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EXECUTIVE INSIGHTS WITH

Robert Walters

SVP NETWORK PLANNING, CONSTRUCTION & ENGINEERING, AT&T

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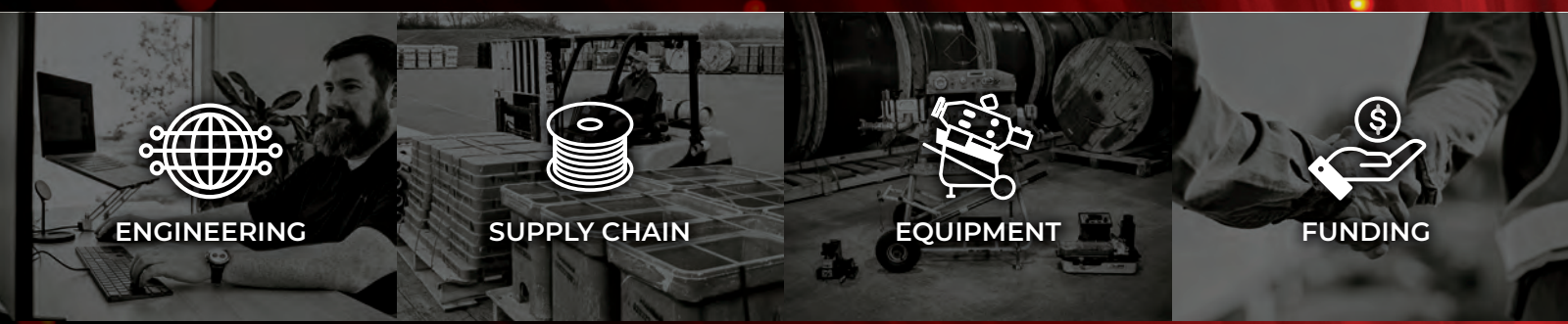

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ROBERT WALTERS, SVP NETWORK PLANNING, CONSTRUCTION & ENGINEERING, AT&T — PAGE 14

CONTENTS

FALL 2025

CONTENTS

FALL 2025

IN EVERY ISSUE

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ISE ICT SOLUTIONS & EDUCATION

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Built to Last

THE PUSH TO expand connectivity is moving fast, but speed alone isn't the measure of progress. Scale is only valuable if it holds up under pressure, and resilience matters most when things don't go as planned. The industry has ambitious targets, but the real test is whether those builds can endure the stresses of weather, demand, and time.

This issue explores how resilience, scale, technology, and efficiency all intersect, but also how none of it matters without the workforce to make it happen.

Technology is pushing progress forward. Automation, AI, and advanced tools are speeding up design and deployment, catching problems earlier, and cutting out waste. But they only deliver real value when paired with experienced crews, solid training, and clear processes. At the end of the day, it's people who turn the plans into working networks.

Every avoided truck roll, every tightened procedure, every smarter material choice adds up. Those incremental gains keep projects on schedule and networks steady, even when conditions aren't ideal.

Growth and resilience can't be treated as separate goals. Building fast matters, but building well matters more. The networks that last will be the ones planned with discipline, tested under pressure, and delivered by teams equipped to do the job right. The future of connectivity is less about what's promised and more about what holds up when it counts.

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ISE NETWORK INNOVATORS' AWARDS

Honoring Pioneers Transforming Telecom & ICT

Groundbreaking solutions, technical excellence, and meaningful industry contributions set the 2025 ISE Network Innovators' Awards honorees apart from the crowd.

We were proud to spotlight their innovation, dedication, and impact—and to celebrate the achievements that are driving progress at ISE EXPO in New Orleans.

Congratulations to these companies for their dedication!

AFL

VCTI

The Most Important Developments in Fiber Optics

The breakthroughs that built today's high-speed networks.

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IT WAS ALMOST 50 years ago that I was given a tour of Bell Labs in Murray Hill, New Jersey, where they were developing fiber optics for communications. My guide was one of the researchers there, Dr. Tingye Li, who was also the Director of Lightwave R&D.

Li was obviously proud of his job and the people working at Bell Labs. I remember walking down one hallway with him as he pointed out that this office and that one and that one belonged to a winner of the Nobel Prize, and this other office even had two Nobel Prize winners! As a physicist by education, I was thrilled, but also convinced that what I saw there was the future of communications.

I was recalling my memories of those visits to Bell Labs when I was asked recently what I thought were the most important technological developments in fiber optics. Here is what I think are those that have driven the development of optical communications.

Optical Fibers for Communications

Optical fiber had been used for years for transmitting light and images, but It was not until 1966 that Dr. Charles Kao at STL in the United Kingdom proposed the way to make low-loss fiber suitable for communications. It eventually won him a Nobel Prize. It took six more years for Corning to devise a way to make low-loss fibers and another decade for the manufacturing processes to be refined so that singlemode fiber became readily available. That singlemode fiber of 40 years ago is practically the same as the fiber used today.

Semiconductors — Solid State Lasers and Telecom ICs

Communications over optical fibers needed high power transmitters that could be modulated for data rates of millions of bits per second, and that required solid state lasers. Numerous labs, including Bell Labs, worked during the 1970s and 80s to perfect these devices.

Often overlooked in the development of fiber optics are the semiconductors that made the conversion of analog POTS signals on copper to digital logic signals for fiber optics. In the late 1970s, semiconductor companies developed analog-to-digital (A-D) and digital-to-analog (D-A) converters on a single chip that could replace large expensive modules required at the time.

Fiber Optic Connectors

Another invention proved to be a crucial part of the fiber optic cable plant: the connector needed for singlemode fiber. The precision needed was too high for early connectors. The connector problem was solved by the invention of the molded ceramic connector ferrule in Japan. The connectors that became available in the mid-1980s proved to be perfect for connecting singlemode fibers. And they still are.

By the mid-1980s, fiber optic technology had matured adequately for telcos to begin mass conversion to fiber. It was not the technology that drove building fiber optic networks; it was economics. Transmitting data on fiber cost less than 5% as much as copper and microwave alternatives because fiber had hundreds of times as much bandwidth and more than ten times the distance capability.

Telcos began converting long distance links first then moved to metropolitan networks. Starting with TAT-8 in 1988, submarine fiber optic cables started connecting the continents and replacing satellites. Fiber-to-the-home (FTTH) was

DFB lasers, fiber amps and DWDM combined to greatly expand the already massive distance and bandwidth capabilities of fiber optic communications.

tested but proved to be much too expensive with the technology available at that time.

Fiber found other applications in computer networks, utility grids and even sensors. Fiber optic gyros guided airplanes and missiles. Fiber sensors measured high voltages and currents for controlling electrical grids. Networks of super-sensitive fiber optic microphones were installed along the coasts to listen for enemy ships and submarines.

The next few years were devoted to installing fiber. Technology was still being developed, much of it in communications equipment, where higher speeds were developed to take advantage of the capacity of optical fiber. But in the early 90s, three new interrelated technologies were developed that were very important to the development of fiber optics and broadband networks. One of the researchers contributing to these next developments was Dr. Tingye Li, my guide at Bell Labs.

Fiber Amplifiers

Fiber amplifiers convert a short section of special optical fiber into a laser, amplifying any signal traversing it, making them ideal for repeaters or regenerators for long-distance networks. A simple fiber amp with a couple of fibers and one laser to pump the amplifier was simpler, cheaper and much more reliable than electronic repeaters used previously.

Wavelength Division Multiplexing (WDM)

The concept of transmitting multiple signals on one fiber simultaneously goes back to the beginnings of fiber optics. The first AT&T backbones on the East and West coasts began with 850 nm lasers but were designed to add a second wavelength, 1310 nm, when those lasers became available. The conversion to singlemode changed the wavelengths and the components required for multiplexing on singlemode needed development. Perhaps the most important development for WDM was the lasers needed.

Mass deployment of optical communications had to wait until singlemode fiber became available in the early 1980s.

Distributed Feedback Lasers (DFB)

DFB lasers used some optoelectronic and semiconductor tricks to better control the wavelength and line width of the laser. With precisely chosen lasers, more wavelengths could be carried in a single fiber, making DWDM—DENSE wavelength division multiplexing—capable of putting more than a hundred signals on a single fiber.

But DFB lasers had another unique characteristic that had at least as large an effect in another area of communications, cable TV or CATV—the ability to convert analog signals to optical signals while maintaining the quality of the analog signal. CATV sent TV over coax cables using analog signals, putting TV channels at different frequencies on a cable instead of the radio waves used in broadcast TV. DFB lasers allow CATV to convert to hybrid fiber coax (HFC) networks simply, enhancing reliability and expanding the physical coverage area of their networks.

All this was occurring as the internet became available to the public. The internet needed a comprehensive fiber network as a backbone, but individual subscribers were limited to slow speeds using modems over POTS lines. Another important development, the cable modem, allowed CATV companies to use their "broadband" HFC networks to deliver fast, always-on internet connections, leading to the dominance of CATV companies in the delivery of internet service until the emergence of our next major development.

Passive Optical Networks (PONs)

PONs replace electronic switching with optical couplers and send signals bidirectionally over a single fiber. While the first optical LAN (computer local area network) used this concept in the 1980s, it was not until the early 2000s that singlemode PONs were adopted for FTTH. Today, most FTTH networks use PONs to connect hundreds of millions of users.

Bend Insensitive Fibers

With a slight modification of the optical structure of a fiber, light lost by macrobending can be guided back into the core of the fiber, allowing fibers to be bent around smaller corners or crowded tightly into a cable without adding attenuation. This development led to microcables, small enough to blow into microducts, and high fiber count cables, typically up to 1728 fibers for OSP networks in metro areas and 6912 fibers for data center interconnect.

Coherent Networks

A lot of fancy engineering and maybe a little bit of magic have led to transceivers that make 100 gigabits per second and above routine. And like everything else, over time they have shrunk in size and price to the point they are being used everywhere.

What's Next?

Hollow core fibers allow signals to go from point to point 50% faster than glass fibers, and multicore fibers add capacity to a single fiber. Both are beginning to be used for special applications, but may prove to be the choice for next-generation networks. Other proposed technologies involve quantum theory, entangled particles and other ideas that really seem more like magic, until they become practical.

Even after nearly 50 years in the business, I can still say fiber optics are never boring! ■

Jim Hayes is a VDV writer and educator and President of The Fiber Optic Association (FOA).

What Could Possibly Go Wrong?

A New Guide to Resilience

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HAVING AUTHORED SEVERAL articles on Networking, AI, Cybersecurity and Zero Trust, this article brings all of them together.

My definition of Resiliency: Ensuring that the operation and purpose of the organization are fulfilled under any circumstances and as seamlessly as possible.

Resiliency has become a hot topic. This article begins with the big picture and then aligns with the magazine's readership, highlighting best practices for networks, operations and security.

