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Technology support in exploring and identifying valuable elements of Kuldīga and Sēlpils Castles

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Abstract. An upstanding archaeology study is an analytical study that involves a visual inspection of the site, with measurements and probing for various features. The information is compared to the visual and historical documentation relating to the site. Compiling the data obtained from historical sources, morphological materials, and stratigraphic probing, an integrated analysis of the tectonic and formal aspects of the site can be conducted. The research carried out at the site makes it possible to fill in gaps in archival materials and to provide additional details of lost historical architecture, its location, and the processes of building and rebuilding.

An architectural artistic study is conducted to determine the features of cultural, historical, and artistic value in the historic buildings. This is followed by a reasoned decision on the future development, status, and conservation options for the site.

Keywords: standing archaeology probing, brick construction technology, artefacts, georeferenced data, airborne laser scanning

Introduction

Upstanding archaeology as a method for researching historical sites was developed in late 19th century on the basis of archaeological research done as part of the archaeological excavations organised by the German Archaeological Institute in the East. In Latvia, this approach dates back to the 1950/1960's, when architects Gunārs Jansons, Jurijs Vasiļjevs, Gunārs Zirnis, and Gunārs Erdmanis carried out research of sites that were to be restored.

In 1982, architect Pēteris Blūms set up an upstanding archaeology group. The research methodology has not yet been unified and the definition of its theoretical basis is fragmentary. Research, therefore, continues at the scientific level, seeking answers to important research questions at the archaeological, architectural, and artistic levels. The same applies to the study of the outdoor spaces (path networks in parks, small architectural forms, etc.).

Materials and Methods

Upstanding archaeology (German*: Bauforschung)* as the main form of understanding and documenting the built environment, is used for researching above-ground on cultural and historical sites. In Latvia's recent history, it began in the 1950's [8], and saw its rise in the last quarter of the 20th century. Today, in parallel with traditional research methods, upstanding archaeology is increasingly reaping the benefits of modern technology. Thus, upstanding archaeology increasingly transitions away from probing and physical interventions in the site, and towards investigating, analysing, and compiling studies done previously. The sets of data previously collected makes it possible to draw new conclusions on their basis.

Such new findings, for example about the technology of brick construction, or explanations pertaining to certain items of fashion, resulted from the analysis of the artefacts discovered during the long-term archaeological excavations in Cēsis Castle [4]. As the instrumental recording methods improve, such research could distance itself even more from the historic building itself in the future. In castle ruins, this is already done in otherwise difficult-to-survey and even dangerous sections. For example, the instrumental survey of the south tower of the Alūksne Castle ruins made it possible to identify the locations of the openings in the lost upper floor [5]. If a detailed spatial survey results in a virtual equivalent of the historic site, research can possibly be conducted remotely via the associated database. This type of data analysis is possibly the future of upstanding archaeology, and, perhaps, even the future of all research in the world.

In addition to above-ground sites, upstanding archaeology methodology can also be used to identify structures below the ground. It was, for example, used as the basis for a theoretical reconstruction of the lost Kuldīga medieval castle spaces, offering various modern options for their interpretation and presentation [3]. The spatial data were obtained using remote sensing, with the extraction of information, measurements, analysis,

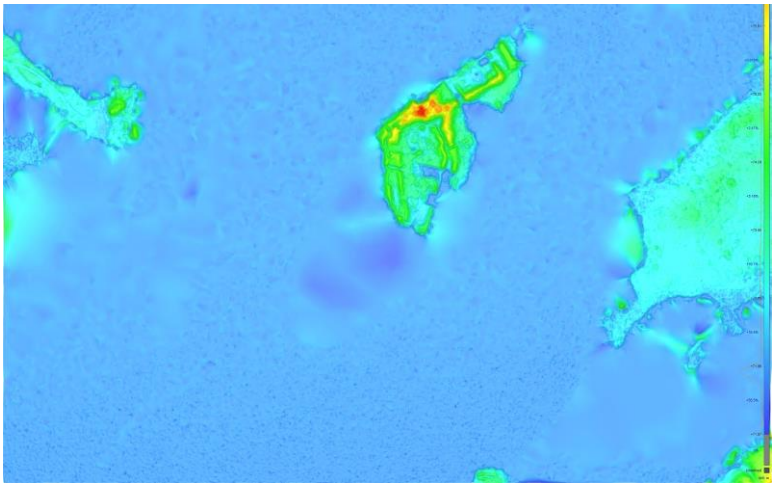

Fig. 1. Elevation map of the Sēlpils hillfort
[Sēlpils castle development sketch by the author]

Fig. 2. Aerial photograph of the current situation at the Selpils hillfort [photo by author, 2022]

and visualisation through images obtained using a contactless method.

