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ARCHAEOLOGICAL SITE MONITORING: UAV PHOTOGRAMMETRY CAN BE AN ANSWER

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Abstract. During archaeological excavations it is important to monitor the new excavated areas and findings day by day in order to be able to plan future excavation activities. At present, this daily activity is usually performed by using total stations, which survey the changes of the archaeological site: the surveyors are asked to produce day by day draft plans and sections which allow archaeologists to plan their future activities. The survey is realized during the excavations or just at the end of every working day and drawings have to be produced as soon as possible in order to allow the comprehension of the work done and to plan the activities for the following day. By using this technique, all the measurements, even those not necessary for the day after, have to be acquired in order to avoid a 'loss of memory'. A possible alternative to this traditional approach is aerial photogrammetry, if the images can be acquired quickly and at a taken distance able to guarantee the necessary accuracy of a few centimeters.

Today the use of UAVs (Unmanned Aerial Vehicles) can be considered a proven technology able to acquire images at distances ranging from 4 m up to 20 m: and therefore as a possible monitoring system to provide the necessary information to the archaeologists day by day. The control network, usually present at each archaeological site, can give the stable control points useful for orienting a photogrammetric block acquired by using an UAV equipped with a calibrated digital camera and a navigation control system able to drive the aircraft following a pre-planned flight scheme. Modern digital photogrammetric software can solve for the block orientation and generate a DSM automatically, allowing rapid orthophoto generation and the possibility of producing sections and plans.

The present paper describes a low cost UAV system realized by the research group of the Politecnico di Torino and tested on a Roman villa archaeological site located in Aquileia (Italy), a well-known UNESCO WHL site. The results of automatic orientation and orthophoto production are described in terms of their accuracy and the completeness of information guaranteed for archaeological site excavation management.

[Conference Paper](#) (PDF, 745 KB)

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