# SoilSpy Rosina

Multichannel digital seismic acquisition system: extremely light, sensitive and flexible in use

SoilSpy Rosina is the new hardware and software concept of multichannel digital system for all active and passive seismic surveys.

SoilSpy Rosina is a digital data transmission cable along which the amplification/digitization modules are attached, each one to be connected to a sensor (usually a geophone). The system is designed to work with any portable or pocket PC with Windows™ OS.

The *Grilla* software allows to store the recordings of SoilSpy Rosina and to analyze them together with the recordings of TROMINO®.

## SoilSpy Rosina... *it's time to move to digital!*

Some advantages of moving to digital:

- **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

Additional exclusive features of SoilSpy Rosina:

- **NO EXTERNAL BATTERY**. The system is powered directly from the USB port of any portable or pocket PC

- **EXTREME LIGHTNESS**. Less than 200 g per module + 5 m cable, i.e. less than 2.4 kg for a standard 12 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

- **THRESHOLD TRIGGERING**. Each channel can be set as a trigger channel. No need for a separate trigger cable

- **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

### A FEW TECHNICAL FEATURES

| | |
|---|---|
| POWER SUPPLY | 3.3 V (from 5 V of the PC USB interface) |
| CONSUMPTION | **7.5 mA** per channel @256 Hz |
| | **8.1 mA** per channel @512 Hz |
| | **9.4 mA** per channel @1024 Hz |
| | Interface: **20 mA** |
| POWER CONSUMPTION | **0.55 W** (12 channels @128 Hz) |
| BATTERY | non existent. Powered from PC/pocket PC |
| SAMPLING | 89 kHz per channel in continuous mode |
| OUTPUT FREQUENCY (fs) | 128, 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 |
| 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 a trigger** and acquire at the same time. No need for a separate trigger cable |
| PRE-TRIGGER | several options (up to 1 s) |
| VISUALIZATION | allows for continuous visualization in real time (for fs < 2048 Hz) |
| STACKING / PHASE INVERSION / AVERAGING | dedicated software routine with unique features |

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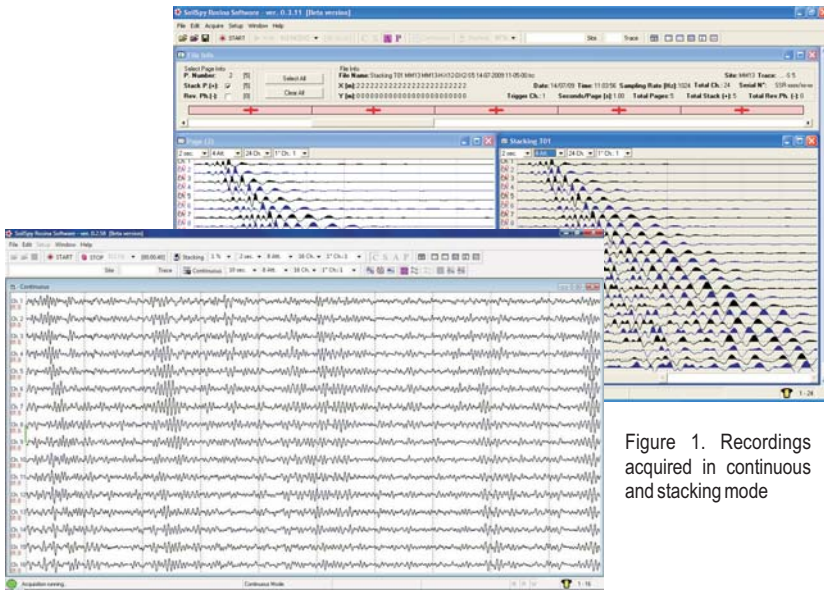
Figure 1. Recordings acquired in continuous and stacking mode

**SoilSpy Rosina** is extremely flexible and allows to perform:

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

**Any kind of sensor can be connected to the system.**

SoilSpy Rosina software (Figure 1) allows to set the acquisition parameters, to view the recordings and pre-process data.

Two acquisition modes are available: 1) continuous mode and 2) fixed duration after trigger. 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. Several SoilSpy Rosina units can be linked in a single deployment.
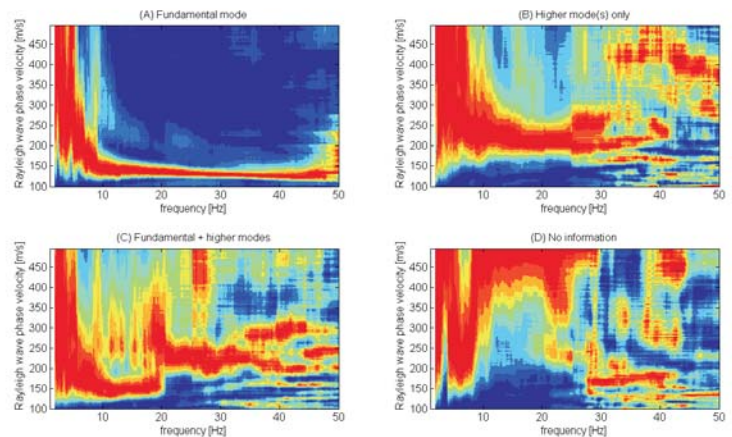


Figure 2. Rayleigh wave phase velocity spectra at the same site, from the same array, at different times, in a passive seismic survey
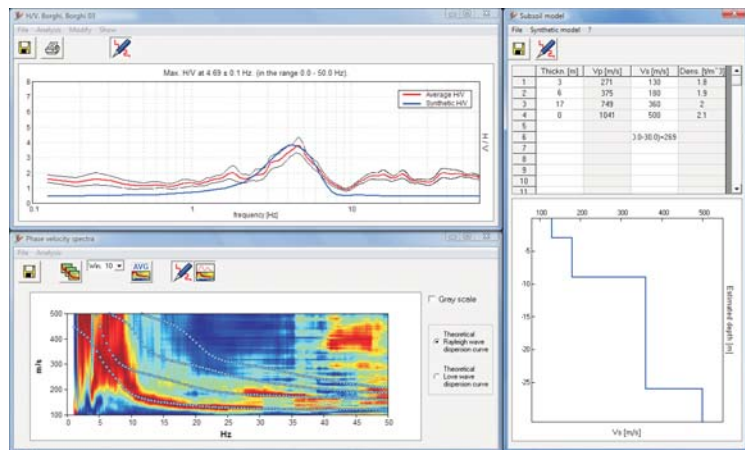


Figure 3. Joint fit of H/V and dispersion curve

The *Grilla* software manages in a database the recordings acquired by SoilSpy Rosina, allows to determine the surface wave phase velocity spectra (ReMi™, MASW, 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. The user can recognize the different vibration modes also in passive seismic surveys (Figure 2).

*Grilla* allows also joint fitting of H/V and dispersion curves (Figure 3, cfr. the TROMINO® brochure).

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

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