By compiling existing studies and analysing terrain, it is also possible to identify elements of structures preserved below the ground, as well as possible areas that can undergo archaeological excavations. Data about the area of the archaeological site are provided via the satellite images available on the website of the Latvian Geospatial Information Agency, made in the visible and in the infrared spectrum [2]. The latter offer particularly contrasts views of green areas and the existing footpath networks, e.g. the Venta river bank becomes clearly visible in the terrain of Kuldīga.

The infrared spectrum map also clearly shows the only vaulted space preserved above ground (behind the Bangerts restaurant). Unfortunately, most of the ruins sites are overgrown, and surface terrain features cannot be discerned in these images.

In addition to visible-spectrum images, the point cloud generated as part of the airborne light detection and ranging (LIDAR) process is available.

These spatially georeferenced data can be used for surface terrain modelling and analysed in a similar way to orthophotographic maps.

Two types of digital datasets are available: a surface and terrain model, originally designed for flood modelling, but currently also used in archaeological remote sensing [7].

- The surface model, similar to orthophotographs, shows the volumes of the existing buildings and tree canopies, so it is not too important for researching castle sites.

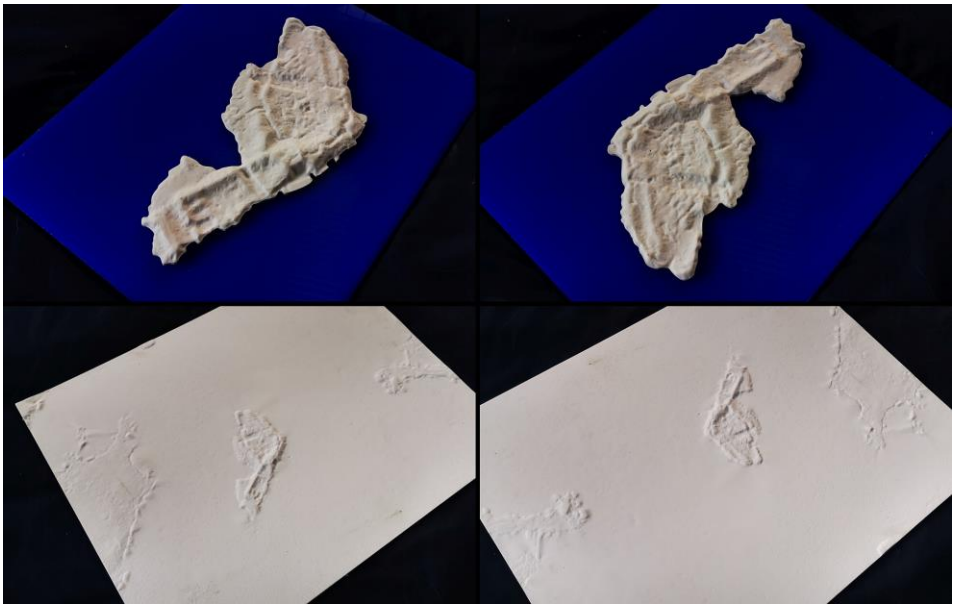

Fig. 3. Spatial model of castle ruins. Tactile visualisation of surface terrain. [Sēlpils castle development sketch by the author]

- The terrain model clearly shows uneven locations within the site, making it possible to identify structures that have survived below ground.

