Beacons of the Past – Hillforts in the Chilterns Landscape

The Project

The *Beacons of the Past* (*BotP*) project was developed by the Chilterns Conservation Board (CCB) to investigate the Chiltern Hills of Southern Britain, a landscape that has a pivotal role in understanding human colonisation of upland spaces in post-glacial Britain, the development of farming on marginal soils, and the evolution of power and regional tensions of the later prehistoric period. Generously funded by a £695,600 grant from the National Lottery Heritage Fund and a number of partner organisations, including the National Trust, the Chiltern Society, and local authorities, the project began in earnest in April 2018.

The project approaches the prehistoric heritage of the Chilterns through the lens of three main themes, or Beacons:

- Discovery
    - LiDAR survey
    - Geophysical, topographical, and field surveys
    - Small scale targeted excavation

- Learning
    - Training volunteers in a variety of skills (both fieldwork and desk-based)
    - School workshops and teacher training events
    - 'Pop-up Prehistory' - bringing ancient crafts to life in family-friendly events
    - Augmented reality apps to enhance interpretation of the sites
    - New panels with bespoke reconstruction art at hillfort locations

- Protection
    - Conservation management, including scrub clearance where appropriate and erosion mitigation
    - Working with Historic England to provide greater reporting of and resilience to Heritage Crimes
    - Ecological survey to better understand the impact

The jewel in the crown of the project is the LiDAR survey of the entire Chilterns Area of Outstanding Natural Beauty (AONB) and environs. The AONB provides an ideal test case for a landscape-scale, high resolution archaeological LiDAR study. The key reason for this is the Chiltern woods. Over 23.5% of the 833 km² AONB is today covered by woodland (more than double the average for England - National Forest Inventory 2017[1] and Forest Research Statistics 2019[2]), and about 60 % of this has been found to be "ancient woodland," continuously wooded since before AD 1600 (Natural England, Ancient Woodland Inventory 2012[3]).

Woodland throws up a great number of impediments to an archaeological surveyor. Tree trunks, branches, and any undergrowth curtail vision for any distance around a surveyor, whilst leaf-litter and forest "duff" hide from view the natural soil and any small surface features or earthworks. Features are difficult to map, tree-trunks again blocking lines of sight for a total station theodolite, and the tree canopy lowers the accuracy of GPS. Non-wooded landscapes might be dominated by arable farming, which frequently brings artefacts to the surface by ploughing, to be spotted and collected by field-survey, and of course the crops themselves may indicate buried archaeology through crop marks or parch marks visible to aerial photography – these processes do not assist the survey of woodlands. Even geophysical survey techniques are hindered by woodland, trees blocking the walking of grids,

[1] https://www.forestresearch.gov.uk/tools-and-resources/national-forest-inventory/
[2] https://www.forestresearch.gov.uk/tools-and-resources/statistics/statistics-by-topic/woodland-statistics/
[3] https://naturalengland-defra.opendata.arcgis.com/datasets/45d3eebaebf847ac8c9f328091af5571_0

and the soil disturbance caused by roots and tree-throws masking clear reading of the data. Archaeological excavation within woodland is made significantly more difficult by having to dig around and cut tree roots, the obstruction of trees, and the damage root and woodland animal activity causes to stratigraphy. Woodland, in short, presents a great many challenges to archaeologists.

Environment Agency (EA) LiDAR data has wide, and growing coverage of the UK. Initial coverage has focused on areas where flood risk was present. As a result upland zones, which often retain the greatest potential for survival of prehistoric archaeology, including Iron Age hillforts, Bronze Age tumuli, Neolithic long barrows, and prehistoric field systems, have been excluded from such flights.

In the Chilterns, large areas are still yet to be surveyed by EA, with completion planned by 2021. The EA data which does exist for the region has often been flown at 1m resolution. At this resolution many archaeological features are not identifiable. This is particularly exacerbated under tree cover, where ground point densities are inevitably lower than for open ground.

A bespoke LiDAR dataset was therefore viewed as being of great benefit for enriching the understanding of this landscape, and through funding from the National Lottery Heritage Fund and other partners, **the largest bespoke high-resolution archaeological LiDAR survey yet undertaken in the UK was commissioned**. Encompassing 1400 km^2 (Figure 1) and flown at a minimum resolution of 16ppm, extending to 27ppm in open ground, utilising the Riegl Q1560 LiDAR sensor, the survey offers not only the potential to reveal hundreds of new archaeological sites, but also in keeping with the mission of the CCB, point cloud data can be used to record and monitor tree canopy and hedgerow health.

