

STL

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# Fibre Optic Sensing Solution





# Protecting **Perimeter Infrastructure** and **High-value Assets** is the need of the hour

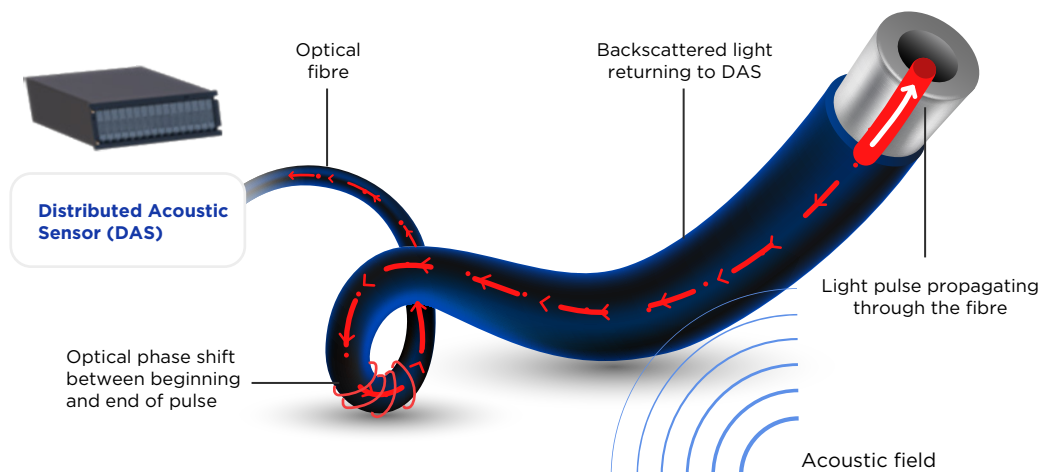
A growing number of high-value assets deployed for multiple industries are often not adequately protected against crime or infiltration. Detecting and deterring criminal activities such as theft, and trespassing requires continuous monitoring and surveillance. Any failure in providing protection and security over stretches of thousands of kilometers is not physically possible 24X7. One single breach could lead to a major repercussion. Technological innovation has led to the development of solutions for intrusion detection and securing high-value assets and critical infrastructure.

Optical fibre has sparked widespread interest due to its unique ability to function as a sensor. It has the capability to provide high-precision fault detection, high performance, and protection of data networks. It enables improved system uptime and availability by monitoring and anticipating accidental damage due to digging or other intrusive human activity. Fibre Optic Sensing Solution helps in Asset, Perimeter, and Network monitoring which are critical functions for securing infrastructure. It offers a wide range of benefits for companies of all sizes.

## STL's Fibre Optic Sensing (FOS) Solution

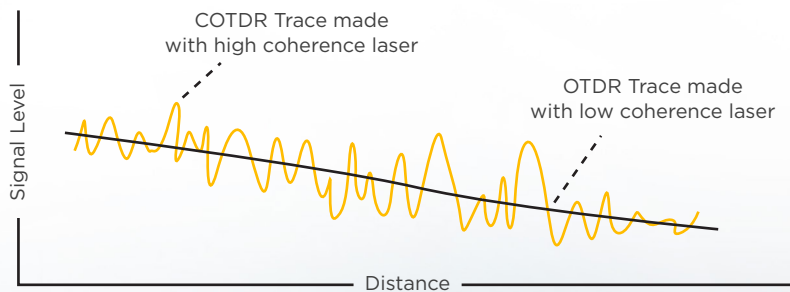
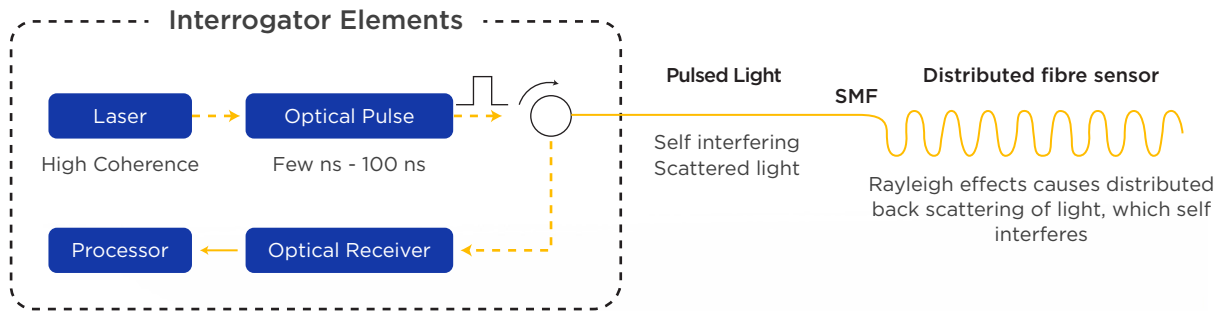
STL delivers a fully integrated and networked sensing solution based on Distributed Acoustic Sensor (DAS) coupled with an AI-enabled smart alarm system that helps to detect, inform, and defend with actionable insights. A DAS interrogator converts standard communications single mode fibre into thousands of extremely sensitive acoustic and vibration sensors. It senses the vibrations from various events around it, which could be several meters away.

