

# NITRO Fiber Sensing for Pipelines

**Harness the power of fiber sensing technology to manage,  
maintain and protect your pipelines**



NITRO Fiber Sensing is a solution that enables pipeline owners and operators to stay on top of all aspects of their operations. From infrastructure health monitoring to fault prediction and location, to threat detection and perimeter security.

Pipeline owners and operators, across various industries such as oil, gas, water and chemical, face a myriad of challenges. From maintaining the reliability and efficiency of aging infrastructure to managing the risks associated with environmental hazards and regulatory compliance. Ensuring uninterrupted product/service delivery amidst these complexities requires innovative solutions that can provide comprehensive monitoring, real-time data and insight.

NITRO Fiber Sensing applications for pipelines provide cutting-edge solutions designed to revolutionize pipeline operations. By harnessing the power of optical fibers and fiber sensing technologies, this state-of-the-art solution offers comprehensive monitoring capabilities with real-time data and trend analysis. Enabling real-time detection and location of leaks, threats, anomalies, faults, and environmental factors along infrastructure. From enhancing security to optimizing asset management and ensuring regulatory compliance, it empowers pipeline owners/operators with unprecedented visibility. Ensuring your operations are secure and compliant with environmental safeguards.

### Benefits

- Rapid response with real-time data
- Facilitate preventative maintenance
- Elevate safety standards
- Drive cost and operational efficiency
- Enable informed decision-making

### Features

- Superior data/trend analysis
- Leak detection
- Movement detection/Infrastructure stability
- Fault prediction
- Security breach and threat localization
- Distributed Temperature Sensing (DTS)
- Distributed Temperature and Strain Sensing (DTSS)
- Distributed Acoustic Sensing (DAS)

### Applications

- Oil, gas, water and chemical pipelines
- Geological stability
- Environmental protection
- Network monitoring and maintenance





NITRO Fiber Sensing provides a suite of compelling advantages for pipeline owners and operators, enhancing not only operational efficiency but also security and environmental compliance.

### **Leak Detection and Location**

Fiber optic sensing can detect even minute changes in temperature or acoustic vibrations along a pipeline, enabling quick detection and localization of leaks reducing the spread of potentially hazardous materials caused by failures, elevating safety standards. This is crucial in areas prone to extreme weather conditions or in densely populated urban environments. It can also monitor strain to look for geographical conditions such as soil displacement and other factors that could affect the integrity of infrastructure. This is particularly useful in areas prone to natural disasters like earthquakes or floods.

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### **Real-Time Monitoring of Pipeline Infrastructure**

Fiber sensing technology enables continuous, real-time monitoring of pipelines over long distances. Operators can receive instant data on the status of a pipeline, which is vital for prompt decision-making and response to potential issues.

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### **Enhanced Safety**

By providing early warnings about potential pipeline failures, fiber sensing technology enhances the safety of the operations. This is especially important in industries where the transported materials are hazardous, delivering compliance to industry standards and regulations.

## Proactive Maintenance and Improved Pipeline Integrity Management

Data collected through fiber optic sensing can be analyzed to gain insights and spot trends. This information can be used to assess the structural health of a pipeline and make informed decisions on infrastructure maintenance, upgrades, and other strategic initiatives which can achieve considerable operational cost reductions. In addition, it can provide early warning and detection of issues that helps to avoid expensive repairs and potential fines from regulatory violations. The long-term savings from targeted pro-active maintenance that results in fewer unplanned outages/leaks can be significant and can help extend the lifespan of infrastructure.

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## Environmental Protection

The ability to detect small changes in temperature or acoustic vibrations along a pipeline within minutes vs hours/days (with other monitoring techniques) provides immediate detection and localization of leaks. Meaning that remedial actions can be taken quickly to minimize environmental impact. This is particularly important for pipelines that transport oil or chemicals through sensitive ecosystems and crucial for minimizing environmental damage.





## Intrusion Detection and Enhanced Security Measures

By detecting unusual activities in vibrations and acoustic signals in the environment along and around a pipeline, acoustic fiber sensing can enhance threat detection. Enabling quick identification, localization and notification of unauthorized activities such as unplanned construction works (e.g. manual or mechanical digging) and tampering, fence climbing or other security breaches such as people or vehicles approaching or breaching a pipeline's perimeter. Allowing you to respond to external threats swiftly, it provides the critical intelligence required to react promptly and protect your assets, helping to prevent accidental damage, potential sabotage or theft before it occurs.

## Geographical Coverage

Fiber sensing can monitor extensive lengths and areas of pipelines, providing wide-area surveillance without the need for multiple traditional sensors. This coverage is especially beneficial in remote or inaccessible areas where visual, physical or other types of surveillance is challenging.

Overall, the deployment of NITRO Fiber Sensing not only enhances the operational and environmental aspects of pipeline management but also significantly boosts security and protection against threats.

Visit [viavisolutions.com/fibersensing](https://viavisolutions.com/fibersensing) to learn more about distributed fiber optic sensing.

## VIAVI Care Support Plans

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