

NOVEL PLATFORMS AND APPLICATIONS FOR GROUND-PENETRATING RADAR

M.A. Collins

Department of Geography, University of Leicester, University Road, Leicester LE1 7RH, United Kingdom – mac79@le.ac.uk

THEME: Socioeconomic Issues including Health, Urbanization and Human Heritage

KEY WORDS: GPR, radar, UAV, survey, lightweight, archaeology

ABSTRACT:

The purpose of the research is to investigate the possibilities of using small, lightweight and highly-portable ground-penetrating radar (GPR) units for the purpose of investigating sub-surface features, with a focus on archaeology. An advantage of GPR, as with other remote-sensing techniques, is that data can be derived without the expense or inconvenience of destructive excavation. The primary differences between these units and other GPR units are that these radar rigs are smaller than previous examples, and they are designed to be used at higher speeds than conventional sled-based systems, potentially allowing them to be used either hand-held or to be attached to unmanned aerial vehicles (UAVs). These differences should allow surveys to be taken more quickly and cheaply, as well as providing the opportunity to survey previously-inaccessible areas and areas where the ground-conditions are not suitable for standard GPR surveying equipment. This is likely to mean that the units will be able to be used in many novel locations. GPR is widely used in environmental monitoring, civil engineering and mineral prospecting. The applications of GPR to heritage research and management are also important globally; GPR has been used over 40 years on archaeological sites as diverse as pre-Colombian sites in Peru, Japanese gravefields, and Roman forts. Recent work demonstrates the suitability of GPR to locating materials and surfaces that other geophysical techniques are not capable of easily detecting, such as basalt used for surfacing roads and used in paving, and the presence of concrete substructures. A wide range of tests seems necessary to begin to determine the capabilities of the units. Tests which compare units against each other and other GPR systems, against data derived from the same unit under different conditions, and which test the robustness and survivability of the units, are all necessary for inclusion in this study.