

## VIII Forum Nazionale delle Misure



# OGS

Istituto Nazionale  
di Oceanografia  
e di Geofisica  
Sperimentale

## Centro di Taratura Sismologico di OGS

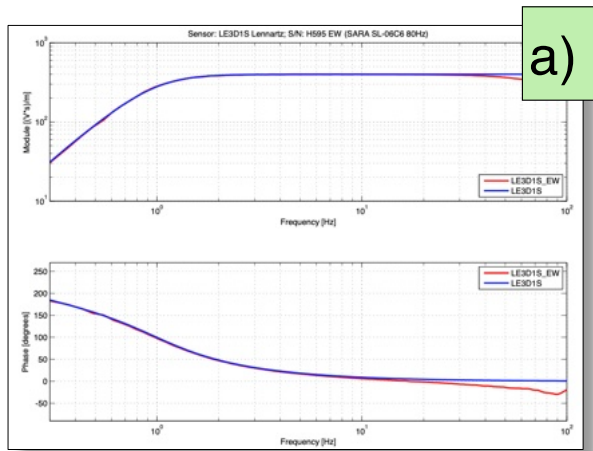
Autori: D. Zuliani, A. Compagno, E. Del Negro, M. Bertoni, P. Di Bartolomeo, H. Siracusa, P. Ziani, G. Capotosti, G. Rossi, P. Bragato, M. Picozzi.

Garden Toscana Resort - San Vincenzo / 12-14 Settembre 2024

# Centro di Taratura Sismologica

## Motivazioni

- Verifica, a priori e a posteriori, dei sensori in dotazione.
- Certificazione.
- Calibrazione di sensori sperimentali.



calibration laboratory

### Factory Calibration Certificate

Calibration mark

Calibration Object: PCB  
Manufacturer: PCB  
Type: 370152FA30  
Serial number: 8881  
Customer: [blank]  
Order No.: [blank]  
Number of pages of the certificate: 3  
Date of calibration (dd-mm-yyyy): 9/14/2024

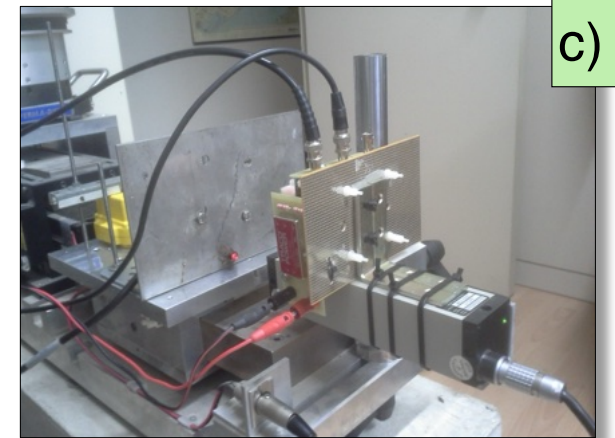
Calibration is carried out using standards that are traced back to national standards for the realization of units according to the International System of Units (SI).  
The user is obliged to have the object recalibrated at appropriate intervals.

Reference Measuring Equipment	Manufacturer	Type	Serial Number
Vibration exciter	SFEXTRA	APS 120-MF	1327
Laser Vibrometer	Polytec	VibraX	37764-120-VIB-X-F-110
Calibration System	SFEXTRA	VCL15	202402

The calibration certificate may not be reproduced other than in full accord with the permission of the issuing laboratory. Calibration certificates with the full name of the approval responsible person are valid without signature.

Seal: Date (dd-mm-yyyy): 9/14/2024 Head of the calibration laboratory: CS user Person in charge: CS user

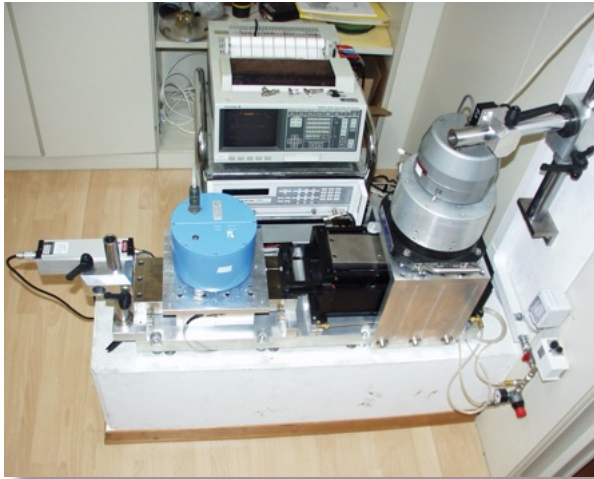
Sample Company 1234  
Sample Street 12, DE-12345 Sample City





