GeoResistivimeter for Time Lapse Analysis

G.Re.T.A.

Environmental Monitoring Solutions

- Fixed and energetically autonomous installation
- Soil percentage water content calculation
- Visualization and configuration via Cloud software
- Automatic Alarm messages when thresholds are reached

G.Re.T.A. is the most effective and innovative solution for Permanent Geoelectric Monitoring of the conditions of large sections of soil.

This instrument measures the alteration over time of the soil's resistivity profile, functional to the characterization of the same in terms of water content, presence of pollutants, cavities and other anomalies.

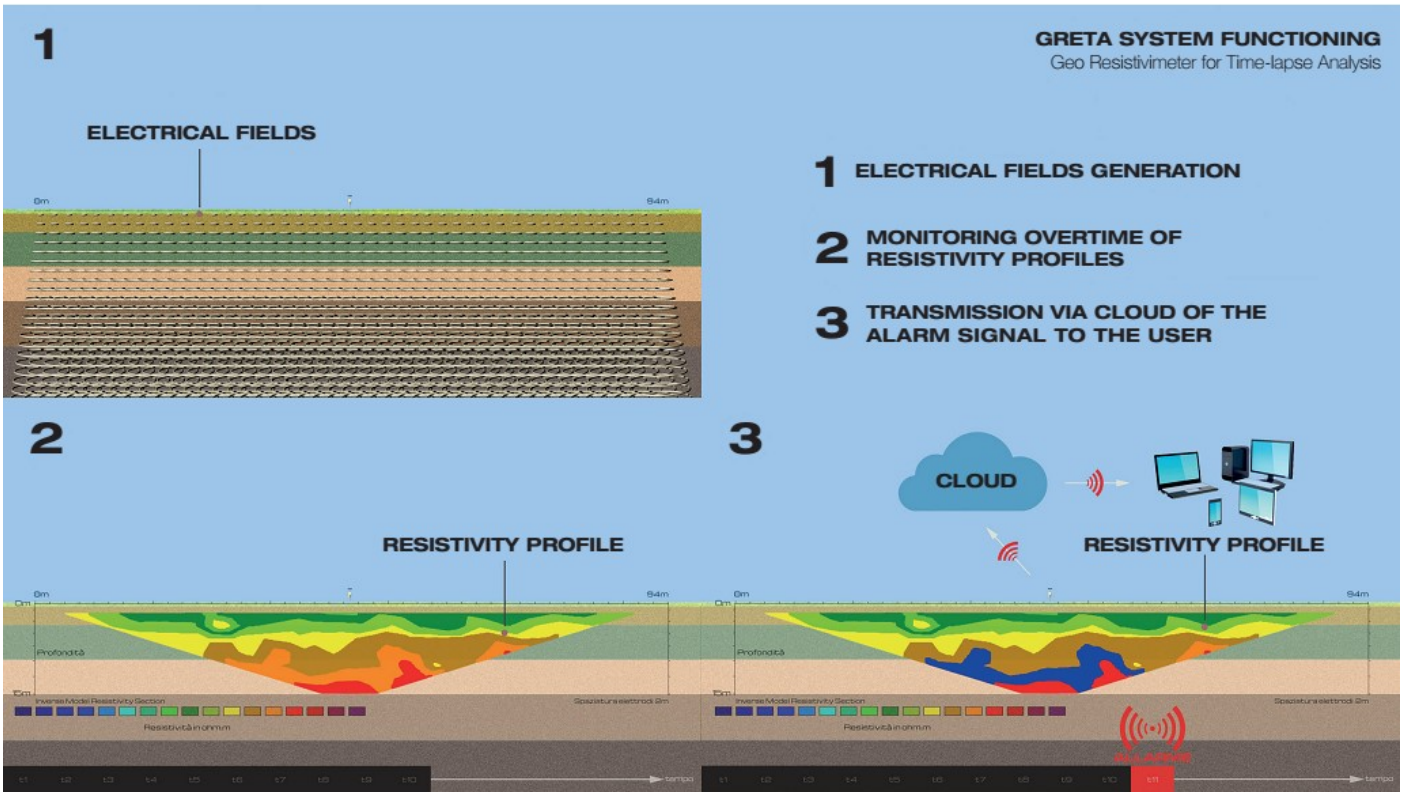
A consolidated technology

Multielectrode Electric Tomography (ERT) is based on the insertion of an electric field in the ground through electrodes (input electrodes), and the measurement of the voltage through other electrodes (measurement electrodes). From the measure of the voltage it is possible to obtain, through the second law of Ohm, the resistivity value, a peculiar characteristic of all materials.

