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Managing editor: Andrzej Maciałowicz (amacialowicz@uw.edu.pl)

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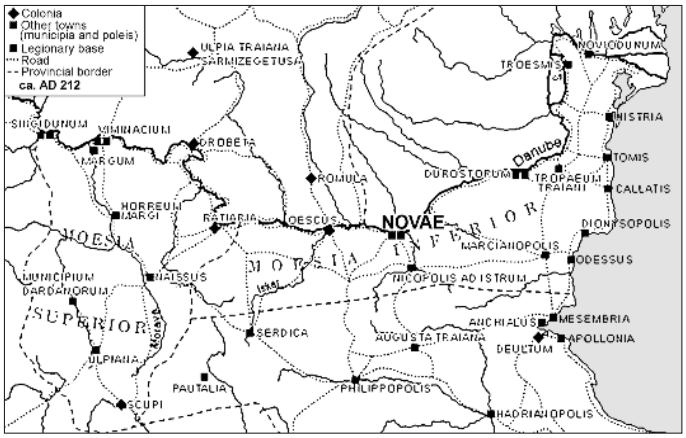
Agnieszka Tomas

Non-Destructive Investigations in the Extramural Area of Novae (Lower Moesia; Bulgaria) in 2012

Site: Svištov, District of Veliko T″rnovo, Bulgaria
Survey coordinator: Agnieszka Tomas″″
Survey team: J. Balcerzak, M. Jaworski, P. Jaworski, W. Małkowski, K. Misiewicz, M. Pisz, P. Wroniecki
Financial assistance: National Science Centre (Narodowe Centrum Nauki), decision No. DEC 2011/01/D/HS3/02187
Fieldwork: 16 March – 6 April 2012



In March 2012, we started a three-year project of non-destructive surveys in the area surrounding the legionary camp at Novae. The team consists of specialists from the Institute of Archaeology of the University of Warsaw (IA UW) and other Polish researchers.[1] A series of tests, including aerial photographs and geophysical surveys preceding the start of the programme was done in August 2011.[2] At the same time, finds registered by the local museum workers before the regular excavations started in 1960, were documented and catalogued. Many of them most probably come from the *canabae* and other civilian settlements.[3]

The project fits into a recently developing trend of landscape archaeology conducted as an interdisciplinary research on the Roman frontier zone. The landscape archaeology often uses both settlement studies and non-destructive methods which can cover large areas. Non-destructive surveys have been done on other sites related to the Roman army, such as *Carnuntum* or *Isca*.[4] The methods implemented in Novae, which is a very complex and difficult site to survey, engage a very broad range of tools of prospection.

The vicinity of the legionary camp at Novae (**Fig. 1**) was extensively investigated in 2000 by Bulgarian and German archaeologists, who estimated the size of the *canabae* at 70–80 ha.[5] Several buildings were excavated, including a large urban villa and a late antique church with a burial ground and a shrine of eastern deities, as well as some burials and elements of infrastructure.[6]

[1] J. Balcerzak and M. Pisz, students of IA UW, are responsible for aerial photography. Geomagnetic prospection and electrical resistivity surveys were carried out by M. Jaworski, P. Wroniecki (freelance) and K. Misiewicz, W. Małkowski (IA UW). Intensive field survey with the aid of metal detectors is carried out under the direction of P. Jaworski (IA UW). T. Sarnowski is an advisor of the project.

[2] T. Sarnowski, L. Kovalevskaja, A. Tomas, *Novae 2011*. Principia et Munitiones Castrorum. *Headquarters Building and Legionary Defences*, "Światowit" IX (L)/A (2011), 2012, 189.

[3] The archive and museum research carried out in the Historical Museum in Svištov and the Bulgarian National Archaeological Museum in Sofia was financed thanks to the KWERENDA programme of the Foundation for Polish Science.