At the Kuldīga Castle site, there is the elevation of the vaulted cellar, and the rampart of the Kuldīga Castle fortifications in the south and west. The southwest bastion, the castle moat and the north side of the star sconce. Surface elevation data make it possible to reasonably accurately determine the spatial layout of the lost fortifications. The terrain model allows, based on upstanding archaeology data, determining with more details the expected trajectory of the perimeter wall, which is likely to have followed the still-visible terrain, rather than crossing it obliquely, as it was inferred from a small outcrop of the foundation in the north western part.

Sēlpils Castle research materials

Sēlpils Castle is a national archaeological site, protection number 940 'Sēlpils hillfort and medieval castle'. Since 1965, it has been an island in the reservoir of the Pļaviņas HPP. The island is near the left bank of the Daugava, opposite the Sēlpils Lutheran Church. Once the reservoir was filled with water, the upper part of the hillfort remained above it. Depending on the water level in the Daugava, the island is up to five metres above the water, and can reach 150 metres in length. The island can be accessed by boat, or viewed from the bank of the Daugava. In 1705, after the explosions, the Sēlpils Castle was deemed unsuitable for residential and military purposes, and was abandoned. Over the following centuries, the walls of the castle ruins were affected by precipitation and frost, eroding and collapsing in ever greater amounts. An analysis of the LIDAR surface model of Sēlpils Castle produced an elevation map that shows features of masonry structures both above and below ground. The main survey method for the Sēlpils hillfort was the matching of historical visual materials with spatial surface data from the model. At the same time, previous archaeological and historical research was reviewed. By virtually simulating different lighting conditions (raking light, hillshade), it is possible to highlight the features of the terrain in a surface model, similarly to a real plane, making it possible to notice irregularities in the surface — such as depressions and elevations. Based on the terrain features and historical images, a spatial theoretical reconstruction model of the site is created. It shows the spatial structure of the mediaeval castle, with the inner castle on the south side of the former hillfort, and on the north side, the castle courtyard. Both the parts of the castle are surrounded by a defensive stone wall, built following the edge of the elevations in the terrain. The model is complemented by results of upstanding archaeology studies: inside the perimeter wall, the inner castle and the castle courtyard, the former wooden and masonry buildings [1]. The entrance to the inner castle was located on the eastern side of the castle site, next to a square tower whose foundations were revealed during excavations in the 1960's. The model also includes a section of the eastern inner castle perimeter wall still visible above the ground to a significant extent, as well as individual parts of masonry structure in the western and northern parts. Based on the existing fragments of well masonry, a well is shown in the depictions of the middle part of the inner castle.

