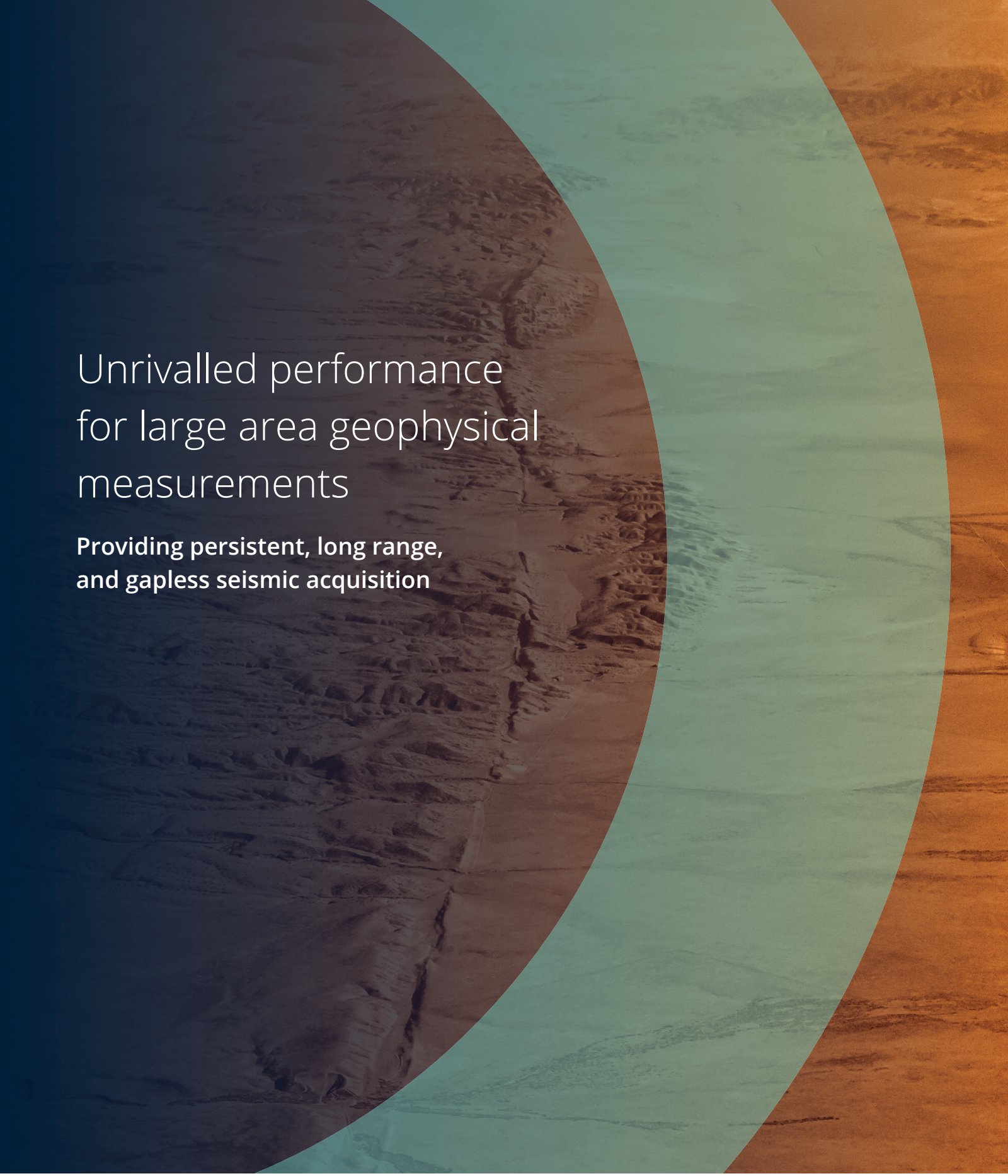


Unrivalled performance for large area geophysical measurements

Providing persistent, long range, and gapless seismic acquisition

www.sintela.com

SINTELA

ONYX™ peta

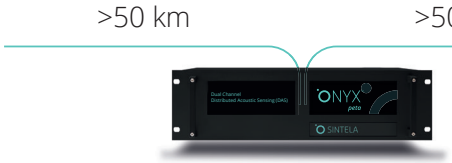
Real-Time Gapless Monitoring for Geophysical Measurements

Trusted Partner
Sintela ONYX™ represents the next generation of DAS. Used with optical fiber in cables deployed on location; it provides gapless, and highly cost-effective data acquisition with flexible configuration which can be optimised for each deployment.

