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Fiber MicroCables and MicroDucts

The Smart Solution for Intelligent Transportation System Challenges

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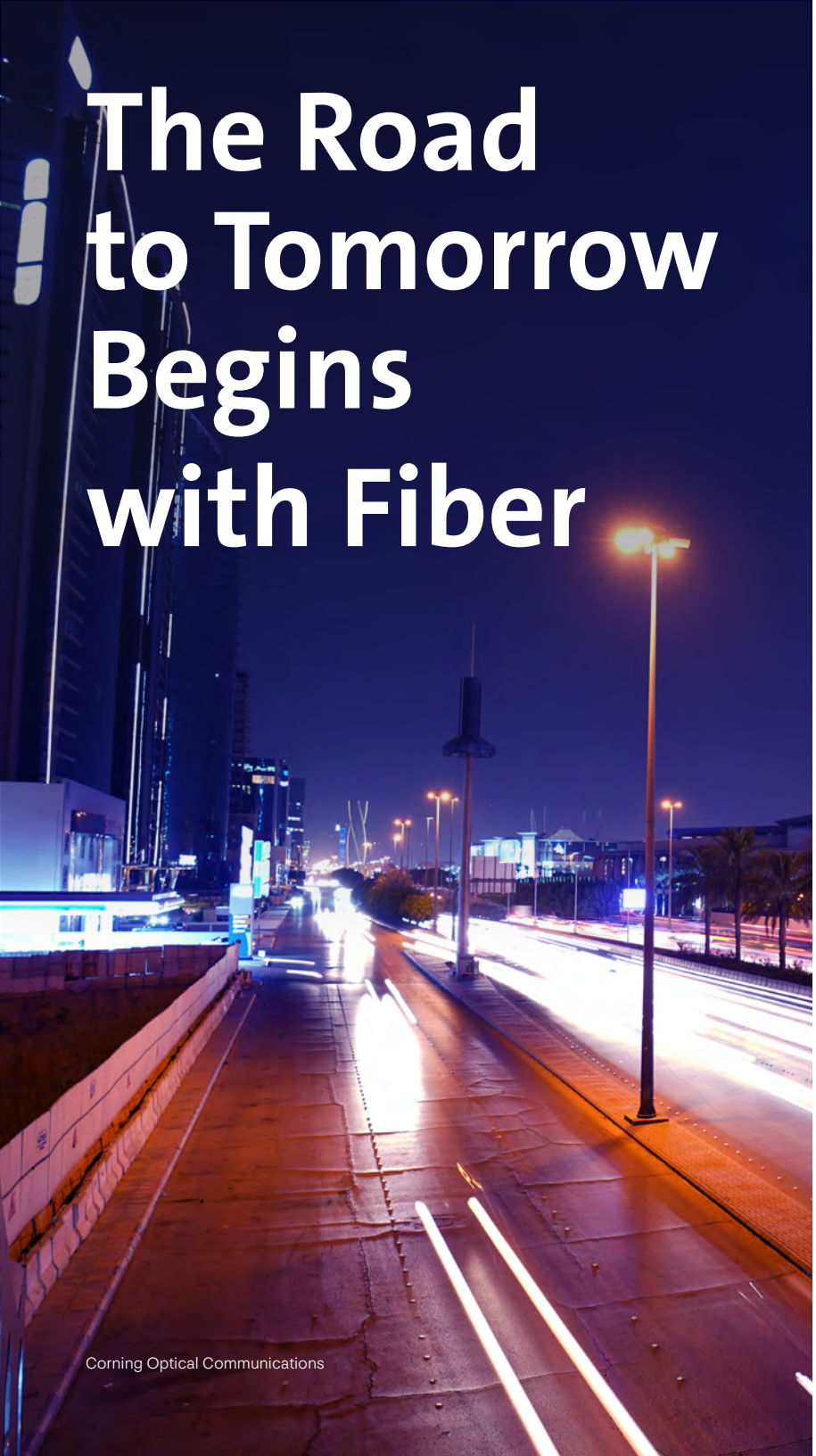
The Road to Tomorrow Begins with Fiber



Highways have always played a critical role in driving human innovation, keeping us connected and moving us forward. But today, the most exciting developments aren't happening on the road itself. To see the future of transportation, look to the right of way. From autonomous vehicle enablement to real-time monitoring and enhanced safety, new technologies are turning the roadside into ever more valuable, and crowded, real estate.

