



DRONE PILOT GUIDE

3D building modelling

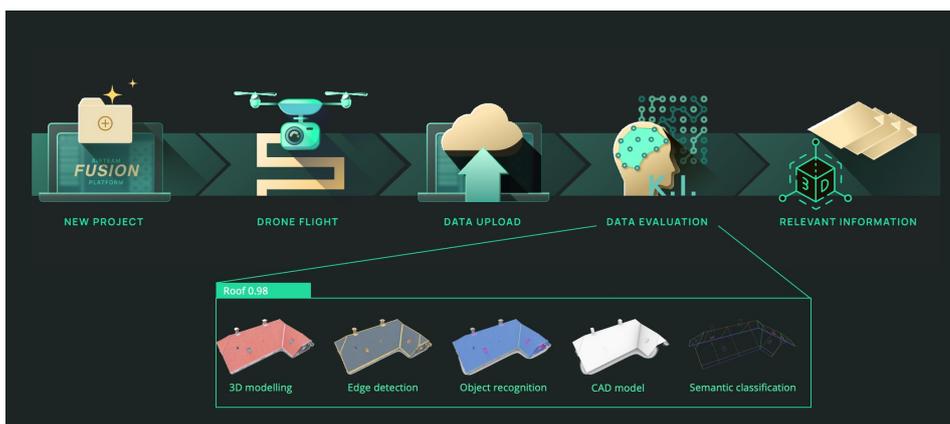
DJI Fly App

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Airteam is an AI-powered software that converts aerial data from drones into 3D building models. This allows photovoltaic planners, roofers, and contractors to measure and inspect buildings quickly and cost-effectively in 3D.

This saves approximately 90% of the time of measurements vs. traditional methods such as tape measures and lasers. In comparison to satellite images, the Airteam 3D measurements and inspections are down to 1cm in accuracy.



This guide describes how you can use the DJI Fly app, which is used by many DJI drones, to quickly and safely create aerial images for perfect 3D building models. All you then have to do is upload them to the Airteam Fusion Platform www.airteam.cloud and the AI will take care of the rest.

The Airteam computer vision algorithms use the images to create 3D models, PV designs and survey reports. In order for the algorithms to be able to process the data, a few points must be taken into account, which we explain below.

In addition, all legal regulations that apply to drone flights must be observed. Please note that drone flights over private property are always subject to authorization. You must obtain the consent of the landowner (and neighbors if applicable). Regional authorities and/or neighbors may also need to be informed about the flight.

If you have any questions, please contact us: +49 30 37 580 830, WhatsApp +49 176 87790770 and info@airteam.ai.

Requirements

3D model	Method	Camera resolution	Number of images
The software can only model what is recognizable on the images.	Circle flight	12 resp. 20 Megapixel	Min. 50 images per object
Sections behind trees or scaffolding cannot be modelled.	Depending on the size of the building, one or more circle flights are required.	The higher the resolution, the more detailed the 3D model becomes.	Images from all directions with sufficient overlap.

Settings

Distance to the object	Gimbal tilt	Images	Camera settings
5 -10 m	-45 degrees	JPEG	AUTO
Distance to the roof and facade	between -30 and -60 degrees is ok	No RAW	No manual mode

Before the flight

Start and landing point	Choose your take-off point so that you can take off and land safely. Make sure that your take-off point is as open as possible, i.e. do not take off too close to buildings or trees.
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Switch on your drone and wait until the drone has at least 12 satellite connections. The announcement "The home point has been updated" sounds when enough satellites are connected.	Satellite connection
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Hyperlapse 1/2

1. Position the drone

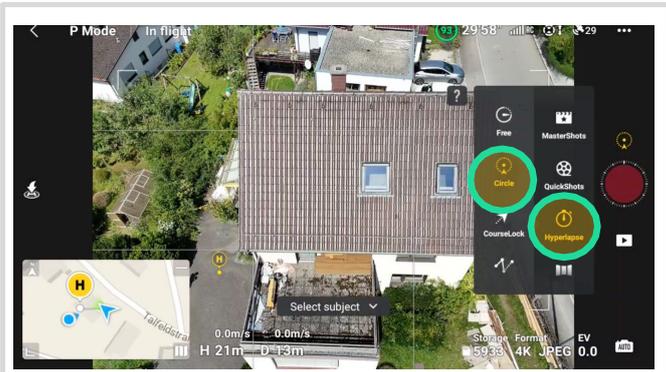
Fly your drone approx. 5-10 m above the building and at a distance of approx. 5-10 m from the building so that you can see the roof and façade optimally on the screen. The camera angle should be between -30 - -60° (-45° is ideal).