Better Performance, Reduced Costs
ONYX™ creates a virtual array of vibro-acoustic sensors along two standard optical fibers in existing or specially deployed buried cables.

The powerful inbuilt processor enables at the edge real-time analysis of the dense spatial and temporal data. This can be configured to provide actionable information such as timely warnings of seismic activity.

Our intuitive, easy to use DAS software can run instantly from any modern web browser without the need for specialist terminal hardware.



ONYX™ Sensing Unit

- 2x >50 km (31 miles) operational range
- Quantitative 'phase-based' measurements
- Industry leading sensitivity on standard fiber
- Integrated processor
- Automated fiber characterisation and optical configuration
- Fully controllable over a remote connection
- Small form factor
  Size: 19-inch 3U Enclosure
  Weight: 16.5 kg | 36 lbs
- Low power operation
  < 110 Watts
- Removable storage
  Up to 16 TBytes on 2x SSDs
- Wide operating temperature range
  -5 °C - 50 °C | 23 °F -122 °F
- Minimal maintenance
  IP 50 – Protected against dust Sealed fanless design
- Safe to operate
  Class I laser operation
- Cyber Security
  Center for Internet Security (CIS)
  Benchmark compliant

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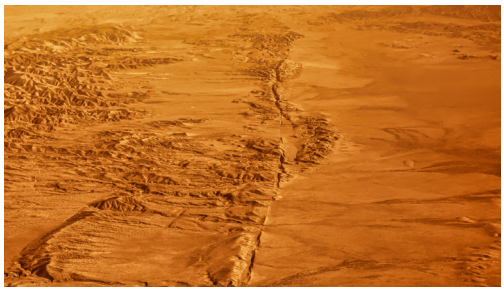
Flexible options for Geophysical Measurements

The configuration of deployed fiber across different environments can be optimised for different acquisition scenarios

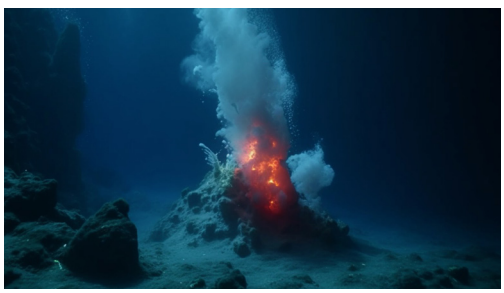
Earthquake Seismology
Using fiber in existing telecommunication cables or fiber specifically deployed on the surface or in borehole, ONYX™ is being used to detect and map earthquake activity in real-time. Furthermore, the surface energy recorded by ONYX™ during an earthquake can immediately be used to highlight areas most impacted and likely to have experienced the greatest damage.



Volcanic Activity
ONYX™ is used to monitor fiber in cables buried on volcanoes to detect and track seismic activity. This information is being used to map the locations of volcanic activity and the information is being developed to provide a real-time warning to neighbouring populations of imminent eruptions and seismic events.

Monitoring the Cryosphere
As our planet gets hotter due to climate change, monitoring changes in the cryosphere has never been more important. The small size, weight, and low power requirements of ONYX™ make it an ideal instrument to take to the hostile environments of the Arctic and Antarctic.

Seafloor monitoring
Fiber in cables deployed on the seabed can be used to monitor coastal morphology, wave, and seabed current dynamics in the littoral, as well as seismic activity on the seabed in deeper water caused by the motion of oceanic tectonic plates and the activity of submarine volcanoes. Whale songs can also be detected, enabling identification and tracking of migrating populations.



Advantages of using ONYX™ for Geophysical Measurements

The Sintela Solution

The Sintela ONYX™ system is designed to convert existing fiber-optic cables into a dense array of vibro-acoustic sensors that detects naturally occurring acoustic and seismic signals.

