



## First Results of AMP surveys for large areas (>100ha) with decimeter resolutions in Archaeology

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The work presented here takes place within the BREBEMI project which is a motorway project between the town of Milano and Brescia in Italy. For the first time, a set of non-invasive tools is used systematically in order to prevent the archaeological risk before the construction of a motorway. This innovative project relies both on:

- the systematic use of a GIS (Geographical Information System) for integration of all data at every stage of the project (from data acquisition in the field to interpretation and field check),
- the use of new continuous high productivity geophysical techniques able to survey several hectares a day with a resolution of a few decimetres (resistivity:ARP(c) and magnetics: AMP), and aerial LIDAR data (acquisition of Digital Elevation Model).
- the integration of all different sources of information (geophysics, aerial photos, documentation, historical evidences but also field truething of anomalies)

For the first time all these techniques are not only used at the level of the site, but also at the level of the landscape. The objectives of this project is to reduce to a maximum the uncertainty linked to the presence of archaeological remains (in particular delimitation of areas not to be excavated due to both positive and/or negative archaeological artefacts).

In the presentation we will focus on geophysics. We have combined the use of continuous electrical imaging techniques (ARP(c)) and continuous magnetic imaging techniques(AMP, Geocarta, Paris). The first method enables measurement of apparent electrical resistivity for 3 depths of investigation at the same time. The AMP method enables the measurement of magnetic vertical gradient of the Earth Magnetic Field. All data are acquired with Quad bykes-towed instruments controlled in real-time with a GIS software: sampling mesh is of the order of a few centimetres in-line and 50cm across lines. No external topography is done and all profiles are computed by the GIS and a differential GPS for optimal coverage of the project within each field. A minimum of 150000 data is acquired by hectare. The maps obtained over areas of more than hundreds of hectares will be presented and confrontation with the past landscape and archaeological remains will be presented for several particular sites.