The Resiliency Plan

The plan is the implementation of a methodology that anticipates, withstands, and recovers from adverse events, constantly adapts to new conditions, and is continually tested. Any actions planned must prioritize and align with the operational and financial considerations of the organization.

The scope of the plan is considerable, reflecting the many causes of disruption. They can stem from poor architectural decisions, human errors, insufficient cyberattack detection or response, software or data compromises, critical infrastructure failures, poorly planned mergers, supply chain failures, untested failover procedures, etc.

It's a documented, all-encompassing framework that must prioritize actions according to the purpose of Resiliency. It has Reactive Aspects (e.g., incident discovery and recovery) and Proactive Aspects (asset stewardship and protection—Disaster Recovery being a subset, IT, network, system and app software, security policy and ZT implementations, supply chain integrity, ZT aspects of HR, policies, etc.).

The cybersecurity mantra "you are only as strong as your weakest link" applies to Resiliency. It was so different looking back at Disaster Recovery software I wrote for a client in simpler times, 30-plus years ago. Now they are not, as the chart shows (see Figure 1.). Implementing Resiliency is like jumping into a moving car where repairs or upgrades are done while it's in motion and under increasing attack without the passengers noticing!

Yes, business continuity is still the organizational purpose that lives inside the data centers, the cloud-based containers where the software applications operate and micro-segmented data is stored. As we said earlier, the article now looks inside the above networks to examine best practices for infrastructure resilience.

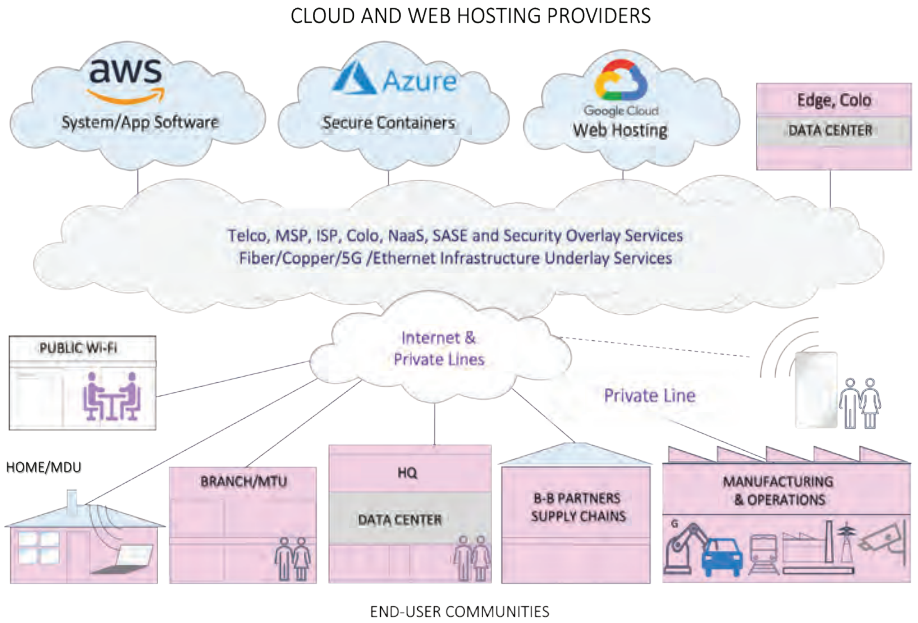

Figure 1.

Network, IT and Security Best Practices

INFRASTRUCTURE

If you have ever wandered into your data center and wondered why a device made by a provider that no longer exists is still connected and the lights are still on, then you know the extent of the problem! Perhaps your providers' network has failover devices that have been untested since before their last merger.

Clearly, if the infrastructure is compromised, access to the systems and software applications could be lost or degraded. Tier 1 service providers must provide alternate paths even if the performance is downgraded. So, best practices involve ensuring that there are physically

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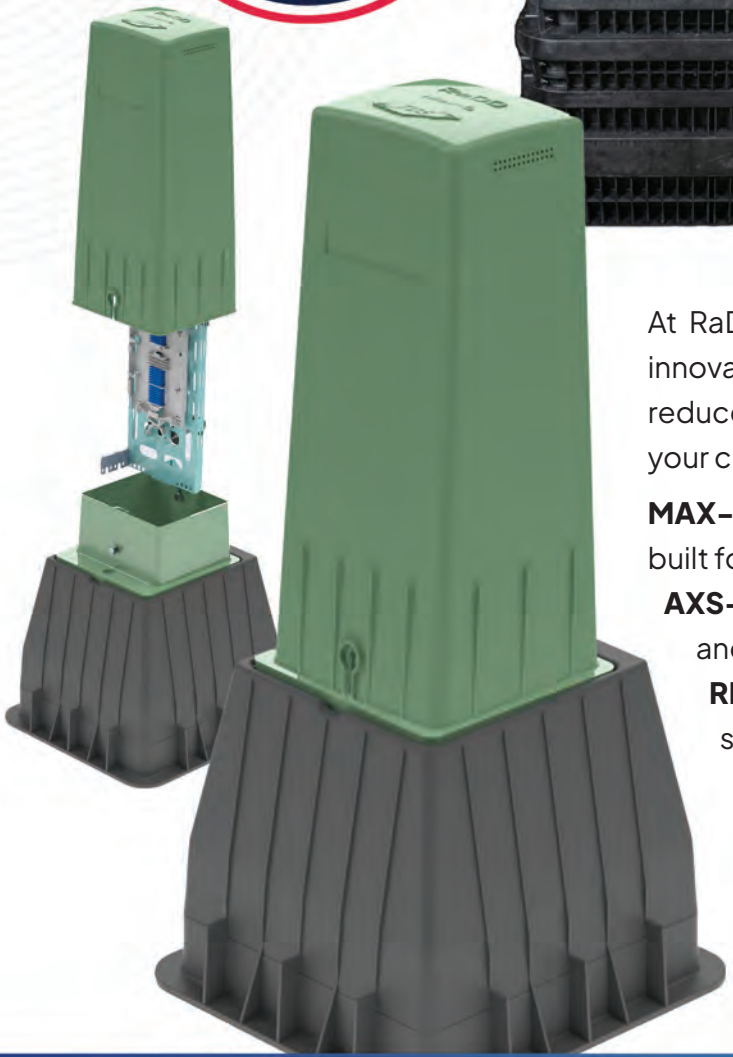

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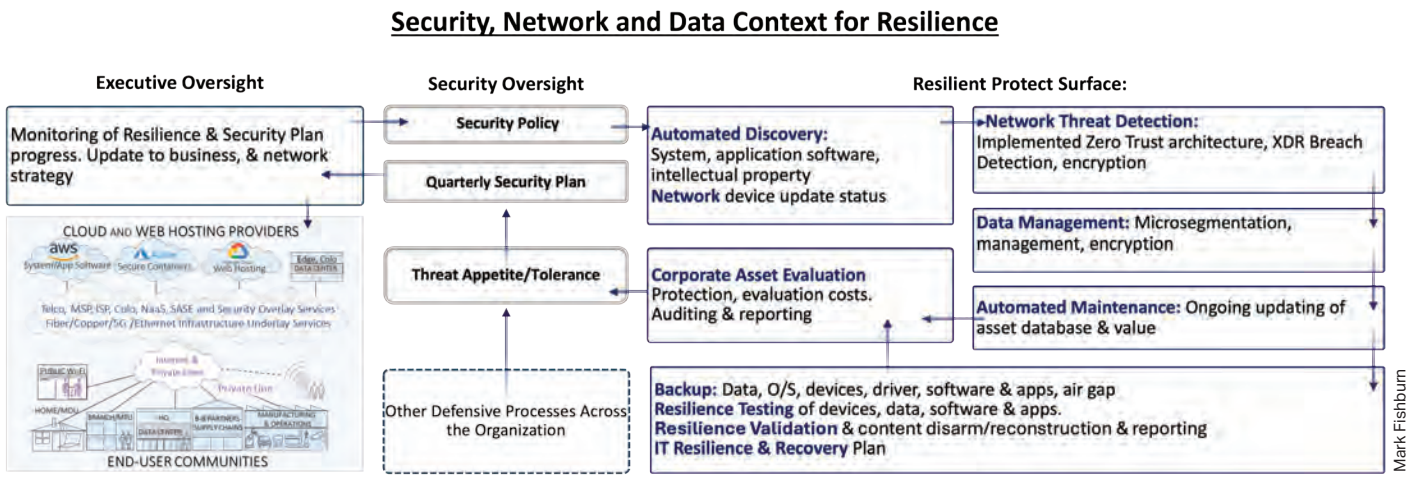


Figure 2

separated routes to the network; should one path fail, then there must be a way of prioritizing key applications or data access. (See Figure 2.)

PREVENTION

It's important in today's complex Ransomware as a Service exploits that threats be detected before they strike. My article in the spring issue of this year investigated breach detection (see cybyr.com/assumebreach).

ASSET STEWARDSHIP

Threats that target vulnerable asset systems and applications software, intellectual property, databases, and customer-sensitive data must be checked, encrypted, and securely backed up. The Figure 2 chart requires that backups be made without connection to the internet to enhance their integrity. It may be inconvenient but having a physical or air-gapped backup is preferred.

The chart also shows microsegmentation, the separation of software apps and data so that a compromise is limited to a small element of the system.

VERIFICATION

Best practices demand that data and systems are restored and then verified. For example, checking to see that they are malware-free.

In larger organizations, mere duplication of key systems may not be sufficient, especially when the infrastructure spans several countries connected via local Telcos and MSPs.

IF IT ISN'T TESTED (REGULARLY), THEN IT ISN'T RESILIENT.

This owns the title of this piece, "What could possibly go wrong?" My decade of working for a network test company showed that the unexpected usually happens. New architectures throw up unexpected challenges or unacceptable performance occurs in failover mode. Everything must be examined.

Network infrastructure and services change or are "improved" frequently and must be assessed. This applies to the integrity of the networks, Cloud or branch-based services, connected devices and protective security software. This is pure Zero Trust thinking applied to networks and software.

Many features that enable failovers should be tested once and then again when software changes are automatically updated. The automatic discovery of what is operating in the network is key.

This necessarily involves collaboration and verification with service providers. We all know that poor regression testing from software suppliers, unverified by their customer, can be disastrous. Interrelated software may have similar resilience issues, but that is not in the scope of this article.

AN INCIDENT RECOVERY PLAN

An Incident Recovery plan lays out what actions to take when compromise, system failure, or performance degradation occurs, laying out failover actions. The priority is always the integrity of mission-critical systems and data.

Background for the Article

For the last several months, I have been working in a Cloud Security Alliance group specifically focused on the Zero Trust aspects of Resilience, including the application of the European Digital Operational Resilience Act. As it evolved, I wanted to see how this important topic could translate into actions for ISE readers, and I hope that was achieved.