The unique architecture of ONYX™, combines the quantitative optical interrogation of two long optical fibers with built-in processing, in a small, lightweight, and low power sensing unit.

Capable of monitoring over 100km of fiber from a single unit with 5m accuracy, it provides academia, government agencies and commercial companies alike with a reliable and cost-effective instrument for acquiring measurements over wide areas.

Designed for Field Deployment

- The small size, low weight, low power and robust construction of ONYX™ has been designed to ensure that it can be transported to and operated in the field with ease.
- Passively cooled using cooling fins on the sides and rear of the ONYX™ chassis eradicates the need for fans which require maintenance and reduce reliability. The sealed construction provides IP50 dust ingress protection.
- A 15+ year Mean Time Before Failure which provides assurance that once deployed the ONYX™ will require minimum maintenance over its lifetime.
- Class 1 eye safe laser ensures safe operation.
- With up to 16TB of removable SSD storage and high speed ethernet interfaces to external recording media, ONYX™ can be used to continuously acquire data over extended periods.
- Inbuilt processor, eliminating the need for external processors and control units and enables full remote access to ONYX™ systems deployed in the field.

ONYX™
peta

ONYX™ Case Study

USED BY ACADEMIA TO UNDERSTAND THE EARTH'S MOVEMENTS

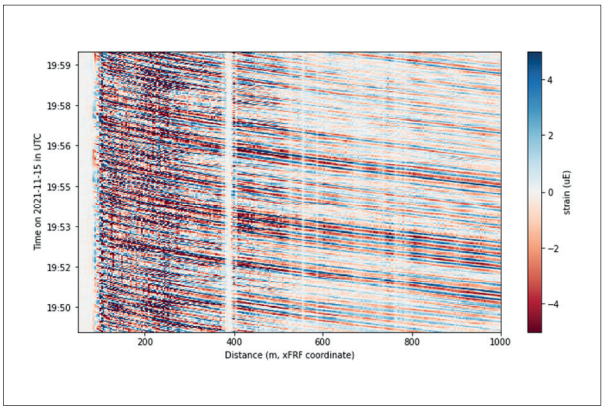
Tohoku University – Sakurajima Volcano

A century ago, a major eruption rocked Sakurajima Volcano, leaving the people of neighboring Kagoshima concerned ever since. Monitoring the volcano is of paramount importance to predict and prepare for future large-scale eruptions. To achieve this, Tohoku University has deployed an ONYX™ Sensing Unit connected to fibers in two buried cables: one running 40 km around the base and the other extending 4 km up the side of the volcano. This setup allows Tohoku University to monitor seismic activity, explosions, and eruptions in real-time, thereby mitigating the risk of system failures during significant volcanic events. The approach is not only effective but also cost-efficient.

Sakurajima Volcano, Japan

Oregan State University – Coastal morphology

The Coastal Boundary Dynamics Group in the College of Engineering at Oregon State University is using the ONYX™ to understand nearshore oceanographic processes. Their research group broadly studies coastal morphology, boundary hydrodynamics, and nature-based engineering solutions. They have been expanding the use DAS to quantitatively record ocean surface gravity waves and bathymetric evolution. The ONYX™ Sensing Unit allows them to measure fiber-optic cable strain continuously through the beach, swash zone, surf zone, and onto the continental shelf.



Example of raw strain recorded in Duck, North Carolina.
Courtesy of Meagan Wengrove

University of Washington – Ice Flow/Glacier Dynamics

In August 2023, the Earth and Space Science group at the University of Washington embarked on an important research deployment to Greenland, using the ONYX™ system to collect data. The ONYX™ unit's efficient power consumption allowed the team to utilize solar energy in the field, facilitating the capture of one month's worth of data using a self-deployed 10km subsea fiber. The ONYX™ system proved instrumental in gathering precise data to measure ice flow and record seismo-acoustic signatures associated with glacier calving.

Field deployed solar powered ONYX™ in Greenland
Courtesy of Brad Lipovsy, University of Washington

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