



#### Volume XL-5

Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XL-5, 157-164, 2014  
www.int-arch-photogramm-remote-sens-spatial-inf-sci.net/XL-5/157/2014/  
doi: 10.5194/isprsarchives-XL-5-157-2014  
© Author(s) 2014. This work is distributed  
under the Creative Commons Attribution 3.0 License.

## A multi-range approach for Cultural Heritage survey: a case study in Mantua Unesco site

S. Chiarini<sup>1</sup>, S. Cremonesi<sup>1</sup>, L. Fregonese<sup>1</sup>, F. Fassi<sup>2</sup>, and L. Taffurelli<sup>1</sup>

<sup>1</sup>Department of Architecture, Built environment and Construction engineering – ABC, Politecnico di Milano, Campus Mantua, via Scarsellini, 2 – 23100 Mantua, Italy

<sup>2</sup>Department of Architecture, Built environment and Construction engineering – ABC, Politecnico di Milano, via Ponzio, 31 – 23100 Milan, Italy

Keywords: Close range and aerial photogrammetry, Laser Scanning, UAV, Cultural Heritage

**Abstract.** In this paper, a Cultural Heritage survey, performed by employing and integrating different type of acquisition technologies (imagebased and active sensor based) is presented. The aim of the survey is to create a 3D multiscale database, therefore, different restitution scales, from the architectural-urban one to a detail one are taken in consideration. This research is part of a project financed by the Unesco for the study of historical gardens located in Mantua and Sabbioneta, and in particular for the *Palazzo Te* renaissance gardens in Mantua, which are reported in this paper. First of all, a general survey of the area has been realized by employing the classical aerial photogrammetry in order to provide the actual arboreal and urban furniture conditions of the gardens (1:500 scale). Next, a detailed photogrammetric survey of the Esedra courtyard in *Palazzo Te* has been performed by using a UAV system. At the end, laser scanning and traditional topography have been used for the terrestrial detailed acquisition of gardens and architectural façades (1:50– 1:20 scale). The aim of this research is to create a suitable graphical documentation support for the study of the structure of the gardens, to analyze how they have been modified over the years and as an effective support for eventual future re-design. Moreover, the research has involved a certain number of botanic and archeological investigations, which have been duly acquired and modeled with image based systems.

Starting from the acquired datasets with their acquisition scales, a series of comparative analysis have been performed, especially for those areas in which all the systems have been employed. The comparisons have been extracted by analyzing point cloud models obtained by using a topographical network.

As a result, the multi-range approach efficiency, obtained by employing the actual available technologies have been illustrated in the present work.

[Conference Paper](#) (PDF, 1723 KB)

Citation: Chiarini, S., Cremonesi, S., Fregonese, L., Fassi, F., and Taffurelli, L.: A multi-range approach for Cultural Heritage survey: a case study in Mantua Unesco site, *Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci.*, XL-5, 157-164, doi:10.5194/isprsarchives-XL-5-157-2014, 2014.

[Bibtex](#) [EndNote](#) [Reference Manager](#) [XML](#)