The $350 billion U.S. Infrastructure Investment and Jobs Act (IIJA) has created the largest opportunity since the 1950s for states to reimagine their highway and communications systems for the future.

How do you make the most of limited right-of-way space, reduce costs, and tackle constantly expanding bandwidth needs for your highways and communities? Choosing fiber optic MicroCables and MicroDucts is a great start.

What Are Smart Highways?

Like other intelligent transportation systems, smart highways integrate advanced digital technology to improve safety, performance, and user experience.

Their infrastructure can also be configured to provide states and municipalities with an opportunity to deploy middle-mile broadband networks that bring people and communities together, connecting them with new economic and social opportunities.

5 Ways Fiber MicroCables and MicroDucts Solve Intelligent Transportation Challenges

1 Speed That Goes the Distance

The pace of change is increasing dramatically, with no end in sight. Moves, adds, and changes (MACs) for more and updated devices will happen even sooner than you expect, including technologies that haven't been invented yet.

Choosing fiber MicroCables and MicroDucts for your smart highway network will ensure you have the **unlimited bandwidth, durability, and easy upgradability** you need to handle next-level technologies for decades, not just on day one. Future-ready fiber networks are built to navigate the long road ahead.

2 Small Yet Rugged

Exposed to storms up in the air, buried underground with rocks, water, insects, and rodents, and sharing ever tighter spaces with utilities and other right-of-way stakeholders, the “side of the road” is one tough environment for communications cables. While fiber MicroCables and MicroDucts may be small in footprint, they’re big on durability.

- Dura-Line MicroDucts are made from High-Density Polyethylene (HDPE), a tough yet flexible material ideal for demanding outdoor applications.
- MicroDucts are bundled to create FuturePath, which features multiple pathways under an oversheath in one robust, compact package.
- MicroDucts and FuturePath can be direct buried via all standard underground installation methods (trench, directional drill, plow, or pull into existing conduit), or on poles with standard aerial installation equipment (aerial MicroDuct product required).
- Pathways can be located quickly and easily via integrated tracer wires.
- Accessories for opening and coupling MicroDucts make it easy to keep cables clean and dry.

3 No More "Rip and Replace"

You won't need a crystal ball to be well prepared for the future. A smart transportation network supported by MicroCables and MicroDucts has the extreme data capacity and flexibility to handle whatever tomorrow's innovations bring, making the rip-and-replace cycle a thing of the past.

- Corning MiniXtend® MicroCables are available with up to 864 fibers per cable. Used with Dura-Line FuturePath MicroDucts, this enables thousands of fibers in one easy-to-access and updatable structure
- MicroDucts provide permanent, protective, living pathways for end-to-end jetting
- Simplifies routing to distributed network locations
- Able to add new fibers or replace fibers without disrupting the existing infrastructure

Dura-Line FuturePath® Flex 12.7/10 mm

4 Fast, Easy Installation

When it comes to building underground infrastructure, especially along a busy highway, “the money’s in the ditch.” One key to staying on time and on budget, while causing the least disruption for travelers, is getting in and out as quickly as possible – and staying out.

With MicroCabling and MicroDucts, you can dig once and be assured you’ll have the bandwidth you need for decades. Plus, because they’re easier and faster to deploy and update, they can help increase crew safety, too.

