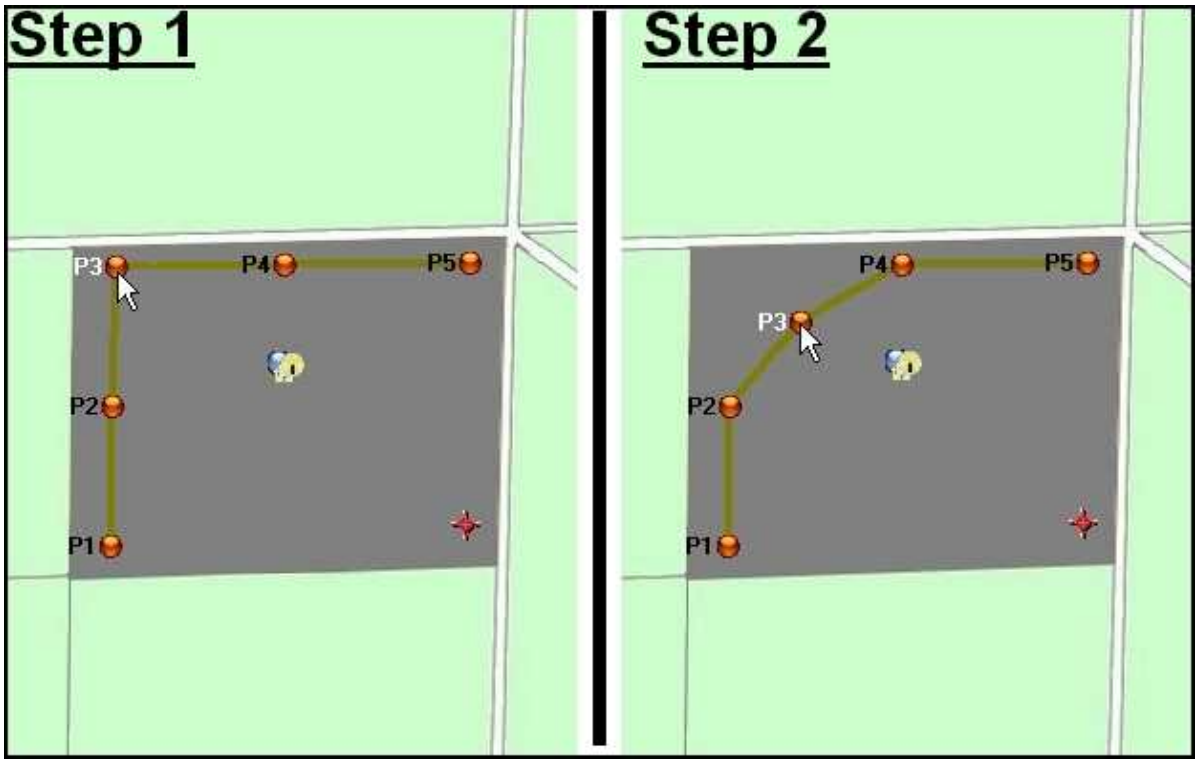
If you move the Mouse over a waypoint or a POI you can also see the informations of this WP or POI.



8.6 Move/displace WayPoints or POI on the map

If a WayPoint is not set correctly on the desired spot it must not be deleted.
Each WayPoint or POI can be moved/displaced easily. Here you need to hold down the left mouse-button on the appropriate WayPoint.
If you move now the mouse you can displace the !WayPoint/POI.
Is the WayPoint now placed to the right spot you can release the mouse-button.

The changed position of the WayPoint will be automatically transfered into the WayPoint-Editor.



9 Transfer WayPoints to the Kopter

After you have set and placed !WayPoints/POI into the map you can transfer those to the NaviCtrl.
Here you have two opportunities:

- **Opportunity 1**
  - ♦ You use the MK-USB and connect it to the NaviCtrl and your PC.
    That could be very awkward if you have to remove the cover first and mount it back after the data transfer.
    Here you can't track the WayPoint-Flight in the OSD.
- **Opportunity 2**
  - ♦ You establish a wireless data connection between Kopter and the OSD i.e. with a Wi.232-set or a Bluetooth-set.
    Here you need to connect one set to the Kopter and one set to the PC.
    That gives you the advantage that !WayPoints/POI can be transfered to the Kopter at anytime.
    In addition you can track the WayPoint-Flight on your PC because the telemetry from the Kopter will be displayed.

Is the Kopter connected over a wireless data connection to the PC you can transfer now the datas:

- ♦ if the Kopter is still on the ground (Kopter connected with Lipo, motors are OFF.)

or

- ♦ during the flight. (Kopter flies around and is set with i.e. "PositionHold" and "!Hold Height".)

To transfer the WayPoints you can click now in the "OSD" or in the "WayPoint-Editor" on the button *"Send All WP"*  or on the button *"Send WP from/to"*  .
Alternatively you can use in the "WayPoint-Editor" under >*WayPoint-List* also the menu *"Send ALL to NaviCtrl"* or *"Send to NaviCtrl"*.

After that the WayPoints will be transfered (all or just the chosen ones) to the NaviCtrl. During the data transfer of the WayPoints to the Kopter it "beeps" one time for each WP.
In addition you can see in the "WayPoint-Editor" which !WayPoint/POI will be transfered right now.

10 Execute WayPoint-Flight

Are the WayPoints transfered to the NaviCtrl the Kopter can fly those WayPoints automatically.

Here we do this as follows:

Step 1

- Start Kopter and bring on height.
- Switch ON the function "HoldHeight".
- Switch ON the function "PositionHold".
- The throttle-stick is in middle-position.

The Kopter should "stand" now in the air and should hold automatically the position and the height.

