fr/WaypointGenerator/Area

7

LotharF
MikroKopter.de

Inhaltsverzeichnis

1 Area 1/15

2 Example 1 - Generate Waypoints + trigger camera at each Waypoint 4/15
2.1 Flight time 8/15

3 Example 2 - Generate Waypoints + Trigger camera permanently 9/15
3.1 Flight Time 11/15

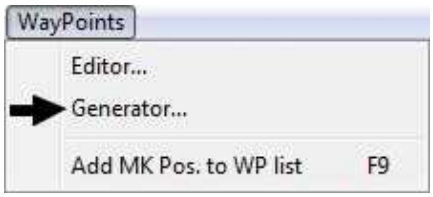
4 Settings Camera triggering 12/15

5 The Waypoint Flight 13/15

6 Save waypoints - Auto Trigger every X meter 14/15

1 Area

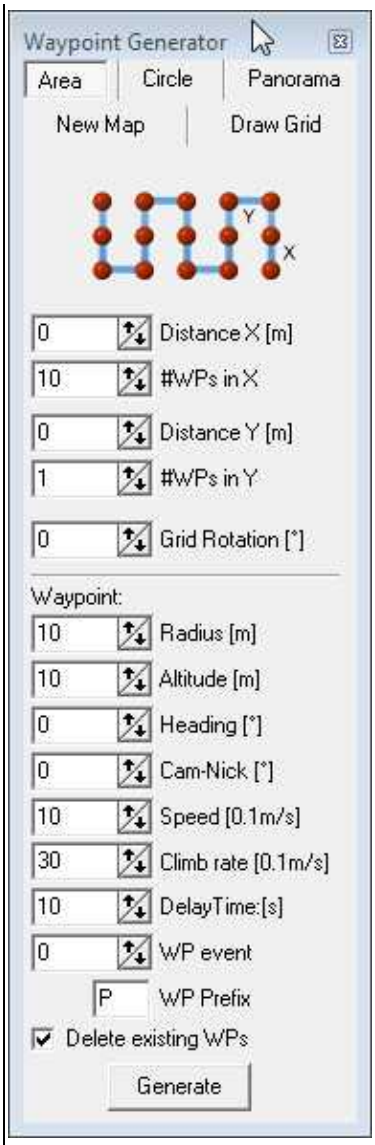
Into the **MikroKopter-OSD** you will come with a "Click" on the tab **"WayPoints"** and on **"Generator..."** into the WayPoint-Generator.



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

With this function you can automatically generate any rectangular grid. Also, you can set any numbers of WayPoints (max. 200).
In example you could fly over an area systematically where you "lost" your Kopter before.
Or an excavation is getting mapped from the air. Also here you could fly over the area systematically and take photos.

	Describtion of the function:	
	Area	
	Distance X[m]:	This is the distance in meter between each Waypoints in X-Direction
	#WPs in X:	Number of Waypoints in X-Direction
	Distance Y[m]:	This is the distance in meter between each Waypoints in Y-Direction
	#WPs in Y:	Number of Waypoints in Y-Direction
	Grid Rotation [°]	Orientation of the grid
	Waypoint	
	Radius [m]	Radius around each Waypoint
	Altitude [m]	Height of the Waypoint
	Heading [°]	Direction in which the Kopter points after reaching the Waypoint
	Cam-Nick [°]	Tilt of the camera while reaching the Waypoint
	Speed [0.1m/s]	Speed in which the Waypoints are flown
	Climb rate [0.1m/s]	Speed in which the Kopter climbs/falls between the Waypoints
	Delay Time [s]	Waiting period per Waypoint. If you enter a "0" here the Kopter will not stop at that Waypoint instead the Kopter flies to the next one.
	WP event	Here you can enter the trigger time for example a camera trigger (see also WP-Event)



Delete existing WPs	When creating new Waypoints the previous ones will be deleted
Generate	Create Waypoints with the set values

2 Example 1 - Generate Waypoints + trigger camera at each Waypoint

In this example:

- An area of approx. 120mtr x 144mtr should be overflown.
- To fly over should be in a height of 30mtr. and with a speed of 1mtr/sec. .
- The rows of the Waypoints flown by the Kopter should have a distance of 12mtr to each other.
- The Kopter should stop in the rows each 10mtr. to take several pictures (for that reason that a few pictures are unclear).
- The camera should look down.
- The Kopter should point with the front (red outrigger) to the south.

