ase
ADVANCED SLOPE ENGINEERING

mums
MODULAR
UNDERGROUND
MONITORING
SYSTEM

HORIZONTAL ARRAY

We monitor the present with the instruments of the future

AUTOMATIC REPORT

DOCUMENTATION SECTION

GEOREFERENCING OF SENSORS

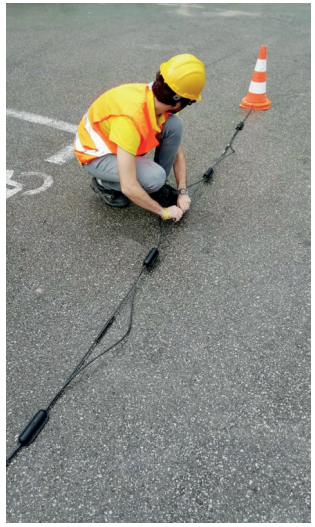
DYNAMIC GRAPHS

MONITORING DATALOGGERS

AUTOMATIC FTP

HORIZONTAL ARRAY

The Horizontal Array is an automatic inclinometer designed to detect displacements in the vertical direction, making it ideal for monitoring embankments, structures, bridges, and viaducts. It consists of a sequence of hermetically sealed IP69 nodes connected by a Kevlar cable or fiberglass rods, along with a single four-core electrical cable. Each node contains a high-resolution 3D MEMS sensor and a thermometer. The number of sensors, spacing, and overall length of the instrument can be customized according to project requirements. The Horizontal Array can be managed by GEI G802 control units or any other data logger compatible with the RS485 Modbus RTU protocol.

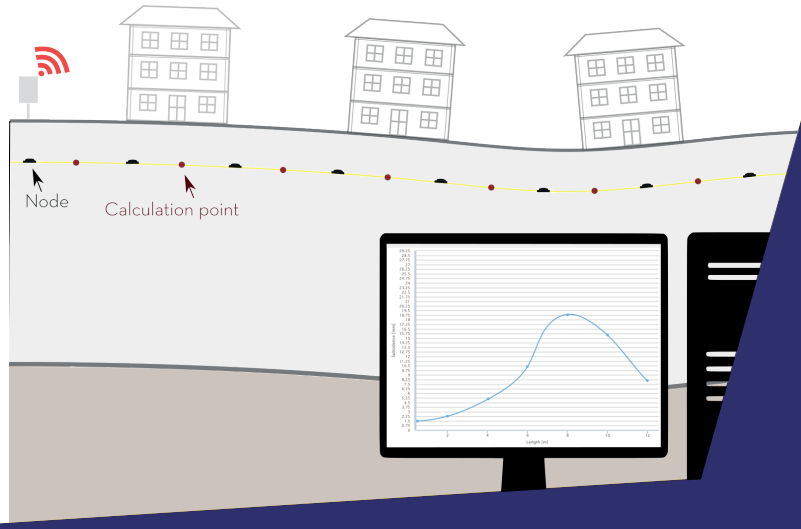


INSTALLATION

The Horizontal Array is a versatile instrument designed for installation in various configurations. It can be buried beneath a structure, installed on the surface, or placed in direct contact with the monitored structure. In the first scenario, it is recommended to install the instrument within a trench approximately 25 cm deep, while in the second case, the sensor can be directly attached to the structure using anchors

OPERATING PRINCIPLE

By knowing the distance between the nodes and tracking the orientation of the sensors in space at different time intervals, it is possible to easily and reliably calculate the local and cumulative position changes of each sensor. Additionally, the proprietary algorithm can automatically identify and correct spikes, measurement errors, and/or uncalibrated sensors.



HORIZONTAL ARRAY

RISULTATI DELLO STRUMENTO

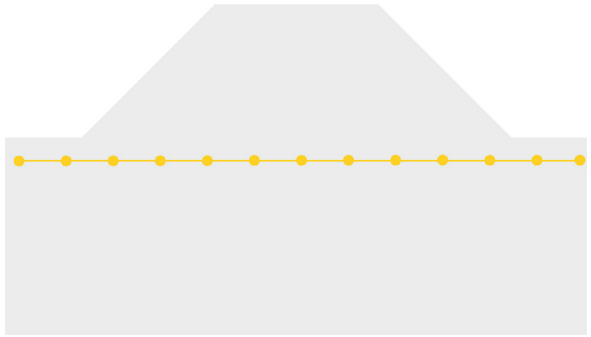
Local settlements
Cumulative settlements
Time trend of acceleration and velocity of individual displacements
Time trend of tilt and roll angles
Temperature of individual sensors
Time trend of temperature

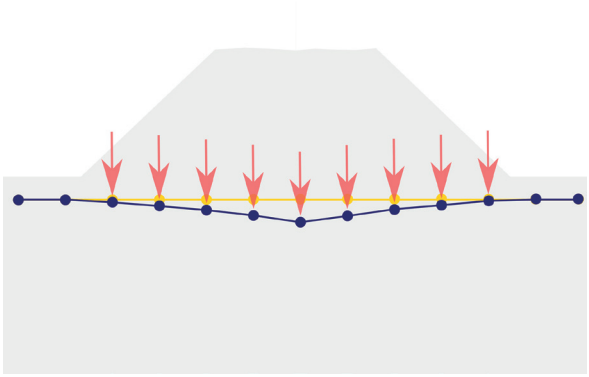
VANTAGGI

Smart
Easy and quick installation
Flexible and lightweight
Durable and suitable for long-term monitoring
Automatic alerts

DATASHEET

Sensors	3D Accelerometer, Thermometer
Measurement range	360°
Accelerometer range	± 1.2 g
Accelerometer sensitivity	105 LSB/° (0.0095°) 6000 LSB/g (0.167 mg) 0.166 mm/m
Sensitivity error	±0.7 %
Sensitivity dependence on temperature	±0.3 %
Accelerometer linearity error	±4 mg
Offset error (on absolute measure)	±1.15° ±20 mg
Offset (on absolute measure) dependence on temperature	±0.57° for X & Y, ±0.86° for Z ±10 mg for X & Y, ±15 mg for Z
Offset (on absolute measure) drift	±0.23° for X & Z, ±0.34° for Y ±4 mg for X & Z, ±6 mg for Y
Accelerometer amplitude response	40 Hz
Accelerometer temperature operating range	-40 °C ÷ +125 °C
Thermometer measuring range	-50 °C ÷ +150 °C
Thermometer sensitivity	18.9 LSB/°C (0.053 °C)
Total accuracy	Depending on MUMS chain configuration and length
Centre-to-centre between sensors	50 cm (minimum distance) 100 cm (recommended distance)
Node length, width and diameter	137 mm – 56.5 mm – 32 mm
Tensile strength of Kevlar rope	15 kN
Node weight	0.2 kg
Electrical cable	CEI 20-35





ase
ADVANCED SLOPE ENGINEERING

ADVANCED SLOPE ENGINEERING s.r.l.

43123 Loc. Pilastrello
(Parma) – Italy
Via Robert Koch, 53/A

info@aseltd.eu
+39 0521 1404292

www.aseltd.eu