FROST & SULLIVAN

BEST PRACTICES AWARDS

PRISMA PHOTONICS

2020 EUROPEAN FIBER OPTICS BORDER SURVEILLANCE SYSTEMS ENABLING TECHNOLOGY LEADERSHIP AWARD

Contents

Background and Company Performance

Industry Challenges

The smart physical infrastructure market and the demand for robust surveillance and monitoring event sensory solutions collectively resulted in fiber optic sensing technology adoption from the border surveillance sector. Frost & Sullivan's research finds the development of faster and more accessible data collection and interpretation methods that aid in the acoustic sensing systems distribution market are factors driving the demand for cutting-edge solutions. Such solutions continue optimizing security and safety for various infrastructures. Sensors for rough environments and optical fiber technology developments are beneficial for a wide range of industries, such as oil and gas and other physical infrastructure, which further impacts growth in the acoustic sensing systems market.[1] Utility owners discovered the advantages associated with distributed fiber optic sensing (DFOS) and persist leveraging from the technology's abilities and possible technological expansions. The technology allows the appropriate support for detecting and monitoring interference events for various sectors, such as highway, railroad, border and perimeter control, pipeline safety, and power line management, by collecting data of detected events in a given area. As opposed to fiber sensing technology, when using conventional sensors based technology, one has to use thousands of discrete monitoring sensors to cover long (hundreds of kilometers (km)) infrastructure assets. The results accrue significant costs associated with the installation of thousands of discrete sensors that need maintenance and future upgrades. Therefore, conventional sensors are not ideal cost-wise when monitoring long-range environments. The need for smart networks delivering advanced sensing capabilities and requiring less change to infrastructure through a single platform would significantly decrease costs. Distributed fiber optics sensing (DFOS) is a very effective platform: an optical interrogator is connected to a very long (up to 100km) fiber optics cable buried in the ground; the fiber is the sensor (passive element with minimal maintenance and very long lifetime).

However, there are few inherent drawbacks; even with the high-resolution and monitoring capabilities included with today's state-of-the-art DFOS technology, sensitivity to any movement type or event results in high false alarm rates. Event classification is often misconstrued based on data quality provided from conventional DFOS systems, resulting in the misdetections. DFOS may detect any sign of movement based on a lack of detailed data and real-time deliverance. Still, it cannot reliably identify if that specific movement was a person or a vehicle. Border surveillance is one specific sector that benefits highly from fiber optic technology; however, standard DFOS systems lack accuracy and performance abilities. Detection specification is one of the challenges that border surveillance and monitoring teams face as they rely on detail-lacking data. While the DFOS technology is highly cost-effective and ideal for monitoring long critical infrastructures (like borders), a high rate of False Alarm Rates (FARs) sometimes turns into a limited solution. There is a clear need in the market for a new DFOS technology that

[1] *Sensors for Homeland Security: Global Opportunity Assessment* (Frost & Sullivan, September 2019)

will have extremely low FARs and high classification capabilities. In addition, conventional fiber optics sensing technology is highly dependent on the fiber cable type and method of installation. Thus, there is a limited ability to use pre-existing communication fibers, resulting in high installation costs of dedicated fiber cables and long ramp-up time. Using pre-existing fibers in these cases will degrade performance and will result in high FARs, low sensitivity capabilities, and poor target classification. A solution that can reshape fiber optics sensing can change how physical infrastructures survey and monitor their entire environments. The opportunity for such solutions that can fully manage predictive maintenance and drive security for all infrastructures, at the same time, is immense. Given the advancements made towards fiber optics and sensory technology, detection capabilities, and target classification will, without a doubt, enhance, prepare, and equip surveillance teams with effective border security and monitoring.

Technology Leverage and Customer Impact of Prisma Photonics

Founded in 2017 and headquartered in Tel Aviv, Israel, Prisma Photonics (Prisma) is a start-up that manufactures next-generation fiber optics sensing solutions for physical infrastructure monitoring and surveillance. The company developed its sensing technology, Hyper-Scan Fiber-Sensing™, for highways, railways, perimeter and border control, smart roads, optical networks, and oil and gas pipelines. The technology offers an array of solutions that manages safety, security, and preventive/predictive maintenance with ultra-sensitivity in real time. Prisma's technology and solutions are reshaping fiber optics-powered surveillance systems by enabling cutting-edge detection capabilities and intelligent learning target classification.