As the data is processed in real-time, advanced signal processing and AI algorithms in our sensing solution recognize the unique pattern of each type of event. The events are detected, classified, and reported to the users through a GUI with actionable insights. The system can then show the users the precise locations and durations of the events and enable the user to make a timely and appropriate response.



# FOS Working Principle

## COTDR/OTDR Key Elements



With the DAS technique, also referred to as Coherent Optical Time Domain Reflectometry (COTDR), a perturbation along the fibre is detected by measuring the changes in the backscatter intensity from pulse to pulse.





# Building Blocks of STL's FOS Solution

## DAS Interrogator

Sends thousands of short pulses of light along the fibre every second and observes the backscattered light disturbed by the vibrations surrounding the optical fibre

Software module that controls various parameters in the DAS interrogator

## Sensor Control Module

## Pre-Processing Module

Converts huge data received from the DAS interrogator into meaningful data for easy visualization and processing

Deep Learning algorithm that detect and classify events based on the unique signature

## Event Detection and Classification

## Graphical User Interface

Web-based user interface to monitor events – type, location and time, configure zones, control user access, configure various parameters & settings, etc

Stores event-related information

## Data Storage

## API

Enables integrations with other applications

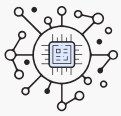


## Sensing Hardware

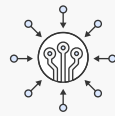


DAS Interrogator

## Software Platform



Sensor Control Module



Ethernet Consumer



Pre-Processing Module



Waterfall plot



AI/ML: Event Detection and Classification



Graphical User Interface



Data Storage

## Command Control Centre (CCC)



API

### Integration Options

- CCTV
- GIS Map
- Smart Light
- Siren/Router
- SMS/Voice Message
- E-mail
- PA System