Step 2

- Switch ON the function "CareFree" (so that the Kopter turns automatically into the set direction).
- Switch ON the function "ComingHome".

Direct after switching ON the function "CareFree" the Kopter turns into the first given direction. After switching ON "ComingHome" the WayPoint-Flight will start.
Now the Kopter will fly on the entered height and position of WayPoint #1. Has the Kopter reached that WayPoint the delay time counts down and the next WayPoint will be flown a.s.o.

IMPORTANT
After the Kopter has flown successfully all WayPoints the Kopter will stop at the position of the last WayPoint!

So that the Kopter will fly back to the start-point you have three opportunities:

- **Opportunity 1**
  - ♦ You fly the Kopter back manually.
- **Opportunity 2**
  - ♦ You "click" on the "House"-Button  . In that way the !Waypoints will be deleted out of the NaviCtrl and the Kopter flies back to the start-point.
- **Opportunity 3**
  - ♦ You turn the GPS-Switch "OFF" and switch back to "ComingHome".
    Turning the GPS-Switch to "OFF" switches the WayPoint-Flight off. When switching to "ComingHome" the Kopter will fly back to the start-point.

Info

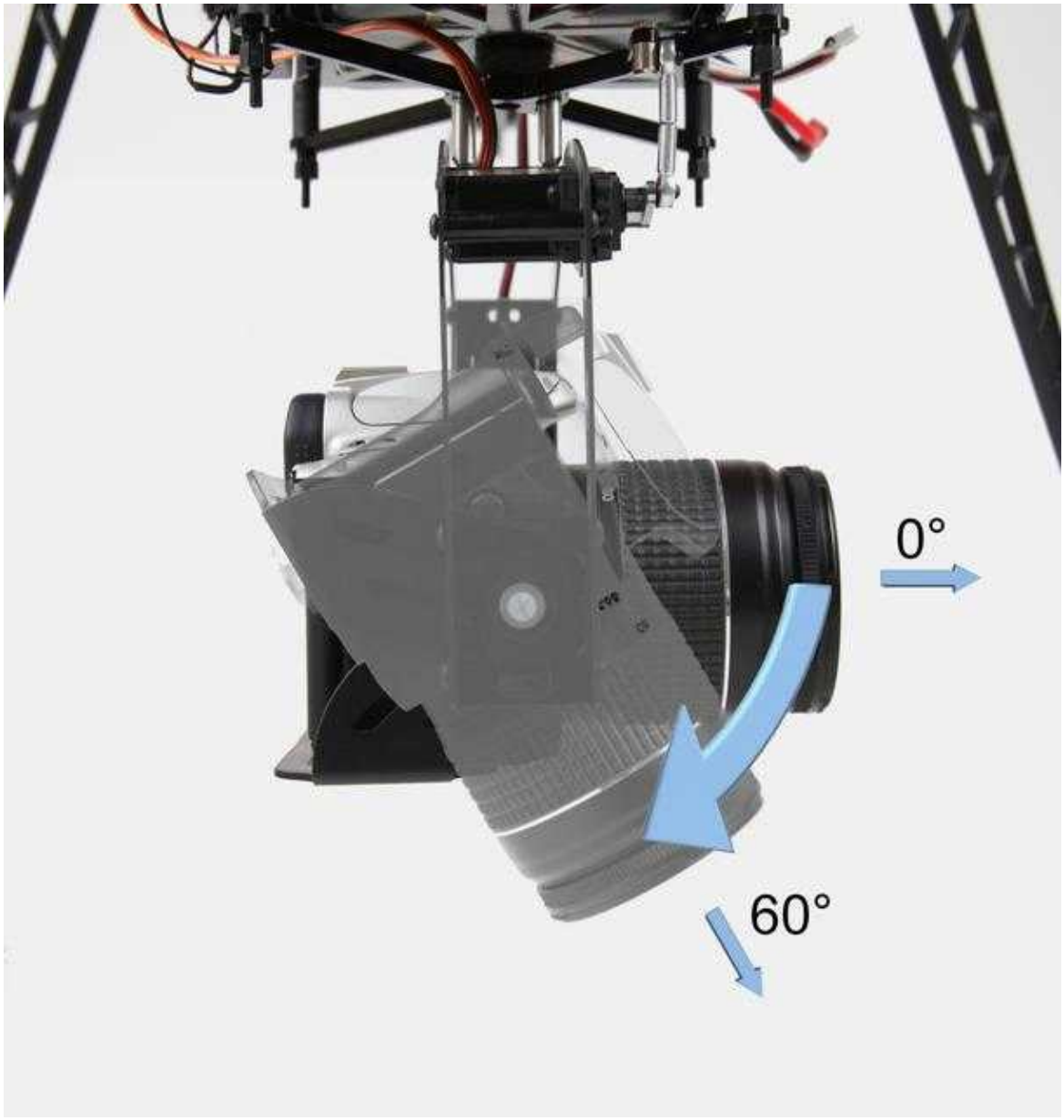
- ♦ The transfered WayPoints will be that long memorized in the NaviCtrl until the power supply will be disconnected.

After landing and switching off the motors you can start and fly the same WayPoints again.

If the power will be disconnected at the Kopter all transfered WayPoints to the NaviCtrl will be deleted.

11 Use a Camera during Waypoint fly

If you want to use a Camera on your Waypoint fly you can see here how to connect and set it: Connect Camera



12 Videos for WayPoint-Flights

Here are some videos summerized for the WayPoint-Flight.

WayPoint-Flight with Probrammable speed I

WayPoint-Flight with Probrammable speed II

WayPoint-Flight with POI

(german)

WayPoint-Flight with POI

(Video in english)

FollowMe-Flight with Wakeboarder

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13 Links

GeoTag
FollowMe
PointOfInterest
WaypointEvent
WaypointGenerator