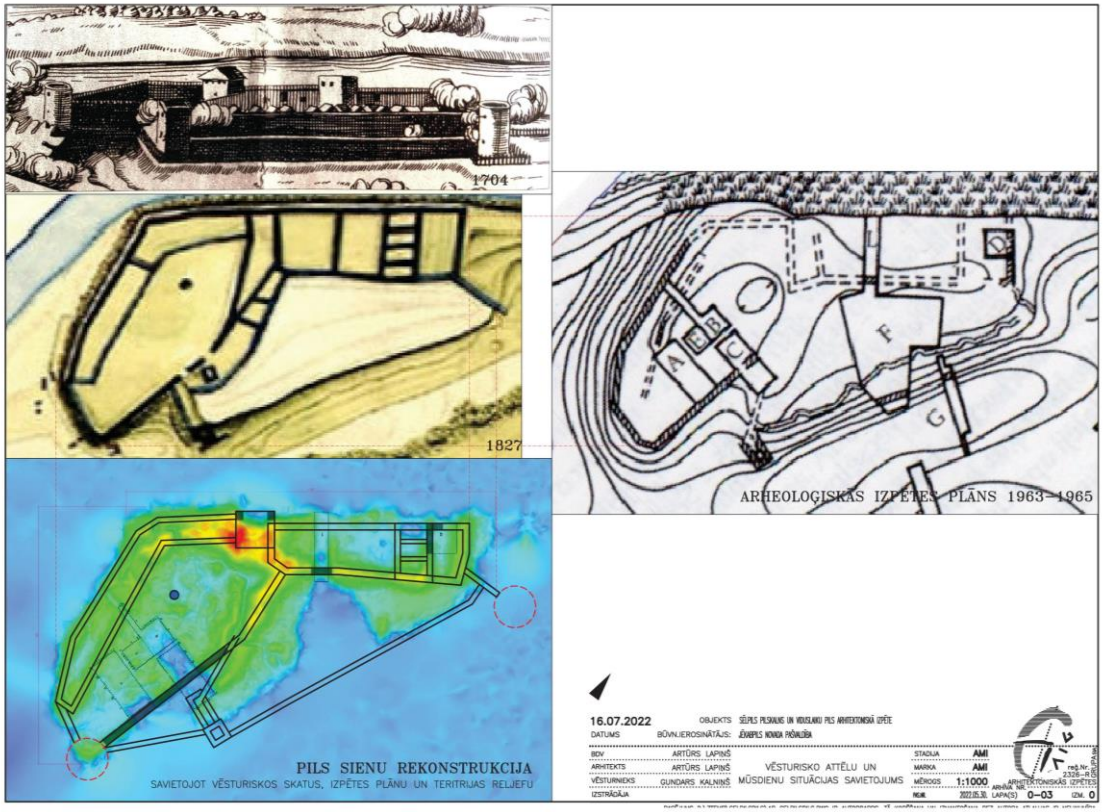

Fig. 4. Combination of historical images with the current situation
[Sēlpils castle development sketch by the author]

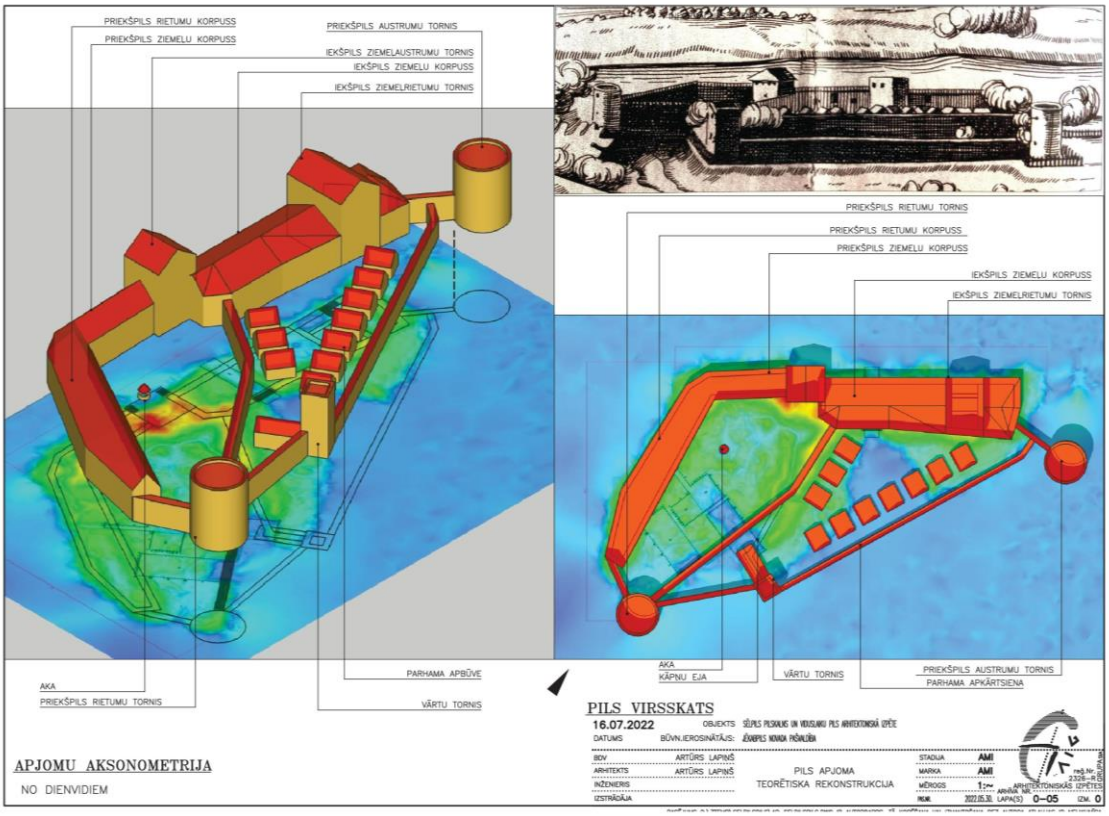

Fig. 5. Theoretical reconstruction of the castle space
[Sēlpils Castle development sketch by the author]

