Searching for hidden chambers at Newgrange Passage Tomb; some results with an evaluation of the multi-method geophysical techniques used.

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1. Introduction

Over a number of years, it was designated a UNESCO World Heritage Site (WHS) in 1993. The WHS contains a broad range of archaeological monuments, spanning over 6,000 years from the Neolithic passage tombs to the Battle of the Boyne in 1690. Excavation has been undertaken at a number of sites, most notably at the great mounds of Newgrange and Knowth. The third great mound at Dowth has not been scientifically excavated. The large sites of Knowth and Dowth both have two passages each beneath their tumuli. With Newgrange has just one passage beneath its mound; despite its large diameter. An outline of each mound with known passage transects were targetted to investigate zone of the reconstructed passage. The depth of investigation was 1.8m. Five ERT transects were targeted to investigate area of the reconstructed passage.

2. Newgrange Passage Tomb

Newgrange Passage Tomb spans from the southwest to the northeast in the known chamber area and its capstone were not excavated. There was a strong negative anomaly associated with the known chamber, as a result of the chamber being surrounded by high resistivity soil. At the base of pseudosection 16N maps the area of the known chamber.

3. Airborne LiDAR data

Available LiDAR data output on a 1m x 1m grid were used to construct contoured surfaces. LiDAR models of the Passage Tomb are shown in the photograph below. The high resistivity anomaly seen at the base of pseudosection 16N maps the area of the known chamber.

4. Electromagnetic and Resistivity Surveys

Electromagnetic and electrical resistivity tomography (ERT) surveys were used to map the extent and sub-surface nature of the reconstructed passage to inform the interpretation of the microgravity survey. (ERT)

5. Microgravity - Predictive Modelling

The low resistivity zone in the modelled transect ERT pseudosections shown below maps the reconstructed passage. Anomalies such as in the photograph below. The low resistivity anomaly seen at the base of pseudosection 16N maps the area of the known chamber.

6. Microgravity - Field Survey and Results

The multi-frequency electromagnetic survey showed a significant linear apparent conductivity anomaly over the zone of the excavated and reconstructed passage. The depth of investigation was 1.8m. Five ERT transects were targeted to investigate zone of the reconstructed passage.

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