

A Comparative Study into the Effectiveness of Geophysical Techniques for the Location of Buried Handguns.

James Murphy¹ and Paul Cheetham²

Centre for Forensic Sciences
School of Conservation Sciences
Bournemouth University
Bournemouth, UK
BH12 5BB

¹ email: g7895042@bournemouth.ac.uk

² email pcheetham@bournemouth.ac.uk

The proliferation of firearms in the UK, deemed 'intolerable' by Prime Minister Gordon Brown has been the cause of great concern amongst law enforcement agencies and the increase in firearm related homicides by gangs in inner city areas combined with the recent large scale criminal alteration of replicas into effective firearms justifies this concern. The burying of firearms for the purposes of storage or disposal after criminal activity is much documented both in the UK and abroad and the US phenomenon of 'block guns' or firearms buried strategically in gang neighbourhoods for rapid access gives pause for thought. Consequently, considering the current gun climate, ascertaining the most effective methods to locate these buried weapons is timely.

Much forensic geophysics research that has been published recently relates to the location of burials, both mass and individual. While this is important there has been less published research into the location of associated evidence, which may be located in a different location to the remains. Previous studies in the location of firearms and metal weapons with magnetic locators and metal detectors have been undertaken, but systematic high resolution area coverage as frequently applied in archaeological geophysical survey and employing range sensitive archaeological grade magnetometry instrumentation has not been thoroughly evaluated.

Methodology

In this study 0.5m and 1.0m fluxgate and 1.0m caesium gradiometer results were compared with 500 and 800MHz frequency ground penetrating radar (GPR) surveys. The two different high-quality replica handguns employed were buried at two depths (0.30 and 0.50m) both singly and as a cache. The site chosen was a flat grassed area set within an urban environment, the near-surface geology being a uniform sand. The site contained significant amounts shallow ferrous material which was partially cleared by the use of a metal detector prior to the main surveys.



Figure 1. *800MHz GPR profile with handgun cache buried at a depth of 0.50m (50cm)*

Conclusions

Overall, the results from the magnetic surveys were problematic with the responses from the buried handguns difficult to distinguish clearly from site noise. However, some of the GPR surveys proved particularly successful (fig. 1), although the type of handgun and changes in the orientation of the guns resulted in significant effects on their delectability.