Step 1
First at all you mark on the map the starting point. You can do that with a "left-click" on the chosen spot.

At this spot appears a marking point  .

Step 2
For that reason that the Kopter should take each 10mtr a photo and the rows should have a distance of 12mtr to each other you need to set the appropriate Waypoints.
That are for the 120mtr 13 Waypoints (0mtr - 10mtr - 20mtr ... 120mtr) and for the 145mtr 13 Waypoints (0mtr - 12mtr - 24mtr ... 144mtr).
All together **169 Waypoints** (of possible 200).

The settings are as follows:

- **DistanceX[m]** = 10
- **#WPs in X** = 13
- **DistanceY[m]** = 12
- **#WPs in Y** = 13

Step 3
The generated grid can be placed on the map in any orientation you like. Here you can, for example, align the orientation of the grid to a road or on the course of a field.
In this example we leave the "Grid Rotation" on 0°.

- **"Grid Rotation [°]"** = 0°.

Tipp
If you want to align the flight directions of the grid in different directions or set along a field you can change the value for the **Grid Rotation [°]** as you want.
Here now some examples:

Example: 58°	Example: 90°



To enlarge click on the pictures

Example: 180°

Example: 270



To enlarge click on the pictures

Step 4
Now you can set the altitude (30mtr) and the camrea tilt (downwards = 90°). For that reason that the Kopter need to point southwards you have to set a value of 180°.
You need to enter the values in that way:

- **Altitude[m]** = 30
- **Cam-Nick[°]** = 90
- **Heading[°]** = 180

So that the Kopter can take some photos it should remain/wait 10sec. at each Waypoint:

- **Delay Time:[s]** = 10

To trigger the camera i.e. over a connected ShutterCable you need to set also a "WP event".
If the trigger should be triggered around each second you need to set here a value of 100:
(see also WP-Event)

- **WP event** = 100

The remaining values are indicating:

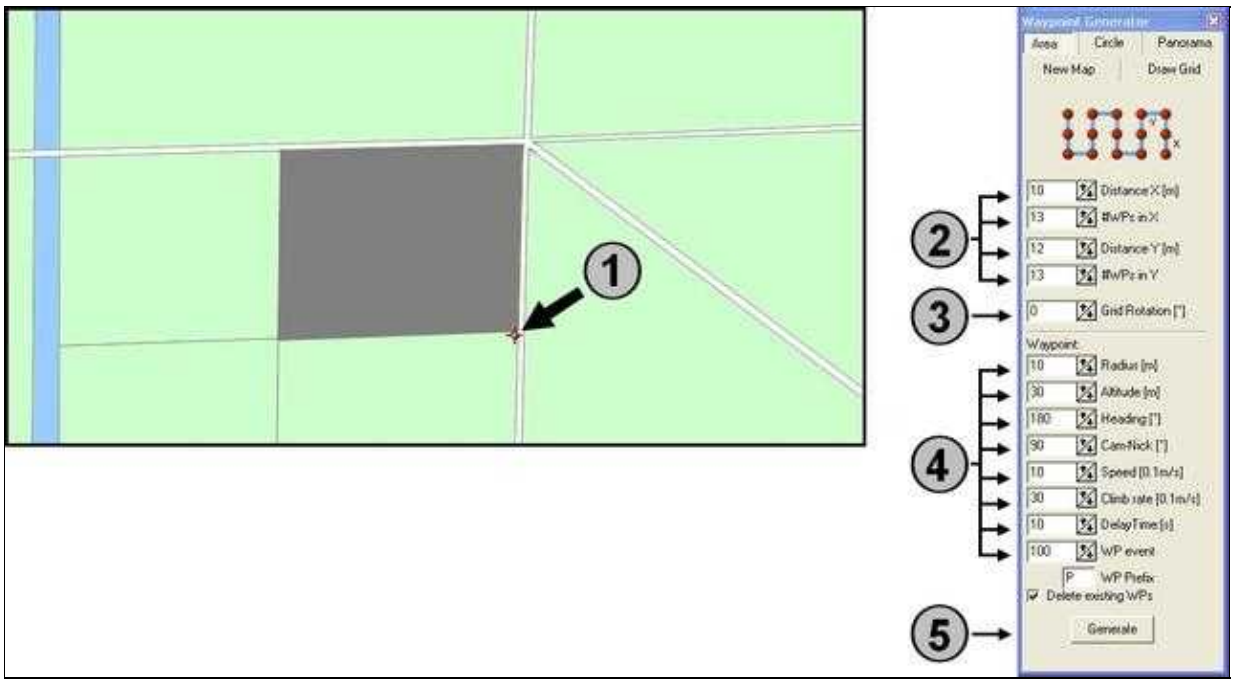
- **Radius[m]** = 10 =>
  - So that the Kopter can reach, even in windy weather, the WayPoint you shouldn't set a too small radius.
  - Once the Kopter reaches the radius of the WayPoint it also begins the "Delay Time" for the WayPoint to expire.
- **Speed[0.1m/s]** = 10
  - That is the speed the Kopter flies to the waypoints.
- **Climb rate[0.1m/s]** = 30
  - Has got no influence right now.

