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INVENTORS

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FIBRE OPTIC BASED STRUCTURAL SENSOR

Patent Filing (USA) : 13734929

INTRODUCTION

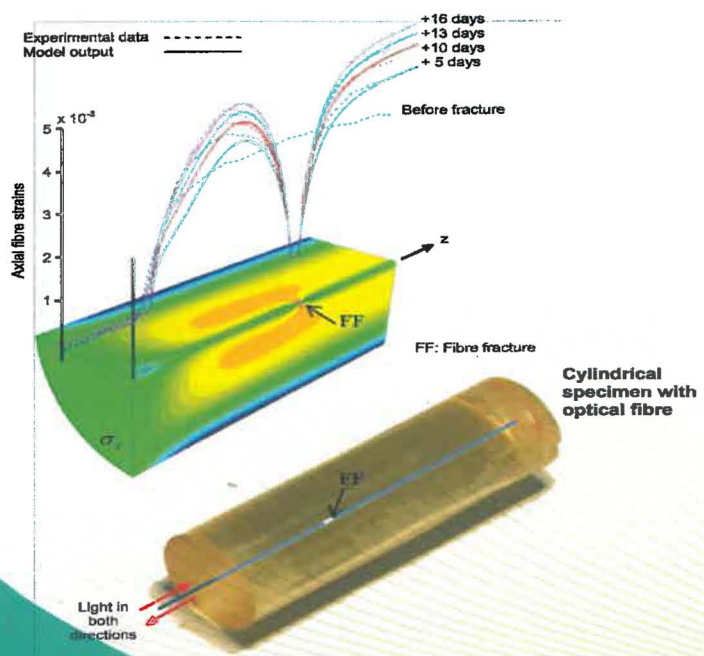
Fiber optics are a mainstay in telecommunications technology, but this technology has not been actively exploited in other areas. Optical fibers can function as extremely efficient sensors when embedded in composite materials; predicting failures and making it possible to perform real-time analysis of changes in the structure of the material. Our Distributed Fibre Optic Sensor (DFOS) system focuses on these atypical applications for optical fibers, creating the next generation structural sensor via embedding fiber sensors in crucial structures such as in aircraft body.

INVENTION ADVANTAGES

- Reliable and comprehensive measurement
- Unique algorithm in estimating coherent Rayleigh noise to produce a reliable backscatter data

COMMERCIAL POTENTIAL

- Easily integratable to existing communication technologies
- Adaptable to specific needs of monitoring
- No need for additional manufacturing process



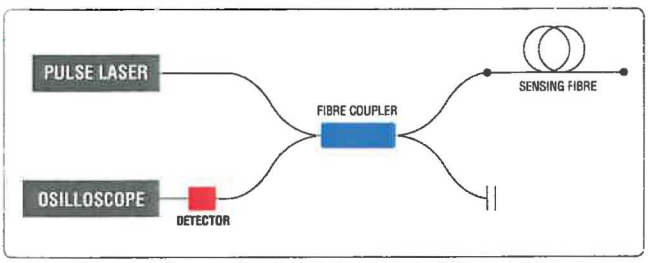
Example of fibre fracture backscattered output

NOVELTIES

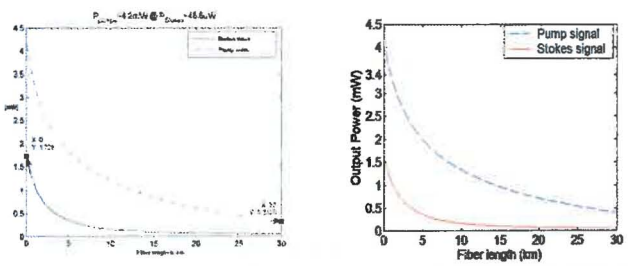
- Low cost but high technology sensor
- Reliable operation
- Simple detection method

APPLICATION

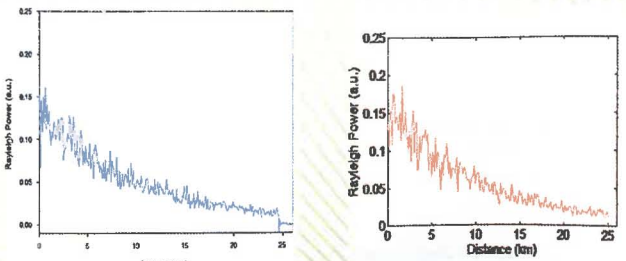
The ability to measure temperatures and strain at thousands of points along a single fiber are particularly interesting for the monitoring of crucial structures such as aircraft body. The system can also be applied to civil structures to monitor bridges, pipelines, oil wells, dams and dikes



Functional diagram of an Optical Time Domain Reflectometer



Pump and Stokes wave evolution using developed algorithm (right) and experimental data (left)



Backscattered Coherent Rayleigh Noise (CRN) using developed algorithm (right) and experimental data (left)