Fiber Optic Infrasound Sensor

Overview

The optical fiber infrasound sensor (OFIS) achieves lower noise levels above 1 Hz compared to traditional methods. The OFIS is 89 m long, offering enhanced sensitivity to pressure changes in the 1-10 Hz range. We have built two styles of prototype. In the first. Fiber-optic Fabry–Perot (FP) acoustic sensors have the advantages of small structure size, long-distance detection, immunity to electromagnetic interference, and so on. However, a small transducer. Infrasound signals in the band 0. 02 to 4 Hz are sensed in the presence of ambient noise generated chiefly by wind as integrated pressure variations, which induce detectable changes in the optical path length, along optic fibers, typically extending 100 m. In recent years, natural disasters such as earthquakes have. A new distributed sensor for detecting pressure variations caused by distant sources has been developed.

Article Content

Design of a New Type of Optical Fiber Infrasound Sensor and Its U ...

In this study, the demand of optical fiber (OF) sonic sensor is analyzed, and a composite OF infrasound sensor is proposed aiming at the detection demand of low-frequency infrasound waves in specific

Integrated Optical Microrings on Fiber Facet for

The miniature optical fiber ultrasound sensor with high sensitivity and bandwidth is important for the field of ultrasonic detection. In this study, a unique

Optical Fiber Sensors for Infrasonic Wind Noise

The Optical Fiber Infrasound Sensor (OFIS) provides an alternative to traditional infrasonic wind noise reduction (WNR) techniques by providing an

Mechanical Filter-Based Differential Pressure Fiber-Optic Fabry-Perot ...

Our platform provides a promising solution for sensors in infrasound signal detection applications. A differential pressure fiber optic infrasound sensor based on a mechanical filter was developed, for the

Miniaturized and highly-sensitive fiber-optic Fabry-Pérot

A differential pressure fiber optic infrasound sensor based on a mechanical filter was developed, for the detection of infrasound within the

Miniaturized and highly sensitive fiber-optic Fabry–Perot sensor for ...

In this work, we proposed and demonstrated a miniaturized and highly sensitive fiber-optic FP sensor for mHz infrasound detection by exploiting a Cr-Ag-Au composite acoustic-optic transducer diaphragm

Fiber-Based Infrasound Sensing

Fiber-based acoustic sensors (FAS) are one of the most important research fields in fiber optic sensors. So far, it has been widely applied in natural disaster warning, medical diagnosis, geological

An Optical Fiber Infrasound Sensor

The Optical fiber Infrasound Sensor (OFIS) is constructed from a compliant, sealed tube wrapped with optical fibers to interferometrically sense deformations in the tube caused by pressure fluctuations.

US6788417B1

The fiber optic based pressure and infrasound detection system consists of an equal-arm Michelson (or Mach-Zehnder, or equivalent) interferometer having optic fiber pressure sensors in...

Detecting and characterizing infrasound signals with optical fiber ...

Optical Fiber Infrasound Sensors (OFIS) are long compliant tubes wrapped with two optical fibers that interferometrically measure the differential pressure variation along the length of the tube.

(PDF) An optical fiber infrasound sensor

The Optical Fiber Infrasound Sensor (OFIS) significantly improves noise reduction in infrasonic measurements. The OFIS design utilizes compliant tubes and optical

Mechanical Filter-Based Differential Pressure Fiber-Optic Fabry-Perot ...

A differential pressure fiber optic infrasound sensor based on a mechanical filter was developed, for the detection of infrasound within the frequency range of 0.01--1 Hz. The sensing unit employs a

Optical-Fiber Infrasound Sensors

Optical-fiber infrasound sensors (OFISs) are being developed for detecting acoustic pressures in the frequency range from a few millihertz to a few

An infrasound sensor based on extrinsic fiber-optic Fabry-Perot ...

Abstract—An infrasound sensor based on extrinsic fiber-optic Fabry-Pérot interferometer (EFPI) structure is reported and demonstrated. The transducer part of this sensor is a composite film ...

(PDF) Miniaturization and Autonomous Deployment of

Optical fiber infrasound sensors (OFIS) are line microphones that instantaneously integrate pressure along their lengths with laser interferometry.

Fiber-Based Infrasound Sensing

Fiber-Based Infrasound Sensing Shun Wang, Wenjun Ni, Liang Zhang, Ping Lu, Yaowen Yang, and Lei Wei Abstract With the maturity of optical fiber sensing technology, its related applica-tions have

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The optical fiber sensor can average over kilometer-scale lengths of arbitrary geometry with an averaging bandwidth governed by the speed of light and thus should offer significant practical

An Optical Fiber Infrasound Sensor

In the first design of an OFIS (optical fiber infrasound sensor), we rely on the change in optical path that results from an optical fiber s strain-optic coefficient (i.e., the index of refraction is pressure

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The optical fiber infrasound sensor (OFIS) achieves lower noise levels above 1 Hz compared to traditional methods. The OFIS is 89 m long, offering enhanced sensitivity to pressure changes in the

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As it relies on optical interferometry, it does not suffer from the propagation delays inherent to mechanical noise filters and as a result can be made very long. Above 1 Hz, the optical

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Optical and Mechanical Behavior of the Optical Fiber

The Optical Fiber Infrasound Sensor (OFIS) is an interferometric pressure transducer consisting of a pair of optical fibers helically wrapped about a

(PDF) Mechanical Filter-Based Differential Pressure

Abstract A differential pressure fiber optic infrasound sensor based on a mechanical filter was developed, for the detection of infrasound within the

Design of the Optical Fiber MEMS Infrasound Sensor

An optical fiber infrasound sensor based on Microelectromechanical System (MEMS) is designed in this paper. Static performance of several sizes of membranes which are the core elements of the

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