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Three-Dimensional Reconstruction of the Early Christian Temples of the Roman Fortress of Pitiunt

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Abstract: Since 2018, the authors have been working on reconstructing the exterior of the Great Pitiunt Roman fortress in 3D. This article presents the results of the visualization of the exterior and interior of the temple complex. During the study, the dimensions and plans of the site were analyzed, revealing discrepancies in various sources. To clarify the complex's dimensions, aerial photography using UAV was conducted, and photogrammetric models, orthophoto, and digital surface models were created. The research also uncovered previously unrecorded architectural features. During the reconstruction of the temples, much attention was paid to the structural design of the buildings, connections and load distribution. Engineering calculations have been carried out for the clarification of the structural solutions. The article presents the results of a detailed reconstruction of the exterior, interior and structural features of Temple Nos. 1–4, based on preserved archaeological evidence, excavation results, contemporaneous Early Christian sites, and an analysis of the materials and technologies used at the time. The reconstruction of the mosaic floor of Temple No. 2 allowed a realistic visualization of the interior.

Keywords: late antique and early medieval temples; early Christian architecture; eastern Black Sea region; Great Pitiunt; 3D reconstruction and visualization; photogrammetry; UAV

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1. Introduction

Pitiunt (modern Pitsunda, Abkhazia) (Figure 1) is one of the oldest cities and religious centres of north-western Colchis, both historically and spiritually.

The first mention of this city comes from Artemidorus of Ephesus, a famous geographer of the second–first century BCE, mentioned by Strabo in his "Geography" (Strabonis Geographica, XI, II, 14). The text refers to Pitiuntus as "great", indicating its importance in the eastern Black Sea region during the heyday of the Pontic kingdom under Mithridates VI Eupator. It later came under Roman interest and is mentioned in the works of Roman and Byzantine authors such as Gaius Plinius Secundus (Historia naturalis, V.16), Flavius Arrianus (PPE, 27), Zosimus (Zos NH, I, 32–33) and Theodoret of Cyrus (Ecclesiastical Historia, V, 34). Despite the destruction caused by the Geniochs in the first century CE, the status of the site remained high.

In the second half of the second century, a Roman fortress was built at Pitiunt, making it an important strategic outpost of the Empire on the northeastern frontier. It served to link Asia Minor, the eastern Black Sea, the Bosphorus and Chersonesos. Its remoteness from the centre of the Empire determined its status as the most distant and problematic area

inscription in Greek. According to some experts, the temple may have been dedicated to the holy martyr, Orentius, who was exiled to Pitiunt for his faith and died on the way. The third part of the triptych was located behind the platform, depicting a deer with birds and a fountain of living water, symbolizing paradise. Probably built during the economic heyday of Pitiunt, this was the richest temple.

The third and fourth temples served as the typical city church. While the first three temples were influenced by the Hellenistic school, the fourth temple already showed distinct features of oriental architecture. There was a noticeable change in the liturgy during the two centuries of the temple complex's existence.

By combining all the available facts, a comprehensive picture of that epoch can be obtained, as reflected in the history of the remote fortress of Pitiunt. The architectural features discovered are consistent with the historical events that occurred in the Empire at that time, as well as with the developing and evolving Christian dogmas and related liturgical rules. The findings of this work provide a substantial addition to the existing scientific material, enabling its widespread use in museum exhibitions, educational programmes and excursions.

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