

# AthosAR

## 3D Scanning the Monastery of Simonos Petra

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Images: (1), (2) 3D scanning with drone of interior and exterior of Simonos Petra main church, (3) AthosAR app using Simonos Petra church level plan, (4) mesh geometry of main church, (5) point-cloud of main church, (6) point-cloud of the west-south facade

This short paper introduces an ongoing cultural heritage research project in the sacred peninsula of Mount Athos in Greece. The monastery of Simonos Petra, a world heritage site starts its history from a chapel built by St. Simon around 1257 on top of a rock. The rich architecture history of the site reveals the traces of its multilayered structure that has been rebuilt and refined throughout the centuries. The katholikon - main church - occupies the entire site on top of the rock while its foundations

must rest on structures of the old Byzantine ruins of the complex. The katholikon is dated around 1600 coexisting with parts from the Byzantine times. The features of the katholikon construction remained hidden beneath internal and external plastering and the new roof. However, more recent restoration processes revealed signs of the arrangement of the masses. In general, the typology of the katholikon is of the Athonite type - a cross-in-square with side apses and a broad narthex. This project aims to create a

historical record of the current state (2019) of the monastery using photogrammetry technologies for 3D scanning as well as an initial study for experiencing the site via augmented reality.

**Methodology**  
Aerial capturing with drones was the primary strategy of documentation given the condition of the landscape and the inaccessible facades. A year after the completion of a three-decade restoration project,

the monastery has no longer scaffolds both on exterior and interior inviting the creation of a historical architecture archive.

An initial dataset of 25,000 photos of the exterior facades and 15,000 photos of the main church were processed on Agisoft Metashape.

**AthosAR**  
AthosAR app is a small augmented reality (AR) application that works with postcards of the monastery's

architecture drawings. Utilizing the 3D models created by photogrammetry data, AthosAR allows the user to see a 3D reconstruction based on the monastery historical plans (tag).

AthosAR is an inviting tool for future visitors to experience key architecture spaces of Simonos Petra such as the main church, and the open courtyard. For those being in the complex architecture plans seem to bring an enhanced experience for them to navigate and comprehend the

historical layers. After leaving the monastery, AthosAR app becomes a tool to revisit Simonos Petra and promote social interaction between visitors of the site and their friends.

The next step of this research includes the distinction between the current state and the remaining parts of previous historical phases.