fr/WaypointGenerator/Circle

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Inhaltsverzeichnis

1 Circle 1/13

2 Example 1 - Fly around a POI + Trigger camera per WP 4/13
2.1 Align camera 7/13

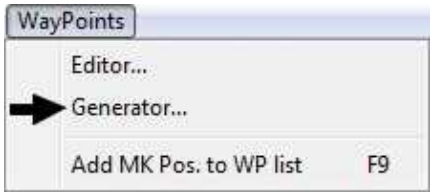
3 Example 2 - POI-Flight in different heights + Trigger camera per WP 9/13
3.1 Align camera 11/13

4 Settings to trigger camera 12/13

5 The WayPoint Flight 13/13

1 Circle

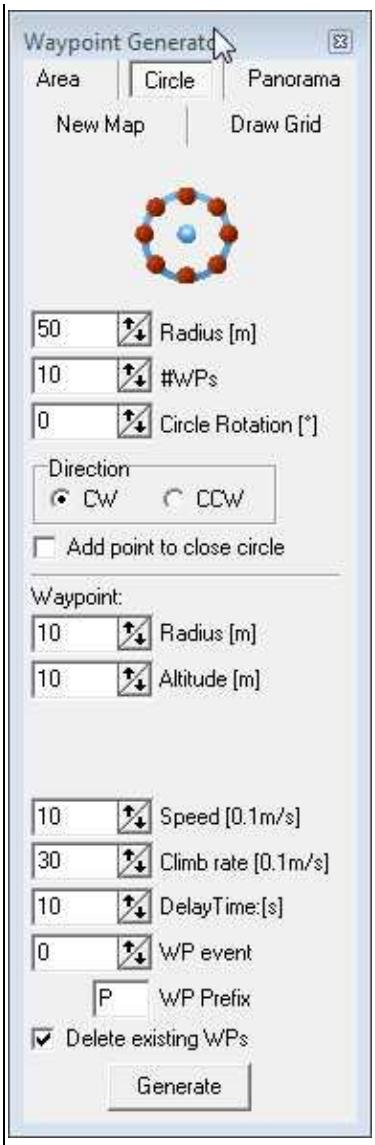
In the **MikroKopter-OSD** you will get with a "click" in the tab **"WayPoints"** to **"Generator..."** in the WayPoint-Generator.



Here you can choose now the tab **"Circle"**.

With this function you are able to create an arbitrarily big circle with WayPoints (WP) and a **"POI"** (**P**oint **O**f **I**nterest) located in the center.
The **"POI"** is marking here a spot which should be flown around by the Kopter.
The Kopter and the camera will be automatically aligned to the **"POI"** and can take photos/images at each WayPoint.

	Describtion of the function:	
	Circle	
	Radius [m]:	Diameter of the circle
	#WPs	Numbers of WayPoints inside the circle
	Circle Rotation [°]	Orientation of the grid
	Direction	Flown WayPoints clockwise or counter-clockwise
	Add point to close circle	An activation will add an WP to close the circle
	Waypoint	
	Radius [m]	Radius around the WayPoint
	Altitude [m]	Height of the WayPoint
	Speed [0.1m/s]	Speed flown to each WayPoint
	Climb rate [0.1m/s]	Speed in which the Kopter climbs/falls between the WayPoints
	Delay Time [s]	Waiting time per WayPoint. If you enter a "0" the Kopter will not stop at the WayPoint and flies directly to the next one instead
	WP event	Here you can enter the trigger time i.e. for triggering a camera
	Delete existing WPs	Creating new WayPoints will delete the existing ones
	Generate	Creates WayPoints with the set up values


Waypoint Generato
Area
Circle
Panorama
New Map
Draw Grid
50
Radius [m]
10
#WPs
0
Circle Rotation [°]
Direction
CW
CCW
Add point to close circle
Waypoint:
10
Radius [m]
10
Altitude [m]
10
Speed [0.1m/s]
30
Climb rate [0.1m/s]
10
DelayTime:[s]
0
WP event
P
WP Prefix
Delete existing WPs
Generate

2 Example 1 - Fly around a POI + Trigger camera per WP

In this example we want to fly around a sight on the ground with a height of 20mtr. and a radius of 50mtr. Out of 10 different directions we want to take photos/images.