Fields of application

- Monitoring of embankments earthen dams and levees
- Monitoring of landslides
- Monitoring of landfill and contaminated sites
- Monitoring of salt water intrusion in the groundwater layer

MW9070-ENG-01-15/07/2020



Main technical features

- Number of electrodes: 48
- Distance between the electrodes: up to 3 m
- Measured profile lenght: up to 141 m
- Max measured profile depth: upto 22,5 m
- Measurement configuration: Wenner
- Power supply: solar panel or electric grid
- Modem or Router for automatic data transmission
- Remote control and programming via LSI LASTEM Cloud
- Alarm management based on pre-defined thresholds

The heart of G.Re.T.A.

Energy efficiency

All components and operating logics have been designed to ensure the lowest energy consumption.

Filtration of any disturbing signals

The G.Re.T.A. system is able to recognize and exclude from the measurement any disturbing signals present in the ground.

Modular architecture

Each specific function of the system (current injection voltage measurement, signal switching, processing and data transmission) is implemented as an indipendent module; this favors possible maintanence activities.

Main component of G.Re.T.A.

GeoResistivimeter

- Measurement and communication Unit
- Energy supply Unit
- 48 electrodes cables in anti-rodent material

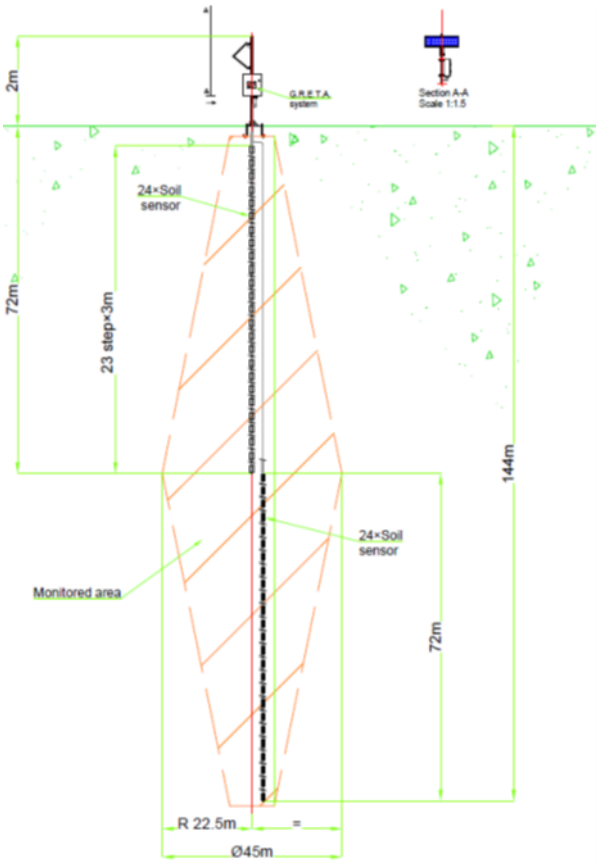
Electrodes Installation

Horizontal installation

The installation requires a small excavation (20 cm depth) to house the two cables with plate electrodes. It allows the best adherence of the electrodes to the ground and the complete protection from possible interference with external agents (people, animals, etc.)

Vertical Installation

For installation in boreholes. In this case electrodes are three wings type.

