Powering the Utility Workforce of the Future

How utilities can use digital transformation solutions to ensure safety, productivity, and efficiency for the future workforce

LIBRESTREAM

TO REMAIN RESILIENT IN THE FUTURE, **WORKFORCE TRANSFORMATION** IN THE UTILITIES SECTOR MUST START NOW

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01   Introduction

50% of the utilities workforce is set to retire in the next decade.

The utilities sector is currently facing significant workforce challenges that will impact service reliability if left unresolved. Currently, **50% of the utilities workforce** is set to retire in the next decade. These retirements will include critical line workers, technicians, plant operators, and engineers. For an industry that relies heavily on the operational knowledge of its experienced workers, retirements of this scale can lead to the loss of critical institutional knowledge. Institutional knowledge is knowledge acquired through years of on-the-job learning, and it is rarely documented. When experienced workers leave, they take this knowledge with them, resulting in increased service disruptions, training times for new employees, and worker fatigue, which can result in an increased risk of accidents and incidents. So as these workers retire, the need to invest in technologies that capture this knowledge has never been higher. As a result, digital transformation technologies like augmented reality-enabled remote collaboration solutions are increasingly gaining traction in the industry.

Regardless of the utility's size or where it is in its journey to grid modernization, the impact of these mass retirements will be felt industry-wide. What's further exacerbating the impact of losing experienced workers is that there aren't enough skilled workers available to fill these gaps.

The 2020 Global Energy Talent Index (GETI) report indicated that "48 percent of power professionals are concerned about an impending talent emergency, with 32 percent believing the crisis to have already hit the sector and 38 percent reporting that their company had been affected by skills shortages."

And the talent shortage isn't unique to the utilities industry; globally, organizations could lose 8.5 trillion USD in unrealized revenue by 2030.

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The new generation of utility workers isn't just getting harder to recruit, it's increasingly more difficult to retain. With heavy recruiting competition between organizations, **new workers, between the ages of 25-34**, on average, stay at an organization for just 2.8 years. This is a stark contrast from the retiring workforce, between the ages of 55-65, who stay with an organization for 9.9 years on average. As a result, organizations must be prepared to continually recruit and efficiently offer on-the-job training and practical skills to ensure workforce safety and productivity regardless of how long their workers stay in the organization. Organizations are struggling to safely prepare new employees for the field at a rate to keep pace with the mass retirements of tenured employees and obtain a return on investment from these new employees who are unlikely to remain in their role for more than a few years.

With all these workforce challenges plaguing the industry, utilities executives must find ways to preserve critical knowledge, seamlessly transition and train new workers into front-line roles, and ultimately, do more with less. Digital transformation solutions like augmented reality (AR), artificial intelligence (AI), and internet of things (IoT) provide incredible value on all these fronts.

Average Years of Employee Retention:
NEW WORKFORCE **VS**. RETIRING WORKFORCE

	2.8 YRS	9.9 YRS
NEW	25-34 YRS OLD	
RETIRING	55-65 YRS OLD	
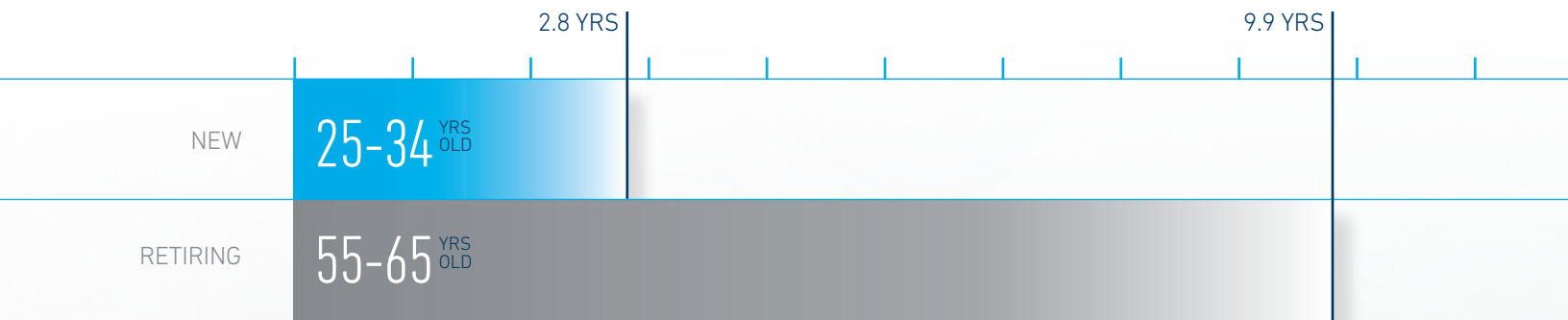
SOURCE: U.S. Bureau of Labor Statistics, 2020 Employee Tenure Summary