[4] M. Doneus, C. Gugl, N. Doneus, *Die Canabae von Carnuntum. Eine Modellstudie der Erforschung römischer Lagervorstädte. Von der Luftbildprospektion zur siedlungsarchäologischen Synthese*, Der römische Limes in Österreich 47, Wien 2013; P. Guest, M. Luke, C. Pudney, *Archaeological Evaluation of the Extramural Monumental Complex ('The Southern Canabae') at Caerleon, 2011. An Interim Report*, Cardiff Studies in Archaeology 33, Cardiff 2012.

[5] S. Conrad, D. Stančev, *Archaeological Survey on the Roman Frontier on the Lower Danube between Novae and Sexaginta Prista. Preliminary Report (1997–2000)*, (in:) J. Freeman et al. (eds.), *Limes XVIII. Proceedings of the XVIIIth International Congress of Roman Frontier Studies held in Amman, Jordan (September 2000)*, vol. II, B.A.R. Int. Ser. 1084, Oxford 2002, 673–681.

[6] A. Tomas, Canabae Legionis I Italicae: *State of Research on Civil Settlements Accompanying the Legionary Camp in Novae (Lower Moesia) Compared to Relevant Lower Danubian Sites*, "Światowit" IX (L)/A (2011), 2012, 155–168; eadem, Municipium Novensium*? Report on the Field Survey at Ostrite Mogili, Veliko T″rnovo District*, "Światowit" VI (XLVII)/A (2004–2005), 2006, 115–128, pls. 121–132.