Step 5
Those set up WayPoints need to be generated now. It all takes is a "click" on **"Create"**.

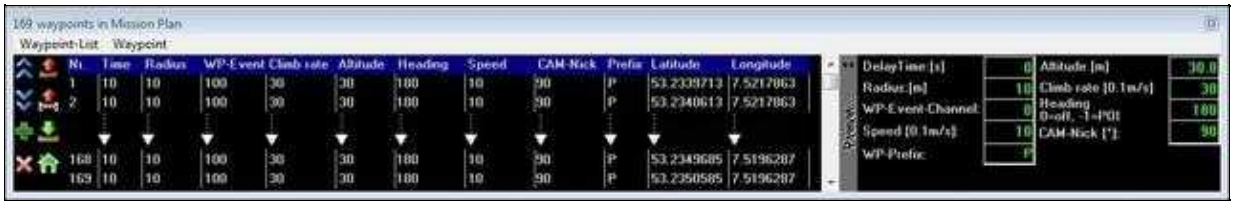
Tipp

- Is **"Delete existing WPs"** marked, with each "click" on "Create" the already existing WayPoints will be deleted on the map.
  If you take the mark out of the check-box you can place i.e. several grids one above the other or at different places on the map.

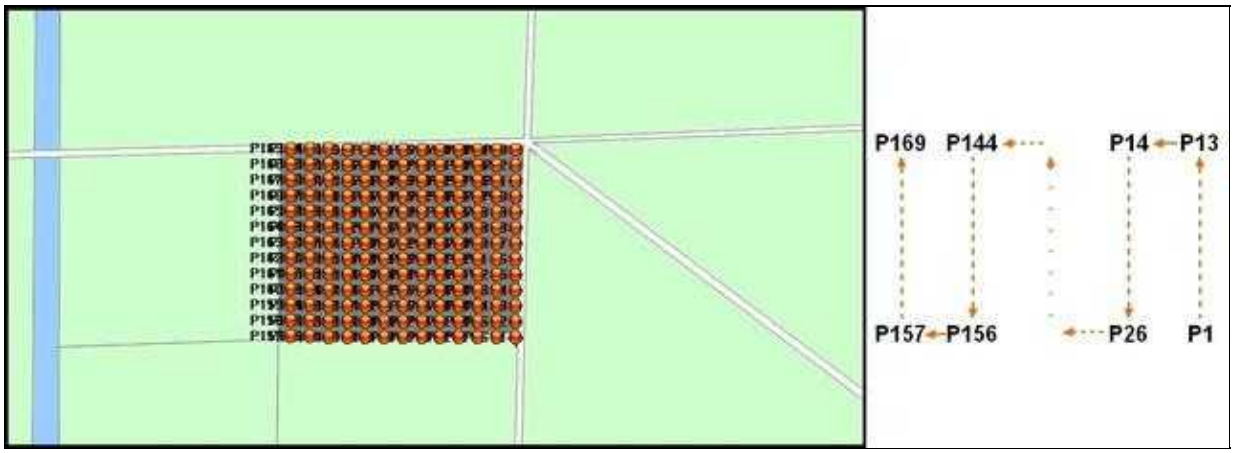
Example View:



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



After that into the map:
(On the right you can see the directions in which the Kopter flies along the WayPoints.)



Now we can send the WayPoints to the Kopter. How this works you can read here: The Waypoint Flight

2.1 Flight time

- **ATTENTION:**

With so many WayPoints and a dwell time at each WayPoint the Kopter needs a long time until all WayPoints been flown.
For this example it takes whole **57 Minutes**! (Exactly it's 56 Min/34 Sec.)