Whether you install additional cables for future needs upfront or leave the spare MicroDucts empty, you can easily upgrade anytime in the same footprint, dig free and permit free, for example:

Day One: 2 x 288 = 576F

Future: 7 x 288 = 2,016F

5 Labor Optimization

Every industry is looking for ways to do more with less, especially skilled labor. Including fiber MicroCables and MicroDucts in your smart highway project lets you:

- Install, update, and add new devices faster
- Deploy with smaller crews
- Avoid long learning curves
- Use the same duct installation and fiber jet methods your teams are used to

The Arizona Department of Transportation was able to minimize labor for its combined smart highway middle mile project. Despite difficult desert terrain and unusual weather events, the ADOT's 2- to 3-person teams were able jet about 40,000 feet of MicroCable per day.

See the case study here

Are You Ready for the Future?

Corning and Dura-Line are Paired for Your Success

Dig once and be ready for the future. Our collaborative solution of Dura-Line MicroDucts and Corning MiniXtend® cables makes it possible.

Dura-Line MicroDucts offer:

- Permanent protective pathways for end-to-end cable jetting
- A range of MicroDuct sizes and bundle configurations
- Optional armor and tracer wire
- Custom lengths
- Flexibility: Easy to route, cost-effective for MACs
- Scalability: Minimize CapEx today without limiting tomorrow's bandwidth
- Capacity up to 864 fibers per MicroDuct
- 5 mm to 27 mm outside duct diameter with integrated tracer wire
- Made in USA
- Durability for challenging 24/7 environments like manufacturing, healthcare, and transport hubs

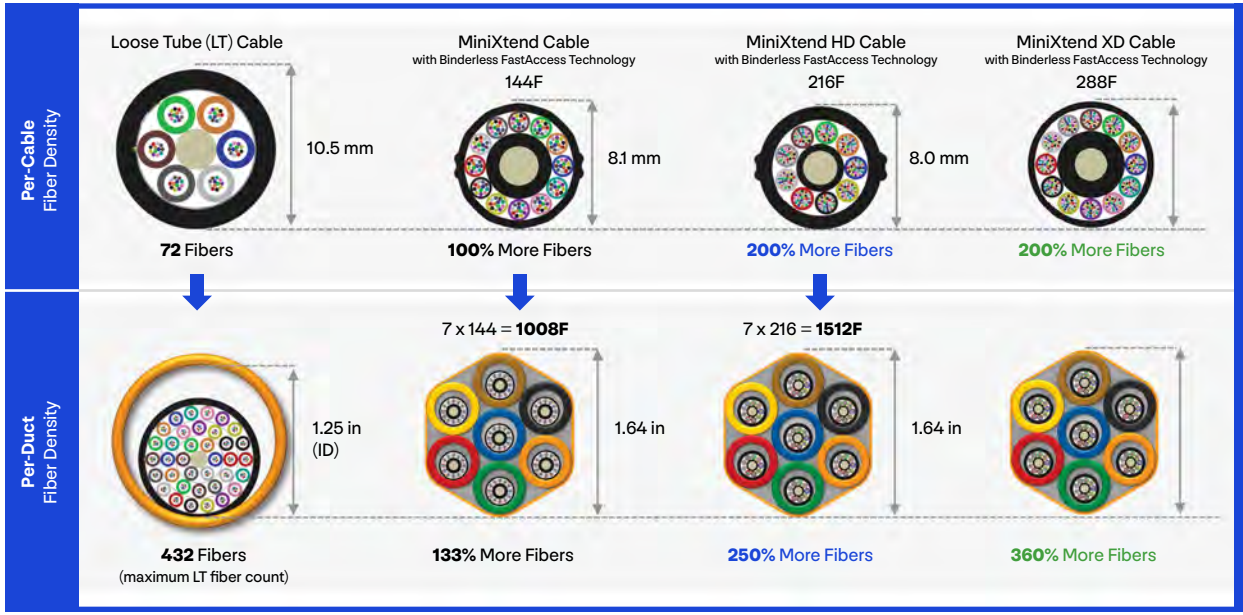
Learn more about Dura-Line MicroDucts here

Corning MiniXtend® and MiniXtend HD Cables

Designed for jetting in low-to-high fiber count applications in tight spaces through protective MicroDucts, our MiniXtend® cables are **up to 60% smaller and 70% lighter vs standard loose tube cables**.

