Beside the boundary of Cholesbury Camp

GEOPHYSICAL SURVEY REPORT / January 2016

Buckinghamshire Archaeological Society

SURVEY:
Members of the BAS Active Archaeology Group, Chess Valley Archaeological and Historical Society and CAGG led by Dr Kris Lockyear of University College London

REPORT:
Kris Lockyear

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THANKS

to Bob and Mary Buckle for giving the survey team access to their fields and for their hospitality on the day, to Kris Lockyear for supervising the surveys and for producing this report, and to members of Chess Valley Archaeological and Historical Society and CAGG for helping conduct the surveys.

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County Museum,
Church Street,
Aylesbury,
Buckinghamshire
HP20 2QP

Website:
www.bucksas.org.uk

Geophysical surveying beside the boundary of Cholesbury Camp in Buckinghamshire

SURVEY REPORT AND RESULTS | Kris Lockyear

[This report is reproduced from 'Sensing the Iron Age and Roman Past', the website log (or 'blog') written by Kris Lockyear, Senior Lecturer in Archaeology at University College London, who oversaw the survey. The original is at https://hertsgeosurvey.wordpress.com/]

1: The survey project – Monday 14 December 2015

At the request of the Buckinghamshire Archaeological Society's Active Archaeology Group, members of CAGG, the Chess Valley Archaeological and Historical Society and the BASAAG got together at Cholesbury to survey a field close to the hillfort.

Cholesbury Camp is one of the hillforts that is being looked at as part of the Chilterns Hillforts Project. It is a scheduled ancient monument and therefore has legal protection requiring a licence from Historic England to undertake a survey within the protected area. The field we worked in, however, lies just outside the hillfort and is of potential interest. The historic map data I have been able to access, just shows this as an empty field. Over many years, however, marks in the grass, dew and frost had led the owners, Bob and Mary, to wonder if there was anything under the surface. They kindly allowed us to come and survey for the day, and between us we undertook magnetometry, resistance and ground penetrating radar surveys.

2: Setting up the survey grid

As the field was not nicely aligned on the Ordnance Survey grid, I had to set-up a "floating grid" using the dGPS. Unfortunately, the guide for how to do this provided by Leica is terrible and it took a while to work out what to do.

Putting in the grid.
Image (c) Mike Smith.

3: The surveying process

The magnetometry survey went quickly once we had got started. The field was only four grids in size, and only one of those was a whole 40m x 40m. By early afternoon the job was done.

Pauline Hey (CAGG, BASAAG) operating the magnetometer.

The resistance survey was undertaken by John Gover and members of CVAHS. They completed a number of 20x20m grid squares at 1m intervals, although at times we were tripping over each other's lines and cables!

Members of CVAHS operate a TRCIA resistance meter.

The Ground Penetrating Radar on loan from Science and Engineering in Arts Heritage and Archaeology (SEAHA) was operated by members of CAGG and completed an area 76m x 40m. We had the option of a second day if the results warranted it.

Jean Bluck (CAGG/BASAAG) operating the Mala GPR.

The grass was short enough to not be too much of a problem. Unfortunately, the moles were less forgiving…

ABOVE:
Muddy wheels from the mole hills

LEFT:
Jim West (CAGG/CVAHS) pushes the GPR over some unforgiving mole hills.

