

## **SPARC Project Short Report**

**Project Name:** Malthi Mapping and Digitization Project

**PI(s) and Institution(s):** Rebecca Worsham, University of North Carolina at Chapel Hill; Michael Lindblom, Uppsala University, Donald Haggis, University of North Carolina at Chapel Hill

### **I. Summary of work undertaken in collaboration with SPARC**

The goal of the Malthi Mapping Project was to re-map, reinterpret, and more accurately document the architecture of a fully-exposed Middle to Late Bronze Age settlement site on the Greek mainland. The site was originally excavated under the direction of the Swedish archaeologist Natan Valmin in the early 20<sup>th</sup> century. The existing plan was clearly inaccurate in a number of places, complicating understanding of the settlement and its patterns of use. Because the architecture is still exposed, it has suffered enormously from erosion and agricultural activities in the area. Collaboration with the SPARC represented an opportunity to preserve the information offered by the remaining architecture, as well as to increase access to the site and its analysis digitally.

In collaboration with SPARC, the project was able to complete the scanning of the whole of the settlement, providing 3D data for all of the preserved surface architecture within the settlement, as well as preserved segments of the exterior wall (Fig. 1). Data collection was led by Dr. Rachel Opitz. Over the course of five days in the field, scans were made at 78 stations across the site at a consistent point spacing of 0.01x0.01m at 20m from the scanner, over a 360x90 degree field of view around each position. This process resulted in a complete picture of the settlement structure with sufficient resolution to create a new stone-by-stone plan and to interrogate the nature of the construction methods. The scans are supplemented by point data collected with a DGPS roving station in order to outline and document remaining surface architecture on a wall-by-wall basis, and notes were made on each of around 469 walls within and immediately surrounding the settlement (Fig. 2). Though we are still processing this data, portions of it have already been integrated into a GIS with pre-existing landscape and elevation data for the surrounding area, also in collaboration with the Swedish group Disir (Fig. 3). This group specializes in data presentation particularly, and will be assisting in the creation of images for publication.

The goal of this study, made possible through collaboration with SPARC, is to determine whether the settlement at Malthi represents a truly “planned” community, as suggested by the original excavator. This idea has important ramifications for the development of incipient state-level societies in the area, prior to the rise of hierarchically-organized Mycenaean polities. Of particular regard here is the relationship between Malthi and the nearby palatial center at Pylos, for which state-like social organization is attested both in the archaeological record and in Linear B tablets. This work demands a careful study and documentation of the architecture in a

systematic and comprehensive way, which was accomplished in large part through the terrestrial laser scanning provided by SPARC. The project and the SPARC data represent a significant step forward in the study of the organization and planning of early Mycenaean settlements, of which Malthi is the most completely exposed and now most fully documented example.