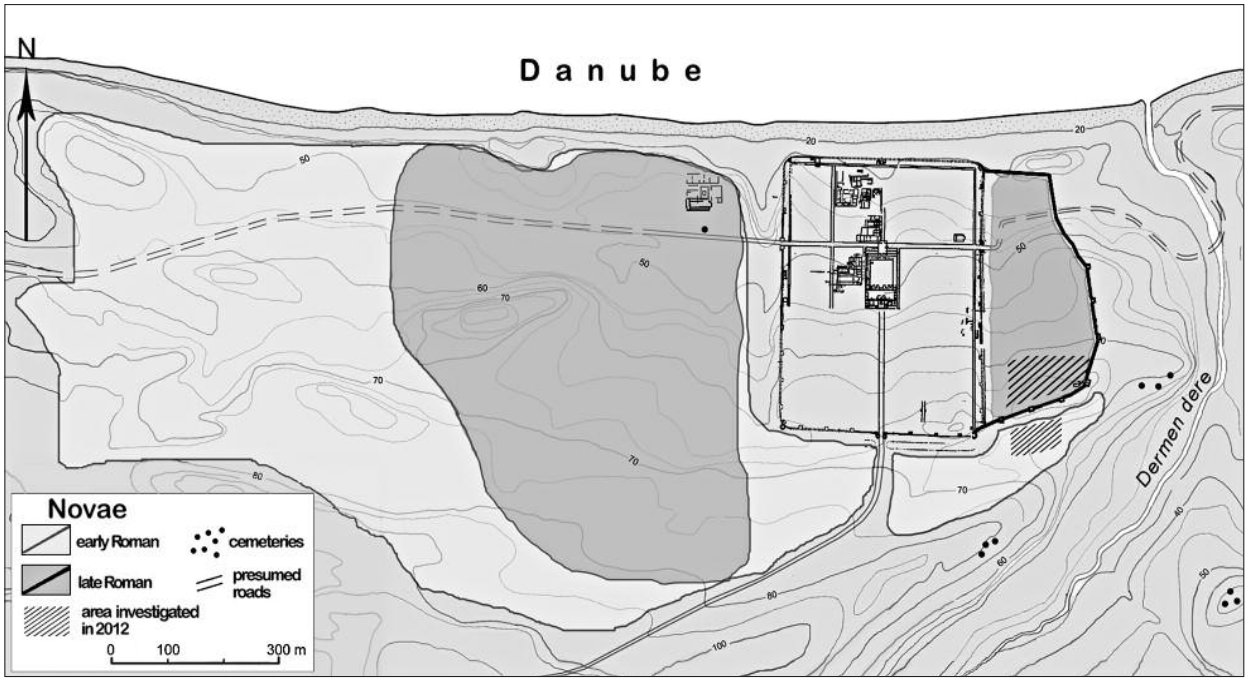


Fig. 1. Novae. The camp, *canabae* and late Roman town. Area investigated in 2012 is marked with lining (Drawing A. Tomas).
Ryc. 1. Novae. Obóz, *canabae* i późnorzymskie miasto. Obszar objęty badaniami w roku 2012 zaznaczono ukośnymi liniami.

The aim of the programme is to create a GIS database for the site, as well as an open catalogue of civil settlement remains. A 3D ground model is being prepared, including data on the flora.[7] Due to the size of the site and practical reasons concerning its topography, we have decided to implement non-invasive methods of surveys, including geophysical prospection, aerial photography, and measurements of visible remains using total station and GPS, as well as intensive field surveys with metal detectors in some chosen areas.

The surveys conducted in March 2012 were basically focused on the eastern part of the fortress, within the line of the irregular circuit of defensive walls erected by the end of the 3rd c.[8] The investigated area covering 2.07 ha is situated on a wide plateau adjacent to the south-eastern corner of the camp and at its foot (**Fig. 1**). Earth resistance surveys were done in the close proximity of the so-called villa *extra muros*, situated to the west of the fortress.[9]

Geomagnetic surveys were carried out using Bartington Grad 601-Dual fluxgate gradiometer (by P. Wroniecki and M. Jaworski, **Fig. 2**) and The Geometrics G-858 Cesium Vapor Magnetometer (by K. Misiewicz and W. Małkowski), integrated with real-time RTK GPS positioning – this enabled also to obtain a micro-relief map (**Fig. 3**). Both procedures produced similar anomalies related to human activities. Strong anomalies along the line of the defensive walls helped to compare them with other features. Regular lines of anomalies running on the E-W axis were recorded in the whole area, but some of them are certainly connected with the modern water pipeline. The remains of ancient foundations were traced at a depth of ca. 1 m. One of the masonry structures seems to be a building of 11×17 m with a fireplace (?) in its NW corner. Some other anomalies in a form of elongated structures were detected by the caesium magnetometer, but poor visibility suggests that the features lay more than 1 m under the ground or their thickness is relatively small. At the foot of the plateau, linear magnetic anomalies were recorded on the E-W and N-S axes. These anomalies were interpreted as ancient streets. Along them some other regular anomalies, square in plan, may suggest the presence of buildings 12×20 m large. The wide range of anomalies and their

[7] A series of samples for palynological analyses were collected in 2010 in a deep trench reaching the natural undisturbed soil on the northern side of the fortress.

[8] L. Press, T. Sarnowski, *Novae. Römisches Legionslager und frühbyzantinische Stadt an der unteren Donau*, "Antike Welt" 21, 1990, 240.

[9] The villa has been excavated by the Bulgarian archaeologists, now headed by P. Vladkova-Baičeva.

