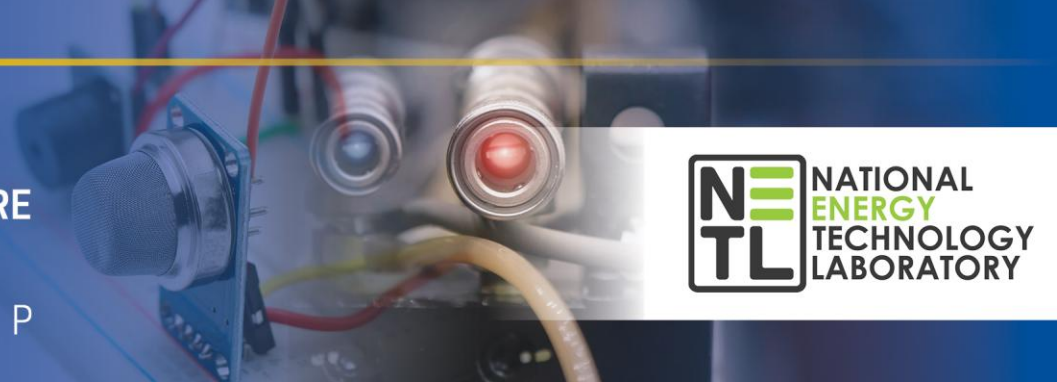




R. Steve Allen is a marketing and commercialization executive with over 20 years of experience bringing advanced photonics and fiber optic technologies to market. He currently serves as Director of Marketing for Specialty Markets at Lightera (formerly OFS Fitel), where he leads go-to-market strategy for a global division spanning sensing, medical, aerospace, defense, and data center applications.

Steve has been at the forefront of market development for fiber optic sensing technologies, translating technically complex sensing solutions — including shape sensing and distributed fiber optic applications — into accessible value propositions for early adopters and institutional stakeholders.



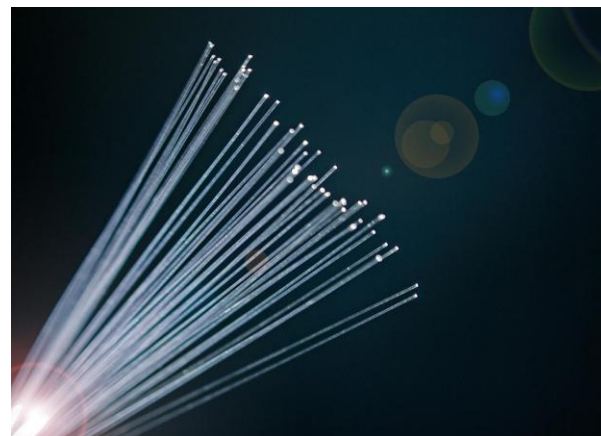
Fiber as the Foundation

A market and technology perspective on Distributed Acoustic Sensing

Steve Allen

Director of Marketing | Lightera

06/03/2026



DAS is in its breakout decade

Distributed fiber optic sensing is outpacing the broader fiber sensor market — and DAS is the fastest segment within it.

9–11%

CAGR

Broader fiber optic sensor market through the early 2030s — consensus across multiple independent research firms.

11–12%

CAGR

Distributed Fiber Optic Sensing sub-segment — growing meaningfully faster than the parent market.

Fastest

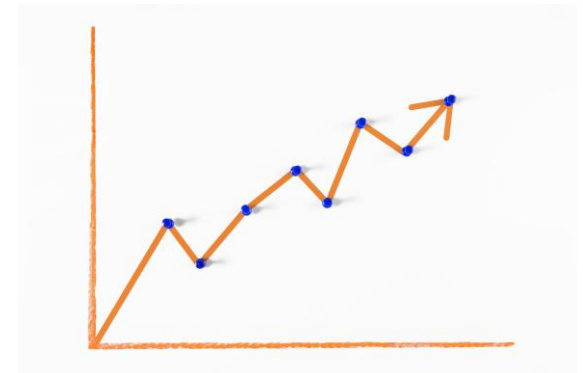
GROWING SLICE

Within DFOS, enhanced Rayleigh DAS is the fastest-growing technology category.