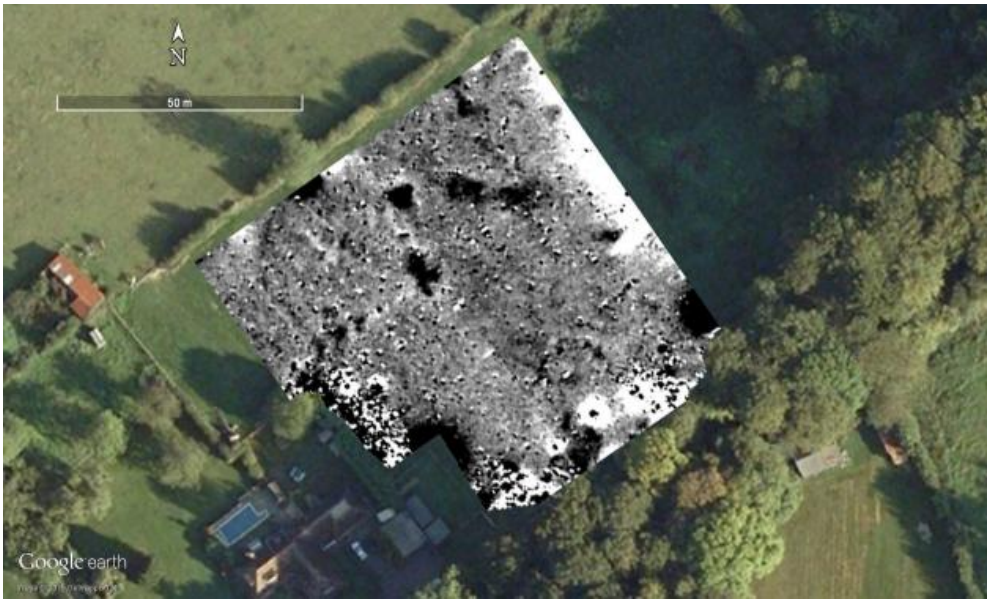
4: The location: Cholesbury Camp

The location of the survey can be seen in the next image. The oval of trees follows the line of the ramparts of the hillfort.

The location of the field next to Cholesbury camp.

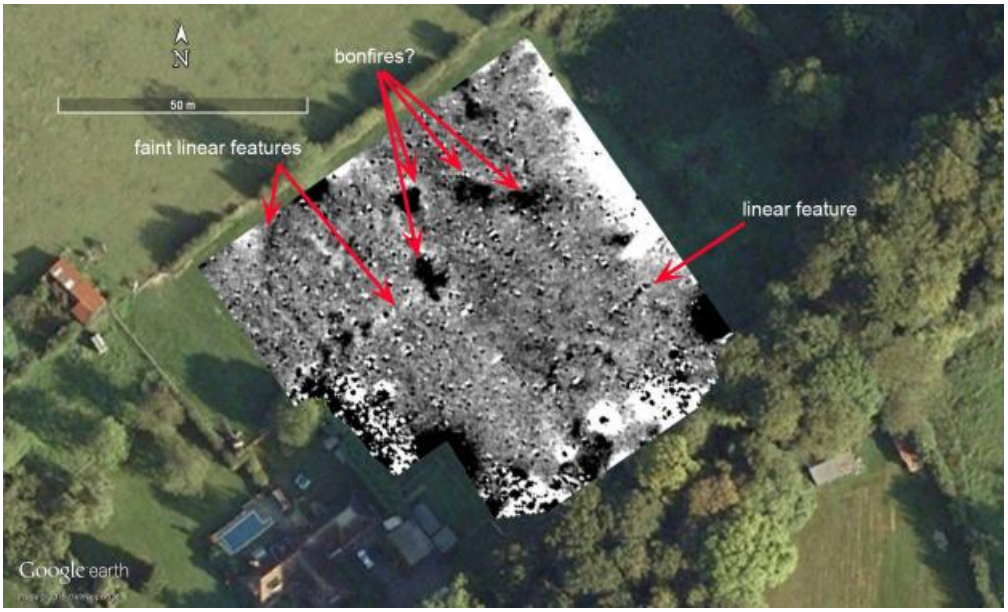
5: Magnetometry Results

Undertaking magnetometry surveys in relatively small fields is often less successful than one would hope. The metal associated with fences, along with other ferrous material can lead to quite "noisy" surveys. The image below shows the magnetometry plot overlain on the Google Earth image. As can be seen, all around the edges of the area surveyed are strongly magnetic features shown in black or white, associated with the fences, gates and so forth.



Results of the magnetometry survey. The magnetometry plot has been clipped to +/- 4nT, with black as the positive readings, white negative.

