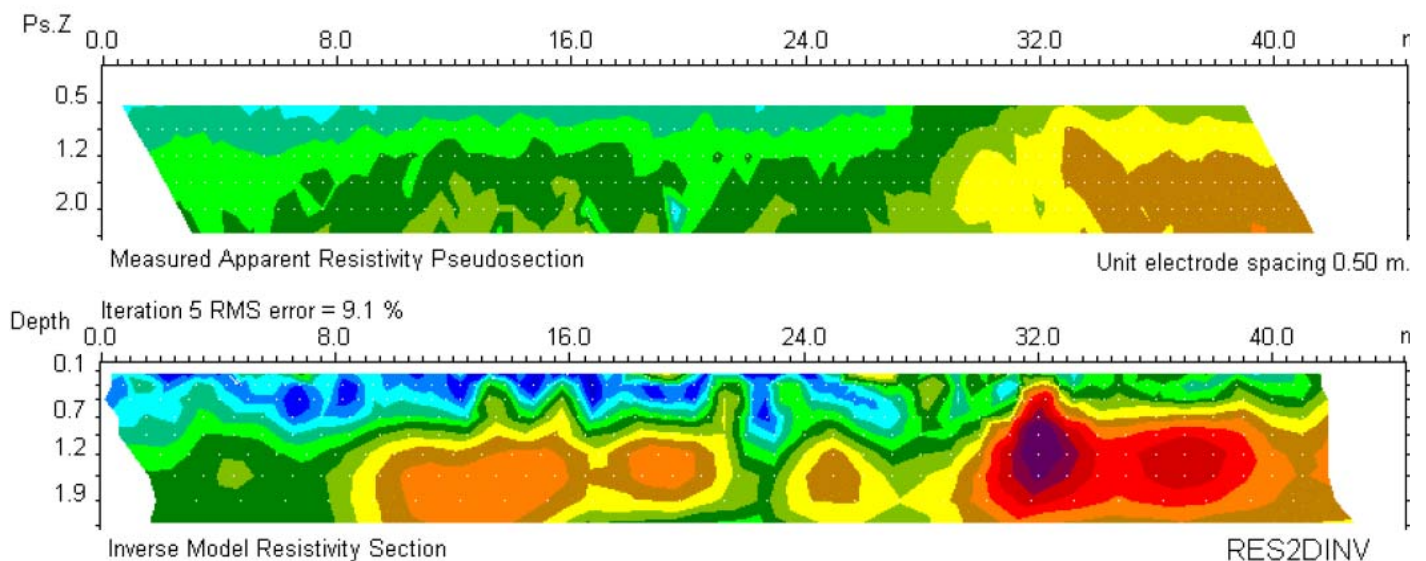# CORIM

SHALLOW
RESISTIVITY

- **Continuous profiling**

- **High logging speed**

- **Ease of use**

The CORIM system measures the electrical resistivity of the ground at a few meters depth, using capacitive coupled carpets pulled on the surface behind a towing vehicle. The logging speed of a few kilometers per ho permits to carry out many readings per day and makes the CORIM system an efficient tool for shallo structures investigation.

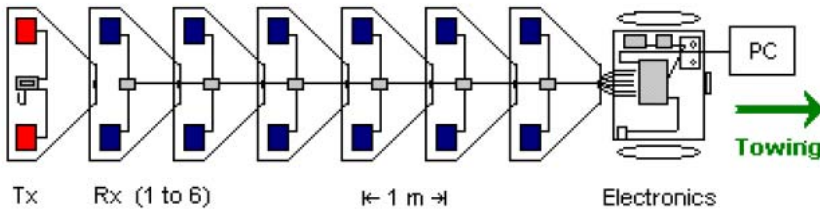A PC computer fully controls the whole system. The images obtained for each profile are apparent resistivi pseudo-sections, which point out conductive and resistive areas related to the presence of fractures or voids, corresponding to lateral variations of lithology, clay content or water content. Inversion software such Res2DInv can be used to transform the resistivity pseudo-section into a true resistivity section.

The main applications of CORIM are trench lay out investigations, soil studies, dike diagnosis, cavity detectio and archaeology.

Measured Apparent Resistivity Pseudosection   Unit electrode spacing 0.50 m.

Iteration 5 RMS error = 9.1 %

Inverse Model Resistivity Section   RES2DINV

CORIM

Equatorial dipole-dipole configuration

Tx   Rx (1 to 6)   ⊢ 1 m ⊣   Electronics

Towing

PRINCIPLE OF MEASUREMENT

The CORIM system uses alternating current which penetrates into the ground by capacitive coupling, and the potential differences are measured in the same way. The electrodes are simply laid on the ground, so that the whole system can be easily pulled along : this enables a much higher acquisition speed than in standard DC current prospecting where electrodes have to be driven into the ground.

An alternating current of 12 kHz is transmitted into the ground through two metallic plates with a 1.5 m spacing. This current is regulated and may be set from 2 to 8 mA depending on the field conditions.

At distances of 1 m, 2 m, …6 m from the transmitting carpet are located receiving carpets for measuring potential differences linked to the current flow in the ground. These potentials depend on the resistivity of the ground. The farther the receiving carpet from the transmitting carpet, the deeper the investigation.

Compared to wire antennas, capacitively coupled plates can be smaller in size leading to much finer resolution

The signals are digitized on each receiving carpets and are transmitted to the PC computer through a controller unit. An automatic digital processing of the data permits to compensate the natural and cultural noise and to filter electrostatic spikes. During the acquisition, the operator can monitor the curves corresponding to the measurements of each receiving dipole for checking the quality of the data.

A coding wheel measures the distance for referring the readings to the intervals along the profile.

INTERPRETATION OF RESULTS

After the acquisition, the CORIMVIEW software plots the apparent resistivity pseudo sections for an identification of the areas featuring conductive or resistive anomalies.

The RES2DINV software, in its equatorial dipole-dipole configuration, gives a quantitative interpretation of the data transforming the apparent resistivities into true resistivities and the depth levels into true depths.

TECHNICAL SPECIFICATIONS

General specifications:
The CORIM System consists in :
- 1 Transmitting carpet with 1 Transmitting unit and 1 battery
- 6 Receiving carpets with 6 Receiving units and their internal batteries
- 1 Controller unit
- 1 Coding wheel for distance measurements
- 1 PC computer

Specifications of Carpets:
- Width : 1.8 m, Length : 1 m (triangle shape)
- 2 Metallic plates (30x30 cm) on each carpet
- Spacing between the two plates : 1.5 m
- In option : Width 1.3 m, Length : 1 m, Spacing between plates : 1 m

Transmitter specifications:
- Alternating current 12 kHz
- Regulated current : 2, 4, 6 or 8 mA
- Autonomy with 7 Ah battery : ~ 8 h

Receivers specifications:
- Measuring range : 0.02 to 6 000 Ωm
- In option : 0.06 to 18 000 Ωm
- Other range on request
- Accuracy: better than 1%
- 50/60 Hz rejection: better than 100 dB
- Input impedance: greater than 20 MΩ

Acquisition specifications:
- Display of the six apparent resistivity curves in real time on PC screen
- Time sampling : 1 sample / 20 ms for each channel
- Spacing sampling : 1 reading / 0.2, 0.5, 1, or 2 m (selectable)
- Digital data processing for signal / noise enhancement
- Acquisition speed : 0.5 to a few km/h depending on field conditions