Dark fiber and AI in defense

Maximizing performance, minimizing waste

As the federal government prioritizes enhancing efficiency, agencies are seeking innovative ways to help drive internal improvements. For the Department of Defense (DoD), this means embracing modern solutions that leverage the existing lit and dark fiber solutions. In this paper, we explore how dark fiber for the DoD presents an opportunity for a scalable and secure solution, reducing redundancy and improving operational efficiency.

How do dark fiber and lit fiber differ?

Dark fiber differs from lit fiber in its usage; lit fiber actively transmits data, while dark fiber remains dormant until activated. Scott Andersen, distinguished solutions architect at Verizon explained, “Dark fiber is simply fiber that has not been lit yet but is laid in the ground. It gives the government the ability to move massive amounts of data without putting it on their main network.”

Dark fiber offers a unique opportunity for the DoD. Instead of waiting for new infrastructure, the DoD can activate specific fiber strands as needed. Although the initial cost of dark fiber may be higher than traditional options, its long-term benefits—such as on-demand scalability—make it a powerful tool for modernizing military networks.

The strategic advantages of dark fiber for the DoD

Dark fiber presents several strategic benefits for the DoD, particularly in security, flexibility, control, and a secure private network (private IP, private wireless). Andersen described how much like managing a stock portfolio, dark fiber empowers the DoD to build a connectivity portfolio that allows for the precise allocation of network resources based on mission needs. Similar to investors shifting assets to balance risk and reward, the DoD can optimize network capacity, moving assets as necessary while maintaining continuous, secure connectivity.

One of its primary advantages is the ability to establish dedicated, private networks independent of public infrastructure. In November 2024, the DoD released their private 5G deployment strategy, stating, “private networks may augment or supplement commercial services because they are tailored to each installation’s mission needs, security, and military-unique capabilities.” Since dark fiber remains unused until activated, it is isolated from external traffic, reducing exposure to cyber threats and improving overall security. This makes it an ideal solution for transmitting sensitive military communications and classified intelligence.

> “**With dark fiber, the DoD isn’t dependent on existing commercial networks. It can light the fiber when and where it’s needed, providing a level of control and security that traditional networks just can’t match.”**
>
> **Jamie Starr**
> Director of Defense/National Security Sales, Verizon

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Dark fiber also enhances flexibility, allowing the DoD to scale network infrastructure as operational needs evolve. As military operations become more data-driven, the demand for faster, high-capacity networks grows. Dark fiber enables rapid scalability without costly infrastructure overhauls, ensuring sufficient bandwidth for intelligence-sharing, battlefield communications, and real-time decision-making.

Owning and controlling dark fiber increases network reliability and resilience. Like leased or shared networks, dark fiber allows for direct infrastructure management, minimizing downtime and improving performance. The dark fiber assets can be turned on and off in times of bandwidth need. In conjunction with the organization's connectivity fabric Dark Fiber enables network diversity, with multiple geographically separated routes for redundancy. Andersen highlighted how "having control over your own fiber means having control over your own security, reliability, and speed. That's a game-changer for mission-critical operations."

By leveraging dark fiber, the DoD gains a network that is not only secure and adaptable but also built for long-term success. It provides a strong foundation for modernization efforts while allowing for future expansion without the limitations of traditional network solutions.

Dark fiber's role in AI and military innovation

As the DoD expands its use of artificial intelligence (AI) into military operations, the need for high-speed, secure, and scalable network infrastructure is critical. AI-enabled defense strategies rely on processing vast amounts of data across locations, from command centers to unmanned systems and battlefield sensors. "Verizon Fabric and dark fiber supports the military's move towards AI. It allows them to surface all their data sources securely and make that data readily available across their entire estate," Andersen noted.

AI adoption in defense is augmented by distributed computing power and low-latency, high-bandwidth connectivity. As part of the overall communication fabric in the organization, dark fiber enables real-time communication between AI-driven systems, providing potential optimization for applications such as threat detection, autonomous defense, and predictive logistics. More importantly, it provides flexibility to modify and expand network capacity as operational demands grow. If a command center anticipates relocating in six months, for example, the DoD can proactively extend dark fiber to the new location in phases, ensuring a seamless transition and continued high-performance connectivity.

Operational efficiency is another key factor. AI effectiveness depends on rapid data access and analysis. Dark fiber enables continuous, high-speed data availability, reducing delays in intelligence gathering and decision-making. "It's about speed to provision," said Starr. "You own it, you control it. There's no need to submit individual circuit orders or wait for approvals. It gives you fast, direct access to your data." From autonomous vehicles to cybersecurity monitoring and battlefield coordination, dark fiber can help AI systems operate at peak performance, enhancing situational awareness and response times.