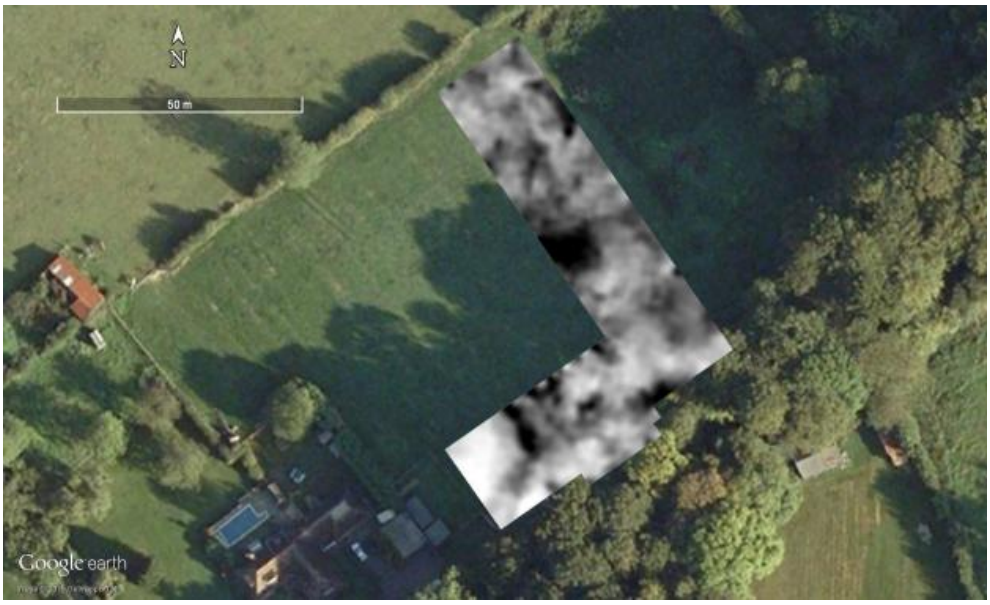
There are, however, a few potential archaeological features. There are a number of irregular areas of high magnetism, especially towards the north (see labelled plot below), which might just be the remains of bonfires. Excavations by Day Kimball within the fort in 1932 revealed some industrial features including some hearths and some bloomery slag from iron working. These features have readings in the range of -4 to +12nT, which does not seem strong enough for iron working, but may be from other processes involving fire. One clear linear feature can be seen, with ranges from -3 to +5nT, which is also visible on the GPR time slices, along with a couple of fainter and less convincing linear features. These are all labelled on the next image.



The principal features in the mag survey.

6: Resistivity Results

The resistance survey was initially downloaded into Snuffler and then the data exported as text files, which were in turn imported to TerraSurveyor. The grids were range matched to make the edges merge nicely, despiked to get rid of odd data, interpolated, smoothed and clipped. The resultant image shows a few possible features but may, as is often the case in our region, reflect the underlying geology as much as anything.



The resistance survey. The image has been clipped to 16-32 ohms, black is high.

There are a few possible features, including two curved / circular ones and a possible platform. In the raw data, these look a little less convincing. The “circular feature” (see below) is very close to the end of a linear feature seen in the GPR data. It would be helpful to extend the survey to pick up more of these features. The most convincing feature is the large low resistance area (i.e., wet like ditch fill) with a high resistance area running along the edge (i.e., dry like a bank). This lines up nicely with an enigmatic spur which extends from the ditch and bank circuit of the hillfort on its western side. We may have found a bit more of the fort’s earthworks.

The resistance survey with labels.

7: Ground-Penetrating Radar (GPR) Results

The GPR data was processed using Jeff Lucius and Larry Conyers' free software. Once converted from Mala format to GSSI format, time slices were in 4ns bands from 6–10ns, 10–14ns and so on. The top five slices showed features. Below that the GPR signal was attenuated and nothing can be seen.

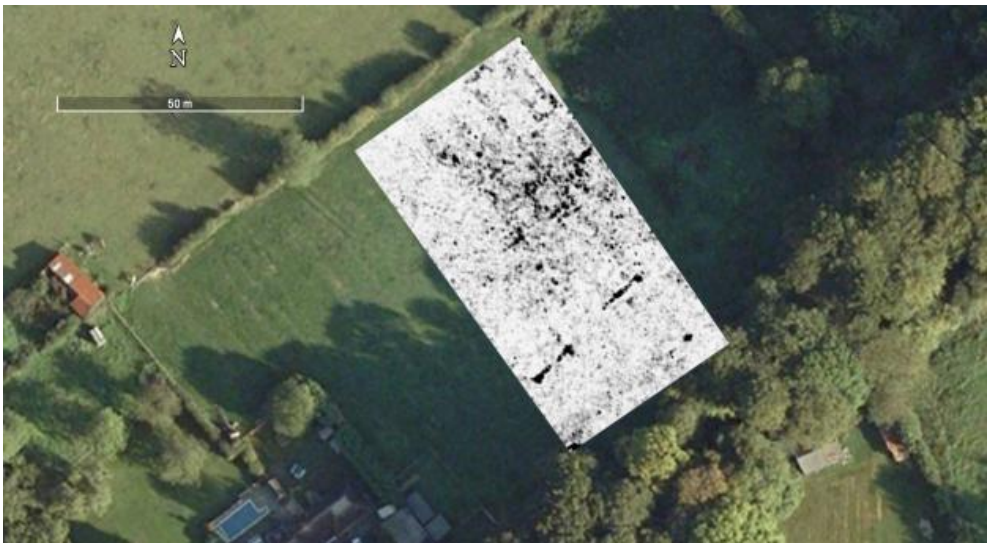
Top GPR time slice, 6–10ns.