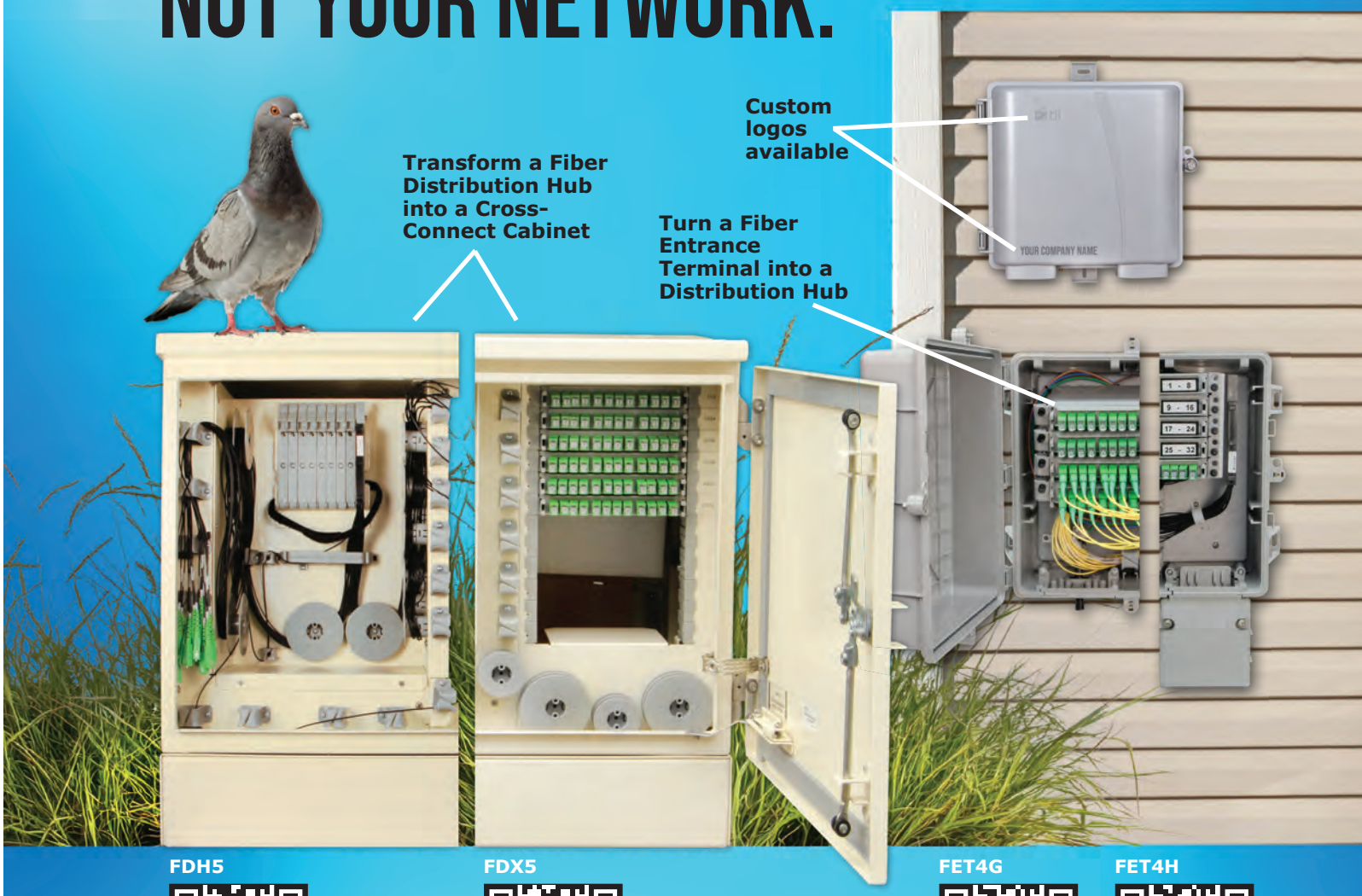
Conclusion

Due to the increasing use of Cloud systems, distributed networks and, of course, cybersecurity, Resilience has become another business imperative, so organizations are not victims of disruption, as in "How soon can we make our plan robust, tested and integrated into everything we do?"

We have only scratched the surface of this monster topic to help those in the world of IT and secure networking get a sense of the difference they can make to the success of their organization. As always, this article is part of a longer discussion on the topic. The story continues at cybr.com/resilience. ■

Mark Fishburn is CEO of cybyr.com and a provider of strategic network, cybersecurity, and marketing services.

PIGEONHOLES ARE FOR THE BIRDS, NOT YOUR NETWORK.



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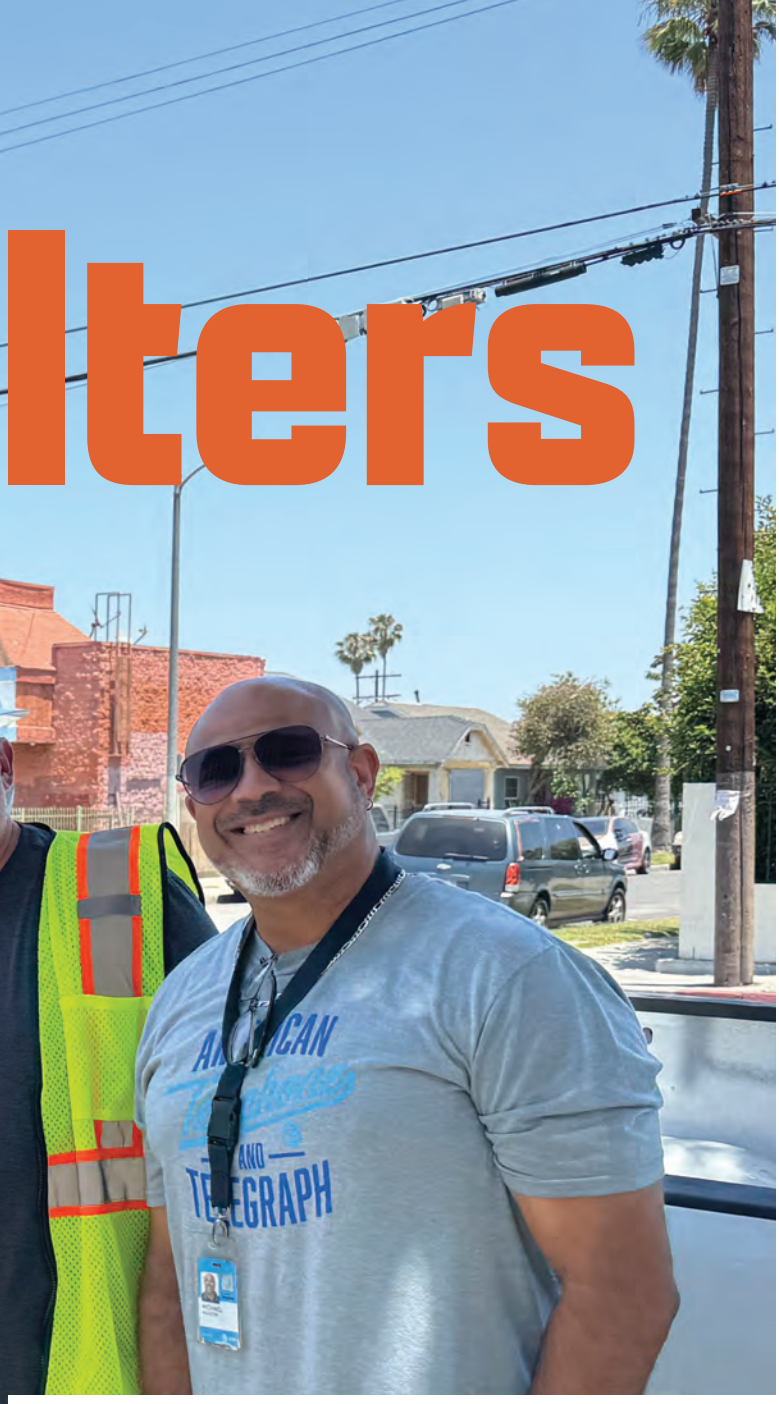

All images courtesy AT&T

BY SHARON VOLLMAN

In an industry racing toward 5G, fiber expansion, and next-gen infrastructure, few people have a clearer view of the road ahead than Robert Walters, Senior Vice President of Network Planning, Construction & Engineering at AT&T. With decades of experience and a front-row seat to one of the largest networks in the world, Walters empowers teams to utilize AI, ML and critical soft-skills to design and build the future of connectivity. This Q&A with Robert is an insider's view of what it takes to keep AT&T's network positioned for what's next.

TOPIC: Fiber Kudos!

ISE: In June, your team reached a significant milestone: AT&T passed 30 million fiber locations, achieved ahead of schedule. In a LinkedIn post, you shared, "This is a testament to our hard work and operational excellence." What are the top three improved processes your team has used to meet this milestone?

Robert Walters: Reaching the milestone of passing 30 million fiber locations ahead of schedule is a proud achievement that reflects our commitment to innovation and operational excellence.

Three key process improvements have been instrumental in this success:

First, we have significantly enhanced our tooling and technology stack throughout the fiber build journey. From planning and design automation to capturing fiber test results, we continuously seek to achieve greater efficiencies through mechanization.

Second, selecting the right materials is crucial for achieving the best results. Our supply partners are industry leaders, providing everything from custom connectorized fiber cables and terminals to appropriately sized handholes. Each component must integrate seamlessly and efficiently to deliver the highest quality service to our customers.

Additionally, collaborating with municipalities is essential to our plan. A streamlined permitting process is crucial; without it, the fiber build cannot proceed.

Finally, our success speaks to the hard work and dedication of our workforce. AT&T is committed to providing a safe working environment and to delivering products and services in a safe, environmentally responsible and sustainable manner.

TOPIC: 2030 Fiber Roadmap

ISE: Looking ahead, AT&T aims to expand its fiber footprint to reach approximately 60 million locations passed by the end of 2030. What technologies, tools and techniques will your team need from vendor partners to help you achieve this goal?

Walters: As we continue to expand our fiber footprint to pass more than 60 million locations by the end of 2030, we will continue to utilize automation and AI functionality within our design and construction tooling stack. We will continue to identify innovative alternatives in partnership with various suppliers. We constantly explore new innovative ways to build fiber, such as micro-trenching and utilizing new technologies that allow for primary flexibility points with splices to be stored in handholes instead of cabinets. We work closely with our vendors to help ensure that our workforce is highly skilled and trained in the latest technologies and innovations.

TOPIC: Paying the Fiber-Learning Forward

ISE: What lessons has your team learned about streamlining make-ready processes, ROW access, and municipal collaboration to accelerate fiber deployments?