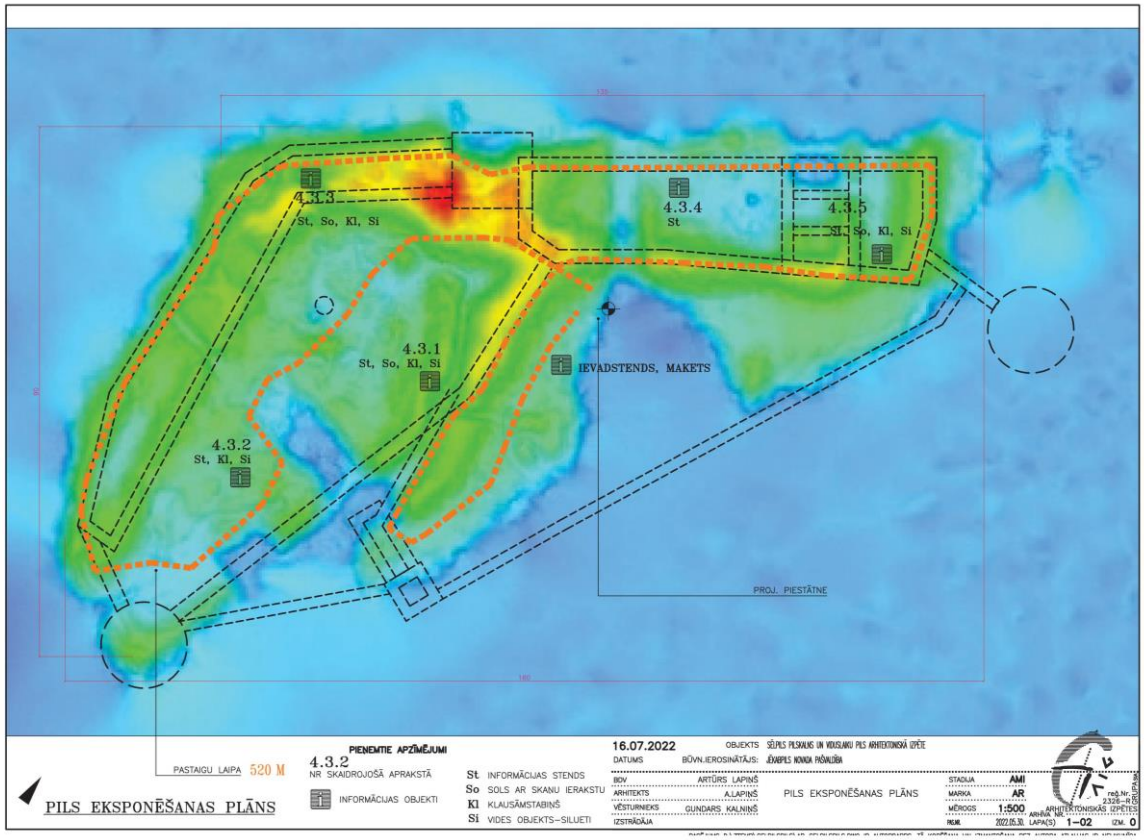

Fig. 6. Castle presentation plan
[Sēlpils Castle development sketch by the author]

Based on the research data, a detailed Sēlpils Castle interpretation plan was prepared [6]. To make the historical information obtained during the inspection of the Sēlpils hillfort multi-layered and accessible for different audiences, it is proposed to implement a complex set of mutually complementing interpretation tools. They combine auditory, visual, and tactile experiences, including new physical objects that use a stylised approach to visualise the appearance of the inhabitants of the hillfort in different historical periods and create a feeling of presence for the viewer.

Conclusions

The instrumental recording and upstanding archaeology of the Kuldīga and Sēlpils Castles, which are not actively present in the cultural environment, have led to new conclusions about their initial layouts, marking possible directions for the possible future research of these sites.

