The case-history shown above (details of which will be discussed in the paper) was taken over two days at St. Croix Island on the Canadian/USA border. The left plot is of the north half of the island, right is of the south half. Colour scale bars are of apparent magnetic susceptibility in parts-per-million (ppm), distances are in metres (note that the distance scales are different for each half of the island), and interline spacing was one metre.

It was on this very small island (of area two and half hectares) in June, 1604, that Samuel Champlain and a company of 75 men attempted to establish a settlement in North America. During the following bitterly cold winter, 34 members of the company died from scurvy and were interred in an earlier Indian burial site situated at the south end of the island. The following year the survivors, along with some of the wooden buildings, were removed to Port Royal in the Bay of Fundy where they established the well-known 'Habitation'. The remaining buildings were left, to be burned ten years later by visiting New Englanders. (Assistance of Steven R. Pendery, University of Massachusetts, Amherst, and the United States National Park Service in carrying out this survey is gratefully acknowledged).

THE CANTERBURY HINTERLAND PROJECT: MULTI-METHOD GEOPHYSICAL INVESTIGATION OF A ROMAN ENCLOSURE AT BOURNE PARK (WITH THE EMPHASIS ON THE GPR SURVEY)

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In 2011, a pilot fluxgate gradiometer survey was conducted at Bourne Park, Bishopsbourne, Kent, where crop marks representing a probable Roman building had been observed by Mr Chris Blair-Myers in aerial photographs of 1990, and by Dr Ben Croxford in a Google Earth image from 2003 (Wallace and Johnson 2012). Furthermore, metal detectorists had recovered Iron Age, Roman and Saxon coins and brooches between 1986 and 2002. The promising results of the 2011 survey warranted further geophysical and topographical investigations. In three seasons of survey (2012-2014), *c.* 47 ha were surveyed with magnetometry at Bourne Park. From 2014 onwards, in addition to Bourne Park, three other sites are investigated with geophysical techniques within the Canterbury Hinterland Project (a rectilinear enclosure at Patrixbourne, a farmstead at Petham and a Roman-period structural complex at Ickham). More details can be found at http://www.arch.cam.ac.uk/research/projects/canterbury-hinterland

Bourne Park is an area of open parkland between the villages of Bishopsbourne to the south and Bridge to the north, *c.* 6 km southeast of the centre of Canterbury. It lies in a valley shaped by the Nailbourne Stream, which is now only seasonal. The valley slopes up to the north-east, towards the line of the Roman road between Canterbury and Dover. The British Geological Survey records the local geology as White Chalk (Wallace *et al.* 2013). The primary objective of the survey at Bourne Park is to investigate the probable Roman structures, the landscape surrounding them, and their relationship with the Roman town at Canterbury and the Canterbury-Dover road with the many burials along it (Wallace *et al.* 2014b).

The fluxgate gradiometer survey was conducted using a Bartington Instruments Grad 601-2 Dual Sensor magnetometer. Readings were taken at 0.25 m intervals along traverses of 0.5 m spacing. The site exhibited a good response to the gradiometer and buried features show clearly against the geological background: positive readings appear to result from ditches or pits, whereas negative magnetic responses are interpreted as walls. Several enclosures were detected, most of which lie approximately parallel to the Roman road. Moreover, an Anglo-Saxon cemetery, partially excavated previously, and probable Iron Age structures were found.

The focus of this contribution is on an enclosure of *c.* 100 m × 110 m, bounded by linear ditches on three sides, and with at least two large buildings within it (hereafter referred to as western and southern building). These are clear in the magnetometry, although the northern part of the western building, visible in the aerial photographs, is absent (Wallace 2013). An earth resistance survey was undertaken over the western building in March 2013 with a Geoscan Research RM15, at spatial resolutions of 0.5 m × 0.5 m and 0.5 m × 1 m, using a 0.5 m and 1 m twin-probe configuration, respectively. It shows the walls in more detail than the magnetometry (Wallace *et al.* 2014a).