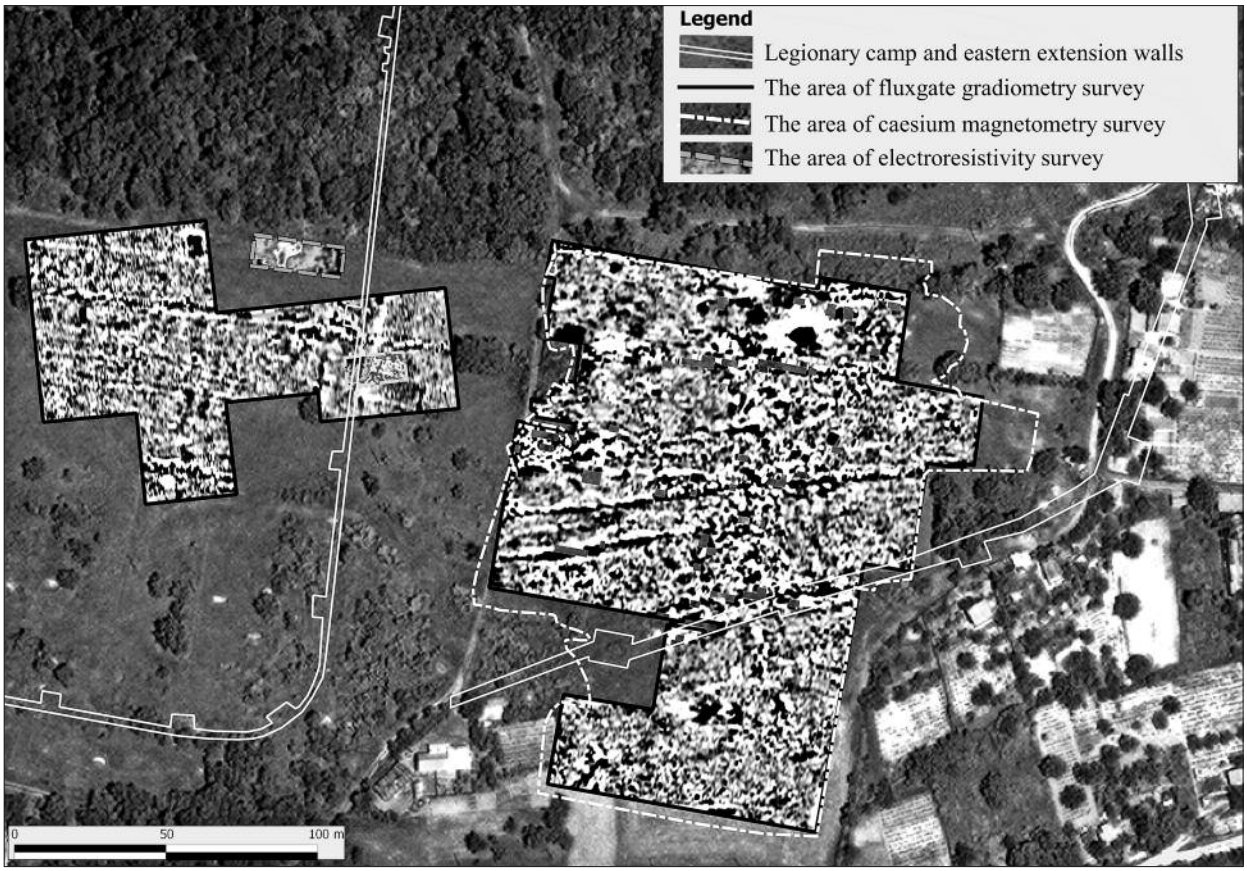


Fig. 2. Eastern extension in Novae. Greyscale visualization of geophysical data superimposed on a satellite image (M. Jaworski, M. Pisz, P. Wroniecki).

Ryc. 2. Wschodnie poszerzenie w Novae. Wizualizacja danych geofizycznych nałożona na obraz satelitarny.

