

GEOPHYSICS AT TINTAGEL CASTLE: NON-INVASIVE WORK AHEAD OF THE EXCAVATIONS

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I am cheating on Day of Archaeology a little, as I am going to talk about work we at [TigerGeo](#) did in May, but that is being used to inform the very-much-happening-on-July-29th [excavations at Tintagel Castle](#). We've been really excited to see the excavations progress over the last few weeks and can't wait to get our hands on the reports and plans to go back to our own data with.



Just getting the gear onto site was a challenge!

While there has been a lot of [media attention](#) about the excavations (see [Sue's excellent piece](#) for the insider perspective), the geophysical surveys happened without much fanfare in May, in order to give us time to process the data and report it back to the dig team at [CAU](#). We thought it might be interesting to have an insight into the work we did on site and the iterative process of interpreting, getting feedback and revisiting the data that we are engaged in. Most of the time, we don't get such a great chance to see the excavations that follow our surveys so this is fantastic for us as we will be able to update our thinking and interpretations in detail.



Magnetic Susceptibility readings being taken on the lower reaches of the southern terrace

So what did we get up to? The excavation team didn't want to make such a drastic intervention on the site blind. They had target areas, based on what was already known or assumed about the site and asked us to look at them in more detail to allow them to better target their excavations. They were particularly interested in finding buildings from the post-roman period that had lain undisturbed by recent archaeologists, so they could look at them with fresh eyes and modern scientific methods. Any excavation is inherently destructive, and on sites as unique as [Tintagel](#), it is important to minimise the impact of destructive research, so to help them do this we came up with a package of four complimentary methods:

Ground Penetrating Radar, which should be able to detect buried walls and surfaces

Earth Resistance Survey, which should detect the same things as the GPR, but using different properties of the material, giving us a 'double chance' to find them

Magnetic Susceptibility, a method that looks at how magnetisable a material is, telling us things about the presence of certain forms of iron. This can help distinguish between different activities taking place on site: we'd expect higher MS in areas of industry or settlement thanks to burning or heating, than we would in storage areas, for example

Terrestrial Laser Scanning, to produce highly detailed surface models to pin down the geophysical data but also very accurately located building platforms that had been recorded over the years by site

archaeologists.



This isn't a photograph, it's part of the point cloud generated by the laser scanner. You can see the team on the right trying to stay out of the scan!

A lot of fun was had on site getting ourselves and our equipment into the right places. Unlike the dig team, because we had to be quite mobile, with heavy gear, we needed to use a rope-access team to provide safety lines for us, so there were a lot of logistics to contend with around making sure we could cover the right areas. We were on site for a total of about 8 days, and really enjoyed talking to visitors to the site about what we were doing and why: people were particularly interested in the laser scanner and we've had to edit a lot of tourists (and seagulls) out of our point clouds!



KC getting the scanner as far along the southern terrace as possible!

So what did we find out? The earth resistance and GPR surveys taken together confirmed the locations of some of the walls and floors that have subsequently been found in the trenches, and hinted that the archaeology on the southern terrace had a different character than that on the eastern area. The magnetic susceptibility data also suggested clear differences between the two areas, with low values on the eastern area and higher values with internal patterning on the southern terrace. This suggested to us that on the southern terrace people were living or working, using fire either for heat and cooking or for industrial purposes. We could also see some strong patches of enhancement that lay between what were thought to be buildings, so we suggested there may be one larger building here instead. The eastern area showed no settlement related enhancement. So were the buildings there perhaps storehouses? Many of the already excavated buildings in this area have been interpreted as stores rather than dwellings.



Earth resistance underway (with ropes!) on the southern terrace

The laser scans were useful not only to us but to the excavation team as well as they will form the basis for the topographical data being collected about the site. We were able to use them to make important topographic corrections to our radar profiles, without which interpretation would have been very difficult!



GPR survey on the southern terrace: this is where one of the walls was found

So, what next? Well, our first and most exciting job is going to be to get all the plans and sections back in from the excavation team and see how they match up with our interpretation, especially of the radar: we were able to survey a larger area than could be excavated, so we can refine our interpretation based on the dig and better predict what other walls and floors lie on the southern terrace. Ideally, we'd like to come back and do even more radar and see if we can cover the entire southern terrace: this might give us the best chance of understanding the exciting structures there and their immediate context. We would also like to do more scanning to provide detailed topographic data for the entire islands. The Tintagel Research Project is set to continue, so watch this space....

You can see more photos from our work on [facebook!](#)



You wouldn't believe how many of these we had to delete from the sky in our scans!