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The Impact of a Modernized Grid on Workforce Transformation

41%

OF THE WORKFORCE REQUIRES RESKILLING OR UPSKILLING IN THE VERY NEAR FUTURE.

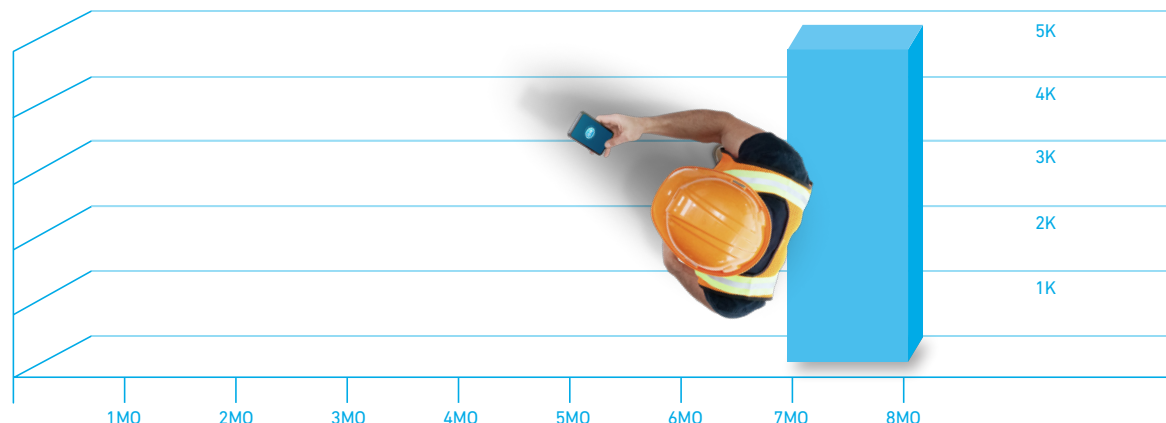SOURCE: Ernst & Young, If tech powers the future, who powers the tech?

In April of 2021, United States President Joe Biden, **announced a nationwide goal of zero-carbon** electricity by 2035. For many utilities, who were already making strides to move to 100% renewable energy or to cut net carbon emissions to zero by 2050, this new mandate has resulted in reconfigured grid modernization plans to help achieve desired results in a significantly shorter timeframe. Grid modernization can mean different things to different stakeholders, but it broadly refers to the steps organizations are taking to ensure reliability, resilience, and use of clean and renewable energy.

This modernized grid will include the transmission and distribution of power from distributed energy resources (DERs). Since renewable energy is intermittent in nature, grid modernization plans include battery storage infrastructure to support increased demand during peak hours. These batteries will play a critical role in helping strengthen and decarbonize the grid by storing energy from renewable sources and dispatching it during those hours. However, batteries are inherently different from traditional dispatchable generators and intermittent wind and solar farms. Operators responsible for grid repair and maintenance feel underprepared for the new grid. **In a survey by Ernst & Young, utilities executives estimate that nearly 41% of the workforce requires reskilling or upskilling in the very near future. The average time needed to reskill an employee is 7.5 months and costs organizations US $4,650 per worker.**