Step 1
First at all you need to mark the spot on the map where the **"POI"** is. That is the center-point where the circle with the WayPoints builts up.
Here you need to make a "Left click" with your mouse on the appropriate location in the map.

At this point appears a marking point  .

Step 2
In the next step you need to enter the numbers of WayPoints where a photo should be taken.
The rotation determines the direction from where the Kopter begins the flying around.

- **Radius [m]** = 50
- **#WPs** = 10
- **"Grid Rotation** [°]**"** = 0°.

INFO:
If you want to fly a complete closed circle you can activate ***Add point to close circle***.
In this case an extra waypoint is placed to the first waypoint.

Step 3
If you want you can also determine the direction (counter-clockwise (**CCW**) or clockwise (**CW**)) the WayPoints should be flown.

Step 4
Now we need to set up the height for the WayPoints.

- **Altitude [m]** = 20

The radius you can set on 10.

- **Radius[m]** = 10 =>
    - ♦ In order to reach the WayPoint even in windy weather you should not set a too small radius.
    - ♦ As soon as the Kopter reaches the radius of the WayPoint the "Delay Time" starts to count down for the WayPoint.

Step 5
Now you need to set the speed in which the Kopter flies to the WayPoints, the Delay Time per WayPoint and the WP-Event to trigger the camera at the WayPoint.

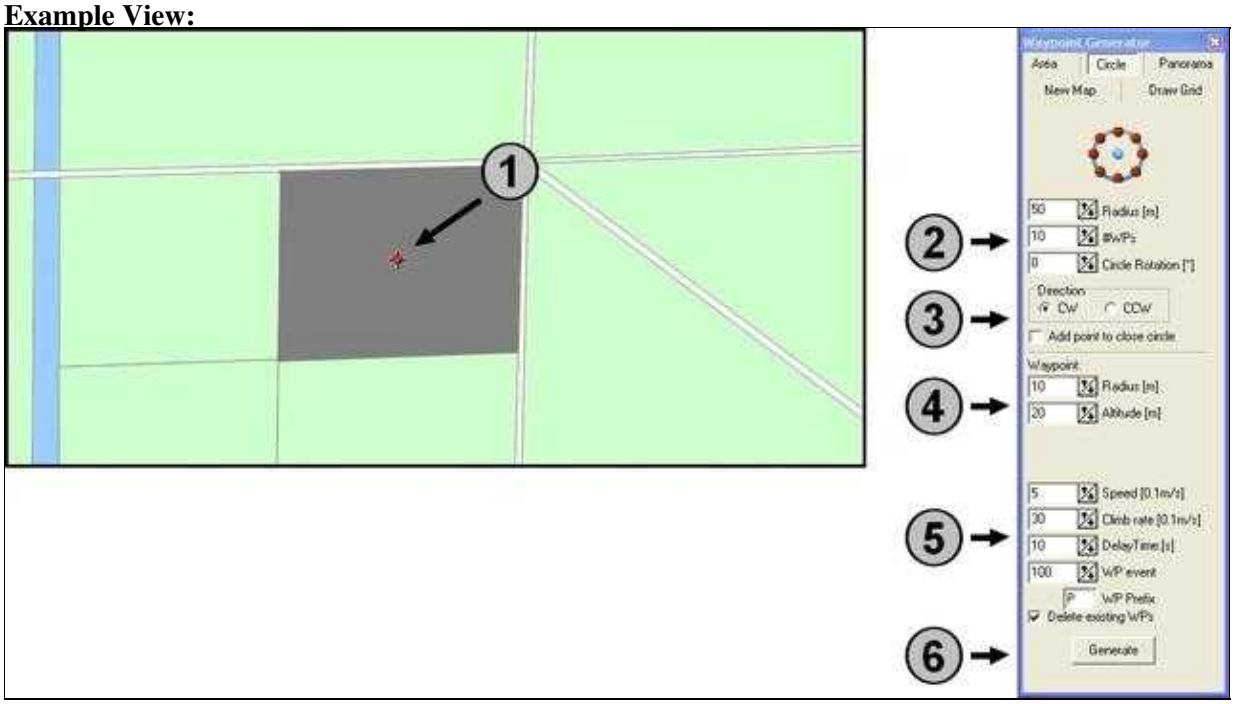
- **Speed[0.1m/s]** = 5
- **Climb rate[0.1m/s]** = 30

