Mapping and Aerial Image Processing Software

Flight preparation – How to plan your flight mission for best Digital Orthophoto

Detailed instruction for optimum image acquisition.

To achieve great results make sure you start with the correct settings right at the beginning. Higher overlap means more images and more images means longer processing time. The minimum overlap between images is 65% (front and side overlap). However in some cases (wide-angle cameras, high vegetation, uneven terrain, etc) it is safer to increase these values to 80%.

Below are instructions on how to best prepare and set up your flight mission to get the best possible orthophoto with minimum processing time. In case you would like to calculate volumes, as well, additional side images will have to be captured – see the instructions for Volume calculations.

- **Standard settings for any drone, any camera:**

  o Camera angle nadir direction (vertically downward) - **90° angle**

  o Flying height from **40 - 150 m AGL** (above ground level) - **Usually 80 m**

 o **Front Overlap** (overlap in the flying way) **80%**, **Side overlap 75%**.

Most drones automatically geotag the images based on drone GPS (usual accuracy 1,5 m) and you can orientate the model in 3Dsurvey based on that telemetry data. If you would like to achieve survey-grade accuracy (up to 4 cm), don't forget to set up GCPs before the flight and measure them with survey-grade RTK GNSS. In case you have a drone with RTK GPS with 1 cm accuracy you can use that data to orientate the model accurately without employing any GCPs.

Note: We always recommend using GCPs if the type of terrain allows for the placement. 3Dsurvey supports all combinations of geo-referencing data, including or excluding GPS inputs in the processing stage is also supported. Check the instructions hot set them correctly: GCP Setup

- **Tips and Tricks:**

  1. Start your mission from the highest point in relation to the terrain you are about to map. Most drones (DJI Phantom 4, Yuneec, DJI drones) fly missions in a single plane and don't automatically adjust their flying height to the terrain characteristics. This can result in an insufficient image overlap (less then 60%) when capturing higher terrain points, high buildings, high trees, etc. in case you start the mission from lower positions.

     a. Best practice:
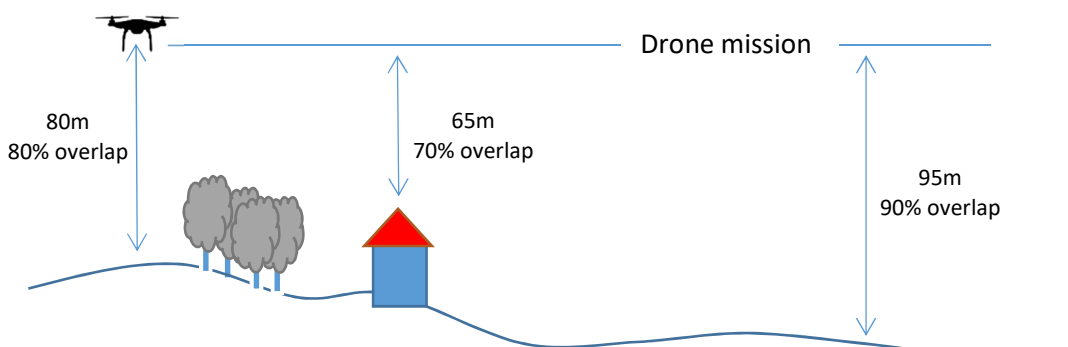
b. Wrong starting point:
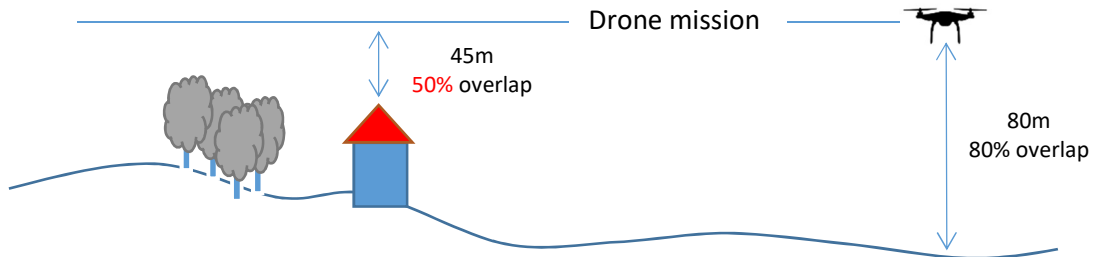
2. Lower flying height with better ground pixel resolution (GSD) does not always mean better results. In areas with high density of buildings, flying too low can result in the following:

   a. High buildings will not be ortho-projected in the digital orthophoto.

40 m AGL – Phantom 4 PRO   80 m AGL – Phantom 4 PRO

   b. Image stitching can be less than perfect if they are directly over a building.
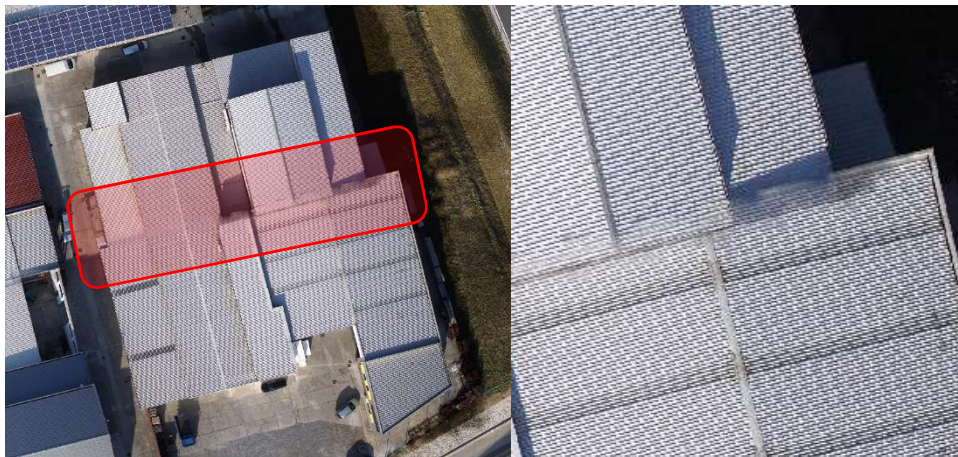
To eliminate the over-the-building image stitching we advise you to have the whole building on a single image. First, perform your mission at 80 m AGL, then manually trigger a few nadir images from a higher AGL (120 m above the object, for example) to get the whole object in one image.

That enables you to recalculate the area with - or/and around - the building (See tutorial http://www.3dsurvey.si/tutorials/digital-orthophoto-recalculation for guidance).