

## **RESEARCH ON UNMANNED AERIAL VEHICLES AS A PLATFORM FOR LIGHTWEIGHT GROUND-PENETRATING RADAR UNITS**

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**THEME: Airborne and Innovative Remote Sensing Platforms and Techniques**

**KEY WORDS:** Max. 6 keywords of your choice here: GPR, radar, UAV, survey, lightweight, problems

**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 attached to unmanned aerial vehicles (UAVs). These differences will potentially 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. 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. Problems to be overcome include weight of the unit, flight-time, wi-fi transfer of data at distance, data-collection at speed, stability of the UAVs during surveying and problems of geo-referencing. Extensive flight-testing with the units will be necessary to determine which of these problems can be mitigated and how this is to be achieved.