    ♦ Has right now no influence because all WP's are in the same height.
- **Delay Time:[s]** = 10
- **WP event** = 100

Step 6
Those set up WayPoints need to be created. For that just simply "click" on **"Create"**.

- **Tipp**
  Is **"Delete existing WPs"** marked the already existing WayPoints on the map will be deleted with a "click" on "Create".
  If you take the checkmark out of the box several circles can be placed over each other at various points on the map.

Example View:

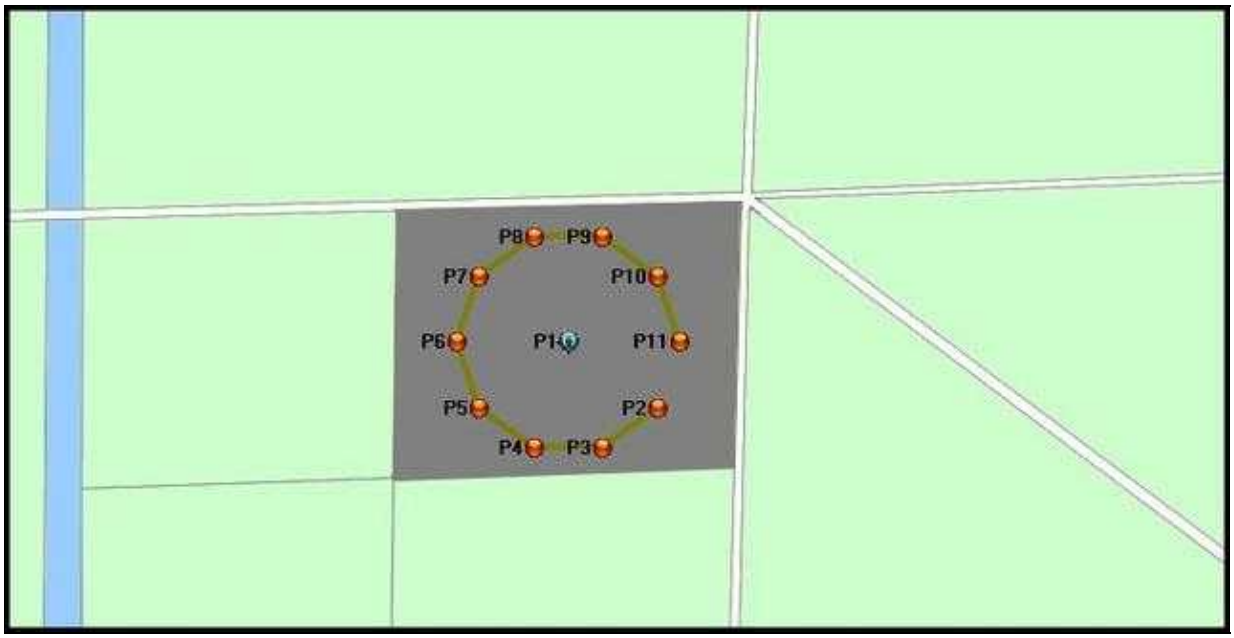


After a "click" on the button **"Create"** those WayPoints with the settings will be entered automatically into the **WayPoint-Editor**:



In the editor you can see that the first entry is the **"POI"** and the following ones the WayPoints (No. 2-11).

After that you enter the **"POI"** and the WayPoints into the map. The **"POI"** is here the "blue point" (P1) in the map:



2.1 Align camera

With the generator "Circle" the Kopter will be aligned automatically in that way that the camrea points always to the "POI".
The camera points with the camera tilt on the pre-set height of the "POI". For that reason that in this example the "POI" is on the ground and not in a height of 20mtr. it need to be adjusted.

