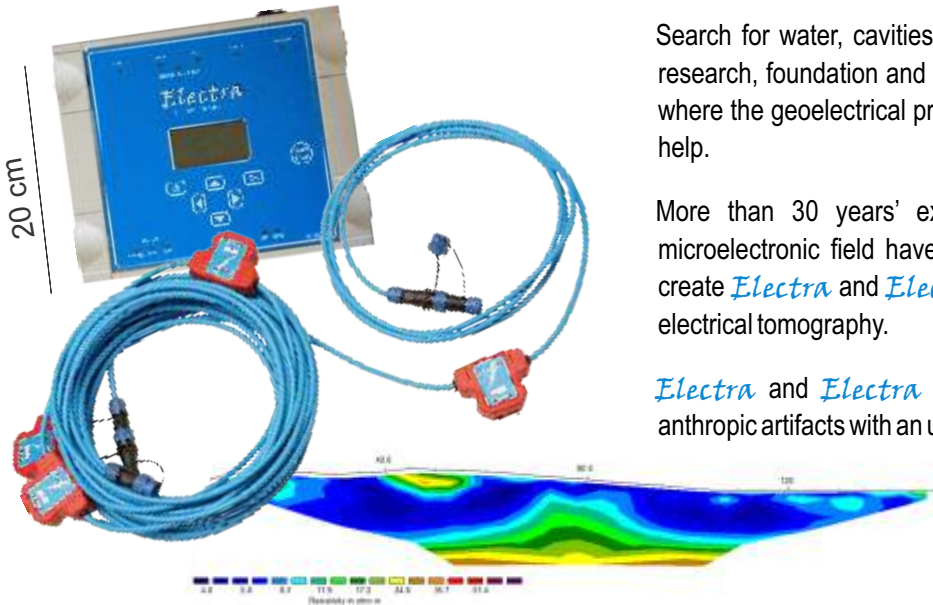




ELECTRA

Two new concepts for geoelectrical surveying: *Electra* and *Electra Matrix*



Search for water, cavities, ores, environmental problems, archaeological research, foundation and wall integrity studies are only a few of the fields where the geoelectrical prospecting at small and large scale can be of big help.

More than 30 years' experience of the developers in the medical microelectronic field have been translated to the Geophysical sector to create *Electra* and *Electra Matrix*: two new systems for 2D and 3D electrical tomography.

Electra and *Electra Matrix* allow to investigate the subsoil and anthropic artifacts with an uncommon easiness of use.

Electra is composed of a central unit (2 kg, rechargeable battery included) to be connected to any PC and of a very light cable along which the small moduli to be connected to the electrodes are attached. Each module has the double function of injecting current in the subsoil and of receiving the signal, by amplifying and digitizing it directly at the source (the electrodes). The signal is then transmitted to the central unit in a digital form through the very simple, light and high performing main cable, which prevents any cross-talk and signal degradation phenomenon.

Electra can inject any current in the subsoil (from continuous to alternate) at different frequencies. Measurements in alternate current are faster and more precise, because no time is needed for the signal stabilization and induced polarization of the electrodes is minimized. The possibility to inject different waveforms also opens the way to new studies on the relations between the energization procedures and the subsoil response.

A unique feature of *Electra* is the simultaneous acquisition of the signal from all the channels of the deployment, both of electric injection and of measurement. This greatly reduces acquisition time, particularly in some configurations.



CUTS DOWN ACQUISITION TIME:

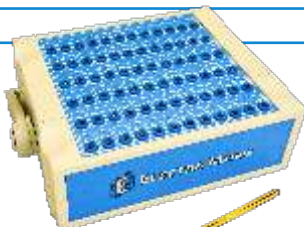
simultaneous acquisition on all channels,
use of alternate current