Now press the photo symbol.



2. Select Hyperlapse mode

A new menu with several options will then open. Scroll down and select the 'Hyperlapse' mode. Within the 'Hyperlapse' mode, select the 'Circle' option.



3. Select object

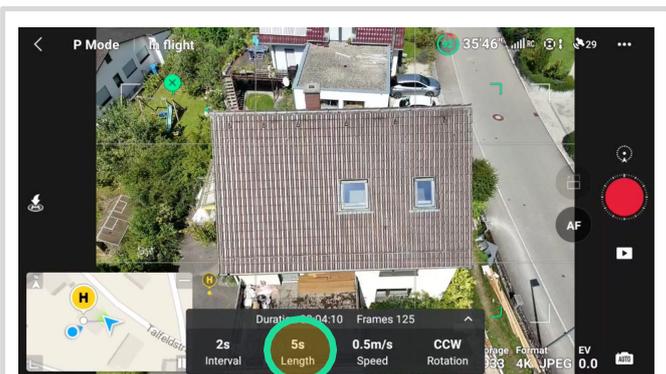
You will now be asked to select the object. To do this, draw a rectangle on the display with your finger. Select the entire area you want to recognize in the 3D model. If you want to recognize the roof and façade area, select both generously.



4. Settings

Another menu now appears at the bottom of the display. Here you can set the length of the hyperlapse or the number of images and the direction of flight.

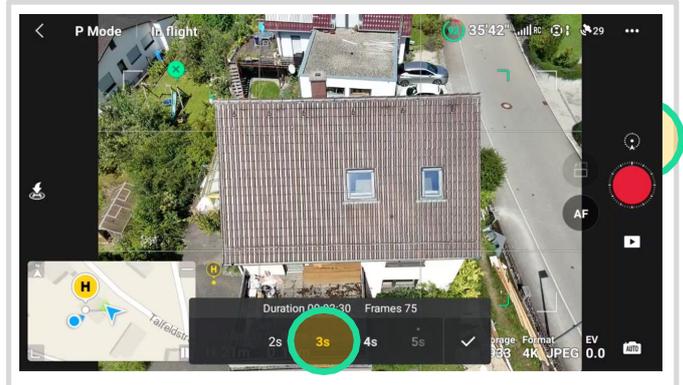
Tap on 'Length' and another menu will appear.



Hyperlapse 2/2

5. Select hyperlapse length

Now select '3s' so that the number of images changes from 125 to 75 images per circle. For large circular flights with a radius > 15 m, select '5s' so that 125 images are taken.



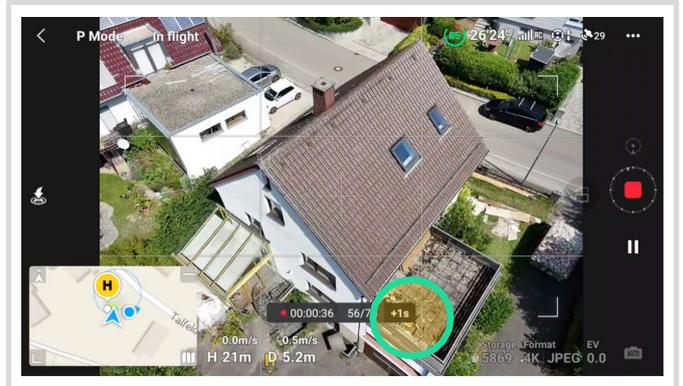
6. Start Hyperlapse

Click on the red 'Trigger' symbol on the right-hand side of the screen. The drone now starts the automated circular flight and takes 75 pictures in 2:28.

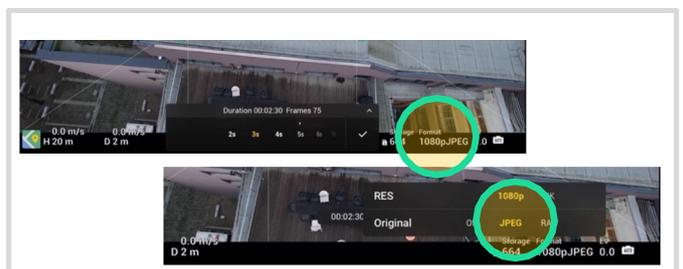


Tips & Tricks - Hyperlapse

Note that the drone does not stop exactly after 360 degrees, but only when it has taken 75 images. If it flies a little more than 360, this is not a problem. If the building is slightly larger and you do not have a complete circle after 75 images (you can check this on the map at the bottom left), you can tap on '+1s' and the drone will take 25 more images.



