

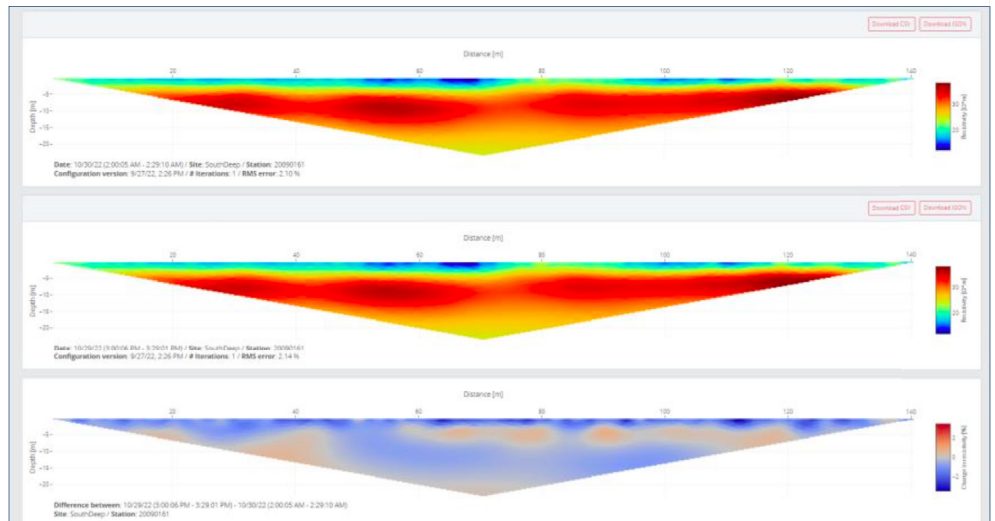
Overview

The Soil Resistivity Profiler is an electrical resistivity tomography (ERT) system that automates Wenner-type tests along an array of 48 electrodes.

The system can generate resistivity profiles of retaining structures, embankments, and landslide areas for spans up to 820 ft and depths to 120 feet.

Automation allows more frequent surveys and provides more consistent measurements. This makes it easier to distinguish seasonal variations from more important changes that may indicate the need for corrective action.

The profiler transmits every survey to the cloud via a cellular connection. The receiving server processes and stores the data and provides visualizations via a website.



Visualizations of inverted resistivity from two different days (top two plots). Details include injected current, measured voltage, and a quality factor. Difference profile (bottom) compares any two profiles.

Field Components

Electrode Cables: Electrode cables are typically embedded permanently in shallow trenches. Electrodes have 1, 2, 3, or 5 meter spacing. Thin stainless steel contact plates are attached to the electrodes at installation time.

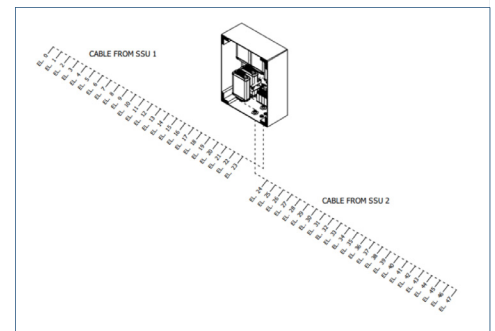
Acquisition Unit: The acquisition unit includes a controller with noise filtering and a communications module that sends measurements to the cloud.

Power Unit: The unit has four step-up transformers to supply the required voltages for testing, a battery, and a charging module for a solar panel.

Cloud Component

The Cloud component processes the survey data and provides visualization via a website.

- Geo-localization of the installed systems
- Comparison of measurements over different periods of time with simple and intuitive graphic models.
- The display of additional environmental and piezometric data if available.
- Water content calculation.
- Automated alarm messages when preset thresholds are crossed. Thresholds can be based on % change or absolute values.



Typical Layout of Electrode Cables

Technical Specifications

Current Injection Circuit (transmitter)

Number of channels: 48 electrodes.
Current modulation: 0.001 to 0.4 A.
Resolution > 120 μ A.

Current measurement

Resolution: 1 μ A.
Stability: 0.0025% VM.
Accuracy: > 60 μ A.

Electrode Voltage Measurement (receiver)

Automatic scale change.
Automatic filtering: 50 and 60 Hz.
Input impedance: 1.6 * 10¹⁰ Ω .

Scale \pm 0.47V

- Resolution: 1 μ V.
- Stability > 0,12% VM.
- Accuracy: 70 μ V.

Scale \pm 4.7V

- Resolution: 10 μ V.
- Stability: > 0.03% VM.
- Accuracy: 700 μ V.

Images and specifications courtesy of LSI Lastem