For that reason that the Kopter flies round about 8-20 minutes depending on the total weight with camera you should fly a WayPoint-Flight like this in more laps.
If we assume an average flight time of 12 minutes under load that would be all together a total of 5 laps.
The order would be in that way:

- Waypoints P1 - P34 Transfered to Kopter. Lift off, after that land Kopter, change battery.
- Waypoints P34 - P68 Transfered to Kopter. Lift off, after that land Kopter, change battery.
- Waypoints P68 - P102 Transfered to Kopter. Lift off, after that land Kopter, change battery.
- Waypoints P102 - P136 Transfered to Kopter. Lift off, after that land Kopter, change battery.
- Waypoints P136 - P169 Transfered to Kopter. Lift off, after that land Kopter. DONE!

Why is the last WayPoint approached again when you restart the Kopter?
This is purely a safety rule to ensure an overlap of the images.
But it shouldn't be done in this way. It can also be flown, beginning from the following WayPoint.

TIPP

Who don't wants to calculate how long a flyover takes with those settings can use this Excel spreadsheet.
The flight time will be calculated automatically. Flight Time - Download

3 Example 2 - Generate Waypoints + Trigger camera permanently

In this example:

- An area of approx. 120mtr x 144mtr should be overflown.
- To fly over should be in a height of 30mtr. and with a speed of 0,5mtr/sec. .
- The rows of the !Waypoints flown by the Kopter should have a distance of 12mtr to each other.
- The Kopter should fly without a stop from WP to WP and shout nonstop pictures.
- The camera should look down.
- The Kopter should point with the front (red outrigger) to the south.

The settings are almost the same as in example 1.
But you need definetely less WayPoints. You just need only 2 WayPoints for each row.
That means you need 26 WayPoints for 13 rows (compared to 169 from the previous example).

Since the camera is triggered during the flight we need to choose a slower airspeed (**Speed[0.1m/s]**) so that the images are not getting fuzzy.
In this example we take a speed of 0.5mtr/s (~1.8km/h).

Tipp:

- For that reason that not every camera is the same the appropriate speed for clear photos should be individually identified with some test flights and with different speeds.

In addition you need to set the **Delay Time:[s]** to **"0"**. The Kopter will not stop at the WayPoint but it's flying directly to the next one instead.

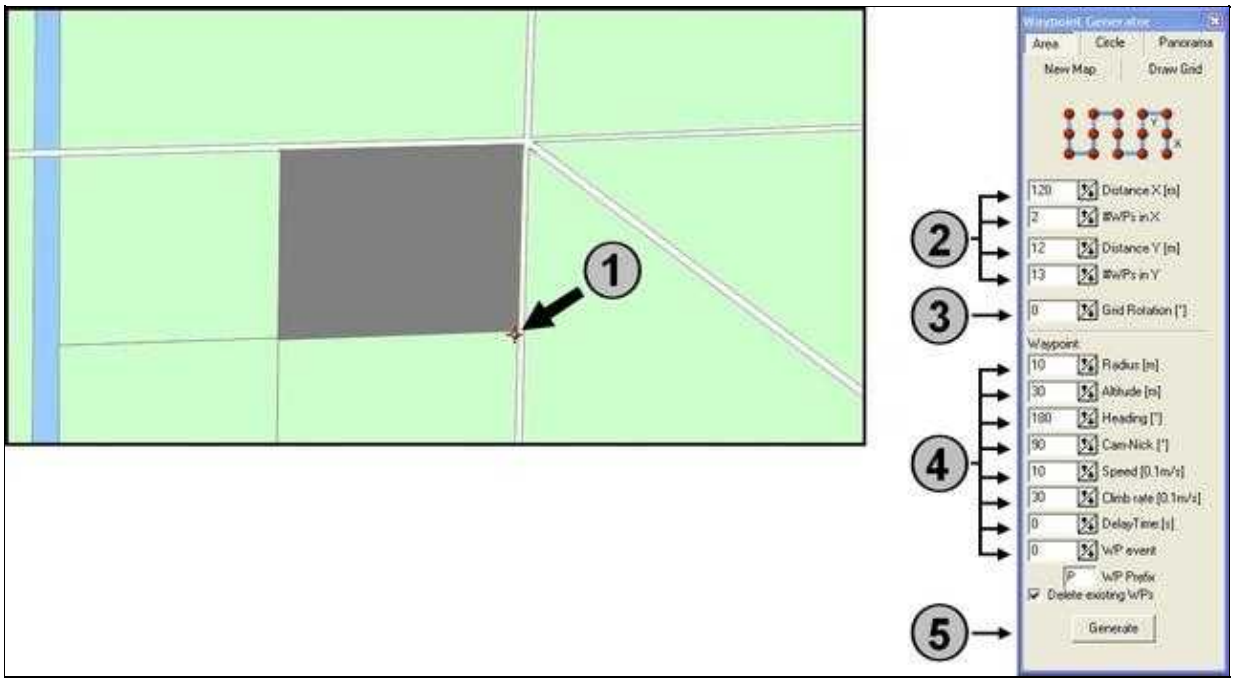
Since the camera is triggered during the entire flight the **WP event** is here not needed and you can set it to "0".