Walters: Our team has learned several valuable lessons that have been pivotal in accelerating fiber deployments.

Initiating early communication with municipalities and utility stakeholders is critical. By addressing concerns proactively, we can secure ROW permits more efficiently, reducing delays caused by last-minute approvals.

Creating standardized templates and checklists has significantly reduced administrative overhead. This consistency helps all parties clearly understand expectations, which in turn speeds up the review and approval process.

Also, utilizing digital platforms for real-time tracking and sharing of project status has enhanced transparency and collaboration. This visibility helps resolve issues quickly, coordinate inspections, and align schedules, which minimizes downtime and accelerates deployment timelines.

Close collaboration between teams ensures that potential hurdles are identified and addressed early. This integrated approach helps streamline workflows and fosters a unified strategy toward overcoming regulatory and logistical challenges.

We believe our customers deserve the best, so we're always setting very high expectations for ourselves.

TOPIC: Partner Collaboration & Vendor Management

ISE: Please share three best practices your team uses to manage vendor and contractor partners, ensuring high standards, safety compliance, and efficient builds.

Walters: In our wireless space, to ensure high standards, safety compliance, and efficient builds with our vendor and contractor partners, our team employs several best practices:

- **High Standards:** We utilize drone capture and build modeling to verify that construction components meet specific tolerances. Additionally, the quality review process enables us to review completed work remotely, increasing oversight and overall network quality. This also lays the groundwork for AI-assisted quality assessments in the future.
- **Safety Compliance:** AT&T is a leader in the industry, requiring National Wireless Safety Association certification for crews climbing our towers.
- **Efficient Builds:** Our planning and engineering teams bundle as many construction tasks as possible during a single mobilization to ensure efficient resource utilization.

For our wireline builds, we utilize multiple approaches to ensure our suppliers are delivering at a high level, which helps drive down cost related to rework and helps deliver better customer service. In recent years, AT&T has implemented a virtual inspection process, where suppliers take pictures of certain completed work activities facilitating a virtual review by AT&T, which increases the number of locations reviewed and drives a better overall quality of the fiber network. Additionally, this is positioning the company to eventually utilize AI technology in reviewing the quality of the workmanship captured in the pictures.

AT&T has structured its contracts to include Key Performance Indicators (KPIs) to measure success factors for the work being performed by the suppliers, establish clear expectations for the suppliers on what is expected, and allow for monitoring of the results.

TOPIC: Network Sustainability

ISE: How is sustainability being integrated into AT&T's construction practices, material selection and long-term network design?

Walters: The integration of sustainable practices into our operations drives efficiency and minimizes negative impacts, ultimately leading to a more competitive and resilient business.

Each year, we implement many innovative energy-efficiency projects across our network and operations, reducing electricity

Sanibel Island, Florida, field photo.

Seattle, Washington, field photo.

consumption, costs and emissions. For example, by transitioning our network from copper DSL to fiber in a particular neighborhood, we provide a faster network for our customers while reducing our energy consumption in that neighborhood by approximately 70%.

We allow select cell sites to enter a "sleep mode" during periods of low demand to conserve energy. Cell site sleeping is implemented throughout our U.S. mobility network, resulting in energy savings. Utilizing machine learning and advanced analytics, we quickly pinpoint inefficient cell sites with excessive energy use and dispatch repair teams to enhance their efficiency. Additionally, we collaborate with engineering teams to identify and retire older, less efficient network equipment where we can.

TOPIC: AI Buzz Versus Realities

ISE: Share two successes your Network Operations team has realized using AI to support performance management, forecasting and optimizing resource utilization.

Walters: Our team has achieved remarkable successes by using AI to enhance performance management, forecasting, and resource optimization. Through AI-enabled integrated network planning and forecasting, we have significantly improved the accuracy and efficiency of deploying fiber and 5G networks. By analyzing vast datasets with advanced machine learning models, the team can predict demand patterns and optimize resource allocation, ensuring that network expansions are both timely and cost-effective. This proactive forecasting reduces over-provisioning and minimizes delays, ultimately enhancing service reliability for our customers.

We have achieved a 30% improvement in energy efficiency by utilizing generative AI models to optimize cell site operations, particularly through intelligent "sleeping" modes during periods of low usage. This AI-driven optimization reduces unnecessary power consumption without compromising network performance, leading to substantial cost savings and supporting AT&T's commitment to sustainability.

We also have designed and built our AT&T Geo Modeler, which is an AT&T-patented, AI-powered geospatial engine that creates a near-real-time, nationwide digital twin of our wireless network. It enables improved modeling of signal strength, interference, and coverage across diverse terrains.

Plus, our patented Network Foundation Model (NFM) is a deep learning-powered platform that applies generative AI to unify and interpret complex network data. It combines KPIs, configurations, logs, alarms, and other inputs to provide a comprehensive and intelligent view of the network. This supports our vision of building an autonomous and predictive network.

TOPIC: Powering the Future

ISE: Technological innovations in power and energy storage solutions allow operators to improve network resilience. However, unforeseen circumstances often challenge the best plans. Describe the nuts and bolts behind AT&T's network strategy that address the reality of a fallible power grid.

Walters: Maintaining network and operational continuity is essential for the millions who depend on our connectivity. Network resilience is a cornerstone of our commitment to customers and a key element of our approach to managing environmental impacts.

Our strategy includes:

- **Infrastructure Investment:** AT&T invests heavily in advanced technologies such as 5G, fiber optic cables and high-capacity data centers to create a strong and resilient network.

- **Redundancy and Resilience:** The network is designed with built-in redundancies to minimize downtime and service disruptions. This includes backup systems and multiple pathways for data transmission. When unexpected outages happen, we strive to restore service promptly.
- **Risk Management:** AT&T uses advanced data to forecast and help mitigate the impact of weather-related risks on its network. This includes flood vulnerability analyses and hardening solutions.
- **Advanced Monitoring Tools:** AT&T utilizes the AT&T Weather Operations Center, our Network Disaster Recovery (NDR) Program and established disaster response procedures to monitor and respond to weather-related events that could impact our infrastructure.
- **Disaster Recovery and Preparedness:** Comprehensive disaster recovery plans help ensure rapid restoration of service during emergencies. This includes mobile cell sites and other rapid deployment solutions to support affected areas. With more than 750 pieces of specialized response equipment that traverse land, sea, and air, AT&T has one of the largest disaster recovery programs in the world.
- **Supporting First Responders:** FirstNet®, built with AT&T, is the only nationwide, high-speed broadband communications platform dedicated to and purpose-built for America's first responders and the public safety community. We built, and maintain, the network in public-private partnership with the First Responder Network Authority (FirstNet Authority).

TOPIC: Results

ISE: Share one story about HOW your team crushed an objective this year.

Walters: This year, our team truly crushed a monumental objective by passing 30 million fiber-eligible locations, **six months ahead of our publicly announced plan**. This achievement was no easy task; it demanded overcoming complex technical hurdles, navigating diverse regulatory landscapes, and executing flawlessly across countless projects and teams. This milestone is more than just a number—it's a powerful testament to our team's relentless passion and precision, powering communities and businesses with the fast, reliable connectivity they deserve. This sets the stage for our journey ahead to pass approximately 60 million fiber locations by the end of 2030. Together, we are not just building infrastructure; we are crafting the digital highways of the future. Our team's achievements this year exemplify the heart and soul behind that mission.

TOPIC: Company Culture

ISE: Culture affects nearly every aspect of a company, and both employees and leaders experience it daily. However, bridging the divide between executive leadership and the general workforce can sometimes be tough. Share strategies you use to nurture your team's culture.

Walters: It starts with the customer…period. When we keep the customer top of mind, everyone is working toward the same goal. We make sure each person understands how their role supports the company's strategy and takes a genuine interest in their professional and personal goals. This drives motivation and belonging. The leadership team also promotes a culture of internal collaboration and healthy external competition, always focused on safely delivering value to our customers.

TOPIC: Significant Learning

ISE: What is the most important thing you've learned in the last year?

Walters: Everything starts on the frontline. Empowering our local leaders is the key to safely delivering what our local markets need, and we have tremendous local leadership teams that put the customer at the center of what we do day in and day out.

TOPIC: Constant Growth

ISE: What soft skills and leadership strategies are essential for your team members to succeed in this ever-evolving industry?

Walters: Curiosity, empathy, and a commitment to continuous improvement are critical soft skills. Leadership strategies that emphasize nurturing relationships, setting challenging milestones, and fostering a team mindset over individual competition are essential. Encouraging team members to focus on daily incremental progress helps build momentum that leads to lasting success.

TOPIC: Leadership Style

ISE: Share one word that encapsulates your leadership style. Share one word that describes you when you're not working.

Walters: Leadership style: Passionate. When not working: Sleeping.

TOPIC: Balance

ISE: What are your thoughts about work/life balance?

Walters: "Balance" has shifted to integration mainly due to the fast evolution of connectivity technology. Use resources available to you and take advantage of AI. AI can help summarize what you've spent a lot of time on, and you just need to refine instead of starting from scratch.

Focus on clear goals, check-in points and time management. You should also have a maniacal focus on the mission, organizational skills, as well as prioritization.■

Robert Walters leads a team of over 15,000 professionals who design, build, and operate AT&T's converged (Fiber and 5G) networks with collaborative responsibility for AT&T's annual multi-billion-dollar network capital investment strategy inclusive of spectrum, fiber and 5G expansion investments. The team is also responsible for life cycle managing the third-party access, satellite, towers, and roaming relationships. Robert also leads the fixed broadband (fiber) build program. For more information, visit www.att.com.

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75% LIGHTER THAN
POLYMER CONCRETE.
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See how Duralite® is changing the game.

- Conduit and mouseholes
- Cable racking and divider slots
- Fiber drop holes
- Pulling eyes
- Enhanced stackability

The 2025 ISE Network

BY LISA WEIMER

ISE Magazine celebrates the ISE Network Innovators' Award Honorees at ISE EXPO 2025 in New Orleans, Louisiana, this summer.

These awards recognize a wide range of innovations that address critical challenges for broadband service providers across fixed and mobile networks. Entries span technologies, systems, hardware, and software solutions.

An independent panel of subject matter experts evaluated each submission based on its application, benefits to the industry, breakthrough performance, and innovation. For 2025, we are proud to present you with the following 17 standout products and their companies.

The 2025 honorees.

Innovators' Awards

ISE NETWORK INNOVATORS' AWARDS

BRONZE

Cyber Power Systems (USA), Inc.

