



D22 Use of Proposed Standardized Geophysical and Archaeological Forensic Techniques to Supplement Crime Scene Investigations: Concepts and Examples of Applications

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After attending this presentation, attendees will have an enhanced understanding for standardization of methods used in combined geophysical and archaeological activities in the field of crime scene investigation.

This presentation will impact the forensic science community by comparison of successful and unsuccessful geophysical deployment strategies as well as argue strongly for use of combined interdisciplinary geophysics and archaeology to establish basic methodologies for discovery and recovery of burials.

Here, some of the major issues encountered during the brief history of the North Carolina Program for Forensic Sciences will be discussed.

This presentation will better motivate the forensic science community by providing an understanding of how standardized field techniques used in combined geophysical and archaeological forensic investigations can be beneficial to the success archaeological forensic techniques by improving the chances for successful criminal burial site recognition.

This project reviewed successful and unsuccessful combined geophysical and archaeological crime scene investigations and identified key components that were lacking in unsuccessful programs that were present in successful investigations. After a review of the findings, recommendations are presented for the establishment of standardized field techniques the geophysical and archaeological forensic specialist. The goal of this discussion is to provide additional initiatives that will foster communication within the geophysical/archaeological scientific communities.

Geophysical and archaeological field sampling techniques require the establishment of anticipated results, and a clear identification of physical parameters that need to be collected to satisfy the anticipated results. This includes: identification of target (i.e., weapons made of steel permit a restricted number of geophysical techniques for evaluation), or other parameters, such as potential depth of burial, size of object, and overall site conditions may further restrict the selection of available geophysical sampling solutions. This selection process is part of what we call “mental mobilization” and is key to selecting the appropriate search methodology. These simple principles have been widely adapted by other professionals in non-criminal applications (i.e., location of underground pipe, tanks, and buried waste). Although the crime scene presents a unique set of issues during the investigation, the scientific principles remain the same.

This presentation will provide examples of geophysical/archaeological combined investigations, and how by following the basic principles of an organized search the chances of success have been improved. Simple guides (tables) will be provided for the selection of investigation methodology using the current knowledge base of geophysical/archaeological investigatory techniques including but not limited to:

- Single and multi-frequency electromagnetic detectors (for large to small area surveys where rapid assessment is desired);
- Total and Gradient Magnetometers (for large and small area survey are desired, and potential targets are composed of iron/nickel compounds);
- Ground-penetrating radar for medium to small areas (where soil and ground conditions permit use); and,
- Other methods such as remote sensing using aerial photography, mapping using GPS, and reflectance and thermal infrared imaging will also be considered.

Results of geophysical/archaeological evaluations provide a valuable and constructive feed-back mechanism to facilitate discovery and recovery of human remains and/or associated crime scene evidence. These data may also be used to provide important information for the inclusion and exclusion of potential areas for evaluation.

Geophysics, Archaeology, Standardization