## Tipologie di sensori

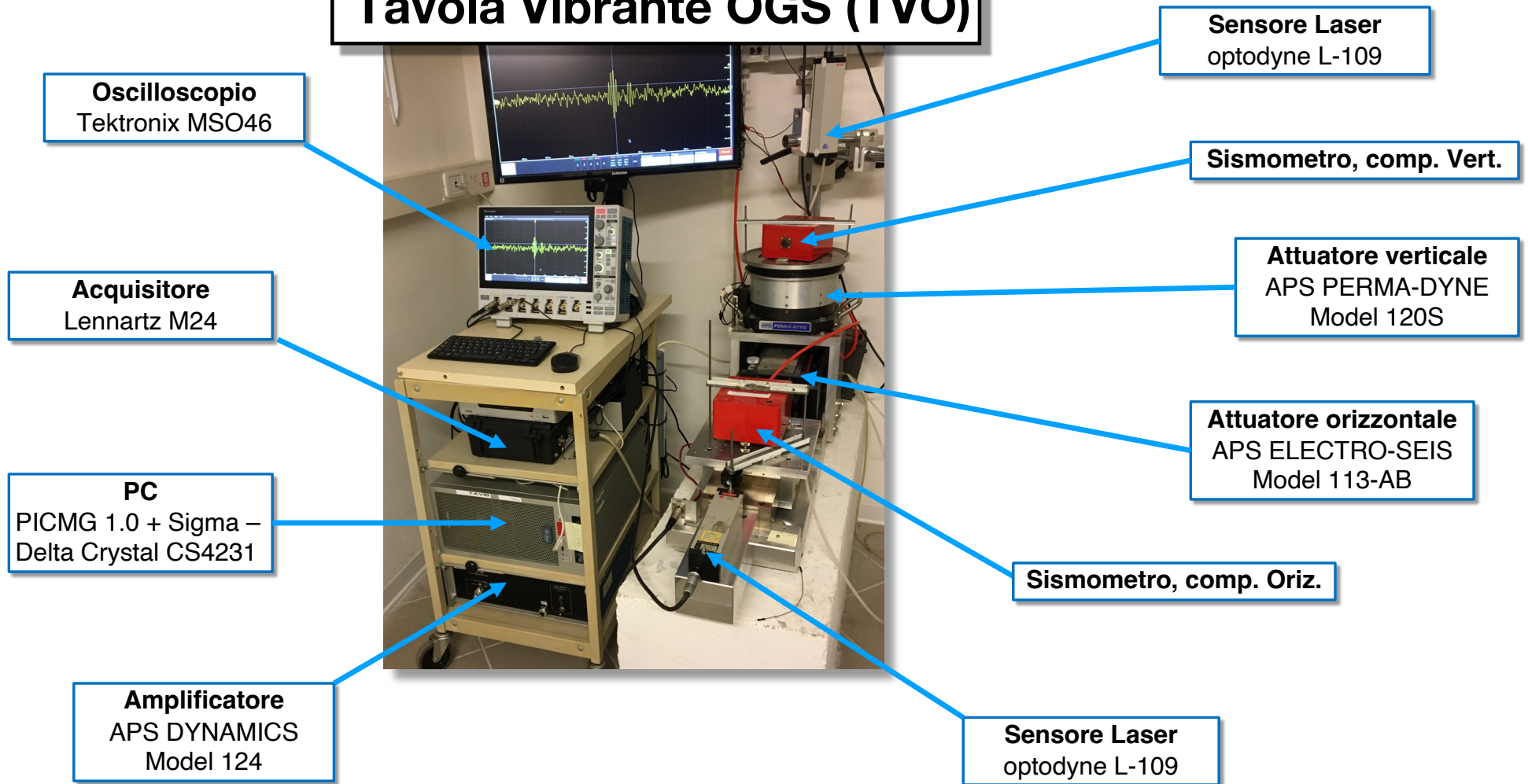
- Velocimetri: sismometri short-period e broad-band.
- Accelerometri: strong-motion.
- Sensori di posizione: GNSS.