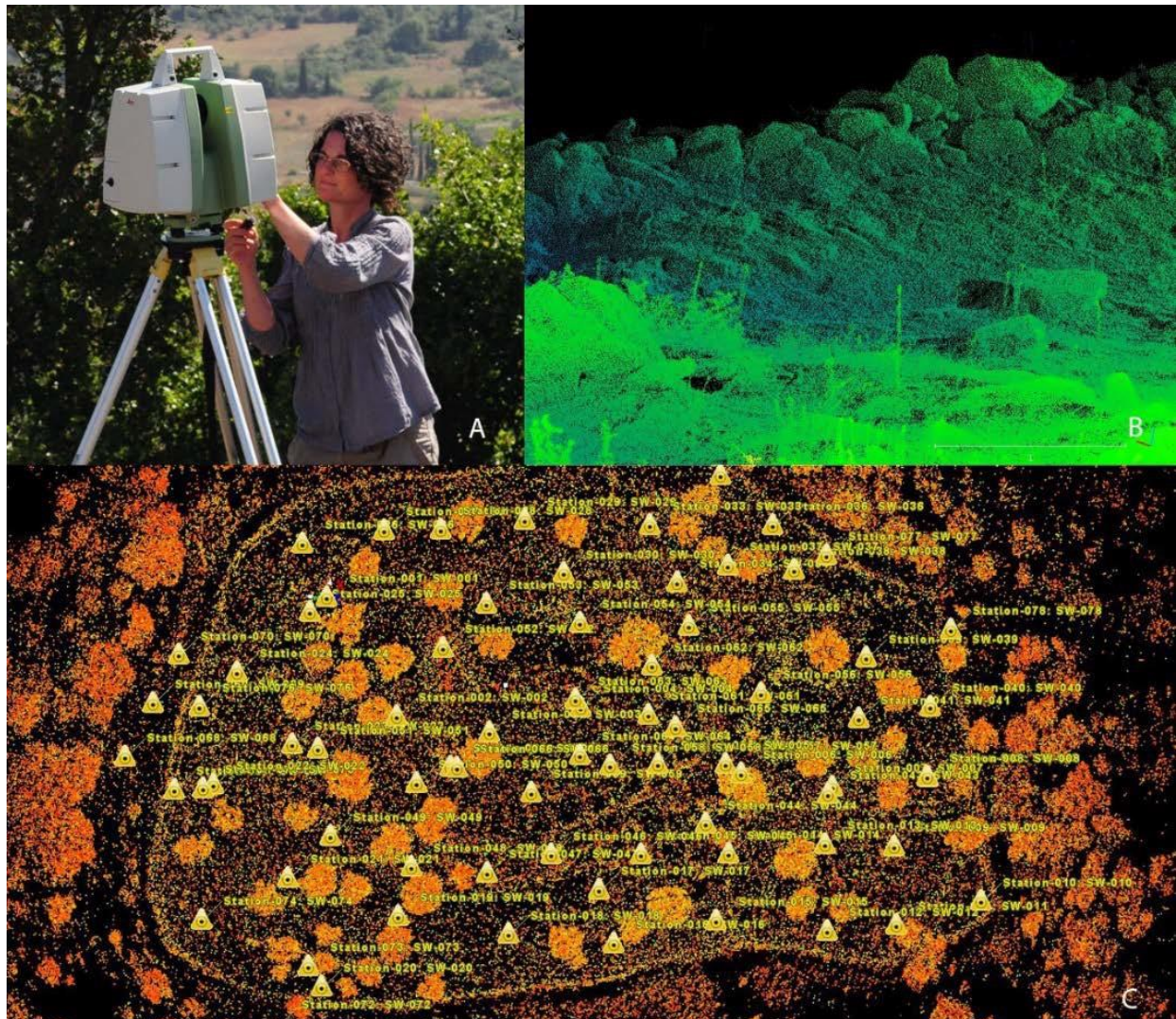


Fig. 1: Terrestrial laser scanning was performed at Malthi by (A) SPARC representative Rachel Opitz using a Leica C10 Scanner. (B) A well preserved section of the fortification possible to investigate in 3D. (C) The scanner was moved between 78 locations in the settlement to capture the surfaces from different angles.



Fig. 2: Comparison of (A) new plan created with a Leica Viva GS14 GPS from architecture remaining in 2015 and (B) plan from 1938 by Natan Valmin.



