



# TROMINO®

## THE REACTIVE TROMOGRAPH

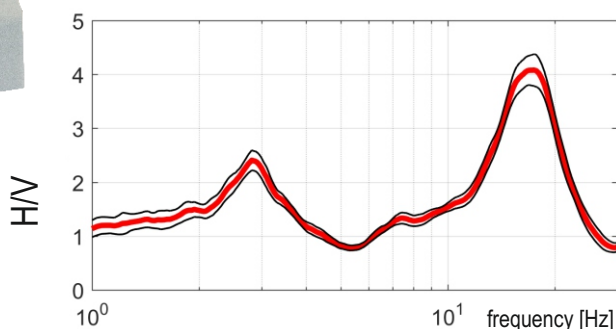
The first all-in-one instrument for the dynamic characterization of soils, structures and more...

Minimum size and power consumption  
Maximum versatility

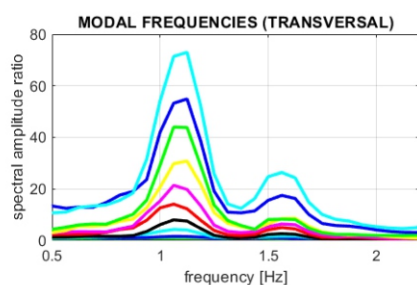
TROMINO® is the first brick for any wall

- 3 velocimetric channels with adjustable dynamic range and sensitivity: from microtremors (up to  $\pm 0.5$  mm/s) to strong vibrations (up to  $\pm 5$  cm/s)
- 3 accelerometric channels ( $\pm 2$  g)
- 1 analog channel (e.g., external trigger for MASW and refraction)
- operating range [0.1, 1024] Hz on all channels with A/D conversion at 24 real bits
- GPS receiver with internal and/or external antenna for positioning and absolute timing/synchronization among different units
- built-in radio module for synchronization among different units and alarm transmission (e.g., signal above threshold)

- Unique feature! Radio triggering tool for MASW and refraction surveys with a single-station, cableless system!



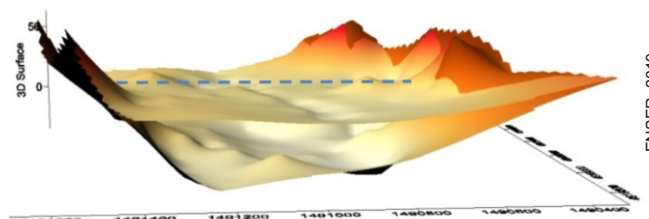
The new **TROMINO® BLU**, with an increased sensitivity, can be controlled also by mobile devices. Download the app!



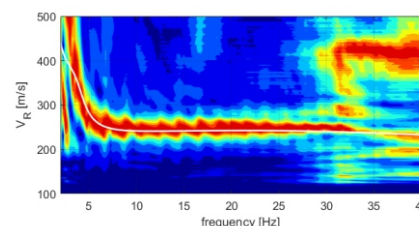
TROMINO® has a variety of applications in **engineering geology** and **seismic engineering**, both in single station and network configuration. A few examples:

### GEOLOGY

- seismic site effect assessment and seismic microzonation
- passive seismic stratigraphy

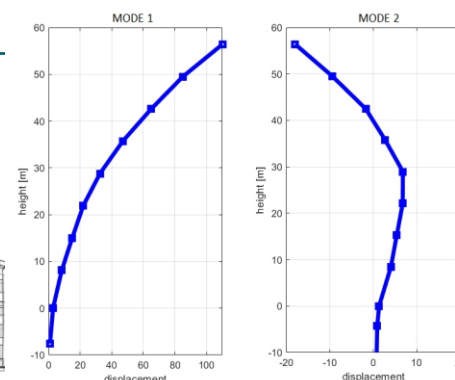
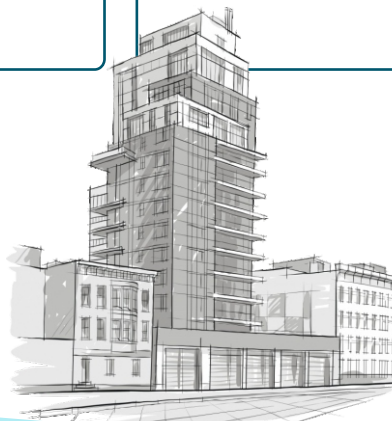


