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Multi-sensing geophysical surveys at the Archaeological Park of Paestum: the discovery of a small Doric temple

Ilaria Catapano[1], Luigi Capozzoli[2], Giovanni Ludeno[1], Gianluca Gennarelli[1], Gregory De Martino[2], Enzo Rizzo[3], Francesco Uliano Scelza[4], Gabriel Zuchtriegel[4], and Francesco Soldovieri[1]

[1]National Research Council of Italy, Institute for Electromagnetic Sensing of the Environment, I-80124, Napoli, Italy
[2]National Research Council of Italy, Institute of Methodologies for Environmental Analysis, Tito Scalo, I-85050, Italy
[3]University of Ferrara, Department of Physics and Earth Sciences, I-44122, Ferrara, Italy
[4]Archaeological Park of Paestum, I-84047, Capaccio Paestum (SA), Italy

Nowadays, non-invasive sensing technologies working at different spatial scales represent a recognized tool to support archaeological researches, because their deployment and cooperative use allow detection and localization of buried ruins before performing excavation. Therefore, they get significant advantages in planning the stratigraphic assays, while reducing costs and times, and support holistic approaches where cultural heritage management, protection and fruition aspects are considered under a unified context.

As a further example among those available in literature, this communication summarizes a successful case study carried out at the Archaeological site of Paestum, sited in the southern Italy [1].

Based on the analysis of aerial imagery and several unexpected archaeological findings, terrestrial measurement campaigns, involving magnetometer (MGA) [2] and ground penetrating radar (GPR) [3] methodologies, were carried out in the northwest quarter of the ancient city near the fortification wall and few meters away from the gate of Porta Marina. As detailed in [4], the MGA was exploited to investigate a large subsurface area in a relatively short time and allowed the identification of the most significant archaeological anomalies, by accounting for the variations of the earth magnetic field due to the different magnetic susceptibilities of construction materials and the magnetic characteristics of the shallow subsoil. The georeferenced MGA image was exploited to select the area requiring a further and more detailed survey, which was performed by means of GPR. Then, GPR data were processed by means of a microwave tomography based approach [4], which allowed a high resolution three dimensional reconstruction of buried targets starting from the electromagnetic field that they backscatter when illuminated by a known incident field. By doing so, detailed information about depth, shape, and orientation of the buried targets were retrieved and an impressive visualization of the the basement of the structure was achieved.

The area is currently under excavation and the initial discovered ruins fully confirm the hypotheses formulated on the basis of the elements found on the surface, the photo interpretations and geophysical investigations. The proposed reconstructive hypothesis of the

building as a whole is a stylobate of 10.83 m x 6.80 on which 4 x 7 columns were arranged, with a significantly increased intercolumniation on the short sides (2.02 m) compared to the long sides (1.68 m).

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