Augmented Reality (AR)-enabled training can help utilities retrain their staff in real-time by offering critical insights required to perform any task. These technologies provide on-the-job training rapidly, safely, and cost-effectively. Since grid-scale renewables like batteries are complex, the ability to connect less experienced workers with experts to install, diagnose, maintain, and repair these assets could save thousands of hours and millions of dollars in training, travel, and time.
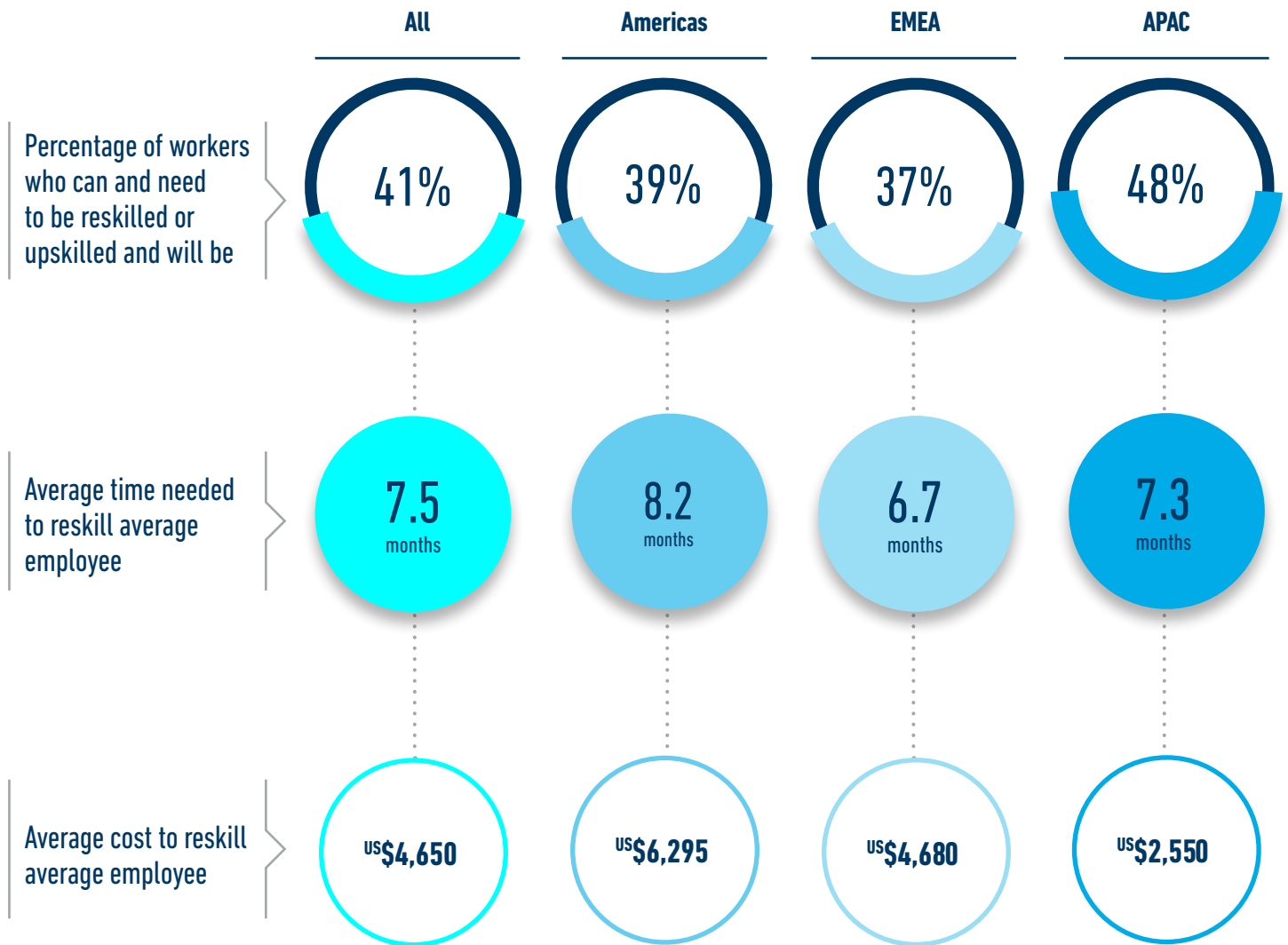
The average time needed to reskill an employee is 7.5 months and costs organizations US $4,650 per worker.