If only a video of the Hyperlapse is saved and no individual images, click on Format before starting the Hyperlapse and select Original 'JPEG'. The images of the Hyperlapse flight are never displayed in the preview on the controller. They are saved in a separate 'Hyperlapse' folder.



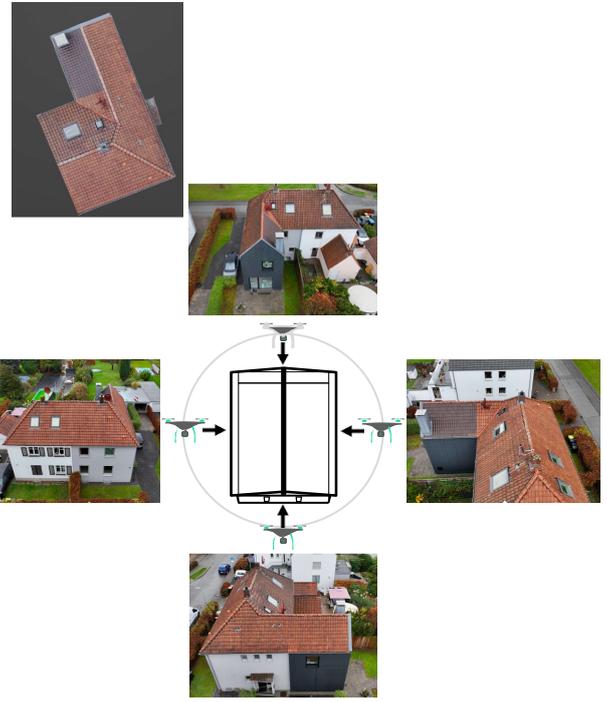
Additional images

Aesthetic images

If you need a survey report, we ask you to create 5 more images.

1. An image above the object with the camera tilted nadir, i.e. -90 degrees downwards. Ideally, the entire object should be visible here.
2. Four further images from all four directions of the object, with a camera tilt of approx. -45 - 60 degrees. The images do not have to correspond exactly to the cardinal points, it is more important that you are as parallel as possible to the object.

Then upload these images to the 'Flight - Images - Aesthetic' folder on the Airteam Fusion platform.



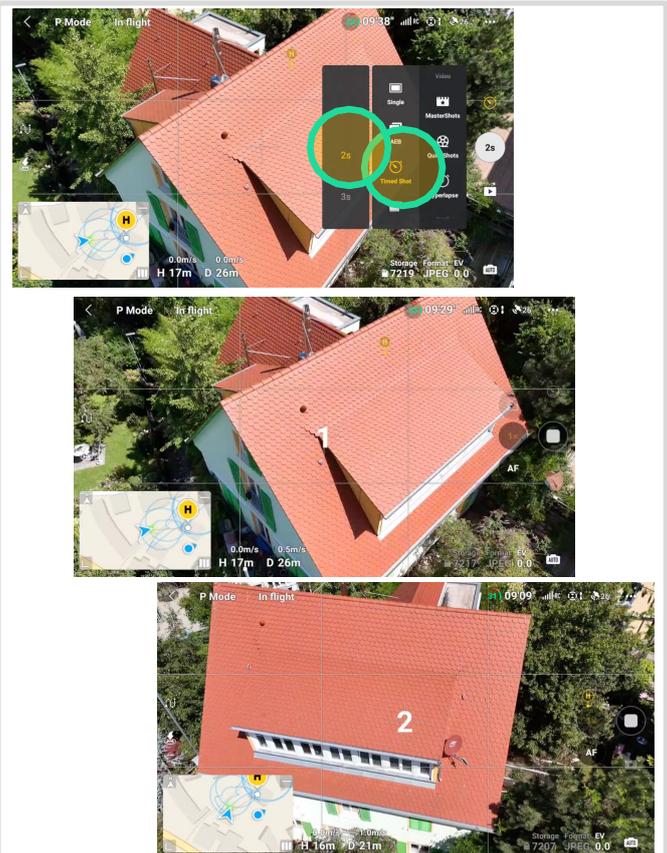
Close-ups

If you need further details such as mansards, dormer fronts etc., you will need to take additional detailed shots.