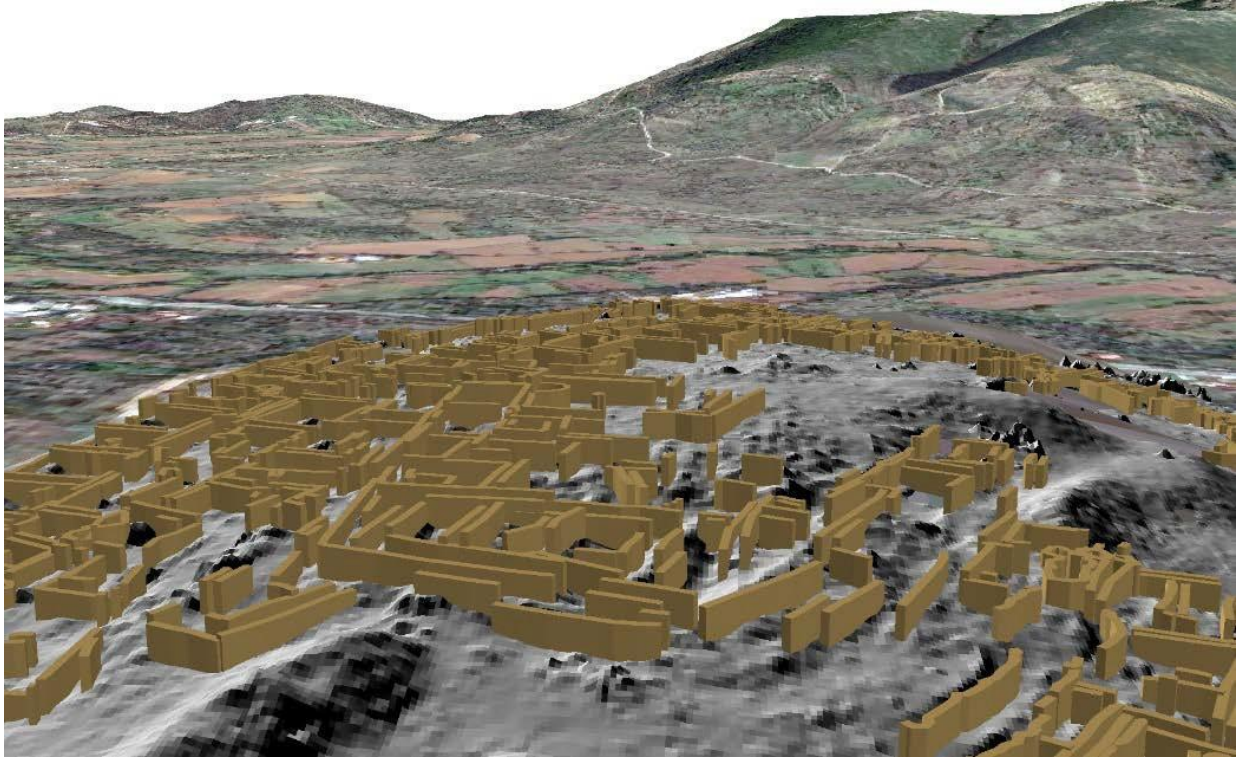


Fig. 3: The processing of the Malthi data is in progress. A hillshade combining the TLS and GPS data with extruded walls (from all periods) can be used to interpret possible access routes within the settlement.

## II. Summary of Results

Fieldwork this season and in particular the scanning process have allowed us to reach three major preliminary conclusions. First, the settlement was well-integrated into the natural landscape, and made extensive use of the natural bedrock, both for building material and to frame entrances and direct movement across the site. Second, movement was fairly tightly controlled and perhaps increasingly restricted, with particular attention toward entrances and routes of approach. Thirdly, it is likely that Valmin was correct in arguing for the planned construction of the settlement as a part of a single, unified project, though the date of this construction is still in question.

To turn to the first point, though Valmin had in some cases commented on the use of bedrock in particular structures, his documentation is inconsistent, with bedrock construction omitted or marked as manmade walls in a number of places. The project was able to correct this oversight both in interpretive mapping and through the laser scans, which clearly show the integration of the bedrock into architecture across the site on a large-scale and pervasive basis. Indeed, the whole settlement follows the natural lines of the bedrock of the ridge, contributing greatly to the overall organization of the settlement.

Related is the question of movement through the site, once again only briefly addressed by Valmin. The site as it now stands is very “full” with contiguous multi-period building, and access routes are generally unclear. Though the project was able to identify likely candidates for

entrance routes into the settlement itself, the 3D data should prove invaluable in testing these ideas and creating additional models for paths through the settlement space. Currently, access seems to become increasingly “directed” over the life of the settlement, with entrance routes crystallized and elaborated in its final phase of large-scale use. Use of the bedrock must have formed a major part of this effort.

The question of the unified nature of the settlement’s organization is particularly important for the identification of this site as the probable product of a polity similar to the later Mycenaean citadels. The investment of labor and capital necessary for the creation of the substantial settlement wall—over three meters in width where both interior and exterior faces are preserved—represents a major undertaking. Several walls of the interior “magazines” are bonded with the fortification and are likely to have been constructed contemporaneously, possibly in sections, suggesting a high level of planning and a preconceived vision of what a settlement should be. Similarly-planned settlements may arise at the same time elsewhere in the valley, perhaps indicating early peer-polity interaction in this area. Integration of the scanning data into existing landscape models may allow some assessment of settlement patterns in the broader geographical area. Though preliminary, this work has much to contribute to models of state-formation during the early Mycenaean period.

### **III. Presentations and Publications Completed**

So far, only preliminary reports have been made to the Swedish Institute at Athens and to funding agencies, including the Institute for Aegean Prehistory and SPARC. Some initial conclusions have been included in Worsham’s dissertation, which is complete and will be submitted formally to the University of North Carolina at Chapel Hill in November of this year. The dissertation will be made available on the Carolina Digital Repository in upcoming months, pending approval of formatting by the University, as well as other online platforms (Academia.edu, for example).