In August 2013, a ground-penetrating radar (GPR) survey of *c.* 0.6 ha was conducted over the western and southern buildings, using a Sensors & Software Spidar network comprising five single 500 MHz antennas mounted in parallel and towed behind an all-terrain vehicle (Verdonck *et al.* 2013). The inline sample interval was 0.05 m, the transect spacing 0.125 m. After dewow and time zero alignment, the same gain function was applied to all traces to enhance later arrivals and preserve relative amplitudes. A low-pass frequency filter (1 GHz) was applied. Also after background removal, there were slight variations in the amplitudes recorded by the different channels in the network, visible as stripes in the time-slices. The amplitudes were equalised using an average for each channel, computed over the entire profile length. Migration velocity analysis was performed both on profiles and horizontal slices extracted from data cubes 3-D migrated with different velocities, and resulted in a velocity of 0.07 m/ns showing little lateral or vertical variation. After 3-D migration, the data were converted from time to depth.

On the basis of the GPR data, the western building seems to consist of a long corridor of 37 m × 5 m, and two 13 m × 6 m large rooms, projecting in SW direction at the extremities of the corridor (Figure 1).

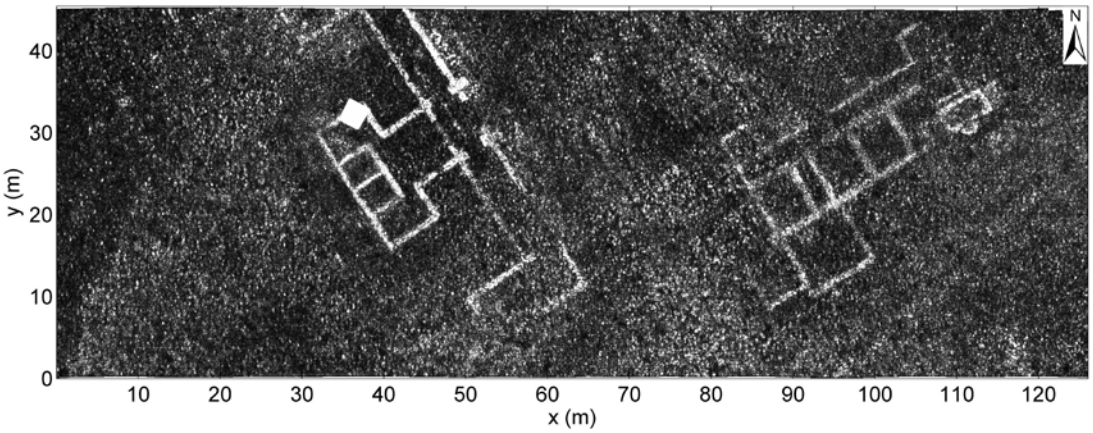

Fig 1

The 4.5 m wide entrance in the middle of the corridor opens onto a T-shaped addition, 13 m deep SW of the corridor, and with a maximum width of 17 m. Whereas the function of this western building is unclear, the plan of the southern building resembles the villas with *porticus* and two projecting pavilions, found elsewhere in Roman Britain and in other provinces of the western Roman Empire (Smith 1997). Remarkably, the *porticus* is not situated in between the two pavilions (as is often the case), but extends over the whole length of the building (*c.* 28 m) and separates the pavilions from the core building. The latter consists of at least four rooms, *c*. 7 m deep and 4.5 - 6 m wide, and a narrow room, probably a corridor. Two more rooms are visible to the south, and a room with apse on the eastern corner could be interpreted as baths (Figure 1).

Beside the western and southern building, a possible third wing in the northern part of the enclosure is indicated by an area of less clear magnetic anomalies. Neither the earth resistance survey nor the GPR prospection of this area in August 2014 were able to reveal clear structures, suggesting a poor state of preservation.

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RECENT SURVEYS AT SARUQ AL-HADID, DUBAI, UNITED ARAB EMIRATES

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The archaeological site of Saruq al-Hadidin the Emirate of Dubai was first discovered from the air in 2002 by Sheikh Mohammed bin Rashid al-Maktoum, who noticed a large spread of dark material in the dunes as he flew overhead. Further inspection determined that the material was metal-working slag on the dune surface, interspersed with metal artefacts, ceramics and other cultural material. The main slag-covered mound extended over more than 1ha, though associated activities could extend the wider site to over 1km^2.