Fly approx. 3-5m above the dormer and set the camera angle to approx. -15° - -30° downwards (note: it is important that you do not fly directly horizontally with a 0° camera).

Now slowly fly a semi-circle over/in front of the dormer and take pictures every 2-3 seconds manually or using the timed shot function.

Fly so that all sides of the dormer are visible in the pictures (approx. 10 pictures per dormer).



Building size

Flight paths vary depending on the size of the building and its surroundings.

Single-family houses

A circle with 75 images is sufficient for single-family house.

Apartment blocks/commercial properties

If you are flying larger buildings, you must combine several circles. All circles must have sufficient overlap.

Facades

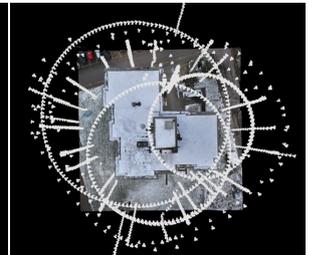
For facades, additional hyperlapse circles, slightly deeper and slightly larger, are recommended for single-family houses. Make sure that the images of both Hyperlapse circles (roof & façade) overlap sufficiently.

For multi-story buildings, you need to add manual images around the building at different heights. Third-party apps for automated flight can also be used for this. Make sure that the camera tilt is always at least -15-30 degrees and is not horizontal.

1 Kreis ist i.d.R. ausreichend für Dach & Fassaden von Einfamilienhäusern



Überlappende Kreise für größere Gebäude über 300m²



Obstacles

If you are unable to perform the circling flight as intended due to obstacles such as trees, power lines or other obstacles, we always recommend that you first perform a complete hyperlapse circling flight at a safe height (above the obstacles). To do this, it may be necessary to set the camera at a steeper angle, i.e. -60-75 degrees.

As soon as you have completed this hyperlapse circle, we recommend making another hyperlapse circle at an optimum height (5-10 meters) above the building. Start this on one side in front of the obstacle and end it manually (press the camera trigger). It is not a problem if this is less than 75 pictures. As a rule, this is a 75-90% circle.



1. flight above the obstacle height

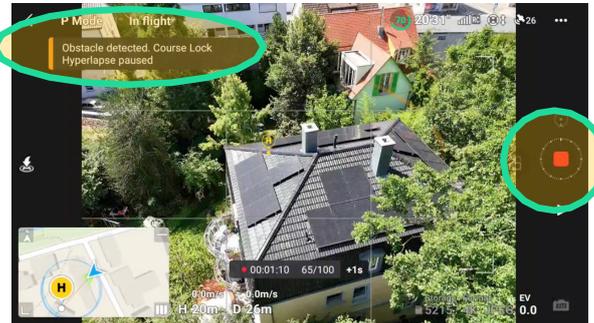


2. flight below obstacle height

You should avoid this

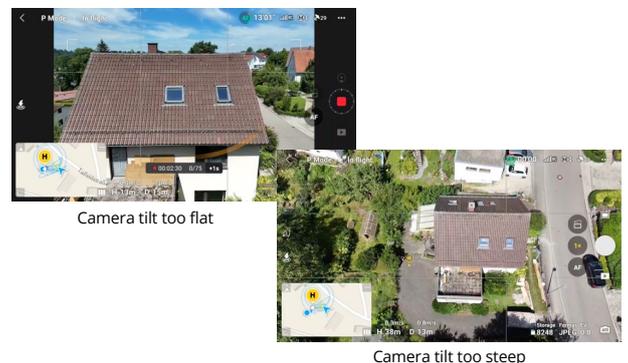
Obstacles

Please ensure that there are no obstacles such as trees, cables or other obstacles in the way. During circling flight, the drone flies automatically and always moves sideways. Many older drones do not have lateral obstacle detection, which automatically prevents collisions when flying in circles. If something is in the way, e.g. trees, you must abort the automated flight in front of the object.



Camera tilt

When flying the circles over the roof, check that the camera is at an angle of -45° if possible. The camera tilt is displayed in flight, so you can adjust it precisely. For dormers, you must fly with an inclination of $-15^\circ - 30^\circ$ downwards. This allows you to capture the front and sides of the dormers very well. A common problem is an angle that is too small or too large.



Selected area and circle size

Make sure that all relevant areas (roof or façade) can be recognized on the images by the selected area. A common problem is that the corners of the roof are not fully depicted on the images. Please check that the building is in the center of the image before each hyperlapse circle. If you have not selected a suitable area for the hyperlapse, you can simply cancel it, select the area again and restart.