### **IV. Presentations and Publications in Press/Planned**

A paper presenting the preliminary conclusions outlined above and the results of the season has been accepted for the Annual Meeting of the Archaeological Institute of America, to be delivered on January 7, 2016. Presentation of the initial results will also be made at the annual meeting of the Swedish Institute at Athens. Preparation of a more formal report is underway for initial publication in the journal of the Swedish Institute at Athens, *Opuscula*. A short article tracking the rate of deterioration at the site since Valmin’s excavation insofar as it can be assessed is also planned for submission to *Hesperia* or the *American Journal of Archaeology*. Raw and processed data will be freely available via the digital archive of the Swedish Institute at Athens following these publications.



## **SPARC Project Short Report**

**Project Name:** Malthi Mapping and Digitization Project

**PI(s) and Institution(s):** Rebecca Worsham, Smith College; Michael Lindblom, Uppsala University

### **I. Summary of work undertaken in collaboration with SPARC**

The settlement of Malthi is located in the Soulima Valley in Messenia. Excavated in the 1920s and 30s, Malthi lacks a clear chronology. Because the settlement is among the most important examples of an early Mycenaean fortified hilltop site, it is critical to situate it temporally within the broader sequence of early Mycenaean development. Work at the site has been geared primarily to this goal, as well as to the documentation and presentation of the eroding architecture, and particularly the fortification wall itself. The support of the SPARC project has been fundamental in especially the second goal, facilitating our reinterpretation of the abundant architectural remains at the site.

In collaboration with SPARC, and Dr. Rachel Opitz in particular, the project was able to complete terrestrial laser scanning of the settlement architecture during the 2015 summer season. This data was supplemented by point-based data gathered using a DGPS roving station, creating interpretive models of settlement architecture including likely entrances and functional spaces, etc. We are continuing to process this data into a GIS partially in collaboration with the Swedish group Disir.

Work in the 2016 field season focused on two major goals. The first of these was drone photography of the site, intended to produce a color image to overlay onto the existing 3D data gathered via the terrestrial laser scanner (**Fig. 1**). Additionally, imagery of the landscape surrounding the settlement was collected, expanding the 3D model. The second goal of the 2016 season was to carry out preliminary excavations of portions of the settlement. This work was intended to provide 1) a more accurate and updated pottery sequence and 2) materials that might be sampled for carbon dating. Structure-from-motion photography was carried out for noteworthy contexts in each trench (**Fig. 2**).

The aims of the 2016 season, as with the 2015 season, were to contextualize Malthi within the events of the early Mycenaean period, made possible in part through the support of the SPARC project. As the original excavator suggested, much of the settlement seems to date to a single major episode of construction, probably to be associated with early Mycenaean state formation. Because the hilltop settlement was not extensively reoccupied, it has much to offer the study of settlement patterns and power dynamics of this period.





Figure 1: Orthophoto of the fortified settlement, produced using the aerial drone.