SOURCE: Ernst & Young, If tech powers the future, who powers the tech?

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Reskill or upskill the average employee

	All	Americas	EMEA	APAC
Percentage of workers who can and need to be reskilled or upskilled and will be	41%	39%	37%	48%
Average time needed to reskill average employee	7.5 months	8.2 months	6.7 months	7.3 months
Average cost to reskill average employee	US$4,650	US$6,295	US$4,680	US$2,550

SOURCE: Ernst & Young, If tech powers the future, who powers the tech?

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# Transforming the Utility Workforce with Digital Solutions

Digital Transformation technologies like AR-enabled remote expert solutions enhance the physical world through digital visual elements, sound, or other sensory stimuli. Whether a worker needs help identifying a particular problem, processing complex engineer notes, or digital signoff on task completion, these AR-enabled business continuity solutions offer them the unique ability to connect with the right individuals, access digital workflows, look up a manual, view photos and videos from past interactions and more. For utilities, this technology can enhance workers' days by giving them access to the real-time data, content, knowledge, tools, and expertise they need to complete tasks successfully.

Like many verticals, utilities are grappling with unprecedented challenges that include external factors like a global pandemic, regulatory mandates, failing grid infrastructure, changing consumer behaviors and expectations, and internal pressures to invest capital in clean energy sources while reducing O&M costs. With many utilities now on their journey to decentralization, decarbonization and grid modernization, organizations are increasingly adopting transformation technologies to turn some of these challenges into opportunities to serve their customers better. These technologies help drive operational efficiencies, workforce resiliency and enhance onboarding and training.

A recent survey conducted by Deloitte identified that **95% of respondents from the utility industry consider digital transformation a strategic priority for their organizations. In another study by Panasonic**, it was reported that 81% of utilities expect the importance of augmented reality for the mobile workforce to increase even more over the next three to five years. So, there is a consensus among utility leaders that incorporating technology into their processes is no longer a gimmick to stay competitive but a necessity to ensure organizational resiliency. That adoption of key technologies must happen now so organizations can do more with fewer resources.

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SOURCE: Deloitte, Digital innovation Creating the utility of the future
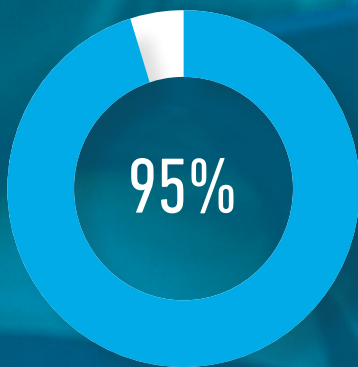
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Main Benefits of Digital Transformation Technologies in the Industry

85% of utilities executives recognize that the ability to reskill quickly is crucial to their success

RESKILL

Only 57% of executives agree their organization has a robust plan to reskill over the next three years.

SOURCE: Ernst & Young, If tech powers the future, who powers the tech?

TRAINING, ONBOARDING, AND RESKILLING

Training, onboarding, and upskilling of the workforce will be critical as utilities navigate workforce retirements, talent shortages, and the over **8 million jobs a modernized grid** will create. While there are many benefits of training workers with AR-enabled technologies, perhaps, the most significant benefit is capturing critical operational knowledge from the retiring workforce.

An experienced workforce doesn't need documented workflows or significant training to process engineer notes, drawings, and daily work logs quickly and efficiently. However, this is not true for new workers entering the industry and current workers in dire need of upskilling. **In an Ernst & Young survey of utilities executives,** 85% recognize that the ability to reskill quickly is crucial to their success and would address critical skills gaps. Yet, only 57% of executives agree their organization has a robust plan to reskill over the next three years.

