An Assessment of the Archaeological Potential of a Low-Level Airborne Geophysical Dataset from the Boyne Valley, Ireland

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The Brú na Bóinne Research Framework's document ( Smyth et al. 2009) has advocated a shift in research focus away from sites and trenches to landscape. It is in this area that remote sensing techniques have an important role. The Brú na Bóinne Remote Sensing Project addresses this aim and is testing and assessing a range of geophysical techniques that will be used in large-scale systematic remote sensing surveys and will be integrated with other remote sensing datasets. The preliminary work presented here is investigating data collected at different scales in defining zones of archaeological potential.

Archaeological Background

The Brú na Bóinne Research Framework's document ( Smyth et al. 2009) has advocated a shift in research focus away from sites and trenches to landscape. Little extensive systematic field survey of the wider landscape has taken place. (Data courtesy of Meath County Council and the Discovery Programme)

Tellus - Airborne Geophysical Survey

The Tellus airborne dataset was collected during low-level (59m agl) surveys carried out in 2012. The flight line spacing was 200m with tie lines spaced 2000m apart. The sampling interval along each line is c. 0.4m.

Tellus - Flight and Tie Line Coverage

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Soils and Tellus Electromagnetic data for Site E

The soils around the area of Brú na Bóinne are predominantly deep and well drained and of jaillie (alkaline) chalkic nature. On the north side of the river, where flake bedrock dominates and the soils are clayey, most of the soils are calcareous and poorly drained. However, this changes close to the river where well drained limestone dominated sands and gravels dominate, leading to the well drained alluvial materials. The soils map presented here is based on large scale reconnaissance mapping and shows a broad classification of five types of mineral soil with thin and thick bands of alluvial material. The location of the Tellus flight lines and recorded archaeological monuments are also shown on the map.

Tellus - Airborne Geophysical Survey

The GEEP system comprises a tractor unit with datalogger and Wi-Fi antennas. The system is configured for surface geophysical survey using a radiometric geophysical system. Simultaneous geophysical measurements were made using a Tellus airborne aircraft. High resolution total magnetic field measurements were made using a caesium vapour sensor mounted in the left wing tip and a radio receiver. Geophysical resistivity measurements were made using a 4-frequency system, configured in the wing tip. A gamma-ray spectrometer with orbital detector measured K, Li, Th and total counts.

Tellus - Airborne Geophysical Survey

The combination of sensors provides geophysical and geochemical parameters used to define regional soil types and profiles.

Tellus - Flight and Tie Line Coverage

The electrical conductivity map in millisiemens per m for the area of Field 112 shows a second class of mineral soil with the thin band of alluvial material lying at the north of the map. The location of two Tellus flight lines and Site E are also shown on the map.

Tellus - Flight and Tie Line Coverage

The data from all 4 magnetometer sensors were combined to produce a total field magnetic map, which shows a dichotomy partially surrounding the site and probably associated with cultivation.

Tellus - Flight and Tie Line Coverage

The combination of sensors provides geophysical and geochemical parameters used to define regional soil types and profiles.

Tellus - Flight and Tie Line Coverage

The electrical conductivity map in millisiemens per m for the study area may have a very broad correlation with the soils map for the area. There appears to be two zones of conductivity perhaps with their boundaries running along a line defined by the alluvial bands which is not differentiated in this map.

Tellus - Flight and Tie Line Coverage

The soils map for the GEEP survey area of Site E in Field 112 shows a single class of mineral soil with the thin band of alluvial material lying at the north of the map. The location of two Tellus flight lines and Site E are also shown on the map.

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