

Locating Jacob Gens: A subsurface geophysical investigation in Rasu Prison, Vilnius, Lithuania

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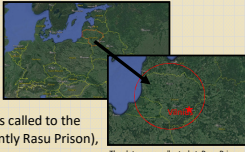


ABSTRACT

Jacob Gens, a Lithuanian Jewish army officer who held senior leadership positions in the Vilnius Ghetto was shot by the Nazis and buried with his journals within the courtyard of Rasu Prison, Vilnius, Lithuania. The objective of the project was to try to non-invasively locate the burial site of Jacob Gens. To search below the grassed prison yard we used a Sensors and Software pulseEKKO1000 ground penetrating radar (GPR) system. To provide adequate depth of penetration, vertical and horizontal resolution, an antennae frequency of 225 MHz was utilized with a step size of 0.05 m along grid transects. The transects were collected 0.25 m apart with 43 lines in the x-direction and 63 lines in the y-direction, resulting in a 13 x 16 m grid. Using EkkoProject and Voxler software programs the collected transects were collated and processed to provide 2D and 3D views of the datasets. Using radar stratigraphic principles and burial site dimensions of 2 m x 2 m, a possible location has been identified and proposed for future excavation.

INTRODUCTION

- Jacob Gens (Jokūbas Gensas, born 1903) was a Jewish Lithuanian who was a Lieutenant in the army during the 1919 Lithuanian war for independence.
- In 1941, the Nazis occupied Vilnius, and with the Jewish population they created two ghettos.
- The Nazis appointed Gens head of the Jewish ghetto, due to his previous leadership experience.
- As head of the ghetto Gens was responsible for gathering the individuals that the Nazis wanted and would later be executed.
- Gens used his position to appease the Nazis and allow for a more comfortable environment for its residents (for example, sporting and cultural events were held).
- September 14, 1943 Gens was called to the Gestapo headquarters (presently Rasu Prison), is reported to have been killed and buried on site with a boxed filled with his writings and a broken plate. Since the ghetto to be liquidated nine days later, Gens' position was deemed unnecessary (Ackerfeld 2006).
- Family members and historians are now interested in finding Gens to retrieve his papers, gain insight into his involvement, as well as give him a proper burial.
- The objective of this project was to locate Jacob Gens' potential burial site in the Rasu Prison courtyard non-invasively using ground penetrating radar.



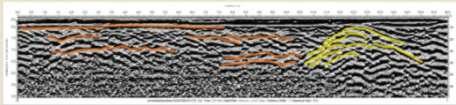
The data were collected at Rasu Prison, Vilnius, Lithuania.

PROCESSING

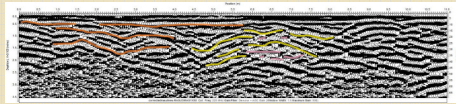
1. In Sensors & Software's GFP Edit processing program the grid was oriented so that every transect was of similar length and in the proper X and Y directions.
2. The grid was then exported to Sensors & Software's EKKO Project. In this program each transect can be viewed in line view and slice view.
3. In EKKO Project, for better stratigraphic analysis of the data, each transect was edited so that the gain was set to Automatic Gain Control (AGC) and plotted in wiggle traces that are shaded to the right.
4. Exported to Golden Software Voxler the grid was processed into a 3D model, which allows for another analysis of objects within the ground in a 3D perspective. VolRender, axes, a bounding box and an oblique base image were added to the 3D model.

RESULTS

2D ANALYSIS

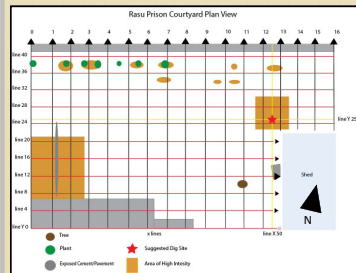


- When looking for a buried object or a body in line view, one should search for hyperbolic reflection patterns (Jol & Bristow).
- The lines highlighted in orange are naturally occurring horizontal stratigraphic layers. After analyzing each transect of the grid in line view a hyperbolic anomaly within line Y25 was detected.