- Vs30/VsH estimation from constrained H/V curve fit
- active and passive seismic arrays (MASW, ReMi™, ESAC, FTAN), P and S wave refraction (requires radio\GPS synchronization or the wireless trigger)



### ENGINEERING

- modal analysis of structures (single station or synchronized multi-station approach)
- vibration monitoring



**TROMINO®** is an ultra-portable package:

- no external cables
- very small size (10 x 14 x 8 cm)
- very light weight (~1 kg)

with very low consumption:

- powered by an internal Li-ion battery
- works also on AC adapter for long monitoring



**TROMINO®** can now be fully controlled (also vocally) by mobile devices, through the Tromino® App.

**TROMINO®** can record in continuous mode or for predefined time intervals. Starting is manual or on threshold. It can work in stand-alone mode or in network configurations through the software tool *Tromino Manager*. This allows to continuously view and save data acquired on remote stations and to send threshold-based alarms on-line or via e-mail. *Tromino Manager* controls networks of **TROMINOs®** connected via radio to a master **TROMINO®**.

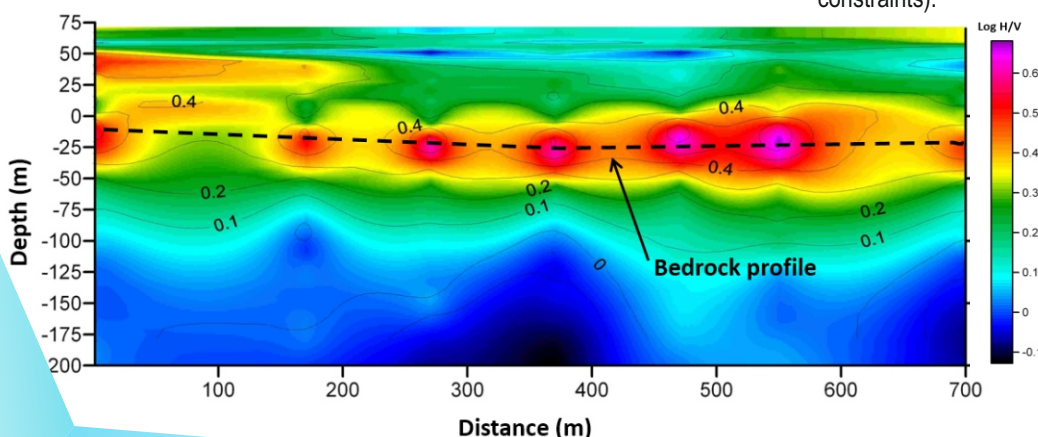
**GRILLA** is the user-friendly software to archive and analyze the recordings of **TROMINO®**.

Site	Trace	Serial no.	Day	Start	End	Length	fs [Hz]	GI
42	EXAMPLE	TR 0011	E3-0078/01-1	23/08/14	12:50:05	13:10:05	20' 0"	128
43	EXAMPLE	TR 0012	E3-0078/01-1	23/08/14	13:48:28	14:08:28	20' 0"	128
44	EXAMPLE	TR 0013	E3-0078/01-1	11/08/14	18:49:42	19:09:42	20' 0"	128
45	Gallipoli (Settembrini)	ROMANO 1	EN-0004/01-0	15/02/10	09:46:33	09:56:34	10' 0"	128
46	Gallipoli (Settembrini)	ROMANO 2	EN-0004/01-0	15/02/10	09:59:39	10:09:40	10' 0"	128
47	Gallipoli (Settembrini)	ROMANO 3	EN-0004/01-0	15/02/10	10:17:22	10:27:23	10' 0"	128
48	Genova	[EW] Beveri_array 0001	SSR-PSEUDOC	14/04/10	09:42:44	09:51:56	4' 5"	512
49	Genova	[NS] Beveri_array 0001	SSR-PSEUDOC	14/04/10	09:42:44	09:51:56	4' 5"	512
50	Genova	[Z] Beveri_array 0001	SSR-PSEUDOC	14/04/10	09:42:44	09:51:56	4' 5"	512
51	Genova	Beveri_array 0001	TR-ES01/01-0	14/04/10	09:42:44	09:51:56	9' 12"	512
52	Genova	Bisegno	EP-0047/01-0	14/04/10	11:48:15	12:02:17	14' 0"	128
53	Genova	Bisegno2	TR-ES01/01-0	14/04/10	10:56:10	11:08:32	48' 48"	128