CyberPower's CP1500PFCRM1U PFC Sinewave UPS System

The CP1500PFCRM1U helps keep equipment connected and protected during power surges and outages, preventing the likelihood of data loss and costly downtime. If security equipment is down, company equipment, property, and employees could be at risk. It provides battery power backup, surge protection, and EMI/RFI noise filtering for security systems, audio/visual equipment, networking, storage devices, and sensitive electronics requiring an active PFC power source. *cyberpowersystems.com*

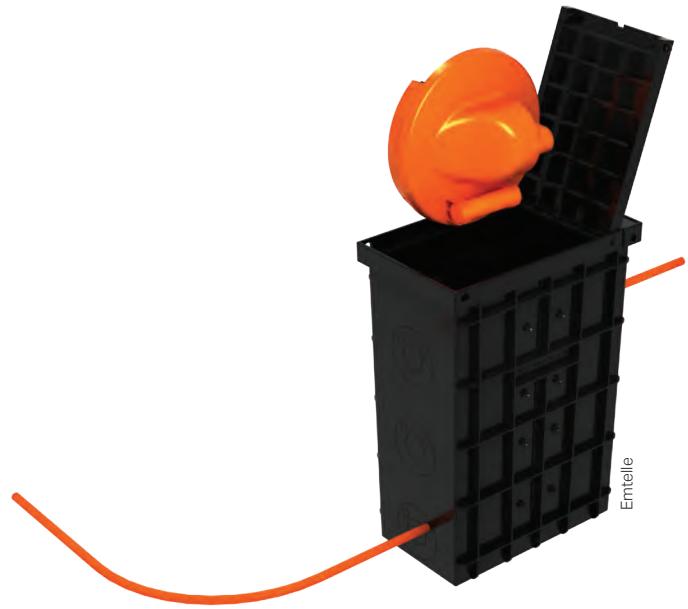
JUDGE COMMENT: "Solid product enhanced by the shorter depth that will support more applications in OSP environments."

Cyber Power Systems (USA), Inc.

CyberPower's PR750LCD3C Smart App Sinewave UPS System

The PR750LCD3C provides battery backup power and surge protection for corporate servers, department servers, storage appliances, network devices, and telecom installations requiring Active Power Factor Correction (Active PFC) power source compatibility. It features a built-in cloud monitoring card so users can monitor their power anywhere. It uses Automatic Voltage Regulation (AVR) to correct minor power fluctuations without switching to battery power, which extends battery life. AVR is essential in areas where power fluctuations occur frequently. *cyberpowersystems.com*

JUDGE COMMENT: "A great option for BSP small business customer-premises installations that cannot tolerate power downtime. Well done!"



Emtelle

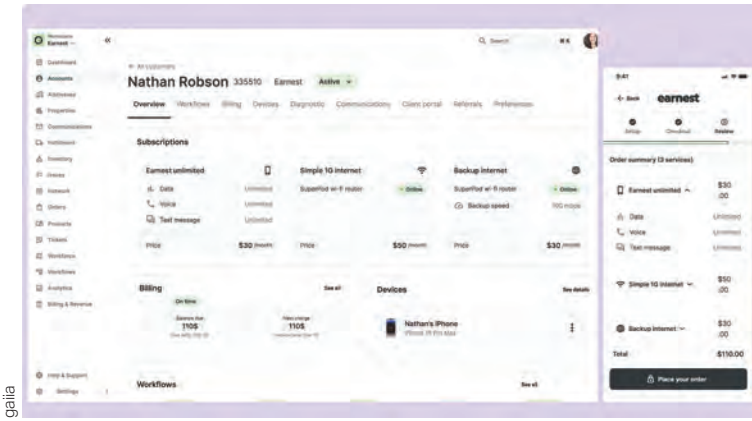
Emtelle's FiberMag – Revolutionizing Last-Mile Connectivity

The FiberMag (patent pending) helps broadband service providers to streamline fiber deployment by optimizing last-mile connectivity. By pre-installing fiber at the property boundary, it eliminates high remedy costs, reduces labor-intensive installation during the customer connection phase, and enables instant, splice-free customer connections. This reduces operational expenses (OpEx) by minimizing truck rolls and secondary excavation in the sidewalk. Additionally, the integrated EM-Marker ensures precise underground traceability if any maintenance is required. *emtelle.com*

JUDGE COMMENT: "Good concept. Less light loss due to connectors and fewer failure points."

gaiia's OSS/BSS Platform

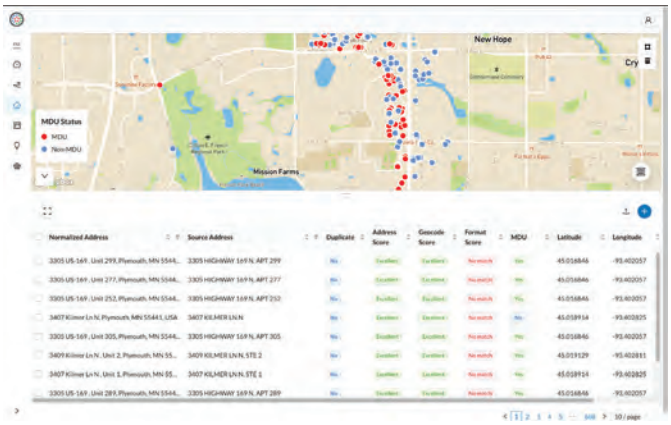
The OSS/BSS Platform is a flexible, automated, all-in-one platform that enhances a subscriber's experience and increases a customer's lifetime value while improving operational efficiency. The solution includes several key strategies under a single pane of glass



gaiia

that helps internet service providers (ISPs) develop new revenue, reduce operational expenses, and achieve success. *gaiia.com*

> **JUDGE COMMENT:** "This seems like a useful product for start-ups or smaller companies that do not have large, internal IT resources."



VETRO

VETRO's Address Genius

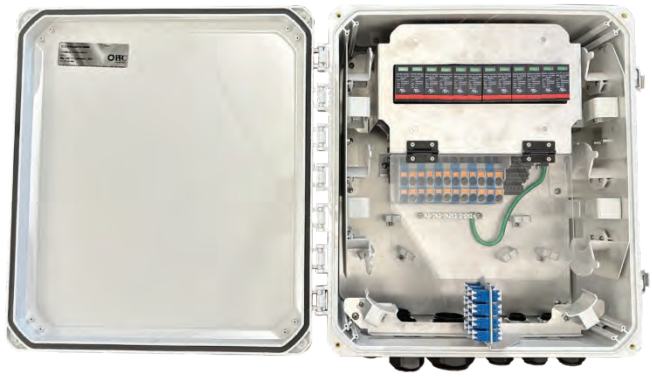
The Address Genius offers benefits to BSPs by streamlining operations and enhancing the customer experience. It directly reduces costs by eliminating the need for manual address corrections, freeing up valuable time and resources and leading to increased operational efficiency. It enhances customer satisfaction by ensuring accurate address data, which results in timely service delivery and fewer customer complaints. Also, the product improves network planning by providing reliable address data, enabling more targeted and effective network deployments. *vetrofibermap.com*

> **JUDGE COMMENT:** "Accurate addressing is critical and is traditionally a weak spot in transitioning from build-out to sales. This solution is a great step forward in ensuring accuracy and improving downstream sales go smoothly."

ISE NETWORK INNOVATORS' AWARDS
SILVER

Belden's Hybrid Fiber/ Power OVP Terminal

The Hybrid Fiber/Power OVP Terminal enhances outdoor wireless network efficiency and reliability, furthering operators' objectives to optimize performance and minimize costs. Integrating fiber, power and overvoltage protection simplifies installation and lowers costs. The modular, field-replaceable surge protection devices (with visual status indicators) allow for quick maintenance and decreased downtime. The terminal's NEMA 4X-rated enclosure



Belden, Inc.

provides protection against moisture, dust and extreme temperatures—an essential quality for outdoor deployments. *belden.com*

> **JUDGE COMMENT:** "A nice flexible product combining fiber management, power protection, and weatherproofing. The

ISE's Editor, Hayden Beeson, announces the honorees.

modular surge protection should offer a nice option for field forces to quickly repair out-of-service modules. Like the scalability and multiple configuration options."

Clearfield, Inc.

Clearfield's 3D Interactive Guides Powered By the BILT® App

The BILT integration empowers broadband service providers (BSPs) by enhancing operational efficiency and reducing costs associated with training and installation errors. By streamlining setup with interactive 3D guides, BSPs can onboard technicians faster, reducing training expenses and improving workforce productivity. The error-reducing nature of BILT's step-by-step animated guidance minimizes rework and material waste, ultimately cutting operational costs. Unique features include interactive 3D visualization, offline functionality, faster training and adoption, and comprehensive product coverage. *seeclearfield.com*

JUDGE COMMENT: "A nice step forward in technician training and on-the-go field reference material."

EXFO

EXFO's FIP-200 – Connector Checker

The FIP-200 – Connector Checker is an essential fiber inspection tool purpose-built for broadband service activation. It simplifies fiber connector inspections with a one-button, fully automated process, eliminating the need for manual image interpretation. Its intuitive 5-bar rating system delivers clear pass/fail results tailored for broadband field operations, enabling technicians to take immediate corrective action, ensuring high-quality fiber connections while minimizing operational costs. *exfo.com*

JUDGE COMMENT: "This is a good handheld tool for quick and easy determination of the viability of the fiber connection."

IQGeo

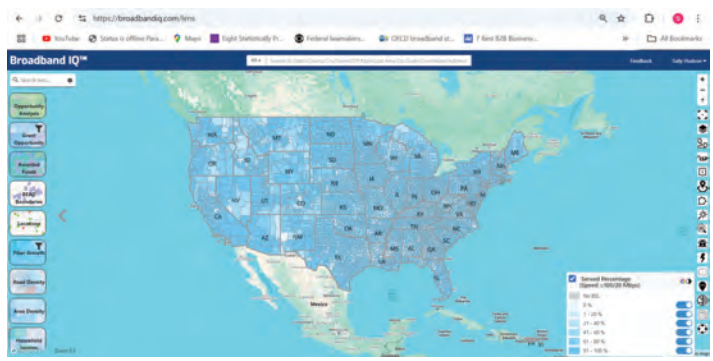
IQGeo's Network Revenue Optimizer

By eliminating manual inefficiencies in lead generation, cost estimation, and sales workflows, the Network Revenue Optimizer accelerates the sales cycle and increases conversion rates. Rules-based analytics automatically identify high-value near-net prospects, generate revenue-optimized route calculations, and produce accurate, real-world cost estimates in seconds—allowing providers to respond to opportunities faster. It seamlessly integrates with CRM platforms, ensuring sales and engineering teams work within a unified system. *iqgeo.com*

JUDGE COMMENT: "Anything that can bring engineering, planning, design, operations and sales teams together is a win-win for the company and the customer. This product appears to be able to make that magic happen!"