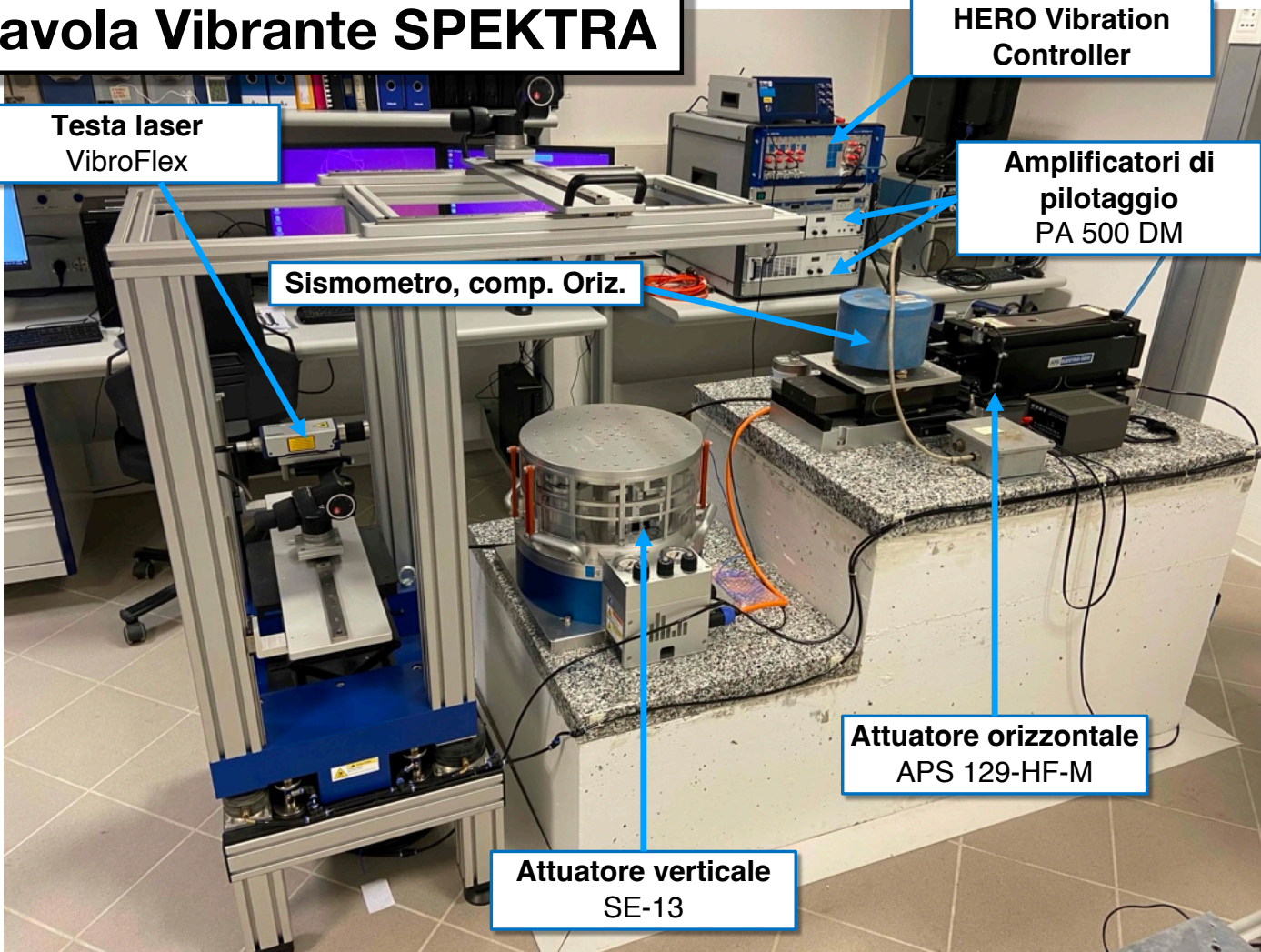
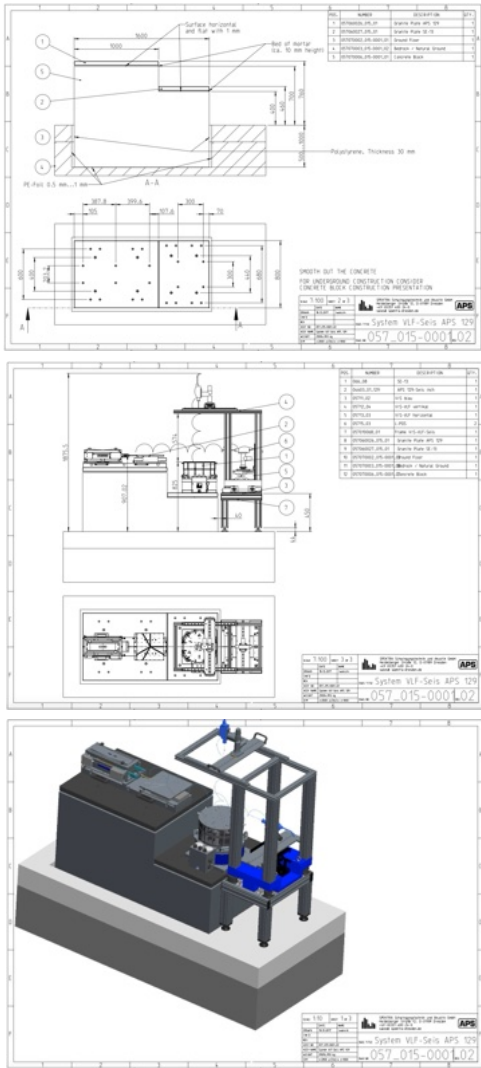
## Tavole Vibranti in dotazione