Next-generation Fiber Optics Sensing Technology

Prisma is reshaping fiber optics sensory enhancements by offering a robust technology for sensory surveillance and detection. Unlike traditional DFOS systems that require massive and lengthy installation projects (as many traditional systems suffer from poor performance when connected to pre-existing fiber optics cable) and presents high FAR and low probability of detection (PD), Prisma offers an unparalleled unique sensory performance platform. Using its patented Hyper-Scan Fiber-Sensing™ technology, Prisma's proprietary technology provides utility owners with a robust and highly reliable monitoring technology that pinpoints specific events with ultra-sensitivity intelligence. The company's technology utilizes a robust signal-to-noise ratio, which allows higher detection capabilities while decreasing false alarms. Prisma's technology exclusively uses the pre-deployed fiber optics cables in and around a surrounding infrastructure, eliminating the installation of new fiber optic cables, making its solutions "sensor-free." Once integrated into existing cables, utility owners can collect Big Data from any location because the fiber itself becomes the infrastructure's primary sensory unit using its smart classification intelligence. Prisma instantly identifies and classifies events or interferences, such as a person running, mechanical digging, or a passing vehicle. This distinctive capability delivers a higher probability of detection rates and eliminates false positives in any environment.

The company's technology covers multiple use cases by enabling high detection sensitivity by integrating its Hyper-Scan Fiber-Sensing™ technology into each specific use case. The company provides a solution for each particular infrastructure; these include PrismaPower™ (electrical power transmission networks), PrismaFlow™ (oil and gas pipelines), PrismaShield™ (border control), PrismaSubsea™ (subsea pipelines), PrismaHedge™ (perimeter control), PrismaRoad™ (smart roads), PrismaRail™ (railways), and PrismaCyber™ (physical security and cyber security). Frost & Sullivan recognizes the technological impact Prisma has established within border surveillance and highlights the capabilities of PrismaShield™.

Unmatched Border Surveillance through a Single Platform

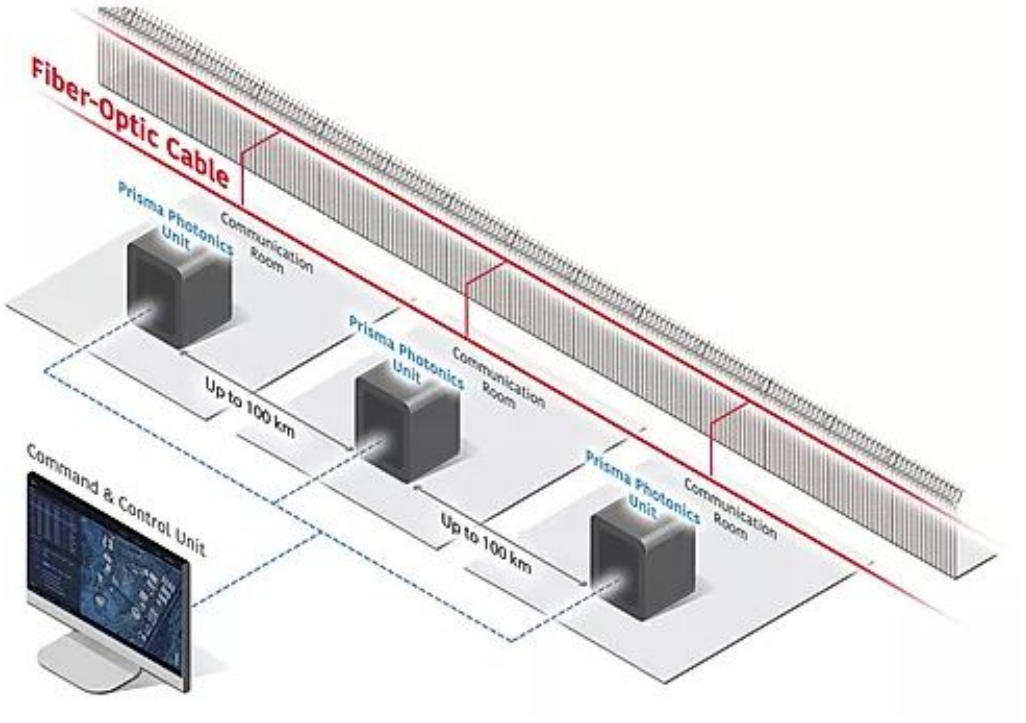
Enabled by Prisma's Hyper Scan Fiber-Sensing™ technology, PrismaShield™ is a next-generation solution that strengthens near border security and detection. Additionally, the solution can provide utility teams with real-time threat detection for every 100km of optical fiber using a single optical interrogator unit (PrismaShield™), as opposed conventional sensors arrays require thousands of sensors to reach longer distances. PrismaShield™ can identify the acoustic signature of each event at or near the border, at a resolution that allows classification of the events and locations with unprecedented accuracy as it dramatically reduces the "noise" of false positive and false negative alarms.[2] High sensitivity allows the solution to establish correct identifications for critical events and activities, such as:

- Pedestrians near or crossing fenced borders
- Light or heavy vehicles (cars, trucks, etc.)
- Mechanical digging
- Any suspicious activity that includes touching, climbing, and positioning a ladder along a fence or acts of vandalism such as fence tampering
- Drones flying over

Enabled by Prisma's high-sensory technology and zero installation, the platform provides command and control teams with a plug-and-play method for advanced preventative monitoring and security. The plug-and-play process delivers minimal maintenance (making the platform cost-effective) and eliminates the need for having thousands of discrete sensors underground. When a bordered off environment needs multiple PrismaShield™ units, integration is simple and reliable because of the direct attachment to the fiber optics cable, no matter the number of units desired, collectively they all connect and transmit the data to a single command and control unit. Furthermore, upgrades to the platform are software-based without any hardware upgrades needed. PrismaShield™'s capabilities compensate for any loss associated with time and costs with deploying standard platforms for border monitoring processes.

[2] https://www.prismaphotonics.com/prisma-shield , Accessed June 2020

Prisma's Solution Architecture



Source: Prisma Photonics

Customer Offerings and Potential for the Future

Prisma delivers a Data-as-a-Service model providing utility owners a "pay-as-you-grow" approach with no upfront costs or commitment. Moreover, the company charges a cost-effective monthly fee, enabling it to reduce the sales cycle. The company focuses on a three-stage purchasing process. Prisma approaches the customer acquisition process beginning with identifying the infrastructure use case and developing proof-of-concept (POC) for field testing. The company recognizes that some customers are more conservative; therefore, it initiates on-site field testing (done in a single day) and works directly with the customer to ensure confidence and trust. For each infrastructure sector, Prisma proves its ability to partner with large system integrators and how its revolutionary technology overcomes sensory limitations. After establishing trust through POCs, Prisma offers a paid pilot phase where the connected units run for up to three months with continuous testing. The company ensures that the key performance indicator exceeds expectations regarding events detection probability and FARs, finally resulting in the commercial phase and integration into the client's infrastructure.

Commercial deployments will begin later in 2020; however, since the company's entrance into the market in 2017, Prisma has won numerous awards. These recognitions include the top 100 start-ups list of 2020 by the German Energy Agency and the World Energy

Council, Israel's Government Companies Authority challenge, the European Commission Seal of Excellence 2019, and the 2020 recipient of the prestigious Photonics Prism Awards. As the company continues to grow, plans for commercial implementation is expected based on Prisma's tested and validated solutions. Currently, the company's customer base extends to Tier-1 customers in the United States, Europe, and Asia-Pacific. The global physical infrastructure is a huge market; Prisma's potential to become one of the top industry leaders in fiber optics sensing is promising and attainable. The COVID-19 pandemic sets an even higher priority for homeland security needs, and at most, drives advanced opportunities for border surveillance.

Conclusion

Surveillance and monitoring sensory technology remain a necessary advanced capability for long-range physical infrastructures, such as power lines, highways, perimeter and borders, and railways. Utility owners have adopted distributed fiber optic sensing (DFOS) technology; however, the data produced lacks high sensitivity capabilities, resulting in high-false alarm rates, low probability of detection, and low accuracy. Moreover, using pre-existing communication fiber optics cable might significantly degrade conventional DFOS systems' performance, forcing installation of new and dedicated fibers, making costs higher for installation, maintenance, and upgrades. Prisma Photonics is providing a next-generation approach to fiber optic sensing. The company's patented Hyper-Scan Fiber–Sensing™ technology delivers ultra-sensitivity and detection intelligence in real-time, making it more intelligent and accurate. The company's unique "sensor-free" solutions connect to an infrastructure's pre-existing fiber optics cables, lowering installation costs and maintenance, and providing complete reliability. PrismaShield™, the company's solution for border surveillance, offers intelligent and swift border management capabilities. The border monitoring solution delivers instant classification of detectable events in any given location of long-range infrastructures. PrismaShield™ sets a new standard for physical borders' managing infrastructure and empowering surveillance and monitoring systems to work smarter.

For its strong overall performance and key differentiators in fiber optics sensors, Prisma Photonics earns Frost & Sullivan's 2020 Europe Enabling Technology Leadership Award for the fiber optics border surveillance systems market.

Significance of Enabling Technology Leadership

Ultimately, growth in any organization depends on customers purchasing from a company and then making the decision to return time and again. In a sense, then, everything is truly about the customer. Making customers happy is the cornerstone of any successful, long-term growth strategy. To achieve these goals through enabling technology leadership, an organization must be best in class in three key areas: understanding demand, nurturing the brand, and differentiating from the competition.