Modification in the Editor
How alignes the camera? Each WayPoint has as settings:

- **Altitude** = 20
  - ♦ This is the altitude of the Kopter at the WayPoint
- **Heading** = P1
  - ♦ The Kopter rotates with this settings automatically and always to the first "POI" (P1).
- **CAM-Nick** = AUTO
  - ♦ The camera mount points automatically on the pre-set height of the "POI".

In the **"Editor"** is for the **"POI"** the same height of 20mtr entered as well as for the WayPoints.
But our "POI" is located on the ground. So that the camera is pointing downwards to the "POI" the desired height need to be adjusted.

Here you need to mark with a "mouse-click" the POI-Value "20" in the editor.
With "F2" you are able now to edit and modify the value. In this example we assume a height for the "POI" of 1mtr.
This will be entered and confirmed with a "click" on "Enter".



Nr.	Time	Radius	WP-Event	Climb rate	Altitude	Heading	Speed	CAM-Nick	Prefix	Latitude	Longitude
--	--	--	--	--	20	--	--	--	--	53.2345751	7.5206705
2	10	10	100	30	20	P1	5	AUTO	P	53.2343106	7.5212787
3	10	10	100	30	20	P1	5	AUTO	P	53.2341471	7.5209029

Nr.	Time	Radius	WP-Event	Climb rate	Altitude	Heading	Speed	CAM-Nick	Prefix	Latitude	Longitude
--	--	--	--	--	1	--	--	--	--	53.2345751	7.5206705
2	10	10	100	30	20	P1	5	AUTO	P	53.2343106	7.5212787
3	10	10	100	30	20	P1	5	AUTO	P	53.2341471	7.5209029

- **TIPP**
  So that the camrera can align itself correctly the camera tilt should be aligned horizontally during a start.

Now the WayPoints can be transfered to the Kopter and flown by. How this works is explained under "The WayPoint Flight".

3 Example 2 - POI-Flight in different heights + Trigger camera per WP

In this example a tower should be flown around automatically in two different heights. Those captured photos/images can be merged i.e. into a panorama.
Also here we want to take a radius of 50mtr. and photos should be taken out of 10 different directions.
The first height for the flight around the tower should be 20mtr and the second one should be 40mtr.

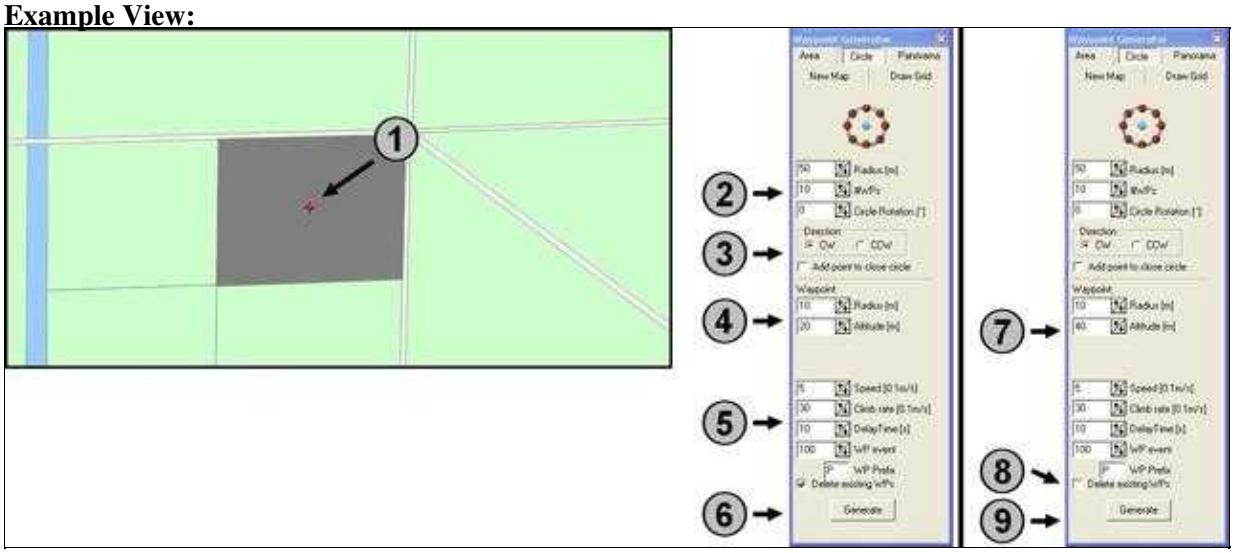
First circle
The settings for the first flight are the same like explained in **Example 1** and entered into the map.

