From Laser Scanner point clouds to 3D modeling of the Valencian Silo-Yard in Burjassot

Introduction
The project of the Valencian Silos-Yard modeling is part of the “Tri-national Cultural Heritage Documentation projects (2015-2018)”. The data collection took place in Burjassot (Valencia, Spain) at the mid of April 2016. The fieldwork was done by the students that participated in the program the last year. These data were used to make the 3D model this year. In addition to it, we did the measurements of the archaeological excavation area in Vergina (Greece), which is the next step of the “Tri-national Cultural Heritage Documentation projects (2015-2018)”. The following methodology describes the techniques used to obtain the final 3D model of the Valencian Silos-Yard.

Implementation
Processing of the data from the Terrestrial Laser Scanner (TLS), it consists to align all the scans. The final mean error is 2.1 mm.

Georeferencing of the TLS point clouds, the U.A.V. point cloud is taken as a reference in CloudCompare to georeference the point cloud from the Laser Scanner. After the transformation, the mean distance error is estimated to 0.033 m.

3D modeling, in order to get an accurate 3D model. It is important to filter the noise and to delete all the objects that should not appear in the cloud point, such as the illumination inside the silos. The following steps consist to generate a mesh, smooth it and add a texture or the color of the points if photos are missing. In the case pictures exist, the mosaics from Photoscan are used like in the following example.

In Blender are joined the outside (designed by A. Yepes) and the inside (designed by M.C. Gómez) parts of the Silos.

Finally, a virtual reality application lets the user discover the site like if he was walking in.

Conclusion
3D-modelling projects of historical monuments are crucial because they preserve the history and the culture. In the case of the Valencian Silos-yard, it was a very important place at the Middle Ages, and thanks to the heritage recording, the knowledge about this place will be possible for the next generations.