



## GPR Prospecting and Endoscopic Investigation in a Renaissance Church

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GPR prospecting in areas of cultural interest can reveal interesting secrets of the past history of the probed monument. In particular, tombs and crypts under the floor of the churches can be revealed [1-2], but also tracks of past restorations and architectural changes occurred in the centuries, or features internal to the walls and the columns as cracks, metallic hinges, walled ciboria and hidden gaps [1, 3-5]. In this contribution, the case history of the church of the Humility in Parabita (Lecce, Italy) is proposed. The church of the Humility is a small and indeed not much well preserved church, deconsecrated many years ago and reused in other ways that have changed its original structure. Nowadays, it is undergoing a further transformation. However, before starting the works, a GPR prospecting has been committed to the Institute for Archaeological and Monumental Heritage IBAM-CNR. The prospecting has been performed with a pulsed Ris Hi-mode system equipped with a double antenna with central frequencies at 200 and 600 MHz, respectively. A first set of measures has been taken along two sets of B-scan, directed after the axis of the (unique) nave and along the orthogonal direction to this. The distance between the lines has been of the order of 40 cm, but some unmovable obstacles have not allowed a constant transect between any two adjacent lines.

A second set of measures has been gathered in the area of the altar (not any longer present), here, due to the shape of the area to be prospected, the data have been gathered along a unique direction, but the interline spacing has been chosen equal to 30 cm. Please note that there is a step between the area of the altar and that of the nave, as usual in ancient churches, and this prevented from executing a unique C-scan including the entire floor of the church.

The data have been processed according to a standard procedure based on zero timing, background removal, gain variable vs. the depth, one dimensional filtering and migration in time domain. The propagation velocity of the electromagnetic waves has been estimated from the diffraction hyperbolas. The processing has been performed making use of the commercial code GPRslice, thanks to which also horizontal slices have been retrieved. As a less conventional aspect, moreover, some ground truthing has been performed on the basis of the horizontal slices by means of a drill with an extension and of an endoscopic survey within the holes made with the drill. This has allowed a more refined interpretation of some of the anomalies, as will be shown at the conference. The noticeable point is that this kind of ground truthing is minimally invasive, much faster than an excavation and of course much cheaper, and so it can be an alternative to it, when possible.

### References

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