Photogrammetry Survey

Work in 2017 both extended and intensified the coverage from 2016 and used the experience gained to modify the terrestrial pole equipment. Additional aerial coverage was undertaken both to improve coverage of the motte and bailey and Hill and to place them in a broader landscape setting. The earlier survey date allowed better penetration of the less dense tree canopy.

Terrestrial Pole Photogrammetry

The pole equipment was modified to deploy 3 cameras (Figure 8) as a means to improve on the single camera and dual camera configurations trialed in 2016. The dense vegetation at the site made it quite challenging to achieve the level of overlap in imagery required to derive the 3D form of the site using computational photogrammetry. A significant improvement was seen with the both the quality of the results of the 3 camera configuration, and the time taken to complete the survey.

In order to make the photoset computational manageable (with more than 7000 discrete images captured), the raw survey imagery was grouped on the basis time and split into sets of 20 minute intervals, using the timestamps on the image files. These grouped images were then processed separately in Agisoft Photoscan and the derived point clouds exported from the software, an example of which is shown in Figure 9. Cloudcompare was then used to assemble and scale these discrete chunks of point cloud data relative to each other using both manual and computational methods, and fitted together (Figure 10). Further processing was carried out to remove the vegetation and clean-up the preliminary model (Figures 11 and 12)

Aerial Photogrammetry

The survey was extended beyond the tree canopy covering the hill using a fixed wing remotely piloted vehicle to capture vertical aerial images of the surrounding landscape. Computational photogrammetry was again employed to derive the 3D form of this terrain.

Georeferencing and Scaling

Prior to the surveys, a number of georeferenced positions were created on the hill using a total station, recording fixed positions like trees and fence posts. Similar positions were also georeferenced around the surrounding terrain (Figure 14). This allowed both the aerial survey and the pole survey to be combined as a single, georeferenced data set.

Future Uses

The georeferenced and scaled 3D model of the site (Figure 16) provides a foundation dataset which can be visualized in a number of ways. These include static images of Round Hill, without the tree and vegetation cover, orientated in any direction as a single image or set in the surrounding landscape. The model can be used as the basis for reconstructions of

the site with features such as boundaries, structures, activities etc. The latter can be animated to produce a movie for viewing using digital media or as a museum exhibit.

Sketchpad link

https://sketchfab.com/models/5e188a37495a431c998bce07eb1299a8

password: roundhill

Video link

https://drive.google.com/open?id=0B1hVRoC9dd1AQy03M2x6bjF5ajg