Where the data overlaps with EA existing data, comparisons can be made to observe erosion and monument preservation between the EA survey and the project's, and any future re-flying of the region by the EA can also be used for comparison to the *BotP* survey.
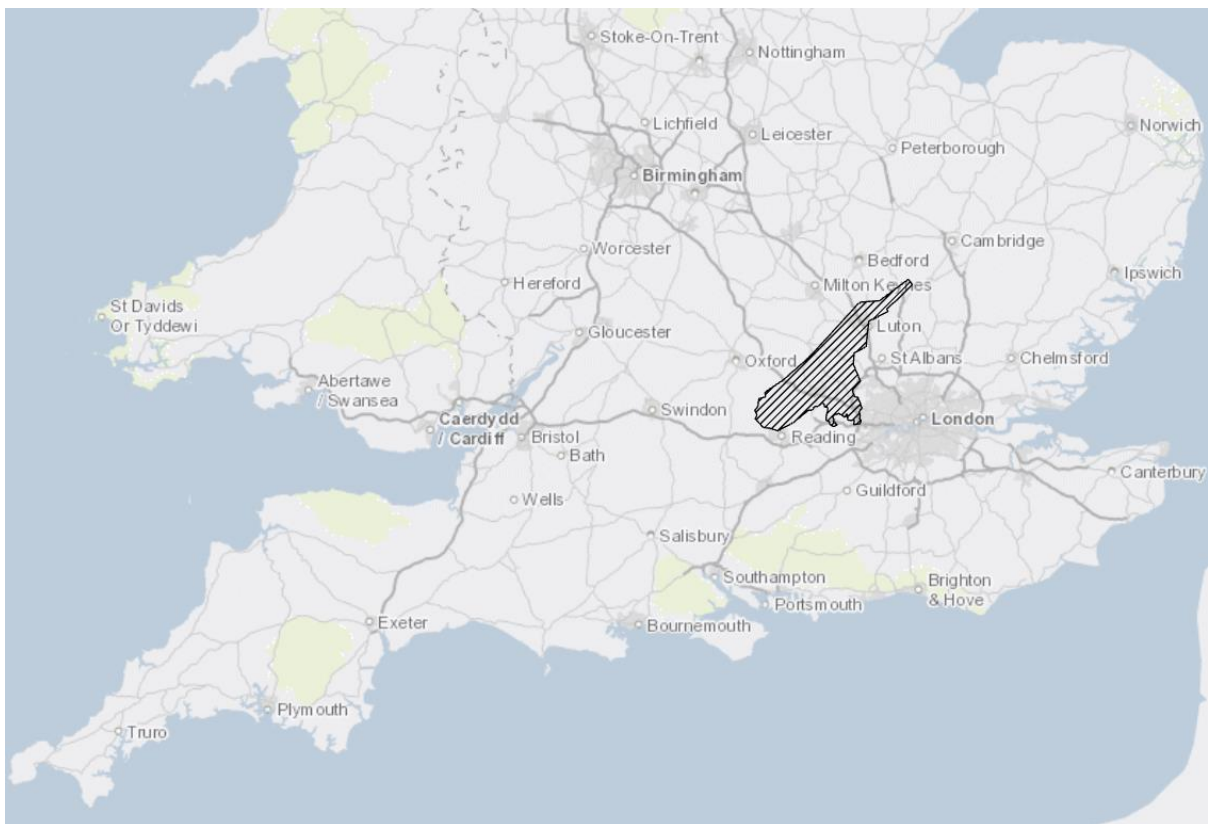

Figure 1 Location of Chilterns Hills in the United Kingdom; lined area is the coverage of LiDAR survey.
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The project has worked to create a bespoke web-GIS and heritage asset management system – our innovative Citizen Science Portal (https://chilternsbeacons.org) , to allow ready, free, licence-less access to view data layers including several LiDAR visualisations, aerial photography, and large scale modern and historic mapping.

A citizen science approach also allows a route to unprecedented engagement with the public. Not only is this data type relatively restricted to expert users, but geographic information systems (GIS) are also generally restricted to professional users, by both licence fees and knowledge barriers to their use. We are presenting a simple, user-friendly, well-documented GIS system which allows engagement with audiences from all over the world.

Building on the systematic recording and identification of archaeological features from the LiDAR results, interpretation work can begin, and we anticipate that by the end of the project, we will have a far better, and perhaps very different understanding of the prehistory of the Chilterns, and of the context of the Chilterns hillforts in their wider setting within Southern Britain.