- Available from 12F to 864F
- Binderless FastAccess® technology makes it easy to strip the jacket without special tools
- Part of a complete family of cables, hardware, closures, and accessories
- Smaller, lighter cable means smaller, lighter reels and easier handling
- Custom lengths available
- Made in USA

Learn more about MiniXtend® cables and find our complete MicroCabling Solutions Guide here



MiniXtend® MicroCable versus Traditional Loose Tube

Corning and Dura-Line have decades of experience in the network and transportation sectors. Our products are American designed and manufactured.

And our experts can work with you to find cost-effective solutions that will last.

How-to: Deploying MicroCabling in MicroDucts

Corning MiniXtend® cables are simultaneously blown and pushed. Used with Dura-Line MicroDucts and a blowing "bullet," they provide:

- Easier handling with smaller blowing machines and air compressors
- Faster, more efficient installation than traditional loose tube cables

For complete details, see our MicroCable Blowing Guide

Average Speed

60 meters per minute

Distance

1.0 km (3,281 ft) in 15 minutes or less
1.6 km (5,249 ft) in 30 minutes or less
1.8 km (5,906 ft) in one step, under ideal conditions

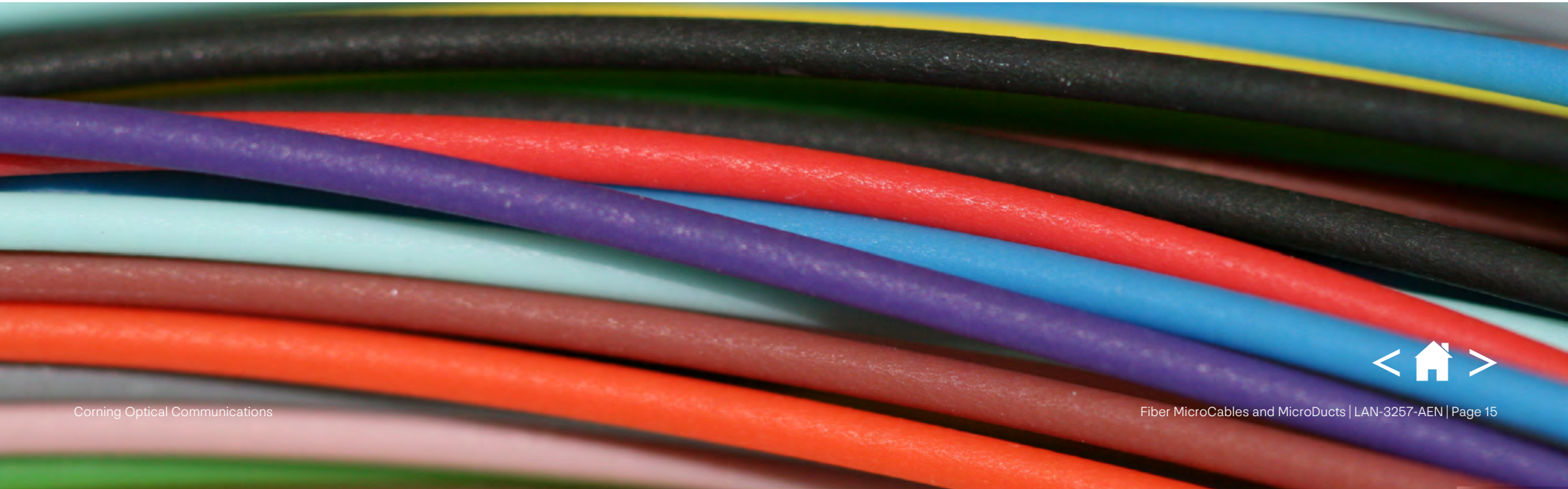
Fiber Sensing Adds Safety and ROI

Distributed Fiber Optic Sensing (DFOS) uses fiber optic cables to precisely monitor a wide range of smart infrastructure, like highways, railways, and pipelines, that run parallel to the cables. From pedestrian traffic to gas leaks to electrical current loads, the technology tracks conditions in real time, alerting operators to most issues and helping prevent harm to people and property.