Second Circle
The second flight has the same settings. Only the height is different and need to be changed under "Altitude" to 40mtr.
For that reason that the Kopter should do both flights together you must place the second circle over the first one.
Here you need to take off the checkmark in **"Delete existing WPs"**.

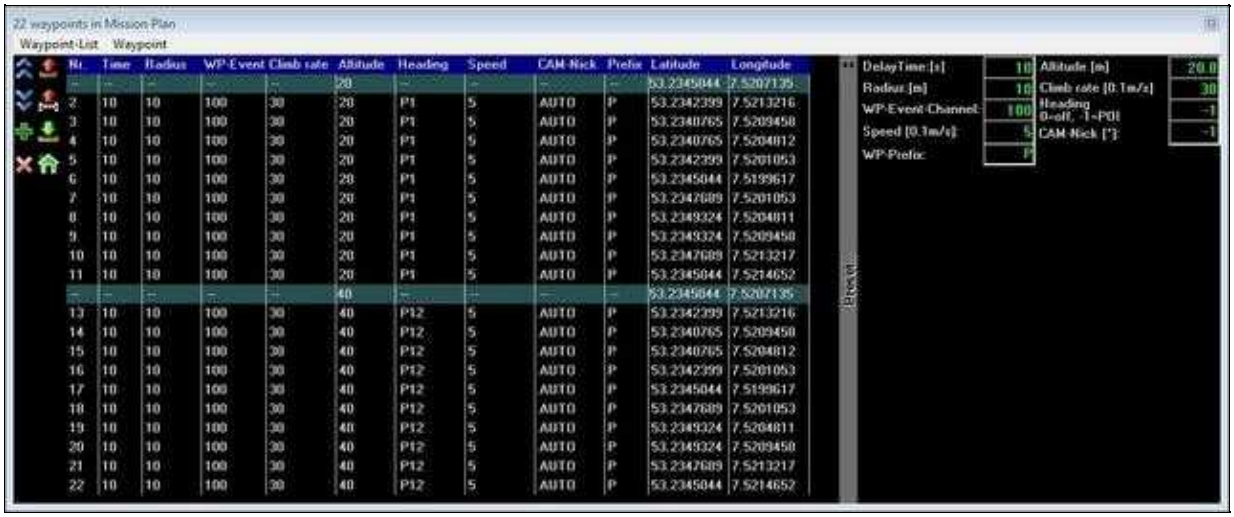
INFO:
If you want to fly a complete closed circle you can activate ***Add point to close circle***.
In this case an extra waypoint is placed to the first waypoint.

Into the **Climb rate** you can enter 30 (or a different value). Here will be determined how fast the Kopter will climb between the WayPoints.
In this case it concerns the rise between the last WayPoint of the lower circle and the first WayPoint of the top circle.