VCTI's Broadband IQ™

The Broadband IQ is a new SaaS offering designed to help service providers quickly analyze the most profitable and strategic markets for network expansion. The solution also helps to develop accurate construction plans and budgets without investing time



VCTI

and money to send teams into the field to physically inspect. Service providers can access VCTI's data and analysis via a self-serve model and leverage their related services and expertise to interpret the information and build expansion plans. *vcti.io*

> **JUDGE COMMENT:** "Timely product for the BEAD/BABA contracts. Software can help determine additional builds around the specified space for the contract."

ISE NETWORK INNOVATORS' AWARDS GOLD

AFL's Apex® X-1 Sealed Splice Closure

The Apex X-1 Sealed Splice Closure is the newest and smallest member of AFL's Apex family of sealed splice closures. In the broadband infrastructure sector, it has revolutionized the industry's approach to fiber deployment. As the most compact sealed dome splice closure in its class, this latest design balances size optimization with exceptional performance, supporting up to 144 single fusion, 432 mass fusion with standard ribbon, or 864 mass fusion with "rollable ribbon" fiber types. *aflglobal.com*

> **JUDGE COMMENT:** "Nice evolution of this product. Great combination of small size and straightforward cable and splice management. Sealing the closure and the individual fiber ports is easy for field forces and reliable."

EXFO's AXS Compact OTDR Series

The AXS Compact OTDR Series is designed to eliminate hidden costs of ownership. The all-day battery > 10 hours of autonomy (Bellcore). It contains a patented, field-replaceable swap-out connector that self-diagnoses the health of the unit connector. Swap it for a brand new one on the go when needed. The calibration date remains valid, even after swapping the connector. Also, there's no need to calibrate the unit sooner than planned. *exfo.com*

> **JUDGE COMMENT:** "Love they attack the hidden cost of ownership—unnecessary downtime of the equipment. Leveraging technology to improve this often-overlooked aspect is excellent. Focusing on simplicity for field use is another plus."

EXFO's PXM/LXM Duplex and Multi-Fiber OLTS

The new PXM/LXM OLTS enhances operational efficiency, reduces costs, and simplifies the certification process for fiber optic networks. It allows users to measure loss, length, and polarity on duplex and multi-fiber links at two wavelengths within just one second, significantly reducing testing time. Its first-time-right polarity detection for duplex and multi-fiber eliminates hidden

errors, ensuring correct fiber connections from the start and avoiding rework delays. The patented Click-Out design eliminates the need for multiple devices. *exfo.com*

> **JUDGE COMMENT:** "Addressing the need to inspect/test multi-fiber connectivity for the massively growing DC market is great. This will save time with labor costs and accelerate the deployment. Combined with the ease of connectivity with the different standards, is an excellent plus."


Panduit

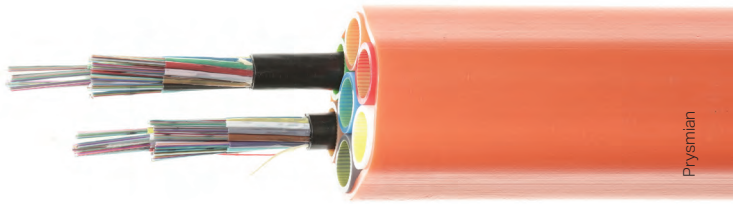
Panduit's Fault Managed Power Systems (FMPS)

The FMPS revolutionizes broadband deployments by delivering safe, efficient, and cost-effective power over long distances. It's recognized by the 2023 National Electric Code and is the first FMPS to be certified by Underwriters Laboratories under UL1400-1. It actively monitors for seven types of faults and stops a power transmission within two milliseconds if a fault is detected. It transmits 600 watts of power of a single 16AWG copper pair and reaches a maximum distance of two kilometers. *panduit.com*

> **JUDGE COMMENT:** "Delivers more power for a greater distance and can be remotely managed making for easier install and maintenance."

Prysmian SiroccoXT Microduct Cable

The SiroccoXT cables, which are smaller than any competing product with the same fiber count, enable customers to install more fiber in the same duct. This generates up to twice the revenue with minimal additional expenses. For instance, Prysmian's SiroccoXT


Prysmian

864 cable has an outer diameter of 9.8 mm, making it suitable for a 12 mm inner diameter duct. When evaluating cables, it is crucial to understand duct fill limits. *prysmian.com*

> **JUDGE COMMENT:** "Prysmian is excellent in leveraging their cable prowess to develop new cable designs and SiroccoXT is a great example of that with clear values in higher density."

ISE NETWORK INNOVATORS' AWARDS

PLATINUM


Brightspeed

Brightspeed's Fixed Wireless Voice and Data Solution

The Fixed Wireless Voice and Data Solution provides customers currently served by aging, unreliable copper cables, an upgraded communications and connectivity experience. The solution provides a more reliable, resilient option that supports voice calls and helps families and businesses connect to the internet with a more stable, carrier-agnostic connection. Brightspeed's fixed wireless solution has industry-standard customer self-serve battery backup in case of power outages. *brightspeed.com*

JUDGE COMMENT: "The Fixed Wireless Voice and Data Solution provides an economical and valid data solution in areas where fiber is unavailable. The battery backup is also quite beneficial."

Corning's Evolv® Field-Installable Pushlok® Connector

The new Evolv Field-Installable Pushlok (FIPL) Connector is the first connector to integrate the flexibility and convenience of a field-installable solution with award-winning push-and-click Pushlok technology unlocking increased network deployment speeds, ease-of-use, and sustainability. With the broadband industry facing an unprecedented amount of uncertainty in labor availability, material costs, and government funding, FIPL enables operators to deploy networks easier and cheaper, turn up subscribers faster, and train new installers quicker. *corning.com*

JUDGE COMMENT: "This connector design is brilliant. The flexibility to adjust to different heads and provide a secure, polished connection without a splicing tool could be a tremendous asset to field technicians." ■

Corning, Inc.

ISE EXPO 2025 Recap

This year, ISE EXPO brought the telecom industry to New Orleans for three days of collaboration, learning and innovation. Attendees explored a bustling exhibit floor, joined targeted education sessions, and connected at networking events, including the annual golf tournament.

The program opened with a keynote on building disaster-resilient communities, where Julie Slattery, Senior Vice President of Core Engineering & Operations at Verizon, underscored how technology and partnerships strengthen preparedness and response in critical situations.

Panels and sessions throughout the week examined key industry priorities like converged and hybrid networks, BEAD program realities, bridging the digital divide and managing fiber capacity. A research-driven discussion offered a state-level perspective on BEAD progress, with insights into technology choices, supply chain pressures and rollout strategies.

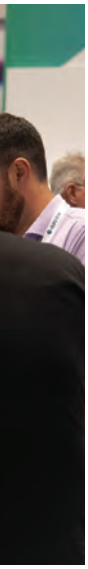
Workforce development was another

Keynote speaker Tom Maguire, Brightspeed.

The 2025 ISE Network Innovators' Awards.

Keynote speaker Julie Slattery, Verizon.

Executive Panel (left to right): Anis Khemakhem, Kevin Czaicki, Randall René, Michael White and Charles Harlow.



focal point, with a half-day program dedicated to strategies for recruiting, training and retaining skilled broadband professionals. The ISE EXPO agenda also included a Women in Telecom luncheon, offering a platform to share leadership experiences, foster mentorship and spotlight diverse perspectives shaping the industry's future.

The closing keynote, delivered by Tom Maguire, Founding Leader and Board Member of Brightspeed, looked ahead to a decisive industry shift, as modern networks replace legacy infrastructure to meet the demands of the future.

From the exhibit floor to after-hours conversations, ISE EXPO 2025 offered a multi-faceted look at the challenges and opportunities shaping the next phases of network expansion, and the people and ideas driving it forward.

Nashville 2026

Mark your calendar for ISE EXPO 2026, August 18-20, at the Music City Center in Nashville, Tennessee. Join industry leaders, innovators and decision-makers in the heart of Music City for three days of networking, education and technology showcases. ■

Women in Telecom Panel (left to right): Janice Oliva, Kelly Bohlman, Carrie Charles, Wendy Danielson, Terri Moore, and Michelle Yirka.

Worawee Meepian via Getty Images

Scaling Smart

How Frontier is Building Gigabit America

BY HAYDEN BEESON

When Scott Mispagel discusses broadband expansion, he doesn't just talk numbers; he talks systems. As one of the senior vice presidents involved in fiber deployment at Frontier Communications, Mispagel is quick to credit a team-oriented approach that blends predictive technology, workforce investment and local engagement to scale fiber infrastructure with purpose and precision.

This approach recently earned him the inaugural Connect the Unconnected Award, which recognizes telecommunications leaders who are bridging the digital divide through innovative, visionary and strategic fiber broadband expansion. The recognition highlights his role in helping Frontier scale its fiber deployment program to more than eight million passings, striking a balance between technical performance and meaningful local engagement.

AI on the Ground: Smarter Installs, Fewer Truck Rolls

According to Mispagel, one of the biggest enablers of that scale is artificial intelligence (AI).

"Frontier uses AI in every aspect of our business," he said, "but specific to our fiber program, we use AI to assist our technicians in installing fiber at the customer's premise."

Through their phones, technicians access real-time, AI-driven guidance that helps troubleshoot network issues and ensure the highest possible quality of service is delivered. AI acts as a dynamic support layer.

Frontier is also layering AI onto performance validation after installs.

"We're comparing statistics from light levels to performance of the fiber and the ONT in the home to all of our benchmark statistics," he said. "We're doing anomaly detection to determine if something maybe is working okay right now, but in the future, is going to result in a truck roll or a phone call from the customer or a bad experience."

The goal: predict problems before they become problems.

"We've just started to scratch the surface," Mispagel added. "I think AI is going to get much more involved in the planning and design of our network and a lot more involved in correcting issues autonomously."

Workforce Strategy: Stability Through Scale

Even with automation, hiring great people remains an important part of the build. Mispagel acknowledges the strain of labor shortages, but Frontier's size and predictability have given it an advantage.

"We've addressed labor shortages by partnering with our vendors across our footprint and giving them visibility to where we're

Frontier Communications

Scott Mispagel, Senior Vice President of Network Engineering and Operations, Frontier Communications.

going to build and how much and for how long we're going to build," he said, "which is a luxury that Frontier has had with our stated 10 million passings program."

That long-term visibility, he said, gives vendors the confidence to invest in equipment, training and workforce development. "If they know that they've got a runway of work, those investments will pay off. And then they've got that much more of a labor force to go work for other providers."

Mispagel says evaluating those vendor partnerships is more of an art than a science. Frontier often uses a blend of national and small local companies and looks closely at early-stage performance.

"We have a ramp-up program where they can demonstrate their ability to establish a logistics hub, whether it be a yard or a warehouse, and start to build a certain amount of locations in a given time frame," he said. "We typically try to identify any inability for them to be able to keep up with us in the first three to six months."