Depending on the size of the building, you must take 50 - 150 images for each circular flight.



Roof & façade cut off

You should avoid this

Exposure

If the sun is shining very brightly, the images may be overexposed. Exactly the same can occur with very little light (in the evening or in winter) with underexposure. To correct the exposure, tap on a very bright area on the screen and the exposure will be corrected to darker or tap on a very dark area to correct the exposure to brighter. Manual exposure compensation is only necessary in exceptional cases. This can be activated via the camera settings.

Note that the screen brightness of the controller is not related to the exposure of the images.



Overexposed image



Under-exposed image

Manual images

If it is not possible to perform a hyperlapse circle flight on site, or if larger parts of the building cannot be fully depicted, you will have to fly manually.

Here you must observe the following:

- that the pictures have a good overlap of approx. 50-70%, i.e. fly slowly and take pictures every 2 seconds
- make sure that the camera is always tilted min. -15-30 and
- pay attention to the distance to the building, this should be 5-10m and similar across all images, i.e. not very far away and then very close to the building.

Legal regulations

For all flights, make sure that you fulfil the legal requirements (which vary depending on the drone). These include, among other things, that you have the consent of the property owners of all those over whose property you are flying (including neighbors if necessary) and that you only fly within the visual range. You can find out more about this in the Airteam training courses and from certified centers.

Further options

Quick Transfer

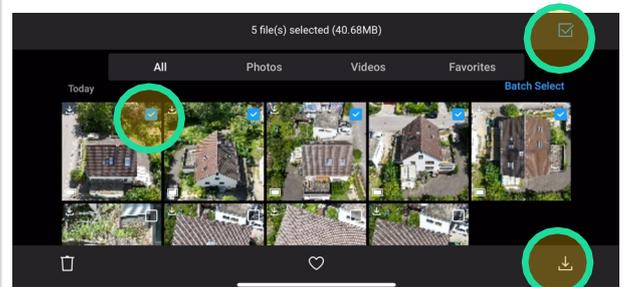
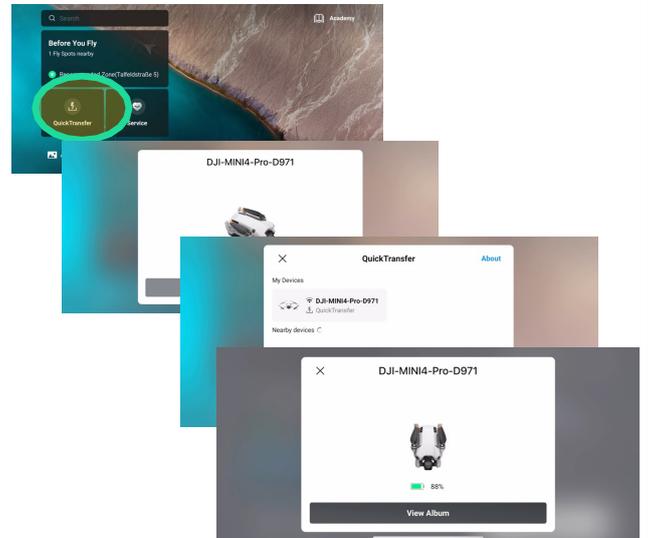
If you want to send individual images from the drone directly to the customer or to the office, you can do this via your smartphone.

Leave the drone switched on after the flight. Download the DJI Fly app to your smartphone. Open it and select 'Quick Transfer' on the home screen. The app will now connect to the drone. As soon as this is done, click on 'View Album'.

You will now see the images from the drone flight in an overview. You can download individual images or multiple images via 'Batch select' by ticking the box in the top right-hand corner. Now simply select the images you need and then tap on the download symbol at the bottom right.

The images will now be downloaded directly to the gallery on your smartphone and you can then forward them.

Please note that the Hyperlapse flight images are not displayed here. You can only access them on your PC or via an SD card adapter, as they are stored in a separate 'Hyperlapse' folder.



Point of Interest Flight (POI)

If you need to move particularly quickly, you can also use the point of interest flight. For this flight mode, position the drone in the same way as in hyperlapse flight so that you have the building ideally positioned on the screen. Now simply click on the screen and draw a rectangle over the roof area. A menu will now appear at the bottom where you can select POI (Point of Interest). You can now set the speed using the yellow slider.

As soon as the drone circles the POI, take pictures manually every 2 seconds. Do this until the drone has circled the building once. Please note that POI cannot be combined with the 'continuous recording/timed shot' function.

You can upload these images directly from the road.