# Features of FOS Solution



Advanced AI/ML-algorithm  
-based solution



Detects and locates multiple  
intrusions simultaneously



Both single (range\*- 40+ km)  
and dual (range\*- 80+ km)  
channel deployment



False/nuisance  
alarm rate: < 1%



Event location accuracy:  
 $\pm$  5-10 metre



Monitoring experience:  
1.2 mn km.hrs



Probability of  
detection: > 95%



Capable of detecting  
and locating cable cuts



Identify and mark various  
events with superior  
confidence levels



Buried and fence  
deployment



System  
uptime: > 99 %



Response time  
: 2-7 Sec

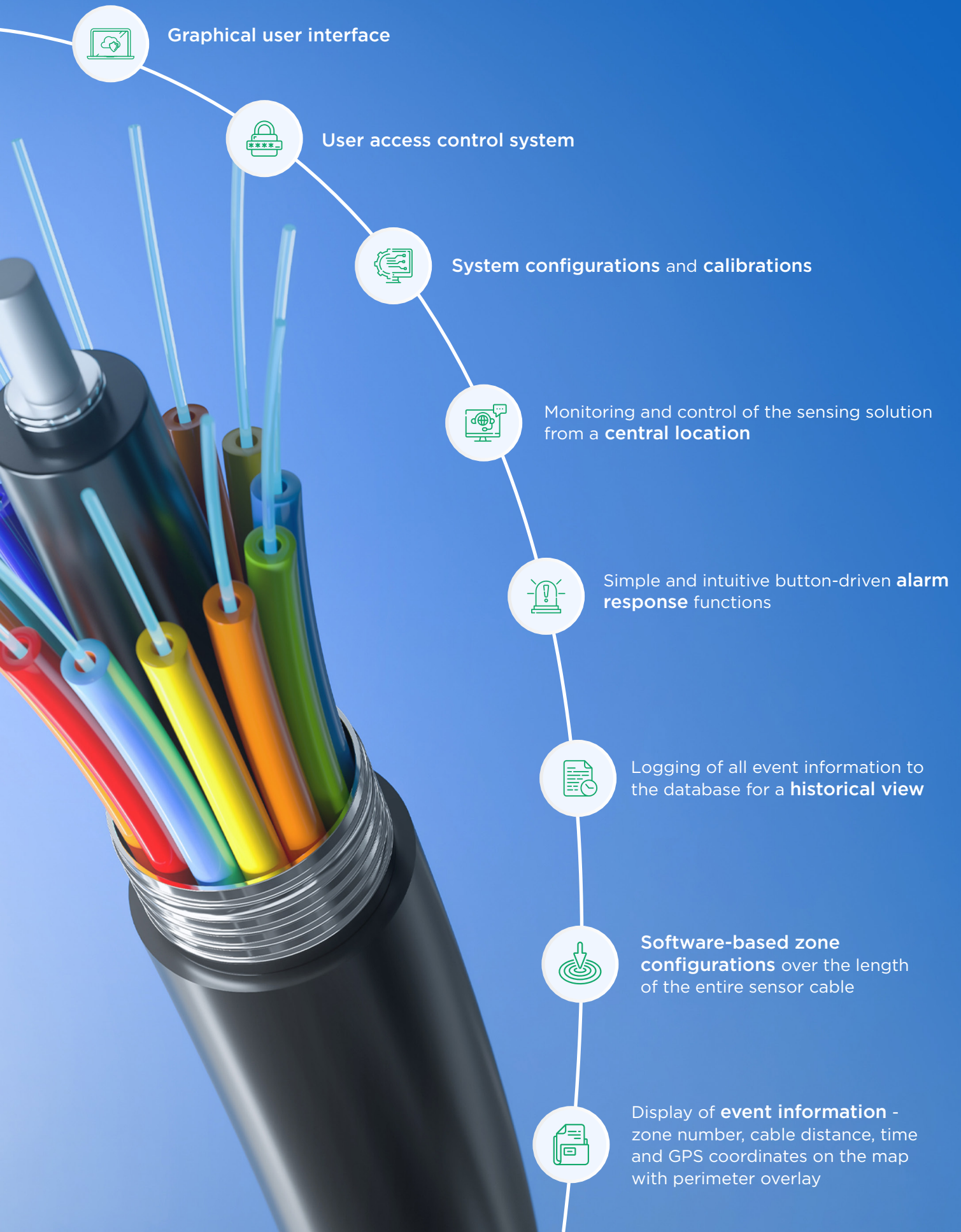


Detection range  
(Depends on soil conditions  
& event types)

- a. Human movement: up to 1-7 metre
- b. Vehicle movement: up to 4-20 metre
- c. Digging: up to 5-20 metre



# Software Features



# Our FOS Solution is **trained to Detect** and **Classify** Multiple Event Types

Our Smart Fibre Optic Sensing Solution prevents **intrusion activities** and **network unavailability** due to intentional or accidental fibre cuts. The system is tunable and machine learning algorithms are trained to detect different use cases. The solution is trained to detect and classify multiple events such as:

Human  
Movement



Vehicle  
Movement



Digging  
Activity



Tunneling  
Activity



Network  
Intrusion  
Monitoring



Flap  
Monitoring



## Creating **custom build** solutions

Leveraged  
Across  
Multiple  
Segments



Border Security



Perimeter Security



Telecom Network Security



Pipeline Monitoring



Smart City Monitoring



# STL FOS Advantage



Prevents  
fibre cuts



Early diagnosis, better prediction  
and faster resolution



Make-in-India  
Solution



Integration with  
3<sup>rd</sup> Party Applications



Works with SM live fibre  
or dark fibre



No change to  
Network Design



Served multiple  
Use Cases



No Special  
Infrastructure Required



In-House  
Support Team



Customization Applications  
and AI-Models



End-to-End Solution Capabilities-  
DAS, Fibre, and Software



Better management  
of OpEx/CapEx



# About STL



**USD 863**  
Revenue <sup>Million</sup>



**50 MFKM**  
annual glass capacity



**35 MFKM**  
annual cable capacity



**650**  
Patent count

## Optical Networking



Optical Networking solutions including fibre, cables and OI.

