P4 INFRASTRUCTURE

ShakeSense™

Product Description

ShakeSense™ is a low-cost, IoT-enabled vibration monitoring system that easily attaches to buildings, bridges, and private homes. The ShakeSense™ system measures, processes, and wirelessly transmits synthesized vibration data. It can be used to monitor, manage, and mitigate risk of damage due to vibrations. The ShakeSense™ system combines low-cost, small form factor sensors and wireless cloud connectivity to measure the effects of vibrations from construction, mining, and more.

ShakeSense™ uses a 3-axis, high sensitivity, low noise, low drift, low power accelerometer. The IP-rated enclosure makes it suitable for outdoor use. Multiple power options and multiple wireless communication protocols are available: Wi-Fi, LoRa, and cellular (it is 5G ready). ShakeSense™ is a self-contained, portable device with no maintenance required. The sensor, computer, and electronics come together in one physical unit to form an all-in-one solution. The solar re-charging of battery systems makes ShakeSense™ a truly stand-alone, maintenance-free, short or long-term vibration monitoring solution. Line power options are available.

Product Features

The ShakeSense™ vibration monitoring Platform as a Service (PaaS) has the following features:

- Low Cost
- Small Form Factor Sensors
- Wi-Fi, LoRA, or Cellular (4G/LTE, 5G) Capability
- Flexible Mounting (wall mounted, floor mounted, or ground mounted)
- Battery Powered (Solar Re-Charging Option) or 120V line power
- Outdoor Exposure Possible
- Autonomous Data Logging and Data Synthesis
- Wireless Data Transmission
- Browser-Based Dashboard for Data Display
- Dashboard Viewing on Desktop, Mobile, and Tablet Devices
- Peak Particle Velocity (PPV) Spectra Generation
- Acceleration Records for PPV Threshold Crossings
- Automatic Device Registration
- Minimal Field Setup (mount, turn on)
- Text and/or email alerts for threshold crossings

Product Specifications

The ShakeSense system includes:

- Small Form Factor: (6”x4”x3” max. dimensions)
- Lightweight (less than 5 lb.).
- Vertical or Horizontal Mounting Orientation
- Battery Power (6-month service life), Battery Power with Solar Re-Charge for perpetual service, or Wall-Wart Line Power (120 V)
- On-board 3-Axis High-Sensitivity, Low-Noise, Low-Drift, Low-power Accelerometer
- LoRA, WiFi, or Cellular Data Transmission
- Edge-Computing Capability:
  - FFT and iFFT Capability
  - Peak Particle Velocity Frequency Spectra (frequency range from 1Hz to 100 Hz)
- Browser-Based (Secure) Dashboarding of PPV Spectra for Comparison to Accepted Damage Threshold Models (*e.g.,* USBM RI 8507, BS 7385-2, SN 640 312a, DIN 4150)
- Archival of Acceleration Time Histories for Threshold Crossings
- Browser-Based Data Viewing and Download through annual software license

Product Benefits

The P4 ShakeSense™ vibration monitoring platform as a service will have the following benefits:

- Mounting of Sensors Far Easier than Current Technology (monitor many locations)
- *SIGNIFICANT* Cost Savings (use a greater number of devices for damage monitoring)
- Low Cost Means Theft and Field Damage Less Impactful (replace without breaking the bank).
- System is “Turn-key” (mount sensor, turn on, see data)
- Monitoring Flexibility (use for mining, construction, transportation, or other sources of vibration)
- Wireless Transmission (vibration monitoring can extend to greater distances from the vibration source
- Lower Insurance Costs (those responsible for construction, demolition, and mining operations can document their operations)
- Wide Market Application
  - Ambient Vibrations Due to Human Activity
  - Ambient Vibration Impact on Equipment
  - Crowd-Sourced Vibration Monitoring
  - Regularized Building Bridge Infrastructure Monitoring

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