- Tavola Vibrante OGS (TVO).
- Tavola Vibrante SPEKTRA.
- Tavola Vibrante ATOM.

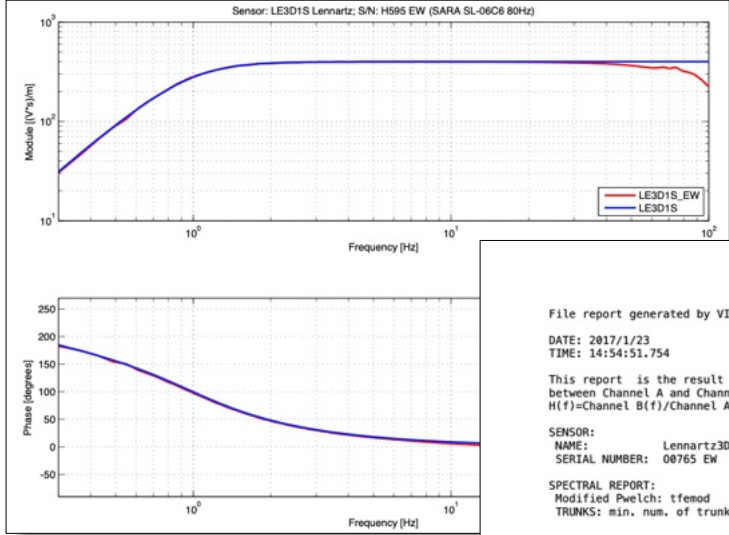
# Tavola Vibrante OGS (TVO)



# Tavola Vibrante SPEKTRA



# Report delle calibrazioni



File report generated by VIBROCALC Ver. 1.25

DATE: 2017/1/23  
TIME: 14:54:51.754

This report is the result of spectral calculations between Channel A and Channel B as a following form:  $H(f)=\text{Channel B}(f)/\text{Channel A}(f)$

SENSOR:  
NAME: Lennartz3D1S  
SERIAL NUMBER: 00765 EW

SPECTRAL REPORT:  
Modified Welch: tfemod  
TRUNKS: min. num. of trunks [20]

Frequency Response:		
f [Hz]	H(f)  [V/(m/s)]	ang(H(f)) [°]
0.100	2.580784053	48.726
0.200	9.672980615	32.090
0.300	30.654248413	8.095
0.400	57.316995400	-7.806
0.500	90.736077626	-25.140
0.600	126.681570058	-38.507
0.700	177.137726037	-50.849
0.800	211.843486541	-60.489
0.900	253.639095638	-70.415
1.000	285.003789047	-81.772
2.000	390.322480139	-134.416
3.000	399.336057141	-152.328
4.000	399.069806914	-161.291
5.000	400.886695070	-167.176
6.000	400.347800816	-171.407
7.000	399.539522259	-174.757
8.000	399.604000461	-177.571
9.000	399.872160657	-179.964
10.000	399.481229703	-182.166
20.000	404.398644106	-198.094
30.000	400.538900661	-211.238
40.000	403.145984104	-223.615
50.000	398.722266730	-235.189