Sources: BCC Research, Precedence Research, Grand View Research, Straits Research, MRFR, The Insight Partners

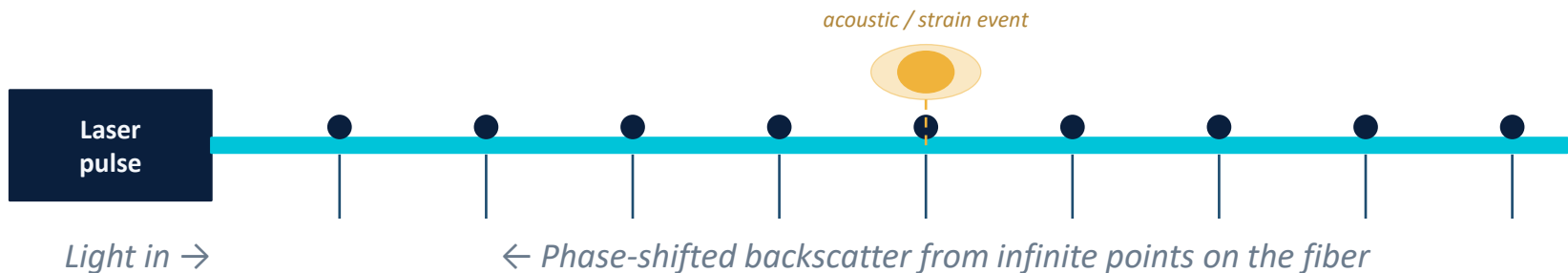
Why Fiber Matters

- DAS Technology Overview
 - DAS transforms fiber optic cables into sensing mediums detecting environmental changes along vast distances.
- Shift in Fiber Value
 - Fiber moves from passive data transmission to active sensing, creating new value in infrastructure monitoring.
- Market and Strategic Impact
 - DAS insights support predictive maintenance, safety improvement, and cost reduction across industries.
- Importance of Fiber Design
 - Fiber design and cable construction are critical differentiators enabling advanced DAS capabilities.



What DAS actually does

The fiber is not the medium for the sensor. The fiber IS the sensor.



10–100 km

Sensing range

Sub-meter

Spatial resolution

Thousands

Virtual sensors per fiber

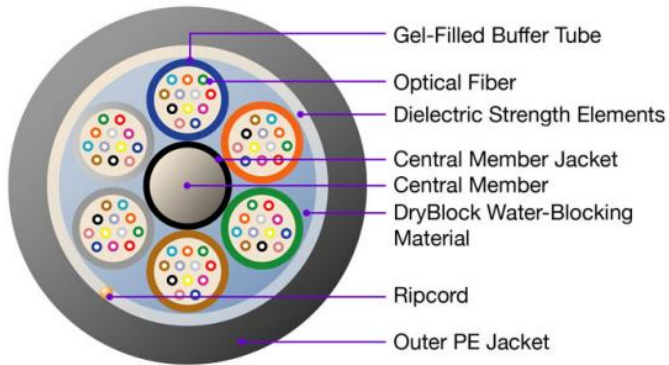
Single fiber

No power at sensing point

Cable design is the unsung enabler

The environment-to-fiber signal path

Acoustic and strain energy must travel from the surrounding medium — soil, seawater, air, conduit — through every cable layer before reaching the glass. Each layer can amplify, dampen, or distort the signal.



Cable cross-section

Cable design variables that shape sensitivity:

- Coating chemistry & modulus (acrylate, polyimide, carbon)
- Buffer type (tight vs. loose tube — couples vs. isolates)
- Strength members & armor (over-armorings dampens signal)
- Jacket material (HDPE, LSZH, hytrel — environment-tuned)

The cable is not a passive container — it is part of the sensor.

