

Network Integrity Systems

VANGUARD FOCUS NX™
Optical Intrusion Detection System

Prevent Damage Before It Becomes an Outage

PROACTIVE DAMAGE PREVENTION FOR CRITICAL FIBER AND UTILITY ROUTES

Detect the Threat. Locate the Activity. Prevent the Damage.

North America's underground infrastructure is under sustained pressure. The Common Ground Alliance (CGA) analyzed 221,717 unique damage reports in its 2025 DIRT Report, and its CGA Index reached 102, a record high against the 2022 baseline of 100. CGA's modeled cost of excavation damage to society in 2025 was $83.2 billion.

Damage is rising while the forces behind it accelerate:

- Increased building and excavation activity
- Aging legacy infrastructure
- AI-driven data center growth
- Power grid modernization
- Rapid broadband expansion

Route patrols, cameras, locate programs, concrete encasement, deeper burial, and redundant routes all provide value. None of them delivers continuous awareness of potentially damaging activity across an entire route.



VANGUARD FOCUS™ from NIS turns standard single-mode fiber into a distributed sensor that detects, classifies, and locates threats while there is still time to respond. It monitors the route continuously for excavation, equipment activity, unauthorized access, cable handling, conduit impacts, and other threats, and gives operators the location and the actionable alarm they need to investigate and intervene before infrastructure is damaged.

This applies wherever a fiber route runs:

- Telecommunications networks
- Electric, gas, water, and other utilities
- Data center interconnects
- Long-haul and metropolitan fiber routes
- High-risk rights-of-way and critical route segments

TRADITIONAL ROUTE PROTECTION IS NOT ENOUGH. PROACTIVE DAMAGE PREVENTION IS ESSENTIAL.

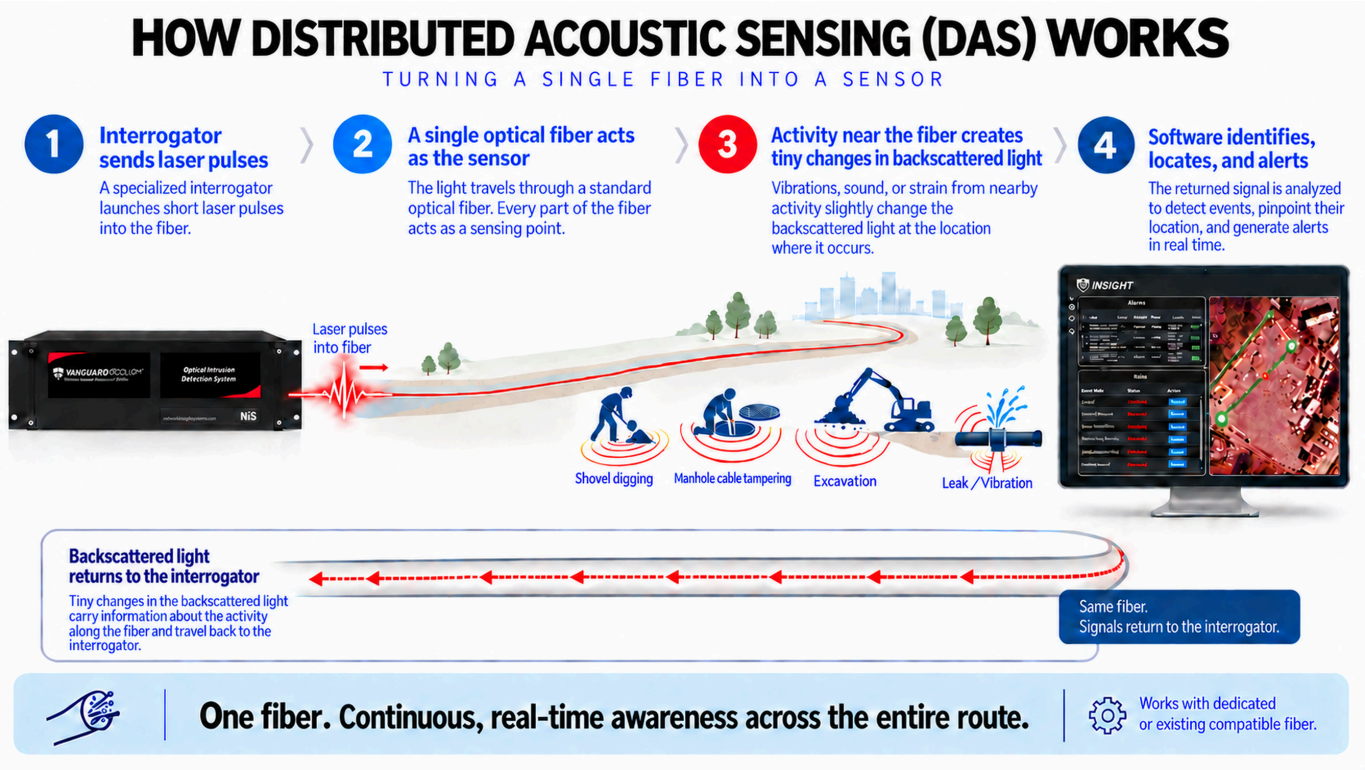
Every existing approach protects part of the route, part of the time. Together they still leave a gap: nobody is watching the whole route continuously for the activity that causes damage.