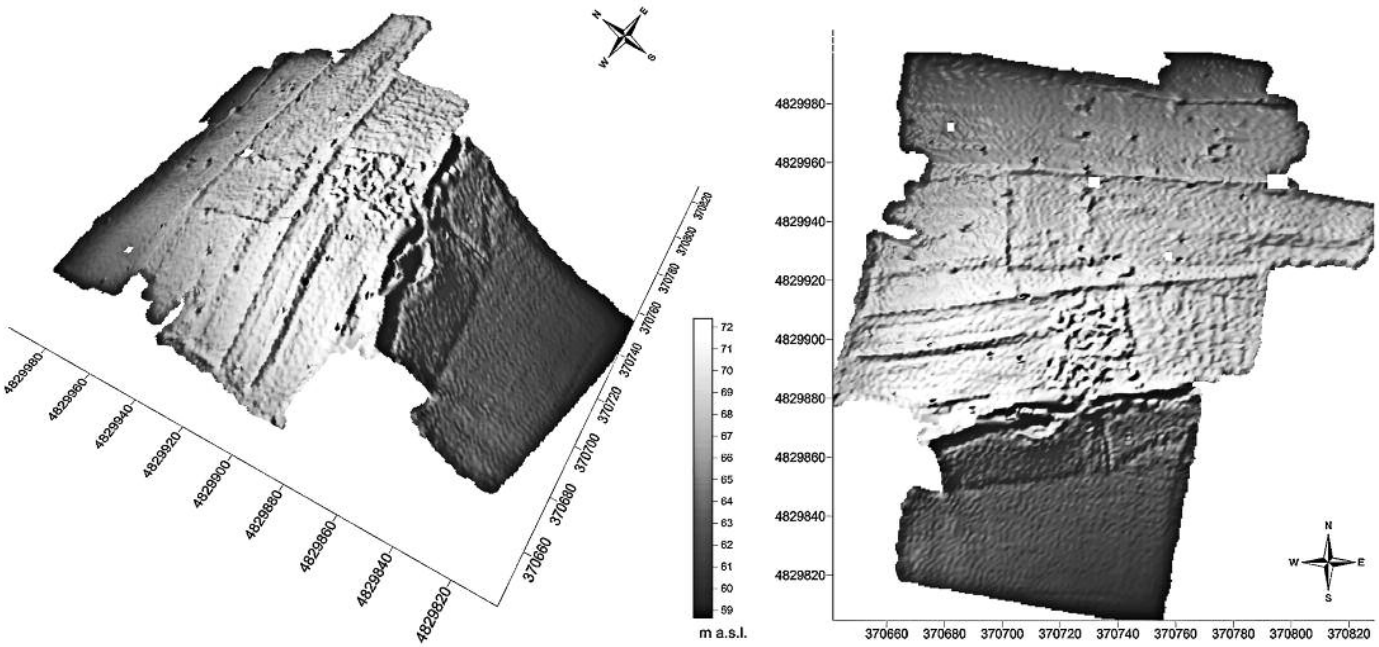


Fig. 3. Novae. Micro-relief map covering the area inside and outside the fortress walls (K. Misiewicz, W. Małkowski).

Ryc. 3. Novae. Mapa mikroreliefowa obejmująca obszar wewnątrz i na zewnątrz murów twierdzy.

