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Microwave tomography enhanced GPR surveys in Consoli Place of Gubbio (Italy)

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European Cultural Heritage (CH) assets, as monuments, historical centers and archaeological landscapes, are affected by a decline process, which is going on to an alarming rate due to natural aging, human impact, environmental and climatic changes as well as natural hazards [1].
In this framework, the H2020 project HERACLES - HEritage Resilience Against Climate Events on Sites aims at proposing a holistic multidisciplinary and multi-sectorial approach devoted to provide an operative system and eco-solutions able to innovate and to promote a strategy and vision of the future of the CH resilience.
One of the main goals of the HERACLES project is a multi-temporal and spatial situational awareness of the considered site as element of a more general context including also territories where the CH is located. This challenge is planned to be faced by collecting and integrating data provided by different novel and state of art technologies operating at different spatial scale (from wide area to the single structure and its elements) and on different observation platforms, i.e. satellite, airborne and on site.
Among non-invasive close sensing technologies, Ground Penetrating Radar (GPR) is taken into account thanks to its ability to perform non-invasive subsurface analysis providing useful information for structural assessment and characterization of environmental hazards, like hydrological risks [2].
This work aims at presenting, the usefulness of GPR surveys, enhanced by the use of a Microwave Tomographic data processing approach [3], with respect to the HERACLES project goals concerning the methodologies for CH diagnosis and monitoring. Specifically, the results of a measurement campaign carried at the Consoli Palace of Gubbio (Italy), one of test sites of the project, are presented. These results allowed to grow up knowledge about the architecture of the Consoli Palace walls and their structural hazards.

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