(Explainations about the settings further down.)

The settings are as follows:

- **DistanceX[m]** = 120
- **#WPs in X** = 2
- **DistanceY[m]** = 12
- **#WPs in Y** = 13
- **Altitude[m]** = 30
- **Heading**[°] = 180
- **Cam-Nick**[°] = 90
- **Speed[0.1m/s]** = 5
- **Delay Time:[s]** = 0
- **WP event** = 0

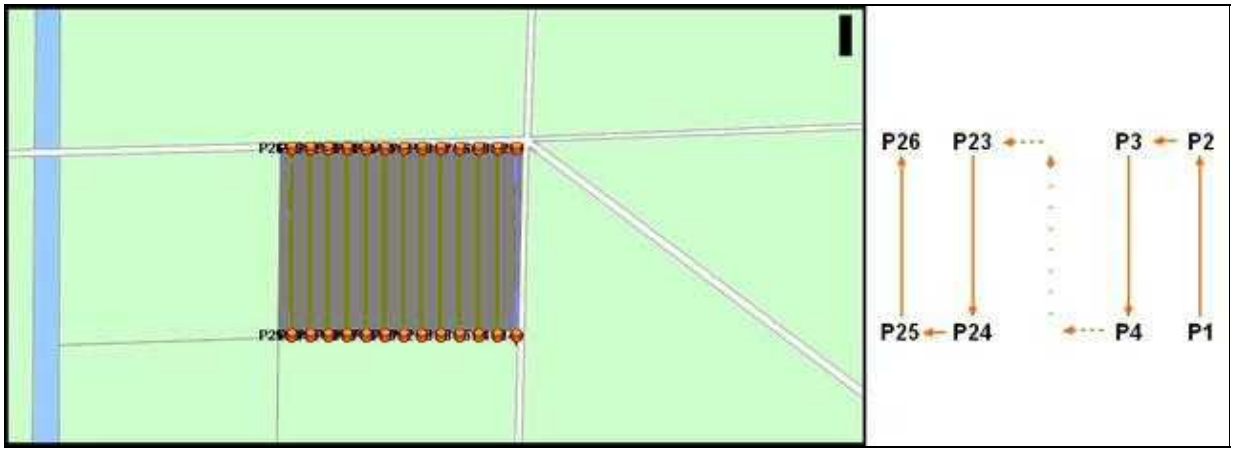
First at all you need to enter those WayPoint settings into the !Waypoint-Editor:



After a "Click" on the button **"Create"** you need to enter those WayPoints settings into the **Waypoint-Editor**:



After that into the map:
(On the right you can see the directions in which the Kopter flies along the WayPoints.)



Now we can send the WayPoints to the Kopter. How this works you can read here: The Waypoint Flight

3.1 Flight Time

With so many WayPoints the Kopter needs a long time until all WayPoints are flown by.
For this example it takes only **57 Minutes**! (Exactly 56 Min/48 Sec.)

Also here you should fly a WayPoint flight in several laps.

4 Settings Camera triggering

In **Example 1** the camera was triggered at each !Waypoint. Here the time was given to the **WP event**.

Those settings are described here: WP-Event camera triggering

So that the camera in **Example 2** is triggering during the entire flight we need to make two settings in the **KopterTool** and under the tab **Outputs**.

Those settings are described here: Permanently camera triggering

5 The Waypoint Flight

The settings are made and the WayPoints generated.

In the next step you can transfer the !Waypoints to the Kopter. (Link: See !Waypoint transfer)
At next you have to set the camera mount so that the camera is looking straight ahead (horizontal).

