Case Study

Industry: Telecomm

A Global Telephone Provider

Major challenge: Locating fiber cable damage in inaccessible areas

Solution: F3X Fiber Fault Finder

The background:

A major telephone service provider needed to determine the locations of gunshot, vandal, and rodent damage in its interoffice fiber optic cable, which typically consists of long fiber loops in rural areas with multiple and often inaccessible right-of-ways.

A cleanly severed fiber is relatively easy to find, but gunshot and rodent damage aren't so obvious and are difficult to locate.

The F3X Fiber Fault Finder.

The F3X Fiber Fault Finder is an infrared leak detection probe designed to precisely locate faults in fiber optic cables. It emits and then detects a proprietary 1550-nm tracer tone at the point where it leaks through a damaged fiber. The F3X is more sophisticated than typical visual fault locators and has greater range, as well as daylight capability.

Operation is simply a matter of applying the tracer source to the damaged fiber and then aiming the F3X along the cable route until it gives both a visual and audible indication when the aim point corresponds with the fiber fault.

The tests:

To determine if the F3X would suit its needs, the telephone company set up two tests that replicated conditions encountered during interoffice outages: long-distance gunshot damage and severed fiber cable.

Since there's no substitute for realism, the company found a non-working, 12-fiber cable and blasted it with a 12-gauge shotgun from a distance of 25 feet.

An OTDR analysis revealed that two of the twelve fibers returned non-reflective events indicative of a damaged fiber. They then applied the light source at the central office, which was 19.6 miles from the damage. (Conventional visual fault locators are limited to fewer than 6000 feet and are usually only visible at night.) The F3X positively detected leakage from a distance of 48 feet.

For the severed fiber test, the company used a 48-fiber cable that was severed 321 feet from the light source. With such a relatively clean cut, light leakage was easily detectable. The test was performed in bright sunshine that would have rendered visual fault locators useless.

A technician at the telephone company tells the story:

"Having spent more than one cold winter's night trying to find gunshot damage in the middle of nowhere, I can attest to the shortcomings of our existing fiber fault-locating tools and techniques. While OTDRs give us very precise distance-to-event measurements, our problem is 'Where does 43,250 feet take you in the real world?'

And even if you get close, how do you find the gunshot damage when the fiber is up in the air and in a right-of-way where it's inaccessible to a bucket truck?

Before the F3X, our only option was to strap on our hooks and drop the fiber so that we might literally 'feel our way in the dark,' sliding our hands along the fiber until we found 'shot pellet bumps.'

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Suffice to say that this is a slow and very labor-intensive process and one that the F3X has the potential to nearly eliminate. Given its ability to precisely locate faults at great distances and without physically touching the fiber, it's possible that, after only a few outages, the labor savings alone might cover the purchase price."

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Technician at a global telephone company