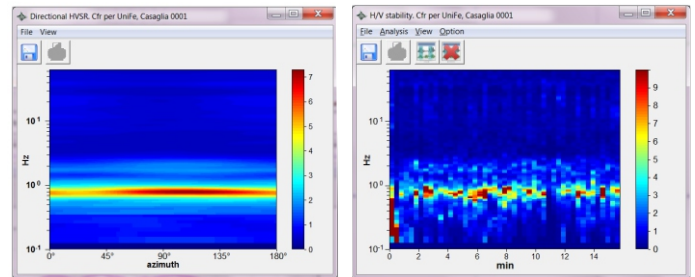
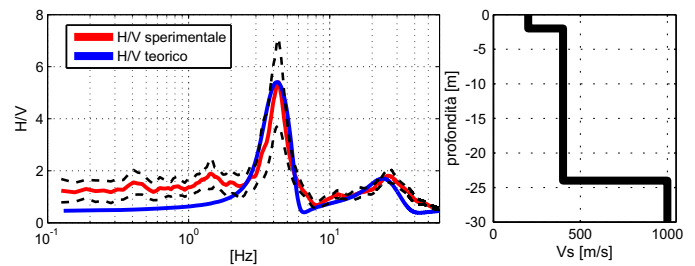
The main modules of **GRILLA** are:

**EXTENDED H/V ANALYSIS.** Full spectral analysis, H/V curves to estimate soil resonances, **constrained H/V fit to get Vs profiles**, trace cleaning in the time- and frequency-domains, statistical testing of significance of the results based on the European guidelines, 'reference site' method, comparison among different analyses and recordings. Automatic editable reports including tables and figures.

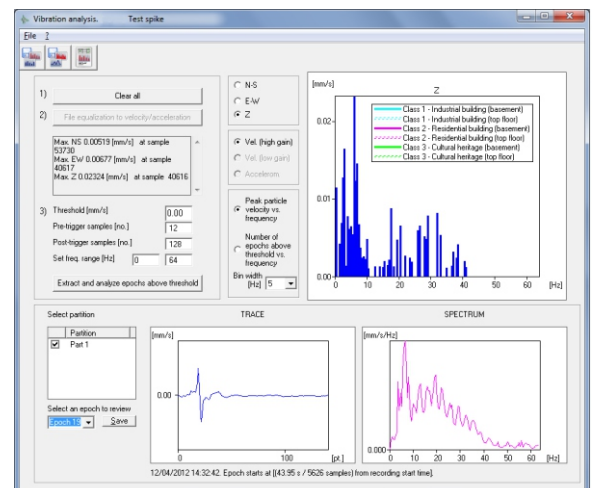
**MODAL ANALYSIS OF STRUCTURES.** Module to derive the modal frequencies shapes and damping of structures from experimental data.



**JOINT FIT OF H/V AND DISPERSION CURVES.** Subsoil velocity profile from joint fitting of H/V, active (MASW, etc.) and passive (ReMi™, ESAC, SPAC, passive MASW, etc.) array surveys.



**VIBRATION ANALYSIS.** Sorting and spectral analysis of signal sections above thresholds, according to the European regulations on strong vibrations in structures. Automatic editable reports including tables and figures.



**H/V+ CONTOURING MODULE.** To provide a synthetic and understandable view of H/V recordings acquired in 2D or 3D configurations. Useful to map the continuity of the main seismic reflectors (the shift from the frequency to the depth domain requires additional constraints).

**Resource Potentials**  
Geophysical Consultants to the Resource & Environmental Industries

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**MOHO**  
SCIENCE & TECHNOLOGY