



Physical Anthropology Section – 2009

H84 Geophysical Remote Sensing Applied to the Forensic Search for WWII Graves in Guadalcanal

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After attending this presentation, attendees will have a better understanding of the use of selected remote sensing techniques (Ground Penetrating Radar and a capacitively coupled resistivity system) applied to the search for clandestine graves, including those from historic 19th and 20th century Virginia as well as covert mass graves from WWII in Guadalcanal, Solomon Islands. Recommendations for future forensic searches will be provided.

This presentation will impact the forensic community by demonstrating remote sensing investigation of clandestine mass graves in a variety of diverse environmental and temporal periods. Advantages and limitations of these techniques in specific burial environments (e.g., Central and Eastern Virginia and Guadalcanal, Solomon Islands) and 19th and 20th century temporal contexts are highlighted, as are applications of these techniques in multidisciplinary forensic investigations.

Geophysical remote sensing techniques have been applied to the forensic search for clandestine graves for more than 15 years. Recently, Schultz¹ has cited the need for additional controlled remote sensing research to elucidate the effectiveness of these techniques in different micro-environments and longer interment periods. The current research does just that, by applying Ground Penetrating Radar (GPR) and a capacitively coupled resistivity system (i.e., Ohm Mapper) to mid-19th century and mid-20th century sandy and clay as well as wet and dry burial contexts in both the northern and southern hemispheres.

The ill-fated U.S. Marine Goettge Patrol was ambushed by the Japanese on the evening of August 12, 1942, in Guadalcanal, Solomon Islands. Only three of the patrol survived; Japanese accounts indicate that 17 of the dead Marines, along with some dead Japanese soldiers, were buried in a group of Japanese rifle trenches. Their remains have never been recovered, although there is much speculation about the probable location of their interment.

In July, 2008, an interdisciplinary team of forensic anthropologists, archaeologists, historians, and physicists conducted the Goettge Patrol Guadalcanal survey. The goal of this survey was to locate the Japanese defensive trenches where members of the patrol were supposedly buried by using geophysical remote sensing equipment (GPR, Ohm Mapper), followed by archaeological test excavations of the identified anomalies. Two GPR systems were used: the Noggin Plus 250 Smartcart with a 250 MHz antenna and the Pulse Ekko GPR system with both 100 MHz and 500 MHz antennae. The Ekko Mapper 3 and Voxler software programs were used to visualize and process the data. Nearly 7,000 square meters of the most likely target area (based on historical and archival research) were surveyed. In addition, a capacitively coupled resistivity system was used to survey a 2,400 square meter area of high burial probability (also surveyed by the GPR), which, when processed using Mag Map 2000, produced a three-dimensional plan view of the data.

Anomalies identified through these remote sensing techniques were then tested by hand excavation of standard archaeological test units and trenches. Although the clandestine graves of the Goettge Patrol were not identified, interpretation of the anomalies was instructive in understanding the history and soil stratigraphy of the site and the impact of natural and human factors on the area since WWII (e.g., ground water accumulation and depositional fill). These investigations also helped narrow the search area in terms of where the Goettge Patrol is not.

The Guadalcanal remote sensing survey highlighted the complexities of using remote sensing techniques in sandy, wet soil and extended interment periods. Further elucidation of these variables was accomplished by applying the same technology to 19th and 20th century historic graves in Arlington, Virginia and at the R.J. Reynolds Homestead in Critz, Virginia. From these investigations, it was learned that identification of graves of considerable postmortem interval was possible, but necessitated the use of a multidisciplinary team approach integrating the specialized skills of archaeologists, forensic anthropologists, physicists, and historians.

Reference:

¹Schultz J. Sequential monitoring of burials containing small pig cadavers using ground penetrating radar. *JFS* 2008; 53; 279-287.

Forensic Archeology, Remote Sensing, Clandestine Graves