Remote collaboration solutions capture knowledge in the form of live video calls, recordings, images, digital work instructions or by tagging relevant data and analyzing unstructured data through artificial intelligence and machine learning. This knowledge is then synthesized and shared to ensure current and future workforces have access to the data, content, and expertise required to complete their tasks. Implementing these solutions can improve situational awareness and worker responsiveness, resulting in a safer and better work environment.

IMMEDIATE ACCESS TO REMOTE EXPERTISE

Another benefit of AR-enabled remote collaboration technologies is the ability to get assistance from the right person at the right time. While the pandemic accelerated adoption of digital transformation solutions for **45% of utilities**, it also illustrated to organizations that it is not always possible to bring the right employee to the field at the right time, pandemic or not. In this scenario, organizations have two options – utilize the workers available on site, or physically send an expert to the site which creates cost, time, and carbon emission ramifications. With the right technology, workers get the expertise they need via an expert, team member, or the control center over a live video call or by following guided step-by-step work instructions. Some AR capabilities even offer data tagging and imaging, machine learning, and AI computer vision to help workers quickly identify and resolve issues. Other use cases of AR-enabled remote collaboration solutions include remote gas line inspections, compliance, and energy efficiency audits, as well as storm recovery.

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By allowing workers access to the right information and guidance at the time it's needed, organizations report significant business outcomes, including 70% productivity gains, 50% cost savings, and 3x efficiency gains.

70%
PRODUCTIVITY GAINS

50%
COST SAVINGS

3x
EFFICIENCY GAINS

SOURCE: LIBRESTREAM

Remote expert technology also taps into workforce safety. Organizations can limit the number of field workers in hazardous situations by ensuring that only essential "hands-on" workers are on-site while other relevant team members connect remotely. Remote peer checks, digital work instructions, and a robust knowledge network with critical IoT sensor and plant information can further ensure safety in radiation zones and hazardous environments.

This technology can reduce nuclear dose by as much as 20% and save tens of thousands of dollars in management costs.

REDUCED O&M COSTS

Modernizing the utility grid will bring significant costs and has the potential to dramatically impact customers' bills. One way to mitigate that cost, is to find commensurate reductions in O&M expenses. Most utilities are seeking significant O&M reductions to help fund the next generation grid. These savings will allow utilities to invest in decarbonization and grid hardening with negligible impact to customers' bills.

By reducing the number of trips to the field, limiting secondary dispatch, and improving first-time fix rates, digital transformation technologies can help reduce O&M spend. Utilities spend an average of **USD 14.6 billion on O&M costs**, of which operations and maintenance of overhead lines made up $7.3 billion.

Power O&M operators encounter various issues ranging from complex equipment and limited on-site expert availability to cumbersome data search and communication challenges. Repair and maintenance tasks can be significantly delayed without the appropriate knowledge, tools, and support available.

With AR-enabled capabilities and solutions, field workers connect with relevant people, content, and data at the point of service. Using "see what I see" technology, workers and control centers can effectively diagnose the issue and promptly complete necessary repairs and inspections. As another benefit, reducing O&M allows utilities to grow their capital investments in the new grid and clean energy resources.

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Best Practices & Recommendations for Successful Deployment of Technology Solutions

For utilities leaders considering digital transformation technologies, here's a quick five-step process to successfully identify, deploy, and scale technology solutions.

1.   IDENTIFY YOUR BUSINESS NEEDS

As part of larger digital transformation efforts, identify how workforce enablement can meet larger transformation goals. Document potential use cases and their impact on O&M savings, safety metrics and workforce upskilling. Conducting a gap analysis of current processes, employment challenges and future technologies is a great place to start. Assessing other factors such as the organization's digital maturity, the employees' level of digital readiness, security and privacy concerns, and IT requirements can further help determine critical business needs. Use this data to create a wish list of capabilities and their potential to bring quantitative and qualitative benefits to the organization.