The top time slice, which is essentially the topsoil, shows hints of what is coming below but is largely dominated by two areas of strong responses along the NE edge of the grid.

Yup, its them moles again…

Second GPR time slice, 10–14ns.

The second time slice starts to show a regular grid work of lines. Some are especially strong, e.g., the one that runs roughly parallel to the SE edge of the plot. That one also shows in the mag data, unlike the others. The lines, however, do not seem to easily resolve into buildings.

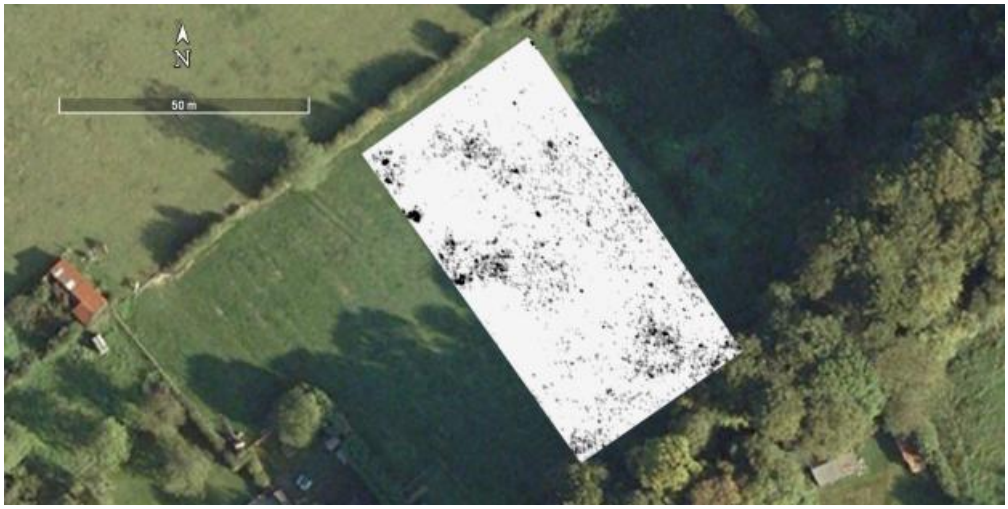


Third GPR time slice (14–18ns).

The third time slice shows how shallow many of these linear features are. The one to the north on the second time slice is not really visible, although that to the south in the mag data persists.

The fourth GPR time slice (18–22ns).

By the fourth time slice, the plot is largely noise with the occasional feature showing, the most obvious one being the linear feature mentioned above.



The fifth time slice (22–26ns).

The last slice shows the GPR signal almost completely attenuated, only a few features remain.

8: Interpreting the Results

What are we to make of this? The linear feature that shows on the magnetometry and GPR surveys must be something both magnetic and reflective. It could be a brick wall, or perhaps a land drain filled with brick rubble? The remaining regular grid-work of lines doesn't really resolve into clear building outlines. My best guess (and it is a guess!), is that these represent field drains leading down towards the ditch of the hillfort.

Sadly, nothing in the surveys really leaps out at one as "wow, we found…" There are tantalizing hints and some possibilities, but in general it is a little disappointing. It is great to see the strength of using multiple techniques, however, and how the combined data sets help with the interpretation.

Many thanks to everyone who came out and helped, to Peter Marsden for organizing it, and especially to Bob and Mary for not only letting us play in their field, but also for supplying tea, cake, and somewhere dry to sit!

Kris Lockyear