Tavola Vibrante OGS (TVO)

### Factory Calibration Certificate

calibration laboratory

Calibration mark

Page 2 / 3 of calibration certificate

WK  
Cal Lab

Calibration Object: PCB  
Manufacturer: 3701Q2FA3G  
Type: 8801  
Serial number: 3  
Customer: 5/14/2024  
Date of calibration (dd.mm.yyyy)

Reference Measuring Equipment

Manufacturer	Type	Serial No.
SPEKTRA	APS 129-HF	1327
Laser Vibrometer	Polytec VibroFlex VFX-130-VFX-F-110	0379002
Calibration System	SPEKTRA VCU15	202402

Seal Date (dd.mm.yyyy) 5/14/2024 Head of the calibration laboratory CS user Person in charge

Sample Company 1234  
Sample Street 12, DE-12345 Sample City

Tavola Vibrante SPEKTRA

### Results - Frequency Response

Item 1

Frequency [Hz]	Velocity Peak V/(m/s*)	Acceleration Peak [m/s²]	Sensitivity [mV/(m/s²)]	Deviation [%]	Phase [°]
0.10	0.01	0.01	100.4772	-2.34	9.103
0.20	0.02	0.02	102.4218	-0.45	4.706
0.40	0.04	0.09	102.7612	-0.12	2.277
0.80	0.08	0.38	102.8373	-0.05	1.049
1.60	0.15	1.52	102.8224	-0.06	0.342
3.15	0.20	3.96	102.8381	-0.05	-0.189
6.30	0.13	5.00	102.8848	0	-0.817
12.50	0.06	5.00	102.9096	0.02	-1.837
25	0.03	5.00	102.9588	0.07	-3.805
50	0.02	5.00	103.4278	0.53	-7.671
100	0.01	4.99	104.9027	1.96	-15.469
200	0.00	5.00	109.5624	6.49	-34.002