A detailed interpretation and presentation plan was also developed for Sēlpils Castle. Using the capabilities of technology, upstanding archaeology, as an interdisciplinary research method, enables a complex approach to documenting, interpreting, and presenting cultural historic heritage, even for heritage sites whose preservation is only fragmentary.

References

1. **Caune A., Ose I.** Latvijas 12. gadsimta beigu – 17. gadsimta vācu piļu leksikons. – Rīga: Latvijas vēstures institūta apgāds, 2004., p. 461
2. http://map.lgia.gov.lv/index.php?lang=0&cPath=4&txt_id=88 skatīts 2020-09-12.
3. **Lapiņš, A.** Kuldīgas pils tālizpēte. // Rozentāle I (sast.). Kuldīga un Kurzemes-Zemgales Hercogiste Eiropā un Pasaulē. Kuldīga: Kuldīgas muzejs, 2023.
4. **Lapiņš, A.** Viduslaiku būvkeramika Cēsu pilī // Cēsu pils raksti III: arheoloģija, arhitektūra, vēsture. Cēsis: Cēsu pils saglabāšanas fonds, 2020., p. 29–39.
5. **Lapiņš, A., Erte, S., Klimbe, K.** Alūksnes pils mūra konstrukciju konservācijas projekts. Rīga: Arhitektoniskās izpētes grupa, 2015.
6. **Lapiņš, A., Kalniņš, G.** Sēlpils pilskalna un viduslaiku pils arhitektoniskā izpēte. Rīga: Arhitektoniskās izpētes grupa SIA, 2022. gads.
7. **Urtāns, J.** Jaunatklātie pilskalni Latvijā. 1998–2021. Rīga: Latvijas Kultūras akadēmija, 2022. gads.
8. **Zirnis, G.** Restaurēšanas projektēšana pēckara Latvijā (1950–1970. g.). Lejnieks J. (sast.). Latvijas arhitektūra'93. Rīga: Baltika, p. 111.

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Artūrs Lapiņš. Artūrs Lapiņš as a conservation architect has worked in "Arhitektoniskas izpetes grupa" (Architectural investigation group) Ltd since 1994, originally as a building archaeologist, but since 1997 as a restoration architect. Member of the Latvian Association of Architects (LAS) and Latvian Chamber of Crafts (LCC), Built heritage restorers Guild. The creative works include researches in building archaeology, elaborated and realized projects for conservation, restoration and remodelling of historic buildings and sites of various scopes all over the territory of Latvia. The spectrum of the works includes remodelling of multi storey early 20th century rent houses, historic public buildings and spaces such as churches, museums, castles and castle ruins. Besides the practical work, the knowledge has been supplemented in international conservation courses in the United States of America, Hungary and Great Britain. Arturs has also reported on and published at international conferences, dedicated to the problematic of historic buildings in Latvia and abroad (Lithuania, Germany, India, Cyprus etc.). In 2022 the PhD Art diploma at Art Academy of Latvia (LMA) have been aquired. Arturs considers historic heritage as a inexhaustible source of inspiration and enjoys it as the sample of good architecture and craftsmanship.

Kopsavilkums. Arhitektoniskā izpēte ir analītisks pētījums, kura ietvaros tiek veikts objekta vizuāls apsekojums, uzmērījums un zondāžas konstatējamās iezīmes. Informācija tiek salīdzināta ar objektu saistīto grafisko un vēsturisko dokumentāciju. Veicot vēstures avotu, morfoloģiskā materiāla un stratigrāfiskos atsegumos iegūto datu savietošanu, tiek nodrošināta objekta tektonisko un formālo aspektu integrēta analīze. Objektā veiktā izpēte ļauj papildināt arhīva materiālos iztrūkstošās un sniegt papildus ziņas par zudušo vēsturisko arhitektūru, novietni un būvniecības pārbūves procesiem.

Arhitektoniski mākslinieciskо izpēti veic, lai noskaidrotu vēsturisko ēku kultūrvēsturisko un mākslinieciskо vērtību. Tālāk tiek pieņemts pamatots lēmums par objekta turpmāko attīstību, statusu un saglabāšanas risinājumiem.