Community-Driven Expansion

That infrastructure growth is grounded in Frontier's purpose of Building Gigabit America, which aims to connect more people to its fiber technology and the opportunities it offers.

One of the ways that Frontier brings its purpose to life is through its "Broadband for Good" program. As Frontier grows its fiber network, it donates its high-speed fiber internet to community-loved organizations, often driven by local nominations and staff suggestions.

"We have more nominations than we could possibly highlight, which is a great problem to have," Mispagel said. "We believe very strongly in it because Building Gigabit America is our company's purpose. And so Broadband for Good really underpins that community engagement that drives why we're building fiber."

Mispagel cites statistics on fiber's socioeconomic impact—home values, education, industry—and emphasizes that in many places, it's not just about service availability but what that service enables in the long term.

Early Buy-In for Efficient Builds

When it comes to timelines and budgets, delays with permitting remain one of the biggest obstacles. Frontier works to preempt those challenges by starting local coordination as early as possible.

"We try to get six, nine, even 12 months ahead so we can start the dialogue and start to identify what the capacity of that agency's ability to work with us on permitting is," Mispagel said. "If it looks like it's going to take nine or 12 months, then we'll stay engaged and plan labor accordingly. Or if things are going to move more quickly, then we'll pull resources from somewhere else to make hay while the sun is shining."

But it's not just about moving fast: it's about working cooperatively.

"In many cases, cities don't have the permitting staff, or they don't have the inspection staff to support what we might be able to bring to bear," he said. "We might be able to put a crew on just about every intersection in a town, but that's going to overwhelm their abilities, and the residents aren't going to support that."

According to Mispagel, that mutual understanding leads to real collaboration. "It's not all about what we want; it's what the city wants as well."

To stay efficient amid weather, permitting or logistical slowdowns, Frontier keeps an extensive library of shovel-ready projects.

"If we hit a snag in an area, we don't want to miss a beat," Mispagel said. "And so as soon as we detect any of that change in pace, we've got to have projects on the shelf ready to go."

> "But it's not just about moving fast: it's about working cooperatively.

Award-Winning Teamwork

In June, Mispagel received the Connect the Unconnected Award, presented by Corning in collaboration with Lightwave, recognizing his leadership in scaling broadband deployment. But he was quick to deflect the spotlight.

"My first reaction was I am humbled to be honored, but really it's the team that I have and the team that I work with out in the regions that do everything we just talked about," he said. "We help to try to put them in the most beneficial situation to be successful."

That team effort extends beyond Frontier's workforce. Mispagel says strategic vendor relationships, especially during moments of industry-wide strain, have been pivotal in keeping pace.

"Corning is a trusted supplier of ours," Mispagel said. "They are an industry staple and really an example of what having a great product, a great business strategy, and a great customer-focused operation really looks like."

During the post-COVID supply chain struggles, as others scaled back, Frontier accelerated its fiber buildout.

"Corning collaborated with us to find out what material we were going to need, and what timeline, and where we would need it," he said. "It really helped us not miss a beat during those supply chain shortages. In fact, we exceeded our targets during that process."

Looking ahead, Mispagel emphasized that public and private coordination will remain critical to reaching underserved communities.

"Collaboration across the public and the private sector has got to continue to improve," he said. "All of these things have to come together and work in harmony for us to be able to close those gaps."

And while Frontier stands ready to support BEAD-funded deployments, much of its growth continues independent of the program.

"The vast majority of our path to 10 million does not come from BEAD," Mispagel said. "It comes from our own investment." ■

FALL PRODUCT ROUNDUP: Innovations in OSP Equipment and Infrastructure

Broadband deployment is evolving quickly, and outside plant (OSP) innovations are helping network operators meet growing demand with greater speed, efficiency and reliability. From installation-time breakthroughs to materials built for extreme conditions, these products showcase how manufacturers are responding to today's challenges while anticipating tomorrow's needs.


Corning, Inc.

XPND Fiber Platform from CommScope

COMMSCOPE SAYS: The XPND fiber platform bridges the gap between rapidly evolving active equipment and long-term passive infrastructure, providing a modular, scalable solution that adapts to change. Its compact, open design supports flexible configurations, reduces the need for extensive technician training, and optimizes space in both large and constrained environments. By enabling a "pay-as-you-grow" model, it helps reduce capital expenditure while minimizing SKUs and inventory complexity. It simplifies deployment, eases cable management, and supports both centralized and distributed FTTH architectures. The XPND platform was inspired by the need to reconcile the opposing dynamics of fiber network design: fast-changing active technologies versus the long lifespan of passive fiber infrastructure. The fully open, modular design enables operators to reconfigure as needed while supporting future growth. *commscope.com*


CommScope

Evolv Field-Installable Pushlok Connector from Corning

CORNING SAYS: The Evolv Field-Installable Pushlok connector is an industry-leading innovation designed to unlock increased network deployment speed, ease of use and sustainability. It combines the flexibility of a field-installable solution with award-winning push-and-click Pushlok technology, allowing for quicker and easier installations. This hardened connector reduces the complexity and cost of subscriber connections by allowing installers to strip, clean, cleave and connect in a fusion splice-free installation to customize drop lengths and complement high-running discrete length factory-terminated drops. Field-Installable Pushlok can significantly cut down installation time to five minutes or less—up to twice as fast as any other hardened field-installable connector on the market. It is the first OSP grade termination of its kind, requiring no polishing, expensive tools or a tabletop for fusion-splicing and offers one-time reuse. *corning.com*

Fiber Reinforced Polymer (FRP) Solutions from Creative Composites Group

CREATIVE COMPOSITES GROUP SAYS: The innovation that excites us the most is the use of Fiber Reinforced Polymer (FRP) within the data center industry. FRP can fill an important gap due to its inherent corrosion resistance, light weight and durability. FRP utility poles are used to bring power into a data center, and fiberglass conduit systems serve as a protective channel for cable and wiring. FRP won't burn through like PVC, which can eliminate elbow repair or replacement. FRP cooling towers are lighter weight and modular, maximizing footprint and are highly energy efficient. Tower Tech towers by CCG are also designed to mitigate legionella bacteria and are available in a closed-loop design to deliver to

Creative Composites Group

the high-quality standards of data centers. Unlike aluminum, steel or concrete, products made from FRP will not rust, spall or corrode. Composite telecom and data center products are ideal for stormy, salty coastal regions, fire-prone areas and locations that experience harsh winter storms. *creativecompositesgroup.com*

Dual-Purpose Pedestal from Panduit

PANDUIT SAYS: This innovative dual-purpose pedestal uniquely supports both Multiport Service Terminals (MSTs) and splice trays within a single enclosure. This integration allows network operators to consolidate two essential OSP functions—distribution and splicing—into one product, reducing the number of separate enclosures that need to be deployed, inventoried and maintained in the field. Labor shortages and installation complexity are addressed with pre-connectorized cables and integrated mounting that dramatically reduce the need for skilled labor and minimize installation time. Fewer unique SKUs make procurement, warehousing and deployment more efficient and cost-effective, while the compact design optimizes use of space. Ruggedized enclosures and weather-resistant materials ensure long-term performance in extreme outdoor conditions. This innovation was inspired by the urgent need to bridge the digital divide and bring robust broadband connectivity to underserved communities. *panduit.com*

Panduit

RaDD Network Services

RFW Vault, Max-5 and Max-10 Pedestals and RFDC48-8 Splice Enclosure from RaDD

RADD SAYS: The RFW vault, measuring 24x36x30, features a flared design for maximum storage belowground while maintaining a compact aboveground footprint. Its lightweight body and cover are compatible with Tier 15 and Tier 22 lids, and its nesting capability optimizes shipping and warehouse storage. Max-5 and Max-10 pedestals offer a blend of strength and versatility, with durable, rodent- and insect-proof construction and interchangeable tops that can be replaced with vault lids. The RFDC48-8 splice enclosure is a compact, ultra-rugged distribution solution with an IP68 rating, accommodating up to 48 splices, three splitters, eight SC adapters and 16 LC connections. Engineered for efficiency and durability, it ensures secure, organized fiber management for underground, pedestal or aerial installations. *raddnetwork.com*

Polymer Concrete and FRP/Hybrid Vaults from Terra-Vaults

TERRA-VAULTS SAYS: Terra-Vaults provide durable and reliable underground protection for fiber-optic broadband networks. The Tier 22 polymer concrete vaults are RUS, ANSI, and SCTE 77 approved and available in 12 sizes. They are the epitome of strength and performance for diverse infrastructural requirements. A flared-wall design gives cable and splice enclosures more room to breathe and allows the vaults to nest, doubling or even tripling the number of units per pallet to lower shipping costs. Reduced weight helps with easier placement and lower trucking costs, while a large, heavy-duty base keeps the vault in place from settling or heaving. The Tier 15-rated FRP/Polymer Hybrid vaults are suitable for lighter-handling needs. *terra-vaults.com* ■

Terra-Vaults

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Top 6 Weatherproofing Strategies for Network Resilience

Extreme weather has evolved from an occasional operational challenge to a persistent, escalating threat to network infrastructure, and for broadband service providers, the stakes are high. Each event can trigger weeks of service restoration efforts and millions in unplanned repair costs, making weatherproofing both a good engineering practice and a business imperative.

Fall is the perfect time to evaluate your readiness, implement proactive measures and ensure crews are equipped to respond quickly when the next storm hits. Here are six strategies every network operator should consider:

1. Harden Outside Plant Hardware with Advanced Materials

Traditional materials can't stand up to increasingly severe conditions. Modern composite alternatives offer superior performance and life cycle economics.

Best Practice: Upgrade poles, cabinets and enclosures with materials engineered for extreme environments. Fiber-reinforced polymer (FRP) poles demonstrate exceptional durability with published projections commonly citing 80-year design life for FRP versus 30–50 years for treated wood. They resist corrosion, rot and insect damage while maintaining structural integrity under hurricane-force winds.

TECHNICAL SPECIFICATIONS:

- Cabinets: NEMA 4X or IP65+ ratings minimum for outdoor applications, providing protection against wind-driven rain, dust ingress and corrosion.
- Enhanced environmental sealing for coastal and industrial environments.
- Temperature-rated enclosures designed for regional climate extremes.

Implementation Strategy: Begin with the highest-risk and critical service areas. Evaluate the total cost of ownership, including reduced maintenance and replacement cycles.

2. Implement Comprehensive Moisture Management

Water ingress is one of the most significant causes of post-storm service degradation, making moisture management one of the highest-impact, lowest-cost improvements available.