How Does Fiber Sensing Work?

When optical fiber encounters vibration, strain, or temperature change, it changes the “backscattering” of light in the cable. DFOS measures that change.

Learn more about the benefits of fiber sensing
or by visiting the **Fiber Optic Sensing Association**



Case Study

Arizona DOT deploys smart highway upgrade + broadband in just 8 months.

By taking a broad view and collaborating with an extended team, including Corning and Dura-Line, the Arizona Department of Transportation (ADOT) was able to add smart capabilities to an important north-south highway.

Despite the many challenges, including difficult terrain, supply chain delays, endangered cacti, and even a rare snowfall, careful planning made it possible, from start to finish, in less than a year. Although originally envisioned as a smart highway project alone, the ADOT expanded their plan to include a robust, future-ready combination of fiber optic MicroCabling and MicroDucts. This change allowed them to add the capability to provide broadband access to the surrounding communities while also generating revenue for future broadband projects.

ADOT: Project at a Glance

Setup

- Approx. 63 miles, Interstate 19 corridor between Nogales and Tucson
- Broken into four manageable, 15- to 16-mile segments
- Pull boxes every 3,000 feet
- Node or regen building every 40-50 miles
- 2- to 3-person cable-jetting teams
- Aerial and buried sections

Fiber and duct solution

- 144F and 288F Corning MiniXtend® cable
- Dura-Line FuturePath Armored 7-way 16/13 mm
- Some ducts were jetted into existing conduit to increase capacity in the same footprint

ADOT opted to use one fiber cable and duct for its own smart highway devices and lease the other six ducts to broadband operators who are connecting communities along the Interstate 19 corridor to high-speed fiber internet.

Take Your Intelligent Transportation Planning and Execution to the Next Level

When you're faced with a large, complex project, it's easy to get tunnel vision. But broadening your point of view can help you take advantage of unexpected opportunities. These expert tips will help you be ready for (almost) anything and make the most of your project for today and tomorrow.

Build an extended local team:

- Consulting a wide range of experts can uncover nuances, leading to a more well-rounded plan. When surprises do pop up, you'll have allies to help you quickly find solutions and keep you on track. In addition to your engineering partner, invite government representatives, local business and community leaders, environmental and cultural heritage specialists, local news media, marketing partners, etc., to consult on your project.

Think bigger:

- Taking the broader view is particularly important when choosing the products for your project. Looking beyond today's needs and "the way we've always done it" can help you save time and money, minimize roadway disruption, and maximize labor efficiency.

Lean into technology:

- There's no substitute for putting work boots on the ground, but technologies like satellite imaging and drones are changing infrastructure projects for the better. Combining analog methods with digital tools, like customizable apps, will help your teams stay precisely oriented during deployment and allow them to pinpoint issues for quicker, easier resolution.

Plan twice, build once:

- When your plan's completed, walk it through step by step to make sure it holds up in the real environment where your teams will implement it. Invite partners with a fresh point of view to help. Create a backup plan accounting for extreme weather during your build season, supply chain disruptions, equipment breakdowns, labor issues, environmental or heritage roadblocks, etc.

A Small Change Can Make a Big Difference

Let's Go!

Contact your Corning rep to get your smart highway journey started.
Learn more about intelligent transportation systems here.

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Corning Optical Communications LLC • 4200 Corning Place • Charlotte, NC 28216 USA • 800-743-2675 • FAX: 828-325-5060 • International: +1-828-901-5000 • www.corning.com/opcomm