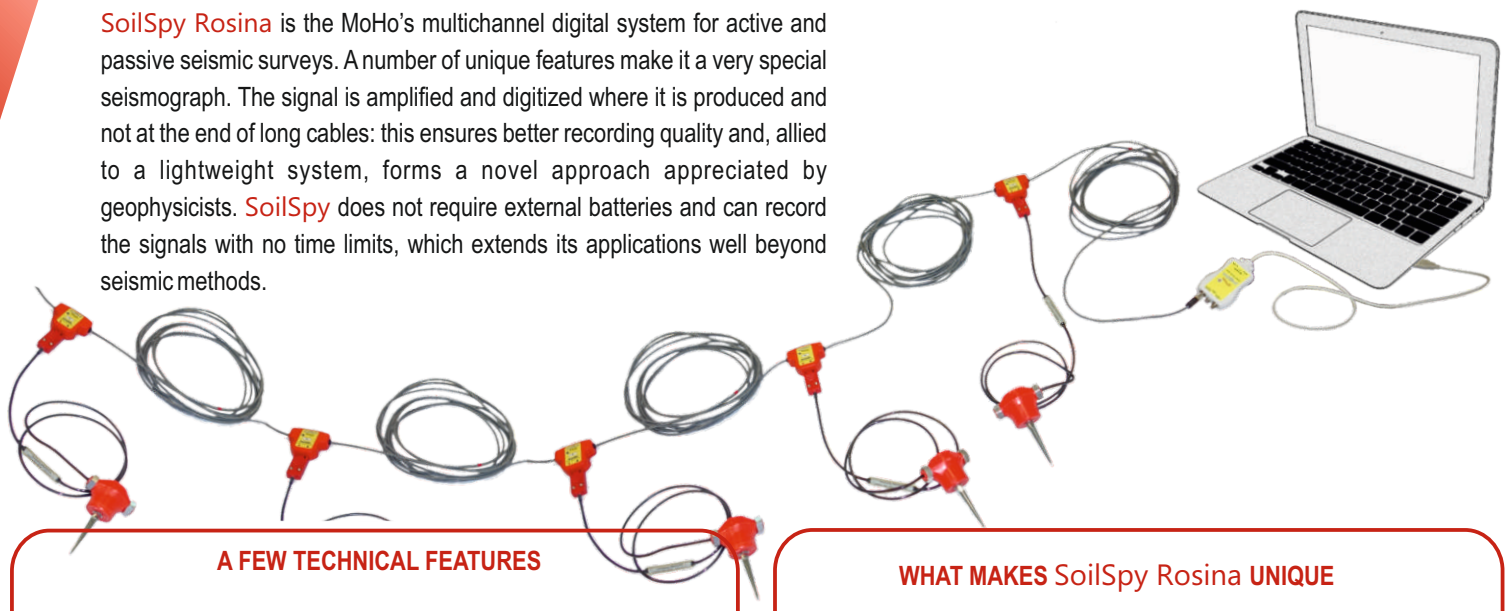
SoilSpy ROSINA

Multichannel digital seismic acquisition system: extremely light, sensitive and versatile

The extended spatial reconstruction of the mechanical subsoil properties (seismic stratigraphy) and the local measurement of elastic moduli are problems traditionally faced by multichannel seismic prospection, which includes a multitude of techniques (surface, in hole, active and passive).

SoilSpy Rosina is the MoHo's multichannel digital system for active and passive seismic surveys. A number of unique features make it a very special seismograph. The signal is amplified and digitized where it is produced and not at the end of long cables: this ensures better recording quality and, allied to a lightweight system, forms a novel approach appreciated by geophysicists. SoilSpy does not require external batteries and can record the signals with no time limits, which extends its applications well beyond seismic methods.