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

So that the Kopter can align itself (In this example the Kopter should point to the south) you need to activate the function **"CareFree"**.

So that the WayPoint-Flight can start up you need to set the GPS-Switch on **"ComingHome"**.
Directly after you have switched the Kopter starts with the WayPoint-Flight.

Is the WayPoint-Flight done the Kopter parks at the last WayPoint. After that you can fly back and land the Kopter manually.
You also can switch the GPS to "OFF" and after that you switch back to "ComingHome". The Kopter will fly automatically back to the start point.

6 Save waypoints - Auto Trigger every X meter

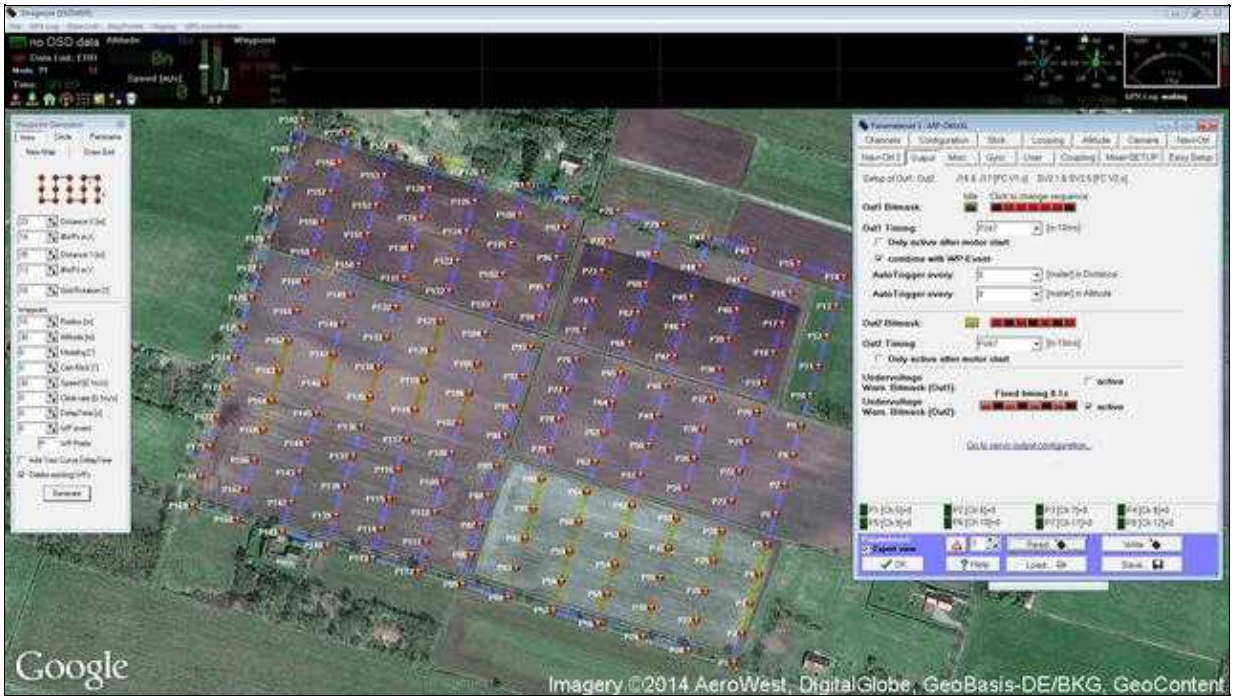
If you want to fly over a larger area and take all X/Y meters a photo, you can do this in two different ways.

Example:
- It should be flown a field with a size of approximately 420x280 meters.
- The camera you use takes in 30 meters altitude an image area of ~60x40 meters.
- The image overlap should be around 40%.

So the copter should fly in 30m altitude and trigger the camera all 23m (X direction) and all 35m (Y direction).

Testflight 1

With the Waypoint Generator you put a waypoints grid with these data on the field.
As you can see, we need **182 waypoints**. Each waypoint will trigger the camera



Testflight 2

In the second test, we do not use a waypoint for each location at which a photo should be triggered.
Here we use now the function **Auto Trigger every X meter** and set here 23m.
So we only have to set a waypoint on the start and the end of each line we will fly.
Instead of the 182 waypoints we need only **26 waypoints**.
The camera will trigger all 23m and also on each set waypoint.

