



New Antennas for GPR surveys in archaeological prospecting and cultural heritage diagnostics

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In the last years, new data processing as microwave tomographic approaches have permitted to enlarge the areas of use of GPR and to improve the quality of the reconstruction results in terms interpretability and of the images more detailed and with higher resolution [1].

However, the use of such a kind of algorithms entails the necessity of more articulated measurements since the imaging of scene benefits of the diversity in incidence (transmitting antenna location), observation (receiving antenna location), frequency and polarization.

In this framework, here we present the design and numerical analysis of a reconfigurable antenna implemented according to the total geometry morphing approach.

In fact, the recent advances in the development and the implementation of RF/microwave switches have permitted the birth of a new concept of the antenna as a device that can dynamically adapt its behaviour to different measurements situations and operational contexts.

The specific design here presented has the aim of resembling a reference bowtie antenna, suitable for a stepped frequency Ground Penetrating Radar (GPR) applications, that works within the work frequency band 0.3-1 GHz for both the free-space and half-space geometry. A trial of the reconfigurability of the proposed solution will be shown for operative conditions with antenna in contact with different materials.

[1] F. Soldovieri, R. Solimene, "Ground Penetrating Radar Subsurface Imaging of Buried Objects", in Radar Technology, IN-TECH, Vienna Austria, ISBN 978-3-902613-49-3

[2] N. Romano, G. Prisco, and F. Soldovieri, "Design of a reconfigurable antenna for ground penetrating radar applications," Progress In Electromagnetics Research, PIER 94, 1-18, 2009.
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