The portfolio of Sensa® fiber-optic monitoring systems includes the heterodyne real-time intelligent distributed vibration sensor (DVS), which brings new high-performance capabilities to a broad range of asset monitoring applications both onshore and subsea. Developed from original DVS instrumentation that was created for permanent asset monitoring, the real-time intelligent DVS was progressed further to provide high sensitivity for use in reservoir monitoring applications. With a strong survey record of accomplishment across the globe, this new generation of sensors has been brought back into the permanent asset monitoring application.

The real-time intelligent DVS’s optical interrogator unit is connected to an optical fiber embedded either within the HV cable construction or in a stand-alone buried fiber-optic cable along a pipeline.

The interrogator unit measures the Rayleigh backscattered light to provide a local linear measurement of the dynamic strain induced in the sensing fiber by mechanical and thermal signals from nearby sources.

A patented multifrequency heterodyne optical technique gives the real-time intelligent sensor best-in-class signal-to-noise ratio across the full sensing range of 25 mi [40 km]. In addition, the multifrequency approach works to suppress local fading effects that can leave other systems prone to the detectable signals disappearing and reappearing at random along the length of the fiber. Such a technique enables the optics system to interrogate measurements every 6.5 ft along the fiber length, thus providing many thousands of data points.

**APPLICATIONS**
- Oil, gas, and water leak detection in pipelines
- Pipeline event intrusion monitoring
- High-voltage (HV) cable fault location
- Subsea asset monitoring
- Integrated and customizable display with SCADA data delivery

**BENEFITS**
- Gathering of necessary intelligence for swift preventive action
- Improved operability through minimized false alarms
- Increased process safety and reduced HSE risk with real-time scraper tracking
- Simplified operations with multiple capabilities delivered by one machine

**FEATURES**
- Real-time detection, identification, and location of multiple simultaneous alarms
- Adjustable detection sensitivity along the asset relative to the local environment
- Customizable event recognition along the asset length
- Wide range of data delivery options
- Compatibility with multiple single-mode fiber types

Accurately measuring every 6.5 ft along the length of a fiber, the real-time intelligent DVS enables swift preventive action and reduced HSE risk.
## Specifications

### Measurement

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of channels</td>
<td>One single-ended (SE)</td>
</tr>
<tr>
<td>Total fiber length (SE)</td>
<td>25 mi [40 km]</td>
</tr>
<tr>
<td>Loss budget (two way at 1,550 nm)</td>
<td>18.5 dB</td>
</tr>
<tr>
<td>Output</td>
<td>Full-aperture seismic waveforms or vibration logs</td>
</tr>
</tbody>
</table>

### Measurement parameters

- **Native measurement type**: Strain
- **Operating principle**: Coherent phase measurement
- **Operating wavelength**: 1,550 nm
- **Range**: 25 mi [40 km]
- **Output spatial interval**: 6.6, 16.4, and 32.8 ft [2, 5, and 10 m]
- **Gauge length**: 16.4, 32.8, 65.6, 98.4, and 131.2 ft [5, 10, 20, 30, and 40 m]
- **Output time interval**: 0.1, 0.25, 0.50, 1.00, and 2.00 ms
- **Low-frequency limit**: 5 Hz

### Physical

- **Server rack**
  - Dimensions (L × W × H): 37.60 in × 22.60 in × 13.11 in [955 mm × 574 mm × 333 mm]
  - Weight: 132 lbm [60 kg]
- **Instrument rack**
  - Dimensions (L × W × H): 37.60 in × 22.01 in × 9.61 in [955 mm × 559 mm × 244 mm]
  - Weight: 66 lbm [30 kg]

### Environmental

- **Temperature**
  - Operating: 32 to 113 degF [0 to 45 degC]
  - Storing: –4 to 158 degF [–20 to 70 degC]

- **Power**
  - Maximum: 400 W
  - Typical: 600 W
  - Supply: 100 or 230 V

### Certifications

- **Laser safety**: IEC/EN60824-1:2014 Class 1
- **Compliance**
  - European Conformity (CE)
  - Restriction of Hazardous Substances (CE Directive 2002/95/EC)
  - EMC Directive 2004/108/EC
  - Low-Voltage Directive 2006/95/EC

*Typical value; depends on application and condition.*