It Is the Spring of 101 AD...

The powerful Roman army under the command of emperor Traianus, crossed the Danube from the area of Upper Moesia. The troops were moving as part of the offensive into the Dacia province. Their objective: deal with the Dacian king, Decebalus, who had distraught the Empire with his bold attacks. After the first clashes, Roman forces moved inland, on their way setting subsequent posts and forts in the territory of today's Romanian Banat. Fortifications, where Roman soldiers were to be stationed, would soon appear in the vicinity of contemporary towns of Vărădia, Surducu Mare, Berzovia, Caransebeş, Teregova and Mehadia. At the time nobody expected that in places where Trajan's army had stopped, monumental stone constructions would be raised and civilian settlements would bloom. After nearly two hundred years, the Roman army and administration were forced to abandon the province of Dacia. Dynamically functioning settlements were desolated and ravaged. However, their remains buried under the layers of accumulated soil, would remain preserved for centuries to come.

It is 2018…

The Sun had risen over the Polish-Romanian archaeological base. A group of geophysicists is heading to explore the nearby fields. Since 2014, Polish archaeologists from the University of Warsaw, in a collaboration with Romanian researchers, have been investigating the relics of the Roman settlement around the Tibiscum fort. However, from the outset they have decided not to employ the tools most often associated with archaeological investigations such as shovels, trowels and brushes. Instead, the most modern state-of-the-art geophysical measurement technologies have been used. With the use of magnetometers they have been performing measurements of the earth's magnetic field. Subtle fluctuations in the magnetic field have so far indicated the locations of archaeological remain and even allow locating entire hidden structures of the former settlement landscape. Ground Penetrating Radar waves reflect and refract signals from the foundations and floors of the ancient houses. The electric field introduced to the ground meets a higher resistance in the spots where thick fort's walls used to delimitate Roman soldiers from the enemy.

The geophysical survey project at the Roman forts in Romanian Banat (Western Romania) assumes the use of the most advanced, interdisciplinary research methods. Geophysical measurements, in addition to studying the subsurface and hydrological conditions, will enable reconstruction of buried settlement complex and examine the influence of environmental factors such as erosion or agricultural activity. Geophysical measurements are based on measuring certain physical parameters that allow capturing physical disparities between the objects being searched and their surroundings. Despite its rich cultural heritage, the Romanian region of Banat has not yet been subjected thorough archaeological investigations. The project has pioneered an analysis focussing on the relation between the values of physical fields registered with a wide spectre of geophysical instruments and the character of the features which cause anomalies, while also incorporating soil and stone samples to enrich the analysis with another layer of data.

As a result of implementing the research methods described above, the settlement landscape analysis will become scalable and be applied on a macro scale – something that is usually not feasible with the sole use of conventional excavations tools due to their prohibitive costs and inefficiencies. The data acquired within the research will bring the research community closer to understanding how people in antiquity planned and perceived the space around them. The research results have so far revealed that there are plenty of remains of Roman material culture that currently remain a hidden mystery. This mystery may now be solved through an effective use of the non-invasive survey technologies described above including, above all, geophysical methods.

Proper implementation of this project will strengthen ties between scientists from different disciplines – geophysics, geology and archaeology. Mutual understanding of basics of geophysical measurements will improve the methodology of interdisciplinary research and, in effect, improve the methodology of geophysical measurements and the results interpretation process.