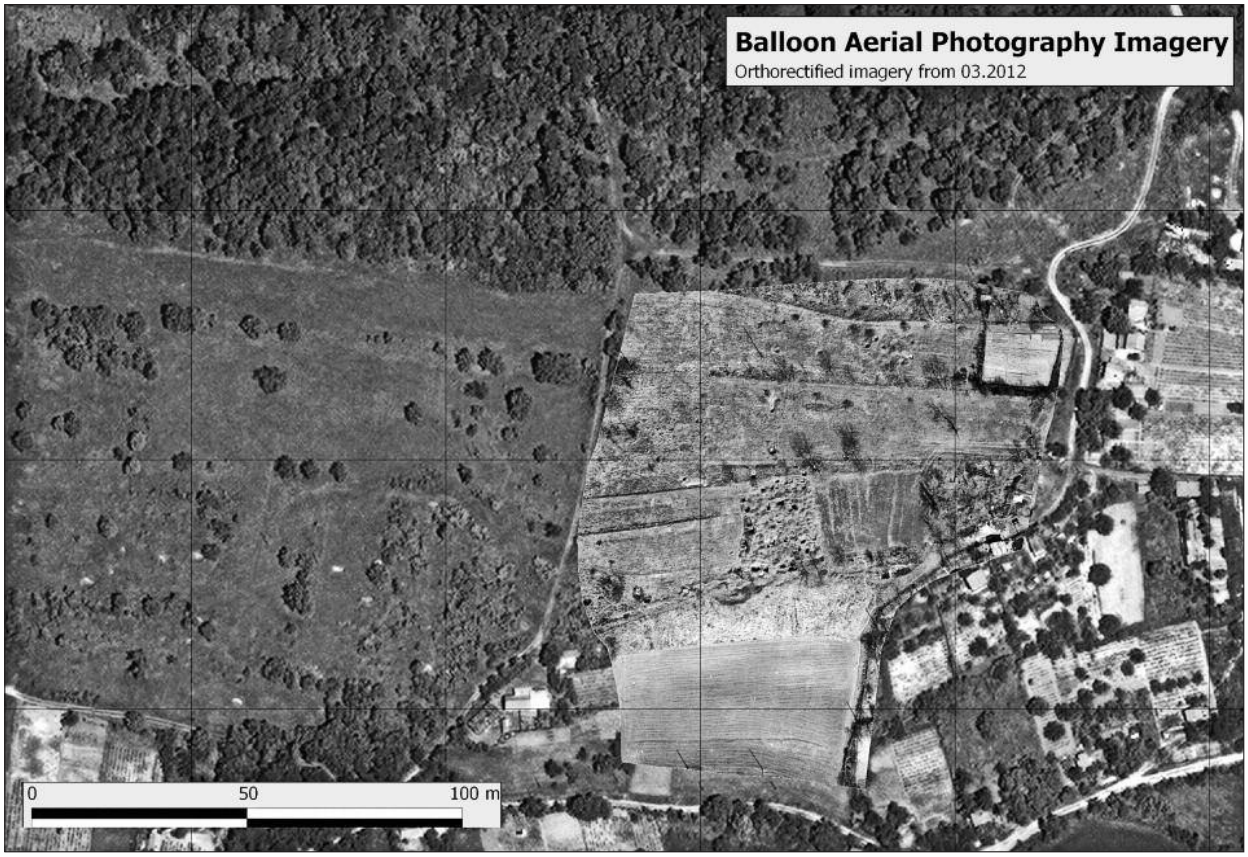


Fig. 4. Novae. The southeastern part of the site. Satellite image and orthorectified BAP images depicting Novae and investigated area (M. Pisz, J. Pisz, M. Jaworski, P. Wroniecki).

Ryc. 4. Novae. Południowo-wschodnia część stanowiska. Obraz satelitarny i ortorektyfikowane zdjęcia wykonane z balonu (BAP) przedstawiające Novae i badany obszar.

character are not clear. The layout and dating of the detected structures still requires verification excavations. Electrical resistance surveys conducted near the villa *extra muros* show regular anomalies of buildings placed to the south from the villa, on the other side of the ancient street.

The intensive survey using metal detectors covered a slightly larger area of 2.7 ha. The survey was carried out within the stripes of 30×2.5 m, which allowed near-complete coverage of the investigated area at a high-resolution. Recording of detected finds was carried out using handheld GPS devices. Among 77 metal finds, 33 were coins dated to between the 1st and 6th c. AD, with the latest one of Maurice from AD 587/588. Of great interest are also two lead seals, one of them of Justinian I and the other of a certain PAMPHYLON. The other finds including fragments of lead mirrors, elements of military equipment, iron fibulae and iron building nails confirm the occupation of the place from the 1st to the 6th c. AD.

A number of flights over the site using a helium balloon with an attached high resolution camera allowed taking several thousand of photographs. The vertical photos were calibrated with a high resolution (0.41m) orthorectified image from the WorldView-2 satellite, encompassing the entire area of the camp, *canabae* and the surrounding territory (**Fig. 4**).

