

ADVANCED SCIENTIFIC SENSORS AND SYSTEMS

Founded in 2017, Advanced Scientific Sensors and Systems s.r.l. proposes innovative modular solutions for the design and implementation of monolithic mechanical linear and angular seismometers and accelerometers for scientific, civil and industrial control and monitoring applications.

The proposed technology, based on the innovative UNISA Folded Pendulum Technological Platform, is state-of-the-art in the design and implementation of low-frequency monolithic mechanical oscillators, key elements of high sensitivity low frequency broadband mechanical seismometers and accelerometers.

This innovative technological architecture, protected by several international patents, allows effective design and implementation of modular sensors, configurable for a large variety of applications in different scientific, industrial and civil fields, including historical and cultural heritage.

The simplicity and effectiveness of the mechanical monolithic architecture and the wide variety of materials available for the implementation allow the design of customizable sensors optimized also for specific requirements, including applications in (UHV), cryogenics and hostile environments.

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Asse III - Obiettivo Specifico 3.4 - Azione 3.4.2
EROGAZIONE DI VOUCHER PER LA PARTECIPAZIONE DI MICRO E PMI
CAMPANE AD EVENTI FIERISTICI INTERNAZIONALI



ADVANCED SCIENTIFIC SENSORS AND SYSTEMS

MODULAR MECHANICAL SENSORS FOR SCIENTIFIC, INDUSTRIAL AND CIVIL APPLICATIONS

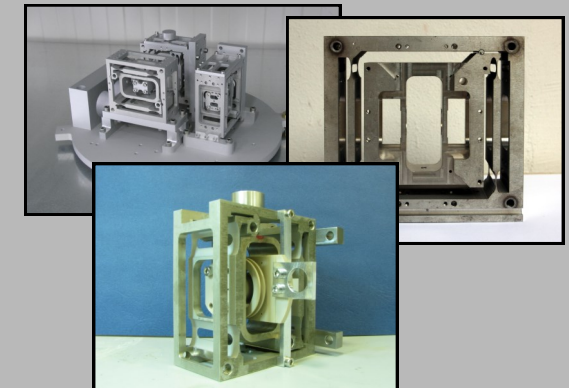
2019 Annual Meeting of the SEISMOLOGICAL SOCIETY OF AMERICA The Westin Seattle - 23-26 April 2019

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New Solutions for Monitoring and Control

MODULAR MECHANICAL SENSORS FOR SCIENTIFIC, INDUSTRIAL AND CIVIL APPLICATIONS

Typical Applications

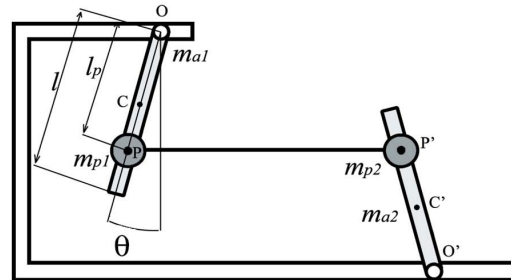
Sensors for high sensitivity broadband low frequency real-time distributed monitoring for seismology, geophysics, cultural and historical heritage (monuments), civil infrastructures (buildings, bridges, dams), oil and gas exploration.

Modular Sensors for custom applications

- Novel mechanical modular seismometers frequency tunable for low frequency high sensitivity linear and angular distributed monitoring and control of sites and structures.
- Compact mechanical oscillators (< 10 cm) frequency tunable down to 0.1 Hz.
- Sensitivity and band determined by mechanical and readout modules.
- Custom readout modules (LVDTs, optical levers, interferometers).
- Configurable as velocimeters and accelerometers with external modules.
- Application in critical environments (ultra high-vacuum, cryogenic temperatures, marine and space environments).
- Low cost fully customizable (material, frequency band, sensitivity, readout, size and weight).

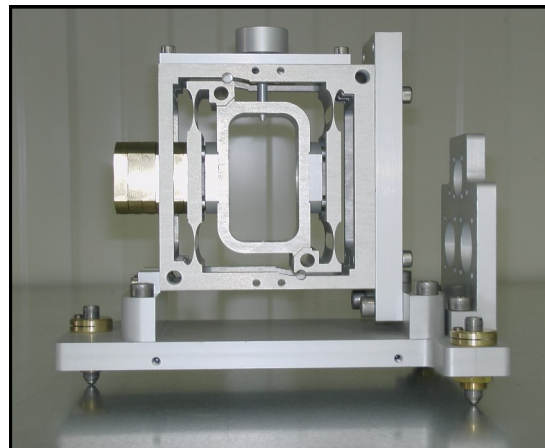
CHARACTERISTICS

- Monolithic structure
- Symmetric Architecture
- Elliptic flexures
- Mechanical Thermal Noise limited (in vacuum)
- Transducer (readout) on requirements basis.

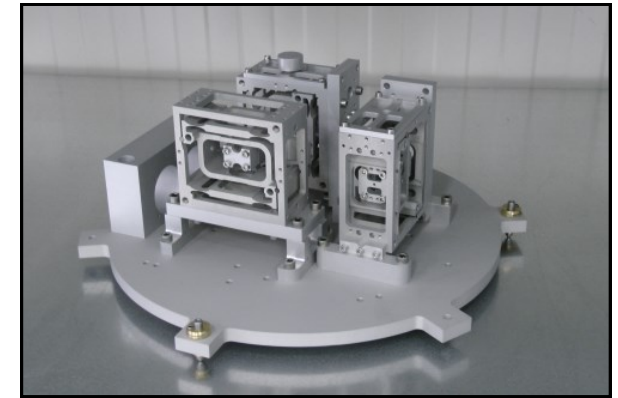


Mechanical Oscillator simplified scheme.

The innovative mechanical monolithic oscillator architecture (patented in Italy, Europe, USA, Canada, Japan, Russia and Australia) is the key element that allows modular implementations of small size, low weight and low cost effective seismometers and accelerometers, characterized by excellent sensitivity and bandwidth in the low frequency region.



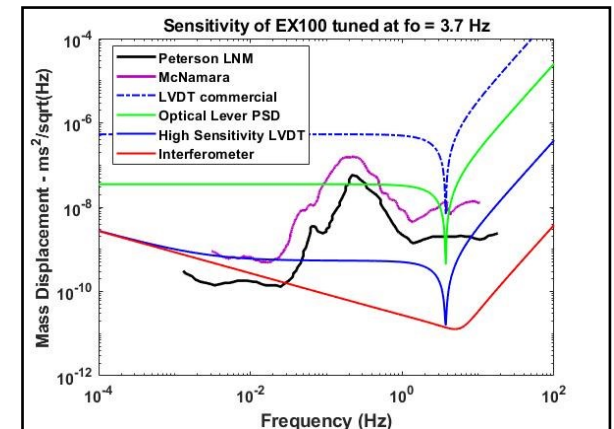
Picture of a light (< 250 g) and compact (side < 8 cm)) horizontal monolithic mechanical oscillator implemented in aluminum alloy (Al 7075-T6) and anodized for open field applications.



Picture of a compact anodized triaxial mechanical sensor (weight < 2,5 kg, diameter < 30 cm) for scientific applications.

SENSITIVITY

Tests with a variety of transducers (readouts) of different sensitivities and cost (optical levers, interferometers, electrostatic sensors, LVDT) have demonstrated the effectiveness of the monolithic mechanical oscillator applied both as seismometer and accelerometer.



Sensitivity curves of a monolithic seismometer with different transducers: commercial LVDT, optical lever and Michelson Interferometer, compared with the ground seismic noise.

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