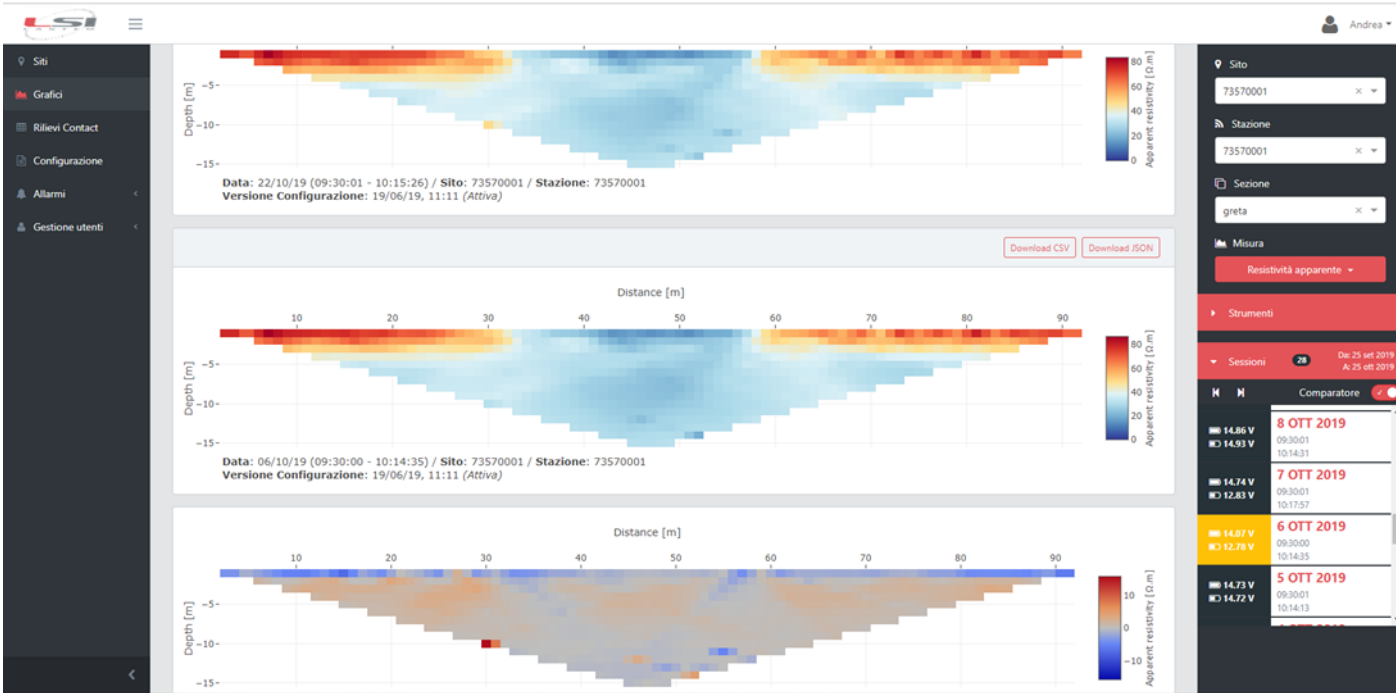


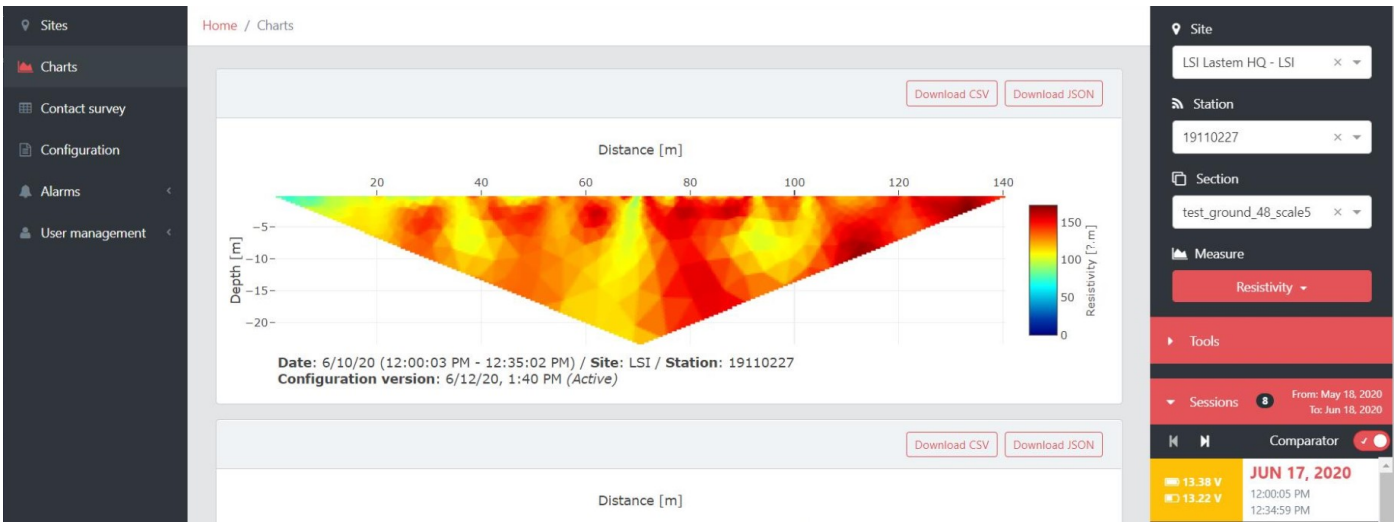
Instrument settings and data management

The Cloud software allows measurements visualization, data storage, instrument parameterization as well as the typical processing of raw data through inversion algorithms.

It also allows:

- The geo localization of the installed system
- The comparison of measurements over different periods of time with simple and intuitive graphic models
- Water content Calculation in the soil according to the resistivity data and the soil characteristics (calibration)
- Automatic transmission of alarm messages when pre-set thresholds are exceeded
- Visualization and management possible also through mobile phone





Part numbers and descriptions

G.Re.T.A. is composed of an Acquisition Unit, a Power supply Unit, Cables and Electrodes. The system is completed by web services on the Cloud platform

Unit	Part number	Description
Acquisition and Power Supply	GRT001.3	G.Re.T.A. ONE Geo-Resistivimeter,including MPU+SDU+PWR+SSU,+ 40Ah battery, 1xEth Port 4G Global Modem/Router, IP66 box
	GRT001.5	G.Re.T.A. ONE Geo-Resistivimeter,including MPU+SDU+PWR+SSU,+ 40Ah battery, 4xEth Port 4G Global Modem/Router, IP66 box
Optional An-tenna	TXANA3033	(Optional) External Antenna SMA COMBO MIMO mobile / GNSS / WIFI ROOF
Solar Panel	DYA101	Solar panel 50 W
	DYA064	Mounting for solar pannel DYA101 on meteo pole Ø 50 mm
Pole & tie rods	DYA010.1	3m meteo pole (Stainless steel AISI304). Ø 5 cm.
	DYA074	Pole mounting arm (diam. 42...65 mm) for IP66 box
	DYA021	Base for meteo poles Ø 50 mm assembly on ground