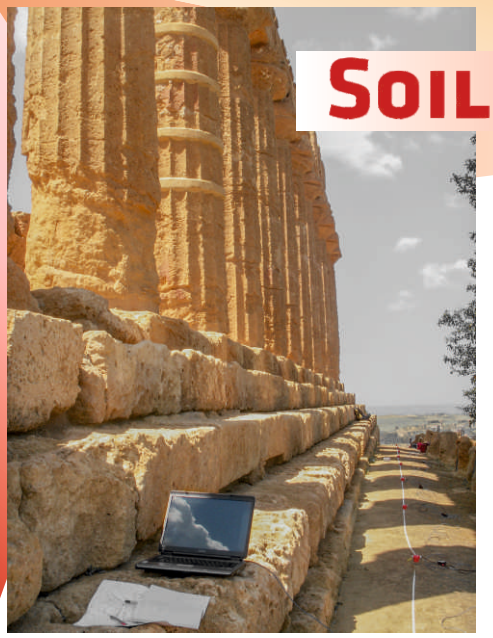


A FEW TECHNICAL FEATURES

POWER SUPPLY	3.3 V (from 5 V of the PC USB interface)
POWER CONSUMPTION	**0.55 W** (12 channels @128 Hz)
BATTERY	**non existent**. Powered from PC/pocket PC
SAMPLING	32 kHz per channel in continuous mode
A/D CONVERSION	24 bit equivalent
OUTPUT FREQUENCY (fs)	256, 512, 1024, 2048, 4096, 8192, 16384, 32768 Hz
RECORDING LENGTH	**continuous** - no limits for fs < 2048 Hz **stacking mode** - selectable, available at all sampling rates
DYNAMIC RANGE	142 dB, selectable among different levels
BAND	DC - 360 Hz
COMMON MODE REJ.	> 90 dB
CROSS-TALK	non existent (digital transmission among channels)
MAX CHANNEL NO.	255 (nominal)
TRIGGER	**each channel can be set as trigger** and acquire at the same time. No need for a separate trigger cable Classical trigger from the interface and radio trigger
PRE-TRIGGER	several options (up to 1 s)
VISUALIZATION	allows for continuous visualization in real time
STACKING / PHASE INVERSION / AVERAGING	dedicated software routine with unique features

WHAT MAKES SoilSpy Rosina UNIQUE

- **BETTER RECORDING QUALITY**. The signal does not degrade along the cable, signal-to-noise ratio is higher than any corresponding analog system, no cross-talk along the cable, precise synchronization of the channels
- **NO EXTERNAL BATTERY**. The system is powered directly by the USB port of any portable or pocket PC
- **EXTREME LIGHTNESS**. 200 g per module + 5 m cable, i.e. 3.2 kg for a 16 channel system (geophones excluded)
- **UNLIMITED RECORDING DURATION**. No compromise among sampling rate, number of active channels and recording length. Record length is limited by the PC storage capacity only
- **RADIO TRIGGERING DEVICE**. No need for a separate trigger cable to perform seismic refraction/reflection surveys
- **STACKING / PHASE INVERSION / AVERAGING** unique routine for the revision of stacks and operations on them
- **INTEGRATED INTERNAL TEST** to verify the functionality of each channel
- **MODULARITY**. Several SoilSpy Rosina systems can be linked to form a unique deployment



SoilSpy *bringing the past of multichannel systems to a new life*

SoilSpy Rosina can perform:

- P and S wave refraction surveys
- reflection surveys
- 1D (e.g., ReMi™) and 2D (e.g., SPAC, ESAC) passive seismics
- surface wave based active seismics (e.g., SASW, MASW, FTAN)
- down-hole and cross-hole surveys
- long monitorings

Several kinds of passive sensors can be connected to the system.

SoilSpy Rosina software allows to set the acquisition parameters, to view the recordings and pre-process data.

Two acquisition modes are available: 1) continuous (Figure 1) and 2) fixed duration after trigger (Figure 2). The software allows to review all the acquired time-segments, to discard the noisy ones, to stack or subtract them (phase inversion routine for S-wave refraction surveys), to pick the various phases. Several options are available for manual and automatic gain setting, trigger setting and to check the system functioning.