## Global Services



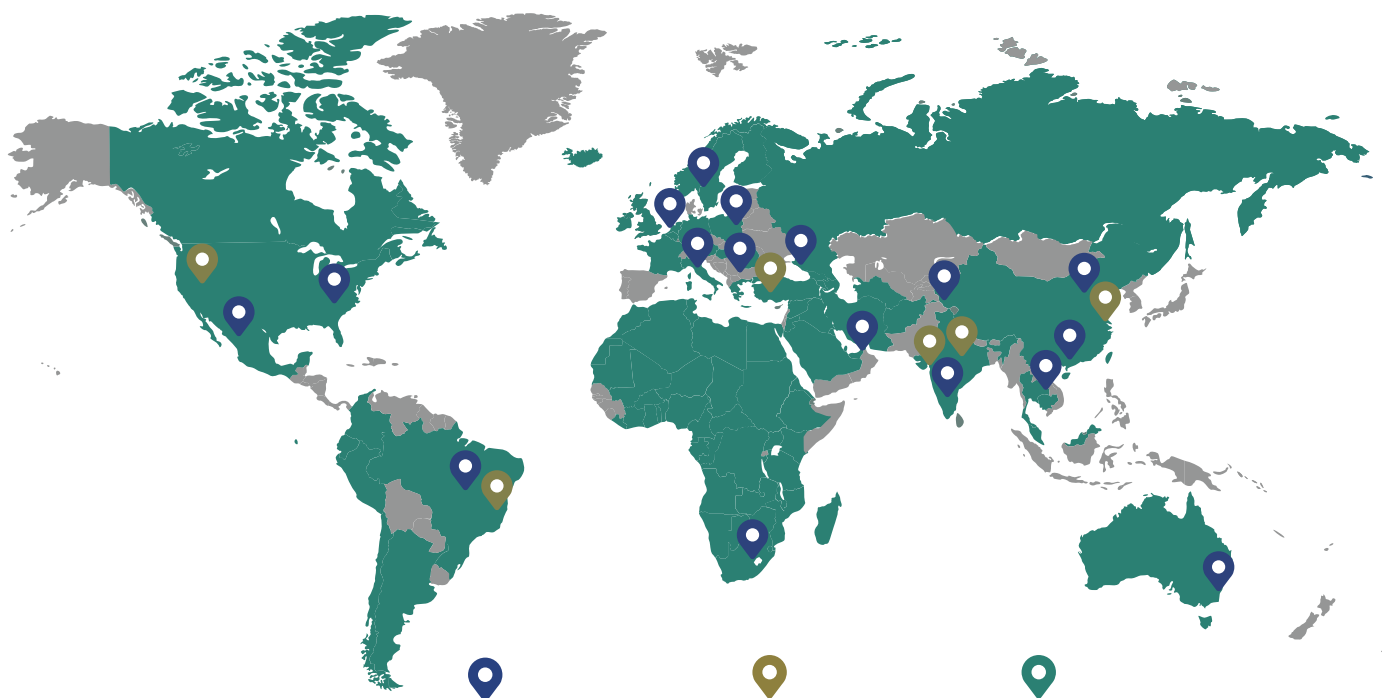
Unique digital integration expertise across the full stack.

## STL Digital



Digital solutions and services across business verticals

# Our presence



Sales Offices

Manufacturing Facilities

Market Presence



**11**

Production  
Facilities

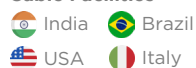
Glass Facilities



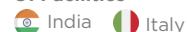
Glass Facilities



Cable Facilities



OI Facilities





“Distrust and Caution  
are the Parents of Security”

- Benjamin Franklin





#### About STL - Sterlite Technologies Ltd

STL is a leading global optical and digital solutions company providing advanced offerings to build 5G, Rural, FTTx, Enterprise, and Data Centre networks. The company, driven by its purpose of 'Transforming Billions of Lives by Connecting the World', designs and manufactures in 4 continents with customers in more than 100 countries. Telecom operators, cloud companies, citizen networks, and large enterprises recognise and rely on STL for advanced capabilities in Optical Connectivity, Global Services, and Digital and Technology solutions to build ubiquitous and future-ready digital networks. STL's business goals are driven by customer-centricity, R&D and sustainability. Championing sustainable manufacturing, the company has committed to achieve Net Zero emissions by 2030.



#### Contact us at:

Phone: +91 9560552222

For queries or  
demo email us: [kuhu.rastogi@stl.tech](mailto:kuhu.rastogi@stl.tech)