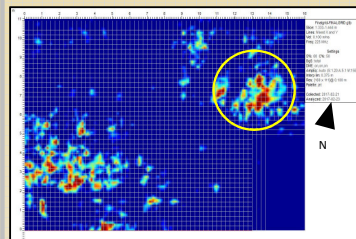
- After investigation of a line that crossed line Y25 an anomaly was found in line X50 that occurred at approximately the same location. The lines in pink are semi-continuous stratigraphic features within a hyperbolic anomaly that may provide details on the burial of Jacob Gens.

PLAN VIEW



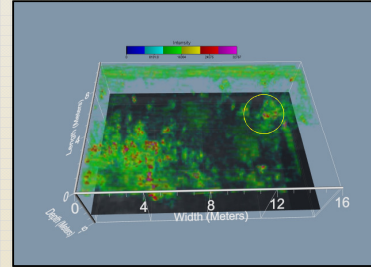
- A plan view (left) of the Rasu Prison was created to model surface features that may provide clues as to why there are areas of high intensity in the subsurface.
- For example, in the southwest corner of the courtyard there was a large area of high intensity, but there was concrete on the surface that suggested a structure had been built there and removed.

SLICE VIEW

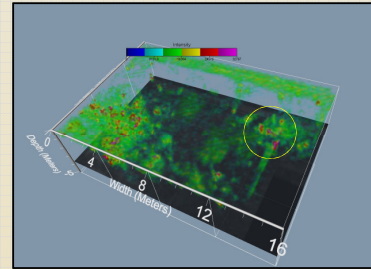


- Slice view (left) can analyze the GPR grid in depth slices. This slice shows high intensity in the northern portion of the grid at the same depth of the anomaly found in the previous line views (1.3-1.4 meters).

3D ANALYSIS



- By viewing the grid in a 3D view the anomaly found in line view took form. Circled in yellow was the detected anomaly. The anomaly detected in the southwest corner of the grid is interpreted as remains of removed structures (see plan view).



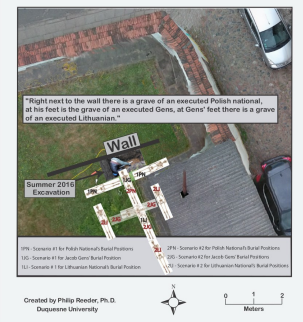
- This anomaly stands out in the 3D grid because there are no above-ground features suggesting that the subsurface was disturbed by any construction of some sort. Furthermore, this anomaly proves deep (1.3m-2.0m) and large enough (2.0m-3.0m) to accommodate a body.

CONCLUSION/DISCUSSION



October 26, 2016 an international team of scientists and excavators returned to the Rasu Prison courtyard. Using the data provided by the GPR survey they set up a 2x2 meter grid above the detected anomaly and uncovered the shoulders and skull of a human approximately 1.4 meters below the surface (left). Unfortunately circumstances did not allow for the uncovering of the rest of the remains. Two teeth were taken from the skull for DNA analyses to see if the remains were Jacob Gens'. DNA results were unsuccessful in identifying if the remains belonged to Jacob Gens, however, historical documents provided by the Vilnius Jewish Museum (email contact) states that Gens was buried near two other men. Plans are now underway for further excavation in Summer 2017 (left).

Rasu Street Prison Vilnius, Lithuania



Along with finding human remains, a wall was uncovered just north of the remains. This wall raised questions on what exactly the anomaly found in the GPR survey was. Whether the anomaly was the wall or the fill from a burial, GPR proved useful in locating human remains from the Holocaust. Many more unmarked burials from the Holocaust still remain in Europe and GPR could be the leading technology to help locate further human remains.

METHODS

DATA COLLECTION

- Ground penetrating radar (GPR) is a device used to non-invasively image the subsurface. We used a Sensors & Software pulseEKKO1000 GPR system that uses two antennae.
- The first is a transmitter antenna, which sends electromagnetic (EM) waves into the ground. These waves are reflected by stratigraphic boundaries and/or various buried objects, which then travel upwards and are recorded by a receiver antenna (Conyers 2016). By pulling the GPR across the surface a trigger wheel signals the transmitter antenna to emit a pulse of EM waves every fixed distance and the reflected waves are collected and revealed on the display monitor. Using GPR we searched for the burial site of Jacob Gens.
- A 13m x 16m grid was laid out in the courtyard of the Rasu Prison site.
- The grid consisted of 43 Y lines and 63 X lines.
- Data collection used the 225 MHz antennae with a step size of 0.05m with 0.25m between each transect.



REFERENCES/ACKNOWLEDGMENTS

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