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Advantages of free-roving multi-sensor geophysical surveys for archaeological prospection

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A major issue in archaeogeophysical prospecting is the time and cost involved in collecting high-quality, densely sampled geophysical data. Provided the selection of survey type, for instance magnetic or resistivity, is made appropriately, the value of the data is not in question. Sometimes the data may indicate no anomalies. If multiple surveys measuring different parameters are carried out, it is easier to decide whether this is a result of no subsurface structures, or structures which do not respond to one particular method. A further bonus is the increased ability to characterize particular sub-sets of anomalies. The survey cost and time however increases.

Our two institutions have collaborated to develop the GEEP survey system to assist with this type of survey. The GEEP (Geophysical Exploration Equipment Platform) is a complete survey system for rapid efficient surveys. A sledge-shaped equipment platform forms a stable vehicle on which a large variety of geophysical sensors can be mounted. The sledge has DGPS navigation, so is self locating. Sensors are connected to a data logging system which telemeters all the data to a remote field station where it is stored, and may be displayed for real-time data quality control and quick-look interpretation. The system is towed by a small tractor. The system requires no previous setting out of survey grids, and can record up to 6 separate geophysical sensors simultaneously. Survey rates of 2 hectares per hour are obtainable, depending on the survey specification and the equipment load.

The system has been used on a variety of archaeological sites and several case histories will be reviewed showing the data quality, and comparing it with equivalent data obtained by conventional surveys. Particular examples will include Wroxeter roman

city, and the Vale of Pickering. A particular feature of the system is the flexibility of surveying mode. It may be used to collect densely sampled data as in a conventional survey. Alternatively, it may be used to collect data in a broader scanning mode. Because of the real-time viewing of the data, it can conduct a dense follow-up survey of areas of interest immediately they are identified. Additionally, since the data is viewed in real-time, data quality can be monitored very carefully, and instrumental problems identified and corrected as they occur, so that poor quality data and survey down-time are minimised.