

# Photogrammetry: Step-by-Step Guide and Software Comparison

Photogrammetry literally means the act of deriving precise measurements from photographs. It involves taking a set of overlapping photos of an object, building, person, or environment, and converting them into a 3D model using a number of computer algorithms.

## Photogrammetry Applications

- **Architects** use photogrammetry for site planning, construction monitoring, and visualization rendering.
- **Artists** can document or convert a piece of an existing artwork, sculpture, or nature into something new.

**Archeologists** can virtually map out and explore undiscovered areas of the world's lands and oceans.

- **Designers and engineers** who need to reverse engineer an existing object or custom-fit new parts onto it.

- **Quality control** in manufacturing processes is significantly aided by the use of photogrammetry.

- **Game developers** can save time designing props and environments by using photogrammetry combined with semi-automatic 3D modeling workflows.

- **Museum curators** can establish virtual collections to attract the public.

- **Meteorologists** use photogrammetry to determine the speed of tornadoes.

- **Photographers** now have an extra dimension to work with.

- **Companies** that want to offer a service to 3D print models of most precious possessions, pets, or family members.

The presence of drone technology in aerial mapping and photogrammetry allows the delivery of high-quality data capture and mapping capabilities in a cost-effective manner.

Additional operational costs associated with more traditional methods involving aircraft or satellite are no longer necessary. Our drones allow easy, safe and cost-effective surveys of site areas both small and large

## The best drone mapping software packages:

1) Pix4D :- Pix4D is probably one of the most widely-used software solutions for drone mapping. With almost a decade of experience, the development team behind Pix4D has amassed a library of specialized software modules for different mapping applications. Although they originally partnered with the eBee drones, they have since expanded the scope of their compatibility to include the ubiquitous DJI line of professional-grade drones. The strength of Pix4D lies in its versatility. With many years of experience, Pix4D has evolved into a robust software package that can handle practically any type of mapping application. Modules allow for specialized functions that in turn result in higher quality data and post-processing results. Pix4D also offers for a huge variety of file export formats, further expanding the versatility of its output data in terms of compatibility with other software.

2) DroneDeploy :- DroneDeploy has made a concerted effort to make their mapping software as intuitive and easy to learn as possible. These efforts have helped propel them to being one of the biggest names in the commercial drone mapping industry. They have focused on being fully compatible with DJI drones, although they also offer compatibility with some of the other popular drone brands.

With more focus on accessibility and compatibility, DroneDeploy appears to be more appropriate for entry-level drone mapping. However, mapping professionals appear to prefer other software options when it comes to enterprise-level mapping needs. The file export options offered by DroneDeploy is also quite limited compared to other software packages.

**3) PrecisionHawk :-** The PrecisionHawk software suite offers end-to-end drone mapping solutions with specialized software for each step of the mapping process. The planning and execution of the mapping survey can be done via the PrecisionFlight mobile app which offers intuitive survey area definition and customized flight path functions.

PrecisionMapper is a primarily cloud-based data processing platform that allows subscribers to access a continuously growing library of data processing algorithms. From its beginnings of being known for processing of precision agriculture data, PrecisionMapper has expanded its capabilities to produce orthomosaics and 3D models on top of its long-established crop health analysis tools. Being divided into separate modules makes the PrecisionHawk software suite one of the most complicated end-to-end mapping software packages. It is not a product we would recommend for beginners.

**4)DJI GroundStationPro :-** DJI being the number one brand for consumer and professional drones, it is no surprise that they have come out with their own mapping software. Naturally, the DJI GroundStation Pro interfaces seamlessly with the professional-grade DJI drones including drones from the Inspire, Phantom, and Matrice series. On the flip side, the biggest limitation of this software is that it only works with DJI drones.

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**5)AgiSoft :-** AgiSoft is an excellent, all-around software for processing photogrammetric images and generating 3D spatial data. It is a standalone desktop software, so it does not come with a mobile app for flight planning. However, it can be considered on the best software packages in term of post-processing capabilities.

The 3D modelling engine of AgiSoft performs exceptionally well in stitching panoramic images and even provides support for images capture with fisheye lenses. It can also create maps from thermal, near-IR, and multispectral imagery. It can generate orthomosaics, 3D models, 4D

models for dynamic scenes, digital elevation models, and several other output file options. The professional version of AgiSoft also supports Python scripting capabilities for automated data processing steps.