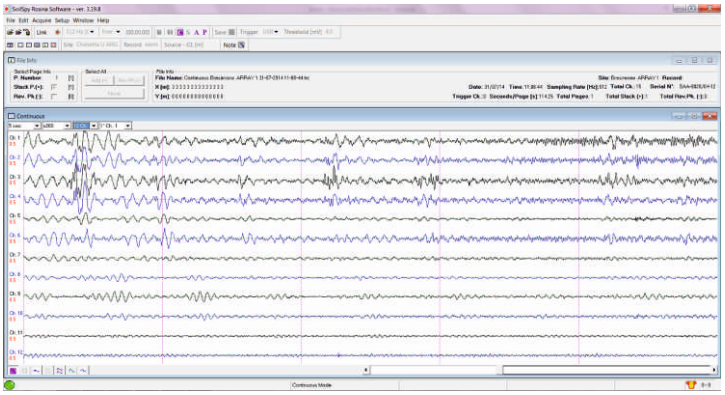


Figure 1. Passive seismic recording

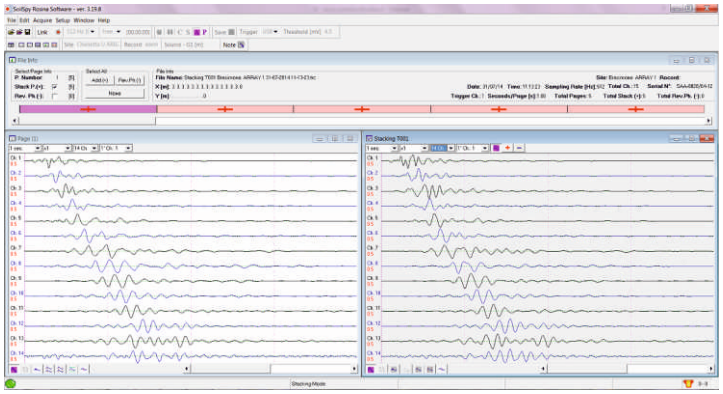


Figure 2. Passive seismic recording and first-processing windows

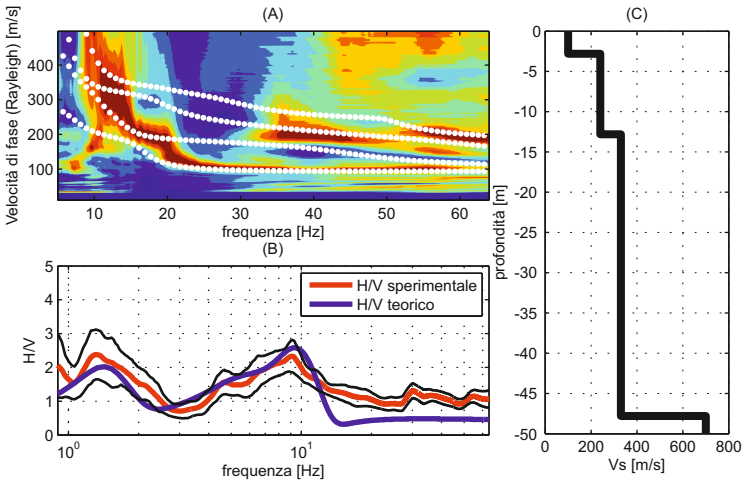


Figure 3. Joint fit of H/V and dispersion curve

The GRILLA software stores in a database the recordings acquired by SoilSpy Rosina, allows to determine the surface wave phase velocity spectra (ReMi™, MASW, ESAC, etc.) and to model surface wave (Rayleigh and Love) phase velocity dispersion curves in the fundamental and higher modes.

GRILLA allows to plot virtually infinite velocity spectra from recordings acquired by SoilSpy Rosina in continuous mode and allows joint fitting of H/V and dispersion curves (Figure 2).

GRILLA compiles an automatic report in Microsoft Word™ format, including tables and figures.

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