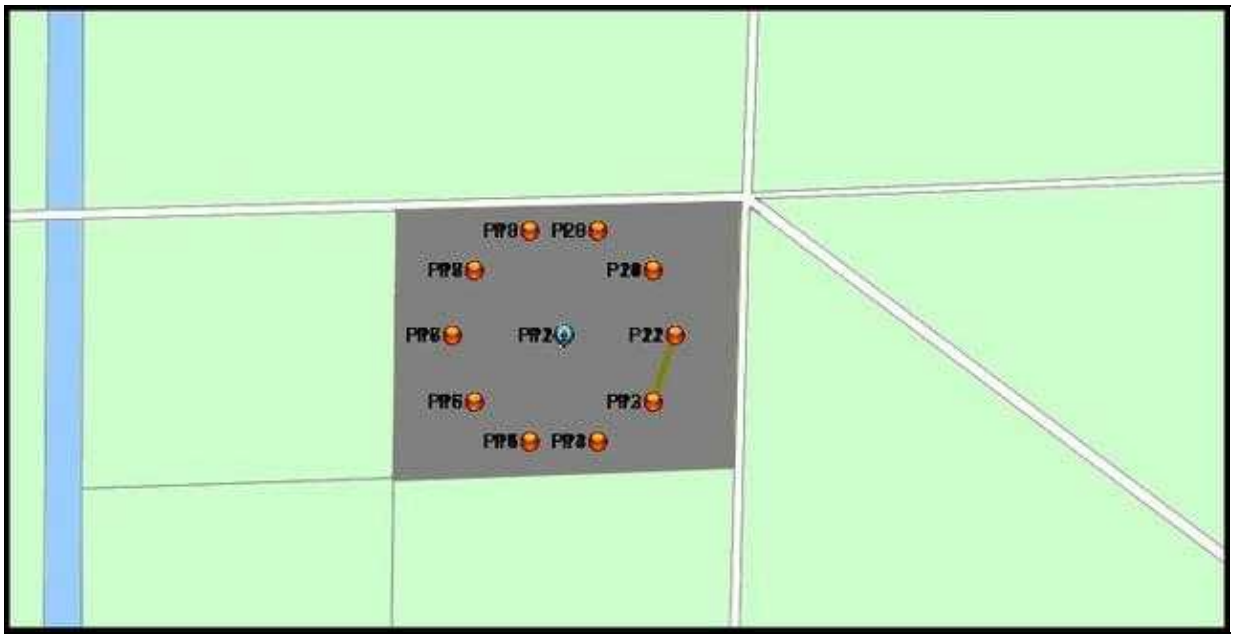
Example View:



After a "click" on **"Create"** (6) the first WayPoints (No. 2-11) with the first "POI" will be entered into the Editor.
If after the change of the altitude (7) and taking off the checkmark in "Delete existing WP's" (8) and a "click" on **"Create"** (9) the new WayPoints (No. 13-22) are appearing with the second "POI" in the editor under the already existing ones:



In the map the second circle with "POI" will be placed over the existing one:



3.1 Align camera

With the generator "Circle" the Kopter will be aligned automatically in that way that the camrea points always to the "POI".
The camera points with the camera tilt on the pre-set height of the "POI". For that reason that in this example a tower should be photographed several times the camera can point always straight forward.

- **TIPP**
  In this example we just have only two heights. To take photos/images of a building or a tower you can place several circles (as described in "Example 2")over each other.
  The camera tilt will align automatically to the appropriate height at the certain "POI".
  So that the camrera can align itself correctly the camera tilt should be aligned horizontally during a start.

Now the WayPoints can be transfered to the Kopter and flown by. How this works is explained under "The WayPoint Flight".

4 Settings to trigger camera

In the **Examples 1+2** the Kopter stops at each WayPoint and triggers the camera at each WayPoint. Here the time was set to trigger the camera under **WP event**.

Those settings are described here: WP-Event Trigger camera

If you want to fly the circle without stops per WayPoint you can set the **"Delay Time: [s]"** for the WayPoints to "0".
This makes it possible for a continuous video flight.

5 The WayPoint Flight

The settings are made and the WayPoints created.

Now the WayPoints will be transfered to the Kopter. (Link: See transfered WayPoints)
The camera mount will be aligned in that way that the camera points straight (horizontal) forward.

You can start the Kopter and "park" it in the air. Here you need to activate the function **"Hold Height"** and **"PositionHold"**.

To self-align the Kopter and the camera (Kopter should point southward) you need to activate the function **"CareFree"**.

So that you can start now with the WayPoint-Flight the GPS-Switch must be set to **"ComingHome"**.
Direct after switching the Kopter starts with the WayPoint-Flight.

Is the WayPoint-Flight done the Kopter will stop at the last WayPoint. Now the Kopter can be flown manually back and also been landed.
Of course you can set the GPS-Switch to "OFF" and after that to again to "ComingHome". Then the Kopter will fly automatically back to the start-point.