	DYA023	Set of n. 3 pickets for DYA021 or DYA021.1
	DYA028	Set of n.3 tie-rods for meteo poles
	DYA026	Set of n. 3 pickets L.1 m
Cables (2 per system)	CCECB0110	Cable with 24 electrodes / 1 m electrodes distance / w-out anti-rodent sheath
	CCECB0210	Cable with 24 electrodes / 2 m electrodes distance / w-out ranti-odent sheath
	CCECB0310	Cable with 24 electrodes / 3 m electrodes distance / w-out anti-rodent sheath
	CCECB0111	Cable with 24 electrodes / 1 m electrodes distance / with anti-rodent sheath
	CCECB0211	Cable with 24 electrodes / 2 m electrodes distance / with anti-rodent sheath
	CCECA911	Cable with 24 electrodes / 2.5 m electrodes distance / with anti-rodent sheath
	CCECB0311	Cable with 24 electrodes / 3 m electrodes distance / with anti-rodent sheath
	CCECB0220	Cable with 24 electrodes lenghtened for vertical installation / 2 m electrodes distance / w -out anti-rodent sheath
	CCECB0320	Cable with 24 electrodes lenghtened for vertical installation / 3 m electrodes distance / w -out anti-rodent sheath
Electrodes	MAGEB0001	Set of 50 stainless steel electrode fins - 40x150 mm - Plate type (vertical installation)
	MAGEB1001	Set of 50 stainless steel electrode fins - 230x128 mm - Plate type (horizontal installation)
Installation	DZZINST	Installation and Commissioning, per day, per person (traveling expenses, board and lodging EXCLUDED)
Web Services	SWCLA1100	G.Re.T.A. GeoResistivimetro Cloud - Software First Configuration
	SWCLA1022	G.Re.T.A. GeoResistivimetro Cloud - Software Annual License Fee

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