- Route patrols see only what is visible while personnel are present.
- Cameras monitor specific locations, not the entire route.
- Concrete encasement is costly and slow, and it cannot prevent every form of damage.
- Route markers and locate programs depend on awareness and compliance.
- Conventional fiber monitoring, like OTDRs, identifies problems after service is affected.
- Redundancy reduces outage consequences but does not prevent the cut.

Proactive damage prevention provides the continuous awareness operators need to identify and address threats before infrastructure is damaged.

HOW VANGUARD FOCUS™ WORKS

VANGUARD FOCUS uses Distributed Acoustic Sensing (DAS). An interrogator sends pulses of light down an unused strand of standard single-mode fiber and reads the backscattered signal. Vibration or acoustic activity along the cable changes that signal. The system classifies the event and locates it along the route. It detects an excavator as it starts to dig, not after it severs the cable, and it can differentiate that excavator from a lawn mower working in the same right-of-way. No proprietary cable is required.



DETECT ▶ CLASSIFY ▶ LOCATE ▶ ALARM ▶ RESPOND

VALIDATE AND MANAGE ALARMS WITH INSIGHT™

VANGUARD FOCUS integrates with the INSIGHT Alarm Management platform to validate alerts, reduce false positives, deliver real-time notifications, automate logging and reporting, and connect with cameras and other security assets. The result is a single response workflow that makes use of the security infrastructure an operator already owns.

OPERATIONAL OUTCOMES

- Continuous monitoring across extended routes
- Detection and classification of defined threats
- Location of activity to support targeted response
- Monitoring of manholes, access points, conduit, and cable
- Integration with cameras, access control, NOC, SOC, SIEM, or SCADA systems
- Integration with ticket management systems like Texas811 Guardian™
- Intelligent alarm management through INSIGHT™
- Monitoring of completed construction segments before turn-up
- Continued preventive protection after the network becomes operational

FIELD-VALIDATED PERFORMANCE

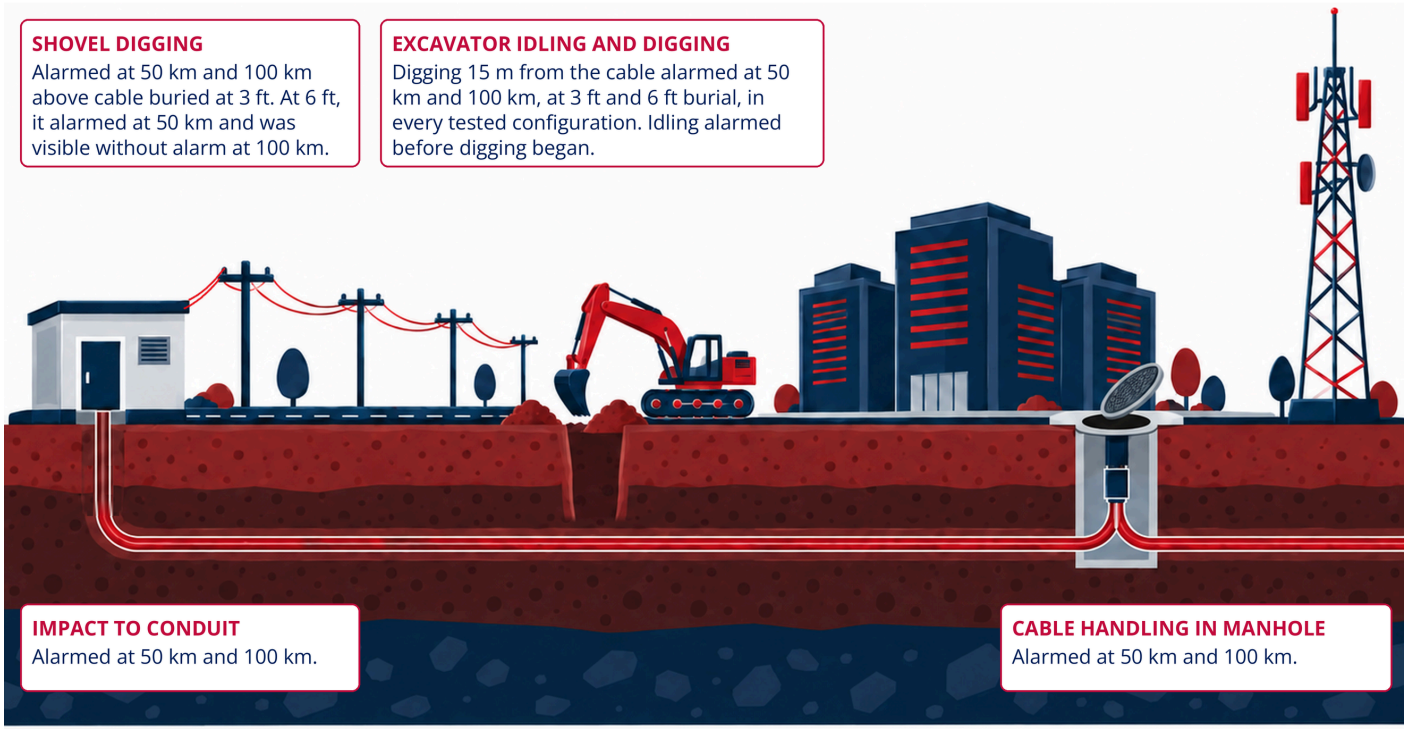
Data center interconnect route protection at 50 km and 100 km