WEIGHT, SIZE, CONSUMPTION

orders of magnitude lower than traditional systems

BETTER DATA QUALITY:

signal digitization directly at the receivers,
data averaging techniques

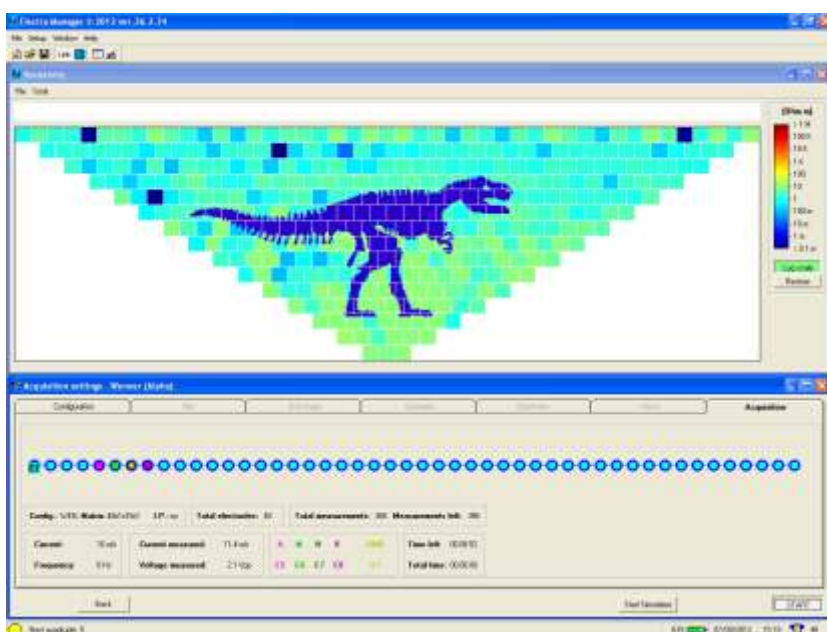


Electra exists also in the *Matrix* version, with the energization and A/D conversion units in a single box, rather than distributed along the cable. This is ideal for application with buried or submerged cables and for high-resolution small-scale applications.

The dedicated acquisition and visualization software allows to set any energization/measurement geometry in an intuitive way. The classical methods of the geoelectric prospection (Wenner, Schlumberger, dipole-dipole, pole-dipole, spontaneous potentials, induced polarization in the frequency domain, etc.) can be performed in a fully automatic way.

The possibility to record the signal from all channels continuously, with no time limits, opens the way to the study of the time dependency of the monitored parameters (e.g. spontaneous potential).

The fully digital nature of the system, the use of alternate current, the averaging techniques, the simultaneous measurements at all the electrodes increase the signal-to-noise ratio and allow to obtain excellent results by inputting in the subsoil fractions of energy compared to traditional systems.



The *Electra* management software

MAIN TECHNICAL FEATURES

POWER	internal rechargeable 12 V battery, included in the central unit
A/D CONVERSION	synchronous on all energization and measurement modules
MAX CHANNEL NO.	255 (nominal) in groups of 24 or 32

CENTRAL UNIT

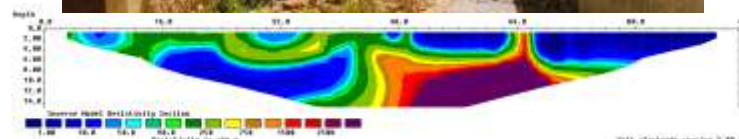
SIZE	24 x 20 x 8 cm, weight 2.3 kg
WAVEFORM	D/A converter with continuous control of current and voltage (feedback)
CURRENT	± 200 mA typical usage values ± 10 mA
INPUT FREQUENCY	1-32 Hz
OUTPUT	4 ports or cable
OUTPUT TENSION	automatic, up to 400 V p.p.

MODULES

SIZE	5 x 6 x 2 cm
INPUT	automatically commutable among 4 functions (+ and - stimuli, reference, input)
INPUT IMPEDANCE	100 M Ω on 6 V dynamic range 100 k Ω on 12 V dynamic range
SAMPLING	synchronous on all modules at 256-512 Hz
DATA TRANSMISSION	continuous and in real time to the central unit and the PC

The ideas behind *Electra*:

- 1) improve data quality
 - 2) strongly decrease weight, size, power consumption
 - 3) offer new measurement procedures
- by keeping the system easy and intuitive



Search for voids under a urban settlement with *Electra*



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