

PUBLIC SELECTION BASED ON QUALIFICATIONS AND INTERVIEW FOR THE AWARDING OF NO. 1 EARLY STAGE GRANT LASTING 12 MONTHS FOR CONDUCTING RESEARCH PURSUANT TO ART. 22 OF LAW NO. 240/2010 AT THE DEPARTMENT OF ENGINEERING AND APPLIED SCIENCES (A.R.F. 08/E2 - RESTORATION AND HISTORY OF ARCHITECTURE - A.D ICAR/19 – RESTORATION) - TYPE B

announced with decree of the Rector Rep. no. 695/2018 of 25.10.2018 and posted on the official registry of the University on 26.10.2018

RESEARCH PROJECT

“Photogrammetric technique and laser-scanning Integration for the knowledge of built heritage”

Research structure: Department of Engineering and applied sciences

Duration of the grant: 12 months

Scientific Area: 09 - Industrial and information engineering

Academic recruitment field: 08/E2 - Restoration and history of architecture

Academic discipline: ICAR/19 – Restoration

Scientific Director: Prof. Giulio Mirabella Roberti

The automatic 3D survey, both by means of active (3D laser scanners) and passive sensors (terrestrial and aerial photogrammetry by UAV), coupled with diagnostic analysis of building surfaces, opens new possibilities for metric and material monitoring of historic buildings. The velocity in acquiring spatial geometries, together with high metric and chromatic reliability, allows drawing complete maps with exact localization of metric and material irregularities (such as cracks, deformations, damages) easily and quickly, both in the acquisition and in the processing data phases.

The integration of the two surveying techniques at the point-cloud level allows increasing the degree of geometrical accuracy and the observation detail, until the precise determination of the attained damage or failure level. Repeating the observations after adequate time intervals would give the chance to control the evolution during the time, adding a fourth dimension to the survey. The facilities offered by modern instruments and recent software developments, able to interface each other inside shared platforms, allow managing in a unique virtual model all the metric, material and physical-chemical building information. Geographical Information Systems (GIS) can combine all the data in a sole reference system, also at 3D level, not only in order to interpret them as simple numerical indicator, but also to visualize them dynamically and produce adequate technical-constructional representations. Possible applications concern multiple aspect of the knowledge of historical heritage, from archeological survey to archeological investigations on architecture, from the realization of virtual models of historical buildings to physical prototyping by 3D printing, useful both for the documentation of actual conservation state and in the design for the evaluation of the impact of new interventions.