Since the scope of the survey is to reach as many data as possible for the reconstruction of the archaeological landscape, data from laboratory analysis of palynological remains are complementary to those mentioned above. Preliminary results show rich vegetation, including traces of cereals in the 1st c. AD.[10]

Dr Agnieszka Tomas
Institute of Archaeology
University of Warsaw
agnieszka.tomas@uw.edu.pl

[10] The analyses conducted by H. Winter (Institute of Geology, Polish Academy of Sciences) are still in progress.

Agnieszka Tomas

Badania niedestrukcyjne na obszarze położonym *extra muros* w Novae (Mezja Dolna; Bułgaria) w 2012 r.

Rozpoczęte w marcu 2012 r. badania nieinwazyjne na terenie otaczającym obóz legionowy w Novae (**Ryc. 1**) inicjują trzyletni projekt realizowany przez pracowników i studentów IA UW oraz niezależnych badaczy, pod kierunkiem autorki. Badania poprzedziła seria testów, wykonanych późnym latem 2011 roku, a także kwerenda muzealna i archiwalna, której celem było m.in. skatalogowanie zabytków pozyskanych jeszcze przed rozpoczęciem regularnych wykopalisk w roku 1960.

Teren otaczający obóz był badany powierzchniowo w roku 2000, w ramach większego projektu bułgarsko-niemieckiego. Powierzchnię osiedla przyobozowego (*canabae*) oszacowano wtedy na 70–80 ha. Wykopaliska na tym terenie prowadzono dotychczas jedynie na obszarze tzw. willi *extra muros* oraz świątyni bóstw wschodnich. Zadokumentowano także fragmenty cmentarzysk oraz elementów starożytnej infrastruktury.

Celem realizowanego przez nas programu jest stworzenie bazy danych GIS dla całego stanowiska, a także katalogu znalezisk pochodzących z okolicy obozu. Oprócz prób odtworzenia zabudowy i rozplanowania, planowana jest trójwymiarowa, cyfrowa rekonstrukcja terenu oraz krajobrazu, która zostanie wzbogacona o dane z analiz pyłków roślin. Zastosowane metody badawcze obejmują prospekcję geofizyczną, fotografie z powietrza, pomiary geodezyjne widocznych pozostałości oraz badania planigraficzne z użyciem wykrywaczy metali.

Wiosenne badania 2012 r. koncentrowały się na obszarze położonym na wschód od obozu, w obrębie tzw. poszerzenia wschodniego, czyli wewnątrz murów wybudowanych pod koniec III w. n.e. Pomiarami geofizycznymi objęto rozległe, łatwo dostępne plateau i jego podnóże o powierzchni 2,07 ha (**Ryc. 2**). Wyniki badań wskazują na obecność regularnych, czworobocznych konstrukcji, zarówno w obrębie murów, jak i u podnóża wzniesienia, gdzie zarejestrowano także anomalie, które mogą wskazywać na obecność ulic biegnących na osiach N-S i E-W. Badania oporności gruntu przeprowadzono natomiast na zachód od obozu, nieopodal wspomnianej willi. Wykryte anomalie jednoznacznie wskazują na istnienie zabudowy o charakterze mieszkalnym, prawdopodobnie miejskiej, po drugiej stronie antycznej ulicy. Zdjęcia wysokiej rozdzielczości, obejmujące obszar obozu, *canabae* i dalszych okolic, wykonane z balonu helowego, zostały zintegrowane ze skalibrowanym zdjęciem satelitarnym (**Ryc. 4**).

Planigrafią znalezisk metalowych objęto nieco większą powierzchnię (2,7 ha), podzieloną na pasy o wymiarach 30×2,5 m. Wśród zabytków wskazujących na zasiedlenie tego miejsca od I do VI w. n.e. znajdują się liczne monety, fragmenty uzbrojenia i gwoździe budowlane. Najpóźniejszą monetą jest follis Maurycjusza z 587/588 r. Interesującym znaleziskiem są także dwie plomby ołowiane, z których jedna została zidentyfikowana jako plomba cesarska Justyniana I, a druga opatrzona jest greckim imieniem PAMPHYLON.