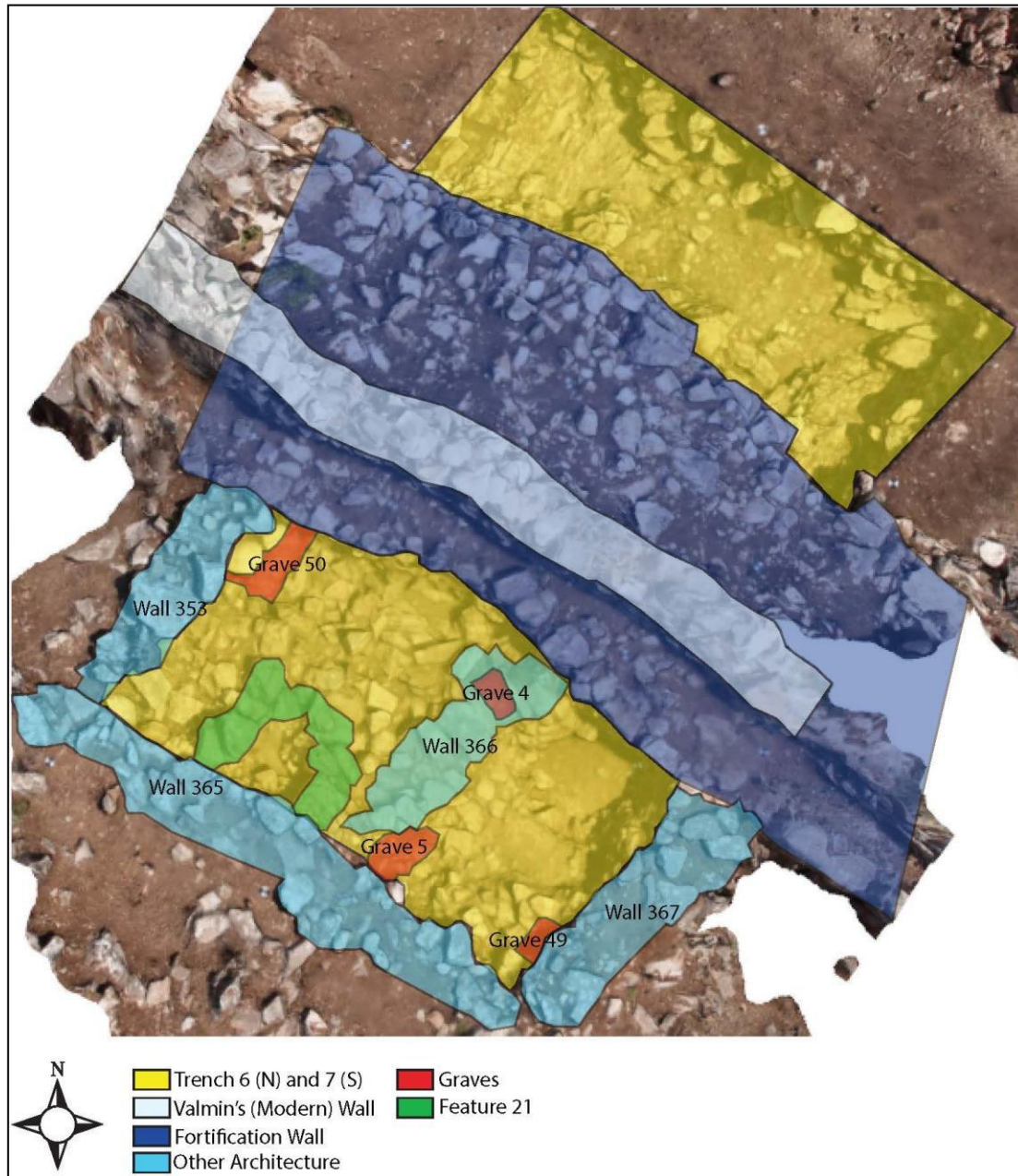


Figure 2: Trenches 6, at the N and exterior of the wall, and 7, at the S and interior. Preliminary model from photogrammetry.

## II. Summary of Results

Initial conclusions from 2016 season are as follows:

- 1) Though the fortification wall appears to have collapsed and slid downhill in several areas, it is likely that a width of around 3m was maintained around much of its circumference.
- 2) The fortification wall is footed on bedrock. This method of construction appears to have been favored wherever possible, and earlier settlement material was likely excavated away to reach this level.

- 3) It may be possible to date the construction of the fortification wall from a deposit of ceramics lying directly on the bedrock on which the fortification wall is built. These are chronologically mixed, but may be roughly datable to Late Helladic I.
- 4) Probably contemporary with the abandonment of the settlement, the fortification wall began to collapse. Earlier material used in the packing of the wall then started to erode out from the wall, overlying later deposits on the exterior of the settlement.
- 5) The site is likely one of several early Mycenaean sites to be used as a cemetery following its abandonment.
- 6) The settlement was not excavated down to bedrock in the northern section. This area is therefore appropriate for stratigraphic studies such as micromorphology.

This work, then, though preliminary, has already helped to contextualize Malthi within the events of the early Mycenaean period. It is still too early to extrapolate, for instance, the relationship between this settlement and the growing dominance of Epáno Englianos or even Peristeria. Even so, now that we are closer to answering when and how the fortification was built, we may begin to understand why.

### **III. Presentations and Publications Completed**

Preliminary reports for the 2015 and 2016 seasons have been made to the Swedish Institute at Athens and to funding agencies, including the Institute for Aegean Prehistory and SPARC. Initial interpretations were included in Worsham's dissertation (*Discontinuous Houses, Settlement Structures, and Social Organization in Late Early Helladic and Middle Helladic Greece*), which was submitted in 2015 to the University of North Carolina at Chapel Hill. In January of this year, the results of the 2015 season were presented at the annual meeting of the Archaeological Institute of America. A brief presentation of this work was also given at the annual meeting of the Swedish Institute at Athens.

### **IV. Presentations and Publications in Press/Planned**

A formal publication is currently in preparation for submission to *Opuscula: The Journal of the Swedish Institute at Athens*, to appear in spring. Preliminary reports have already been completed for the faunal remains, pottery, and architecture, and need only be compiled. Study of the data collected and material excavated is still underway, and additional publications are expected. Raw and processed data from the project will be freely available via the digital archive of the Swedish Institute at Athens following these publications.