**Orthomosaic Generation using drone images and Agisoft Photoscan software**

The 35 drone images dataset from the Bevere Island site was processed using "AGISOFT Photoscan" Drone Mapping software. Briefly, about Agisoft photoscan, it is a fully automated professional photogrammetric kit. Instead of a traditional survey and mapping, Agisoft uses drone technology to generate different formats from the drone images (ortho-mosaic map, 3D modeling, etc.).

Firstly, drone images were "added" to the software, and "reference setting" was done by selecting the WGS84 (4326) coordinate system. The process of creating an ortho-mosaic final drone map is "an automated process," including different tools, and it starts from "aligning images." Next, "optimizing Camera Alignment" was done to correct possible distortion due to internal and external drone camera factors. The aligned and optimized drone images were run to generate a "dense point cloud model." Next, the "build mesh" tool was run to create a mesh from the dense cloud model. This mess tool was used to create "a model texture," simply clicking the build mesh tool. The created build mesh is used to run the ortho-mosaic tool to create an "ortho-mosaic map." Output ortho-mosaic map's format is crucial for the next software to read the data. In this study, the ortho-mosaic map was export as the "TIFF" command from the File menu. Figure 1 shows the "ortho-mosaic image" of the site (accuracy: 10 m).

ADD MAP HERE – ONE PAGE COMPLETELY

**Advances in the ortho-mosaic map in the future**

A straightforward type of drone images' final outcome is an ortho-mosaic map. It is a digital output, high resolution plain image, camera, topographic distortion-free, accurate to the actual locations (geo-referenced), and can be used for further analysis in different software. This is known as low-cost aerial mapping. Due to these characteristics and advances in drones and software applications, there are many uses in various industries, like real estate, law enforcement, agriculture, construction, and environmental conservation.

When the number of applications of ortho-mosaic is high, the accuracy also should be increased. Usually, the map's accuracy (resolution) is 10 m without ground control points (GCPs). RTK GPS is an advanced technology that gives accurate real-time data; thus, aerial mapping can increase the accuracy of the orthomosaic map (Stott et *al.,* 2020). High precise, high-resolution aerial maps will be produced in the future.

When there is a disaster within a low coast budget, an ortho-mosaic aerial map can quickly result in the future without waiting for high-cost-time consuming satellite images (Shrestha *et al.,* 2019). With the advances of IoT and cloud technology, orthomosaic maps in the drone industry will be produced robustly, with less cost, fast sharing among a network. Further, recent advancements in 5G communication and cloud computing have already provided a suitable base for real-time UAV mapping and creating an aerial map (Li *et al.,* 2018; Khoramshahi *et al.,* 2020)

Overall, in the future, with the advanced technology of IoT, Cloud, 5G, robot drones, high powerful software, RTK GPS technology, and powerful computers, there will be resulted in highly accurate, advanced features, high resolution of real-time orthomosaic maps.

**References**

Khoramshahi, E., Oliveira, R.A., Koivumäki, N., and Honkavaara, E., 2020. An Image-Based Real-Time Georeferencing Scheme for a UAV Based on a New Angular Parametrization. *Remote Sensing*, *12*(19), p.3185.

Li, B., Fei, Z., and Zhang, Y., 2018. UAV communications for 5G and beyond: Recent advances and future trends. *IEEE Internet of Things Journal*, *6*(2), pp.2241-2263.

Stott, E., Williams, R.D. and Hoey, T.B., 2020. Ground control point distribution for accurate kilometer-scale topographic mapping using an RTK-GNSS unmanned aerial vehicle and SfM photogrammetry. Drones, 4(3), p.55.

Shrestha, R., Zevenbergen, J., Panday, U.S., Awasthi, B., and Karki, S., 2019. Revisiting the current UAV regulations in Nepal: A step towards the legal dimension for UAVs efficient application. The International Archives of Photogrammetry, Remote Sensing and Spatial Information Sciences, 42, pp.107-114.