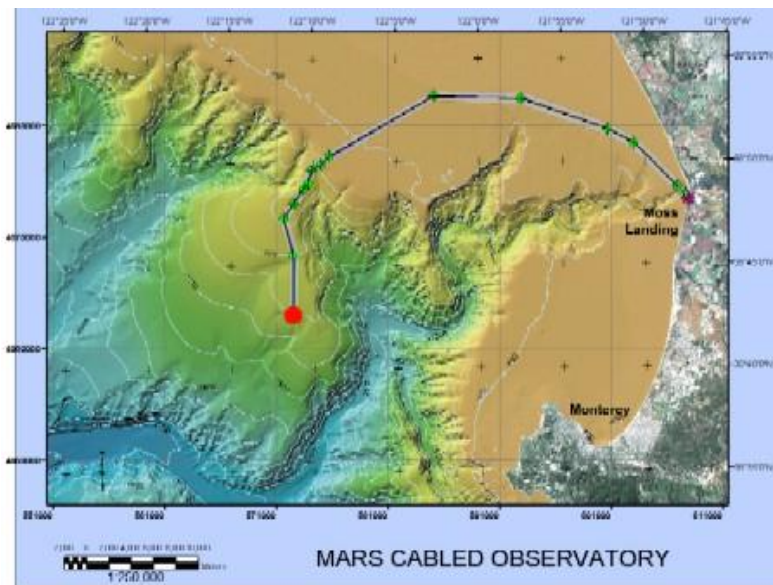
Growth Driven by Infrastructure

- Driving Market Adoption
 - Power utilities, transportation, and smart cities
- Real-Time Grid Monitoring and Integration with Smart Grids
 - Real-time monitoring of transmission lines and
 - Intelligent monitoring enabling automated decision-making.
- Downhole reservoir monitoring and Oil & gas pipelines
 - Production profiling, hydraulic fracture imaging
 - Leak detection, third-party intrusion, integrity monitoring
- Border & perimeter security
 - Intrusion, dig-in detection, critical facility protection
- Subsea & ocean awareness
 - Seismic, tsunami, cable security, marine geophysics



From telecom cable to ocean observatory

MARS Cable, Monterey Bay | Lindsey et al., Science (2019)



52 km undersea fiber cable • 20 km used as DAS array • ~10,000 virtual sensors

What a standard telecom cable detected

Over a single 4-day maintenance window in March 2018, researchers from UC Berkeley, MBARI, USGS and others turned the dark fiber into a dense seismic array.

- 1 Recorded a magnitude 3.4 earthquake 45 km inland — full P, S, and converted phase arrivals.
- 2 Mapped previously uncharted submarine fault zones — entirely new geological information.
- 3 Tracked Pacific storm dynamics through ocean surface gravity wave signatures.
- 4 Captured internal waves, sediment transport, and seafloor compliance — a full marine geophysics laboratory.

And this was standard telecom fiber, in a cable not designed for sensing.

Ocean awareness

Fiber-Optic DAS as the Eyes of Ocean Domain Awareness

Source: CNN, Tim Lister — May 31, 2026

570+

undersea cables carry
95–99% of global data

5.5M km

of fiber on the seabed —
listening, always on

3 nations

US · UK · Australia
uniting under AUKUS

THE THREAT

Russian & Chinese sabotage of undersea cables is a growing concern for Western governments.

Shadow-fleet vessels threaten pipelines in the Persian Gulf and North Sea.

Disruption = immediate, widespread economic and national-security impact.

DAS: THE SOLUTION

Existing fiber cables become continuous acoustic & vibration sensors — no new infrastructure needed.

Detects vessel proximity, seabed disturbance, and cable tampering in real time.

Enables ocean domain awareness from shore to seabed at terabit-scale reach.



Thank You