Understanding Enabling Technology Leadership

Product quality (driven by innovative technology) is the foundation of delivering customer value. When complemented by an equally rigorous focus on the customer, companies can begin to differentiate themselves from the competition. From awareness, to consideration, to purchase, to follow-up support, organizations that demonstrate best practices deliver a unique and enjoyable experience that gives customers confidence in the company, its products, and its integrity.

Key Benchmarking Criteria

For the Enabling Technology Leadership Award, Frost & Sullivan analysts independently evaluated Technology Leverage and Customer Impact according to the criteria identified below.

Technology Leverage

Criterion 1: Commitment to Innovation
Criterion 2: Commitment to Creativity
Criterion 3: Stage Gate Efficiency
Criterion 4: Commercialization Success
Criterion 5: Application Diversity

Customer Impact

Criterion 1: Price/Performance Value
Criterion 2: Customer Purchase Experience
Criterion 3: Customer Ownership Experience
Criterion 4: Customer Service Experience
Criterion 5: Brand Equity

Best Practices Recognition: 10 Steps to Researching, Identifying, and Recognizing Best Practices

Frost & Sullivan analysts follow a 10-step process to evaluate Award candidates and assess their fit with select best practice criteria. The reputation and integrity of the Awards are based on close adherence to this process.

	STEP	OBJECTIVE	KEY ACTIVITIES	OUTPUT
1	**Monitor, target, and screen**	Identify Award recipient candidates from around the globe	• Conduct in-depth industry research • Identify emerging sectors • Scan multiple geographies	Pipeline of candidates who potentially meet all best-practice criteria
2	**Perform 360-degree research**	Perform comprehensive, 360-degree research on all candidates in the pipeline	• Interview thought leaders and industry practitioners • Assess candidates' fit with best-practice criteria • Rank all candidates	Matrix positioning of all candidates' performance relative to one another
3	**Invite thought leadership in best practices**	Perform in-depth examination of all candidates	• Confirm best-practice criteria • Examine eligibility of all candidates • Identify any information gaps	Detailed profiles of all ranked candidates
4	**Initiate research director review**	Conduct an unbiased evaluation of all candidate profiles	• Brainstorm ranking options • Invite multiple perspectives on candidates' performance • Update candidate profiles	Final prioritization of all eligible candidates and companion best-practice positioning paper
5	**Assemble panel of industry experts**	Present findings to an expert panel of industry thought leaders	• Share findings • Strengthen cases for candidate eligibility • Prioritize candidates	Refined list of prioritized Award candidates
6	**Conduct global industry review**	Build consensus on Award candidates' eligibility	• Hold global team meeting to review all candidates • Pressure-test fit with criteria • Confirm inclusion of all eligible candidates	Final list of eligible Award candidates, representing success stories worldwide
7	**Perform quality check**	Develop official Award consideration materials	• Perform final performance benchmarking activities • Write nominations • Perform quality review	High-quality, accurate, and creative presentation of nominees' successes
8	**Reconnect with panel of industry experts**	Finalize the selection of the best-practice Award recipient	• Review analysis with panel • Build consensus • Select recipient	Decision on which company performs best against all best-practice criteria
9	**Communicate recognition**	Inform Award recipient of Award recognition	• Announce Award to the CEO • Inspire the organization for continued success • Celebrate the recipient's performance	Announcement of Award and plan for how recipient can use the Award to enhance the brand
10	**Take strategic action**	Upon licensing, company is able to share Award news with stakeholders and customers	• Coordinate media outreach • Design a marketing plan • Assess Award's role in future strategic planning	Widespread awareness of recipient's Award status among investors, media personnel, and employees

The Intersection between 360-Degree Research and Best Practices Awards

Research Methodology

Frost & Sullivan's 360-degree research methodology represents the analytical rigor of our research process. It offers a 360-degree-view of industry challenges, trends, and issues by integrating all 7 of Frost & Sullivan's research methodologies. Too often companies make important growth decisions based on a narrow understanding of their environment, leading to errors of both omission and commission. Successful growth strategies are founded on a thorough understanding of market, technical, economic, financial, customer, best practices, and demographic analyses. The integration of these research disciplines into the 360-degree research methodology provides an evaluation platform for benchmarking industry participants and for identifying those performing at best-in-class levels.

360-DEGREE RESEARCH: SEEING ORDER IN THE CHAOS

About Frost & Sullivan

Frost & Sullivan, the Growth Partnership Company, enables clients to accelerate growth and achieve best-in-class positions in growth, innovation and leadership. The company's Growth Partnership Service provides the CEO and the CEO's Growth Team with disciplined research and best practice models to drive the generation, evaluation and implementation of powerful growth strategies. Frost & Sullivan leverages more than 50 years of experience in partnering with Global 1000 companies, emerging businesses, and the investment community from 45 offices on six continents. To join our Growth Partnership, please visit http://www.frost.com.