2.   EVALUATE AND SELECT TECHNOLOGY PROVIDERS

Selecting the right technology provider is critical to a successful deployment. Compare providers against your wish list to narrow down the top choices. We recommend thoroughly assessing the credibility of a technology provider, how often new features are released, how scalable the technology is, and the type of hardware it is compatible with. It is also essential to choose a provider that can offer onboarding support and continuous customer support.

3.   PILOT TECHNOLOGY FOR SELECTED USE CASES

Select a handful of use cases and business units to pilot the technology. Whenever possible, focus on concrete business benefit vs. vague technology science projects. We recommend involving critical workers, supervisors, and engineers in the pilot program. Gather regular feedback from these workers to ensure and document measurable benefits, pain points, and technology risks. If the initial goals you set for the pilot are met, move to the next step.

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4.   GET EXECUTIVE AND WORKFORCE BUY-IN

For executive buy-in, we recommend creating a strategic roadmap, highlighting the wins from the pilot and risks associated with the technology rollout. To get workforce buy-in, develop a robust training plan. The more training you can offer your workforce, the more comfortable they'll be with the technology. It is also crucial that you incorporate technology into your processes and create a documented workflow, so your workers understand where, when, and how to use the technology. Seek to find the "what's in it for them" elements of the program. One example, these technologies can often dramatically reduce labor intensive reporting requirements. Show workers that by gathering information via these new capabilities, they may avoid hours of time in the truck or operations center doing reports.

5.   SCALE AND EVALUATE TECHNOLOGY

With executive and workforce support, you can move forward with scaling the technology. A report by Worldwide Business Research (WBR) found that over **53% of organizations** struggle to scale technology after a successful pilot. We recommend working closely with the technology provider to design a plan to scale the technology. You may also want to develop processes to gather feedback from users, standardize existing processes and develop additional use cases across business units. Remember that a continuous evaluation of the technology is the best way to ensure that you get the best results out of it.

53%

of organizations struggle to scale technology after a successful pilot.

SOURCE: Worldwide Business Research (WBR), Augmented Reality Performance and the Future Outlook in the Field Service Industry

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Conclusion

The utilities industry is losing its most experienced workers to retirement. With not enough talent available to fill critical front-line roles, organizations in the sector must look at avenues that enhance worker knowledge. Today, more utilities are seeing the value that digital transformation solutions like AR bring to the table. In fact, a report by ABI research identified that the AR market in utilities and energy is expected to grow to **USD 18 billion by 2022**, of which platform licensing and smart glasses will make up the majority. AR-enabled remote collaboration in utilities empowers front-line and field workers to access the relevant data, content, and expertise they need when and where they need it. This technology can help preserve critical workforce knowledge, enable remote communication in hazardous and rugged environments and improve on-the-job training and onboarding.

By following the five-step process outlined above, utilities can enhance their business outcomes and ensure seamless and effective deployment of digital transformation technologies.

07   About the Author

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Gary McAuliffe - Gary is Librestream's VP of global energy & utilities, where he enables workforce transformation on the front-lines of the utility business. He has deep domain knowledge in the utility sector, including advanced metering, distribution automation, demand response, building automation, distributed energy resources, and regulatory economics.

About Librestream - Librestream transforms workforces through advanced AR and AI solutions that scale knowledge across businesses to enhance safety, efficiency and resiliency. With the Onsight augmented reality knowledge platform, Librestream helps workers and distributed teams gain immediate access to the content, people, relevant data, and guidance needed to solve business challenges. Librestream's global Forbes 2000 customer base includes energy, manufacturing, service, aerospace, and defense enterprises with aggregate annual revenues totaling $3.2T. The company has been honored with recognition, including ranking as the #1 AR remote assistance solution provider by independent research firm, Verdantix, and winner of the Field Service WBR Innovation Award.

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