

## Drone aerial photography/mapping of the farm platform

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Relatively recent advancements and cost reductions in drone technology have presented a new low-cost route to conduct small-scale aerial surveys. Alongside this, the latest Structure from Motion (SfM) photogrammetry imaging techniques and software can provide a very low-cost and simple method of generating high-quality three-dimensional (3D) data from consumer-grade digital photographs. Such data is very useful for investigating topographically-controlled processes and the technique is particularly invaluable for monitoring structural changes over time. Structure from Motion photogrammetry has been applied across a wide range of geomorphological disciplines, including the modelling of shallow river systems and dry-land ecosystems.

In this work, we collected a series of aerial photographs of Middle Wyke Moor, a field of the North Wyke Farm Platform, which will be used to generate 3D SfM models of the field (Figure 2). Images were collected using two different drones (the lower budget Parrot Bebop drone [£200] and the DJI Maveric Pro [£400+]; Figure 1). The photographs from each drone are being processed with Agrisoft Photoscan software and the two 3D SfM models produced will be compared to assess whether the lower budget Parrot drone can produce a similar or sufficient quality model. The SfM models will also compared (e.g. in terms of resolution) with a Light Detection and Ranging (LiDAR) model of the area. Light Detection and Ranging is a more expensive technique which uses a laser to generate a 3D model.

The three models will be used to identify the hydrological drainage channels within the field and to assess whether the channels could be possible routes for nitrate runoff from the field. A cost-benefit analysis of the two techniques and their suitability to produce models to identify the hydrological drainage channels within the field will be conducted.



Figure 1: a) Parrot Bebop drone, and b) DJI Maveric Pro.

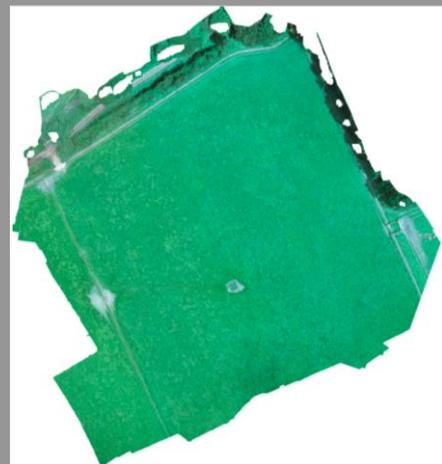


Figure 2: a) Aerial drone image, and b) SfM model of Middle Wyke Moor.