

Medvėgalis

A GPR STUDY OF THE MEDIEVAL HILLFORT IN LITHUANIA

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The Power of **AND**

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ABSTRACT

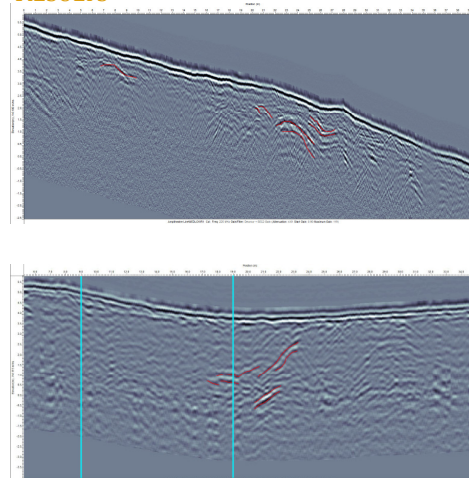
Located on the western border of the Baltic state of Lithuania, Medvėgalis was one of the strongest and most important Middle Age hillforts in the region. First mentioned in written text in 1316, Medvėgalis served as a strategic defense point against invading Crusaders until its destruction by the Teutonic Knights in 1329. Due to Lithuania being the last European country to be Christianized, the hillfort is a significant historical and cultural symbol for Lithuanians. In July of 2016, ground penetrating radar (GPR) surveys were conducted at the fort's location with the purpose of non-invasively locating areas for future archaeological investigation. Two transects and a 10x7 meter grid were collected using a pulseEKKO 1000 system with 225 MHz antennae, and a step size of 0.05 meters. Topographic data was gathered and geometrically corrected with a TopCon laser leveler. Using GFP Edit, EKKO_Project and Voxler visualization software, the data was processed resulting in 2D profiles and 3D images of the subsurface, which highlighted areas of strong radar reflections and anomalies where the remains of Medvėgalis are thought to be preserved. The findings will provide a better understanding of the fort's location, and assist archaeologists in locating areas for future excavation.

METHODOLOGY

In the summer of 2016, a team was invited to collect ground penetrating radar (GPR) data at the site where the fortress of Medvėgalis once stood. GPR is a noninvasive technology that sends and receives radio waves below the surface which bounce off of subsurface objects or material. Data was collected using a pulseEKKO 1000 ground penetrating radar system with 225 MHz antennae and a step size of 0.05 meters. A transect measuring 119 meters in length was collected running from the northeast base of the hill to the Southwest. A grid measuring 10 meters by 7 meters was collected on the northern side of the Hill as well. Another transect measuring 40.25 meters NE to SW was collected near the park's amphitheater. Topographic data of the transects and grid were all collected using a TopCon laser leveling system. The lines of the grid were put into GFP Edit to arrange them in the specific order in which they were collected. This data was imported into the EKKO_Project processing software that organized the lines to view reflections below the surface. Areas with large hyperbolic reflections were highlighted and investigated closer to determine locations for future archaeological investigation.

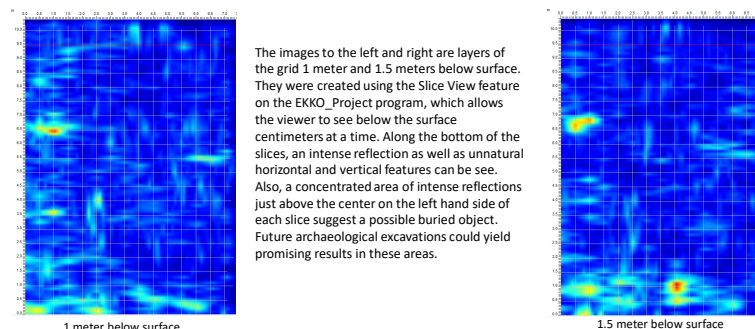


RESULTS



This GPR transect is the 40 meter line taken near the amphitheater located to the West of where the fort once stood. Areas of strong reflection are highlighted in red and suggest subsurface disturbance by human activity. These areas along this transect are suggested areas of concentration for future archaeological investigations.

This is the first 31 meters of the 119 meter line taken across the top of the Medvegalis hill. Areas of strong reflection are highlighted in red and are suggested areas of focus for future archaeological investigations. The blue lines on the image represent the beginning and end of the grid taken along side of the transect.



The images to the left and right are layers of the grid 1 meter and 1.5 meters below surface. They were created using the Slice View feature on the EKKO_Project program, which allows the viewer to see below the surface centimeters at a time. Along the bottom of the slices, an intense reflection as well as unnatural horizontal and vertical features can be seen. Also, a concentrated area of intense reflections just above the center on the left hand side of each slice suggest a possible buried object. Future archaeological excavations could yield promising results in these areas.

THE FORTRESS: A HISTORY

Medvėgalis was a medieval hill fortress, located in present day Šilalė District Municipality, of Samogitia, Lithuania. The fort was first mentioned in texts dating back to 1316 as one of the most important and fortified structures for the Lithuanian army due to its location along the border of Christianized Europe. When Medvėgalis stood, Lithuania had not yet been Christianized by European crusaders under the protection of Pope John XXII, the leader of the Roman Catholic Church. This made it a major target for multiple bands of crusaders who hoped to gain fame and fortune for baptizing one of the last remaining pagan states of Europe. In 1329 knights of the Teutonic order, a crusading order out of present day Germany and Poland under the command of King John of Bohemia, swarmed throughout the Samogitia region. They conquered four towns in less than a week before arriving at the fortress of Medvėgalis. On February 1st, the knights set the fortress ablaze. Facing an army several thousand strong with a reputation of slaughtering captured pagans, the fortress occupants and their prince, Margolis, surrendered in return for their lives and were baptized into the Christian faith. This marked one of the first of such instances of conversion among any Lithuanian, yet it didn't last long. Upon learning the Teutonic Knights had left Poland, Lithuanian ally and Polish King, Władysław I, attacked Teutonic land known as Kulmerland, located in modern day Poland. All following plans to take the rest of Samogitia were abandoned and the knights were forced to return to Poland. Without the pressure of the knights the Lithuanians quickly reverted back to paganism, remaining the last pagan nation in Europe for another fifty-eight years. Today, the hill has been converted into a tourist attraction offering stunning views of the country side. An amphitheater for outdoor entertainment has also been added to the west of the hill.



Portrait of King John of Bohemia, leader of the Siege on Medvėgalis

CONCLUSIONS

- A trench 8 meters South from the origin and a half meter down or 23 meters South and 2 meters down would yield the best results for future archaeological investigations conducted near the 40 meter transect.
- A trench 23 meters East from the origin and 1 meter down would provide the best results for future archaeological investigations conducted near the 119 meter transect.
- A trench measuring 2 meters by 6.5 meters along with a trench measuring 1 meter by 2 meters should be dug along the bottom of the grid and 6 meters from the grid's origin, respectively. These trenches would yield the best results inside the grid due to their location above areas of high reflection.

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