Strategic Implementation Framework

Phase 1 (Months 1-6): Quick Wins

- Moisture management improvements
- Inspection program establishment
- Basic thermal management upgrades

Phase 2 (Months 6-18): Infrastructure Hardening

- Outside plant hardware upgrades
- Backup power system enhancements

Phase 3 (Months 12-24): Advanced Capabilities

- Predictive analytics deployment
- Comprehensive monitoring systems
- Climate-adaptive design integration

MULTI-LAYER APPROACH:

- Cable Selection: Deploy gel-filled or dry-blocked cables to prevent water migration along cable runs.
- Splice Protection: Apply advanced heat-shrink or cold-applied sealing systems at all connection points.
- Preventive Maintenance: Reseal handholes, vaults and cabinet penetrations annually before storm season.
- Drainage Systems: Install proper conduit drainage with flood-resistant materials for buried assets.

Cost-Benefit Analysis: Preventive moisture management represents one of the highest ROI activities in network hardening, as small investments in resealing can prevent major emergency restoration costs.

3. Engineer for Thermal Extremes

Electronics face dual threats from overheating and freezing, with temperature-related failures following predictable patterns.

The Temperature-Reliability Relationship: While the "10°C increase halves component life" rule is widely cited, it's actually a simplified approximation that applies to specific failure

mechanisms under certain conditions. The reality is more nuanced, but the fundamental principle remains: thermal management is critical for equipment longevity.

CLIMATE-ADAPTIVE SOLUTIONS:

- Hot Climate Protection: Install passive cooling systems, heat exchangers, or thermostatically controlled active cooling.
- Cold Climate Protection: Deploy thermostatically controlled heaters and insulation systems.
- Temperature Monitoring: Implement continuous monitoring with automated alerts and protective shutdowns.

Regional Considerations: Customize thermal management strategies based on local climate data and projected changes.

4. Design Resilient Backup Power Systems

When grid power fails, autonomous operation capability determines service continuity and customer retention.

Strategic Value: Backup power systems provide operational independence during grid disruptions, allowing networks to continue serving customers when they may need connectivity most. Power outages often coincide with severe weather events, creating situations where communication services become essential for safety, coordination and recovery efforts.

PLANNING CONSIDERATIONS:

- Load Assessment: Evaluate which systems require continuous operation versus those that can be temporarily suspended.
- Duration Planning: Consider typical outage patterns in your service area and the time required to implement alternative solutions.
- Capacity Sizing: Balance power requirements against practical constraints such as space, weight and maintenance accessibility.
- Fuel Logistics: For generator-based systems, plan fuel storage and resupply logistics appropriate to your operational environment.

ADVANCED CONSIDERATIONS:

- Integrate renewable energy sources where feasible.
- Consider distributed backup systems for improved resilience.
- Plan for extended outages in extreme scenarios with portable generation capabilities.

5. Establish Disciplined Inspection and Maintenance Programs

Resilience begins with systematic maintenance that identifies and addresses vulnerabilities before they become failures.

INSPECTION PROTOCOL:

- Seasonal Scheduling: Conduct thorough inspections before and after peak weather seasons.
- Critical Elements: Focus on seals,

structural mounts, guy wires, drainage systems and thermal management.
- Documentation: Track findings in centralized systems to identify recurring problem locations.
- Predictive Maintenance: Use historical data to schedule proactive replacements.

Resource Optimization: Train existing field personnel on inspection protocols to minimize additional staffing requirements while improving asset knowledge.

6. Deploy Predictive Analytics and Risk Assessment

Advanced analytics transform reactive maintenance into proactive risk management, optimizing both capital deployment and operational response.

TECHNOLOGY INTEGRATION:

- Climate Modeling: Overlay network maps with floodplain, wildfire risk, wind zone and projected climate change data.
- Asset Monitoring: Deploy sensors for continuous monitoring of critical infrastructure health.
- Predictive Deployment: Use weather forecasting to pre-position crews, spare parts and backup power ahead of storm tracks.
- Investment Prioritization: Use risk modeling to optimize hardening investments across the network.

> **When grid power fails, autonomous operation capability determines service continuity and customer retention.**

IMPLEMENTATION PHASES:

- Data Collection: Aggregate existing asset, risk and historical failure data.
- Model Development: Build predictive models specific to local conditions and infrastructure.
- Decision Support: Create dashboards and automated alerts for operational teams.
- Continuous Improvement: Refine models based on actual events and outcomes.

Looking Ahead: Climate-Adaptive Network Design

The future of network resilience lies in proactive, data-driven approaches that anticipate rather than simply react to extreme weather. Advanced climate modeling can now simulate specific storm impacts on individual network sites with remarkable accuracy. Combined with automated asset monitoring and AI-driven analytics, this capability enables operators to harden infrastructure and reroute traffic days before severe weather arrives. ■

MORE THAN MATERIALS: How Prysmian Equips Crews for the Long Haul

Why Prysmian puts training, trust and transparency at the core of its fiber strategy.

BY HAYDEN BEESON

In an industry shaped by shifting funding timelines, evolving workforce demands and complex supply chains, sometimes the most valuable offering isn't just a product but rather it's the ability to help people use it well. At Prysmian, training and technical transparency are built into the deployment process. Jon Fitz, Director of Advanced Business Solutions, explains how Prysmian works directly with crews, project leads and network operators to ensure fiber builds stay efficient, especially when the pressure is on.

Fitz sees workforce empowerment as central to the company's role in broadband expansion, especially as states prepare for BEAD-funded buildouts.

"If you're new to this, let us teach you about it," he said. "If you've never jetted microduct cable, call us. If it's our cable, we'll be happy to provide some instructions."

That willingness to train doesn't stop at basic demos. For new deployments, particularly with unfamiliar products, Prysmian often provides customized support materials, on-site sessions, and what Fitz calls "train the trainer" engagements.

"We've worked with some customers doing big projects to develop guidelines and actual customized audit punch lists. We've done some 'training the trainer' for their auditors so that they know they're getting it from the source," he explained.

That kind of upstream standardization is designed to address a downstream reality: contractors often bring in subcontractors, who bring in other subcontractors, and consistency can erode. To prevent costly mistakes and misalignment, Prysmian helps operators implement auditing processes early, training internal teams and third-party inspectors on how to evaluate installations.

> "If you're new to this, let us teach you about it.

The goal, Fitz emphasized, is not to catch anyone off guard but to raise the baseline of quality across all crews involved.

"We're not trying to surprise anybody; we call the contractor up and we go, 'Hey, you might want to know that we sent these guidelines and this check sheet to your customer,'" he said. "And this isn't a gotcha exercise. If you want, we'll come out and see you, and we'll train you on exactly the same material."

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Building Faster with Fewer Hands

That kind of transparency pairs naturally with another concern looming over broadband builds: labor. With fiber projects ramping up across the country, skilled worker shortages have become a major constraint.

Fitz believes design can help lighten the load. Speaking about the company's SiroccoHD™ microduct cable, he said its compact size and ease of deployment are making a real-world impact.

"You can do it with fewer people and do more feet per day," he said. "Very efficient."

Efficiency, Fitz said, is where Sirocco stands out.

"You can deploy this stuff faster than pretty much anything out there," he said. "We have contractors installing two reels of that a day. And when I say a reel, I'm talking 20,000 feet plus. So getting in 40,000 feet in the day, I don't know anything else that can do that. Which, to be fair, surprised even us."

But deployment speed isn't the only gain. Sirocco's form factor also simplifies the entire operation.

"The equipment that you need for this is about a quarter of the size of what you'd use with standard duct, standard cable," Fitz explained. "You don't need as much air, your equipment doesn't need to be as heavy because the cable's not as heavy. So, everything from the compressors to the jetting heads to the trucks that you move it around with (and the number of people it takes to haul it around) is reduced."

Supply Chain Independence

Prysmian's ability to respond to growing demand is bolstered by its domestic manufacturing footprint. While BEAD and Build

America, Buy America (BABA) requirements are fueling interest in U.S.-made products, Fitz said customer preferences were already shifting in that direction.

"We're getting requests from people who aren't even doing BEAD projects," he said. "We have certain customers that are like, 'Okay, I've been using overseas supply chain, I got burned on that, I don't want to do that anymore.' Or, 'If I have a problem, I want somebody here who can fully support it.'"

Fitz outlined the company's end-to-end production approach: "We make the raw glass, we draw it into fiber, and then we cable it. So the whole supply chain is all here."

> **We make the raw glass, we draw it into fiber, and then we cable it. So, the whole supply chain is all here.**

Among Prysmian's U.S. locations are fiber production in Claremont, North Carolina; cabling facilities in Lexington, South Carolina; and a retooled fiber plant in Jackson, Tennessee.

Spanning the Distance

While Sirocco has drawn attention for its microduct performance, Fitz pointed to another offering, EcoSpan, as a response to real-world rural deployment needs.

"We've taken a really popular form factor, which is a flat drop, and we've made a new cable that's slightly bigger," he said. "But it can go twice the span distance."

EcoSpan retains familiar installation methods but includes Prysmian's FlexRibbon structure inside. That means it can carry up to 72 fibers and support mass fusion splicing for faster connections.

"You can imagine if you're going down a long rural highway, this would be a really fast way to do aerial deployment," Fitz said.

While microduct jetting can outpace aerial installs in terms of raw distance per day, Fitz said EcoSpan was a direct response to real conditions in the field.

"We literally had people coming to us going, 'Oh, I want to buy a bunch of this (standard) flat drop and run it down the road,'" he recalled. "And we're asking, 'What are the pole spacings?' And they're saying, 'Oh, 250 feet,' and we're like, 'It's just not designed for that.'"

EcoSpan, he said, fills that gap. It's an answer to the "I've got to go from A to B and this is how I want to do it" problem that engineers face daily.

Smart Closures

Another problem Fitz sees often? Complexity in closures. Smaller operators, he said, are overwhelmed by choice and under-equipped to manage the inventory and training burden of dozens of unique SKUs.

"If you go to one of our competitors' websites for a closure, they can have hundreds or even thousands of specialized options," he said. "But if you have small engineering and procurement teams, it's easier to manage just a few options that can easily be adapted in the field."

That's the idea behind Prysmian's Eagle Splice Closure, a modular, standardized platform that ships with trays included and supports both ribbon and loose tube cable formats. Cartridges snap in from the outside; the rest is done ahead of time on the ground.

"You do all your work outside of the closure. Believe me, it's a lot easier. Then you slide it in and you get an audible click: now you know it's locked in," Fitz said. "You could throw a half dozen of these on the truck and be ready for a wide range of scenarios without excess parts or reorders."

The Right Cable for the Right Job

Fitz closed with a point that reframed Prysmian's role: not as a company selling one approach, but as one trying to support the right one. His philosophy is straightforward: support decisions with clear information, and customers will find what works.

"Our goal is to educate customers to make the best investments," he said. "We'll probably have the cable that they need regardless, so there's no reason to try to pressure customers into a certain choice." ■

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