In a research initiative to find the limits of DAS in damage prevention, VANGUARD FOCUS™ monitored a buried data center interconnect test route at simulated sensing distances of 50 km and 100 km using numerous fiber optic cable types and conduit types. Excavator digging performed 15 meters from the cable was detected, classified, and alarmed in every tested cable, conduit, and burial-depth configuration at both distances. Excavator idling, impacts to the conduit, and cable handling inside a manhole also generated alarms at both distances. Shovel digging above a cable buried at 3 feet alarmed at both distances. At 6 feet it alarmed at 50 km and remained visible in the waterfall without crossing the alarm threshold at 100 km. Only minimal differences were observed among the tested cable and conduit configurations.

WHAT WAS TESTED

- Cable: Corning 288-fiber flow ribbon and two 24-fiber cable configurations
- Conduit: Dura-Line 7-way microduct, 1.75 in single duct, and 4 in brownfield retrofit conduit
- Burial depth: 3 ft (0.91 m) and 6 ft (1.82 m)
- Simulated sensing distance: 50 km and 100 km
- Conduit water-filled during testing, as commonly found in installed underground conduit

Data Center Interconnect Route Protection Testing Results at 50 km and 100 km



Network Integrity Systems. Technical Report: VANGUARD FOCUS™ Data Center Interconnect Route Protection Capabilities at 50 and 100 km.

Results reflect the tested configurations and conditions. Route-specific performance should be validated against required threats, distances, burial depths, and alarm criteria.

VANGUARD RouteFinder™

Know Where Your Fiber Is Before Work Begins

VANGUARD RouteFinder uses an available single-mode fiber to help technicians non-invasively trace and document the installed route. It provides live feedback, fiber-distance correlation, and GPS-referenced route information without exposing the cable through excavation.

VANGUARD RouteFinder™
Advanced Fiber Route Mapping

Turn Existing Fiber into a Live Locator



GPS coordinates

Fiber position

Live feedback



HOW VANGUARD ROUTEFINDER WORKS

An interrogator connects to a spare fiber strand while a technician applies a surface vibration device along the suspected route. The system detects the vibration signature, returns signal-strength feedback to pinpoint cable alignment, and captures GPS coordinates correlated with fiber distance. The process is non-invasive and designed to avoid disturbing live assets, and it works with any standard single-mode fiber.

THE RESULT: VERIFIED, DOCUMENTED INFRASTRUCTURE

- Locate difficult or poorly documented fiber routes
- Verify routes when records or as-built drawings are incomplete
- Capture GPS-referenced route documentation
- Support safer planning, maintenance, and construction
- Establish route certainty before deploying continuous monitoring

VANGUARD RouteFinder establishes where the fiber is.
VANGUARD FOCUS continuously monitors it for threats.

WHY NIS

Network Integrity Systems is a detection company. Since 2003, NIS has used optical sensing to reveal physical and environmental threats that traditional security and network monitoring systems often cannot see. NIS solutions continuously monitor communications pathways, perimeters, access points, and critical assets, and INSIGHT validates and correlates those detections so organizations can respond before an incident becomes a crisis. NIS designs, installs, tests, and supports every system it delivers.

Talk with NIS about a route-risk assessment or field demonstration.

Network Integrity Systems | +1-828-322-2131

NIS

www.networkintegritysystems.com