Sample Company 1234  
Sample Street 12, DE-12345 Sample City

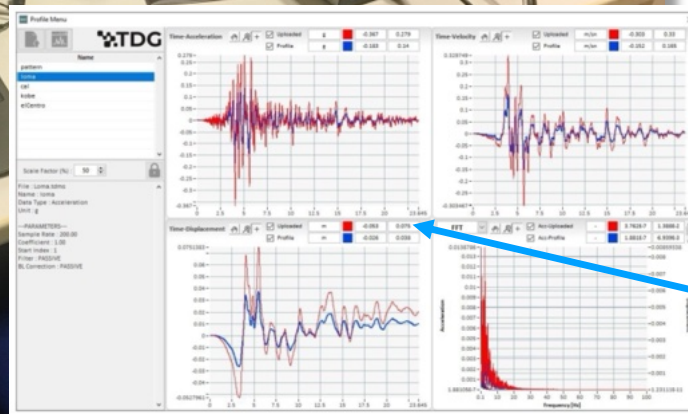
# Tavola Vibrante ATOM

**STEPPER MOTOR**  
Servomotore

**Carrello**  
Dim: 250mmx250mm

**Elettronica**  
Sistema di controllo PID +  
alimentatore e interfaccia PC

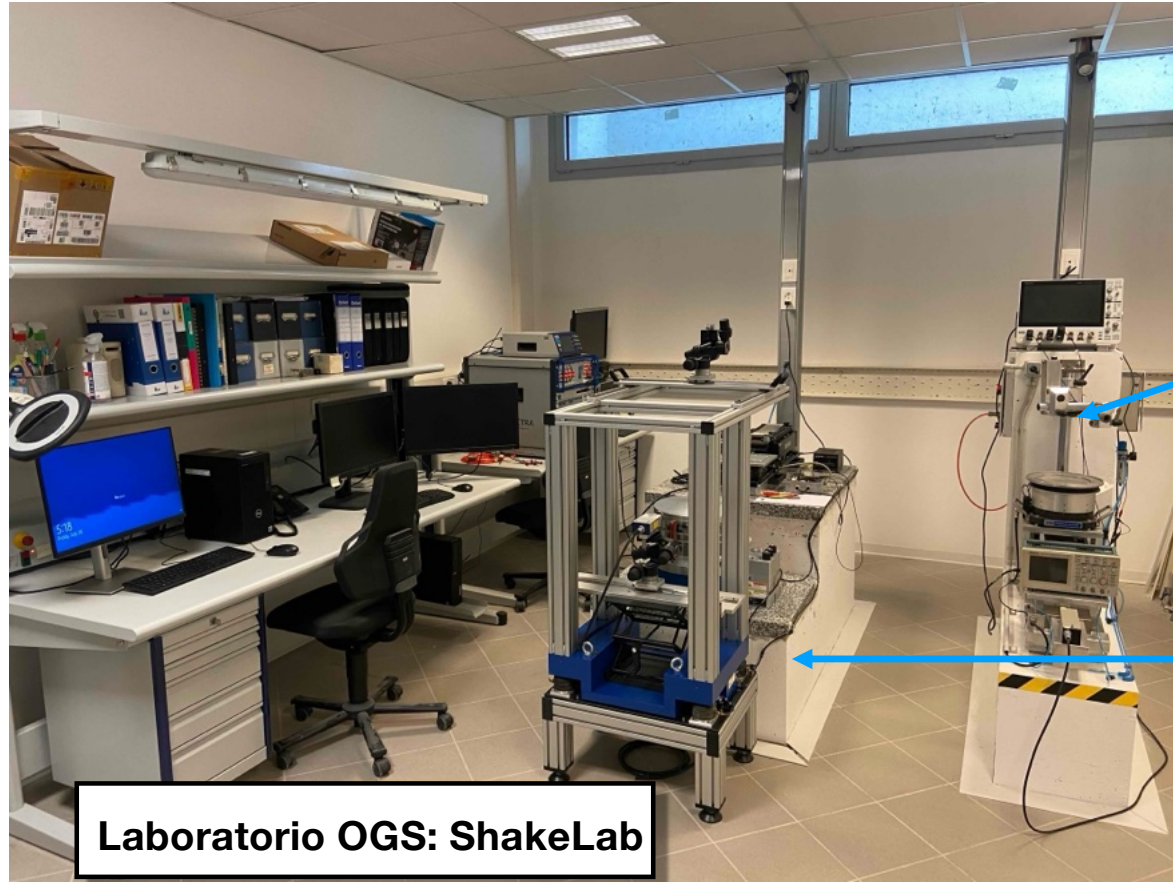
**Laptop**  
Per la gestione via  
cavo ethernet della  
tavola ATOM



**Software di gestione**

- Generazione segnali di pilotaggio
- Lettura sensori

# Centro di Taratura Sismologico di OGS



Laboratorio OGS: ShakeLab

## Tavola Vibrante (TVO)

- Calibrazione primaria.
- Calibrazione continua con **segnali qualsiasi**.
- Calibrazione di sensori con A/D incorporato.

## Tavola Vibrante SPEKTRA

- Calibrazione primaria.
- Calibrazione secondaria.
- Calibrazione con segnali sinusoidali
- **ISO 16063-11**
- **ISO 16063-41**



## Attività future

- Accreditamento Tavola Vibrante **SPEKTRA** (Accredia).
- Inizio attività su sistemi GNSS cost-effective con Tavola Vibrante **ATOM**.
- Sviluppo di soluzioni sperimentali custom su **TVO**.

- Inserimento in circuiti europei per il Transnational Access (**TNA**).
- Attivazione **servizi di calibrazione** per enti terzi (pubblici e privati).

## Riconoscimenti

La Tavola Vibrante SPEKTRA è stata realizzata con il cofinanziamento dell'Unione europea – Next Generation EU - Missione 4, “Istruzione e Ricerca” - Componente 2, “Dalla ricerca all'impresa” - Linea di investimento 3.1, “Fondo per la realizzazione di un sistema integrato di infrastrutture di ricerca e innovazione” – Progetto IR0000032 – **ITINERIS** - Italian Integrated Environmental Research Infrastructures System - CUP B53C22002150006.