Looking ahead, dark fiber provides a scalable foundation for future military AI innovation. As AI advances, the DoD will need greater network capacity for increasingly complex operations. Investing in dark fiber now helps to ensure the ability to process vast intelligence data and execute real-time operations with speed and precision in the future.

> **"If AI is the brain of modern defense, dark fiber is the nervous system. It ensures that information gets where it needs to go instantly, supporting faster, smarter decision-making."**
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> **Scott Andersen**
> Solutions Architect, Verizon

Exploring dark fiber's key use cases

By integrating dark fiber into its AI and modernization strategies, the DoD can unlock the full potential of artificial intelligence, enhancing mission effectiveness and maintaining a strategic edge in an increasingly data-driven battlefield. Along with enabling AI-driven operations, dark fiber has the ability to enhance security and help future-proof military networks efficiently and cost-effectively.

"We want to access the right data, for the right people, at the right time. We want to make sure those foundational components are done across the board." This recent statement from Gurpreet Bhatia, the Department of Defense's Acting Deputy Department of Defense Chief Information Officer for Cybersecurity and Acting Chief Information Security Officer (CISO), highlights a fundamental reality in today's defense landscape: secure, rapid, and reliable data access is mission critical. Mission success depends on protecting and transmitting information without interruption or compromise.

As the demand for secure, high-speed data transmission grows, so does the need for innovative, scalable solutions. Dark fiber provides dedicated, private, high-performance connectivity, giving agencies full control over their networks. In our first article we explored the differences between dark and lit fiber and the key benefits dark fiber provides the DoD. Now, we'll dive into five critical military use cases for dark fiber.

1. Enhancing national security with secure communication networks

The rise of AI and Quantum computing is reshaping cybersecurity for both attackers and defenders. As Deputy CIO for Cybersecurity, David McKeown, warned, "We've got to think ahead as to what the adversary might be working on and develop algorithms that are there in time to meet the adversary's ability to crack those algorithms." Due to the rise of both AI and quantum computing solutions, cybersecurity is being evolved rapidly.

A secure network backbone is essential to support these upgrades. Dark fiber offers a high-performance, private infrastructure that operates independently of public networks, helping to enable the safe transmission of sensitive military data, including command, control, and intelligence (C2I) systems. By integrating dark fiber early in base expansion projects, the DoD can help future-proof its communications, and help enable advanced encryption to safeguard against emerging quantum threats, while strengthening operational resilience.

2. Powering AI & advanced data analytics for defense

AI and machine learning are transforming the way military operations are conducted, offering real-time insights into potential threats, mission planning, and battlefield decisions; However, to achieve this, the DoD needs to move large amounts of data quickly and securely.

Dark fiber plays a critical role by providing the low-latency, high-bandwidth connectivity needed to process AI-driven insights in real time. AI data collection (i.e. sensors) deployed in remote regions, for example, generate vast amounts of data that must be analyzed instantly. Dark fiber ensures this data moves securely between edge devices and central processing centers without bottlenecks.

As Andersen put it, "Dark fiber can help make data readily available throughout the entire military estate. Any device, any location, any data." The scalability of dark fiber ensures that as AI and analytics needs grow, the infrastructure can evolve without requiring major overhauls.

3. Strengthening satellite & space operations

From missile tracking to space surveillance, satellite operations have found an essential place in defense strategy, generating high-resolution imagery, telemetry, and encrypted communications that must be transmitted instantly and securely to military data centers. Any delay or breach in transmission could jeopardize national security. Dark fiber provides a high-speed backbone for satellite communications, ensuring secure, low-latency data transmission between satellite ground stations and military networks. Similar to traditional fiber routes, dedicated dark fiber networks can offer the speed, reliability, and security needed for time-sensitive operations such as GPS, missile defense tracking, and space domain awareness. Dark fiber augments existing network connections.

As the U.S. Space Force and DoD expand their focus on space-based intelligence, hypersonic missile defense, and next-generation satellite constellations such as the Proliferated Warfighter Space Architecture (PWSA), dark fiber delivers ultra-secure, high-speed connectivity. It supports seamless AI-driven analytics and strengthens command and control systems, at the same time providing a resilient foundation for the future of military space operations.

4. Strengthening cybersecurity

The DoD has been advancing its Zero Trust security model, which assumes no user or device is trusted by default. Implementing this across the vast DoD infrastructure requires a robust, secure foundation that can isolate and protect critical data.

Dark fiber provides that foundation by creating a private network independent of public infrastructure, eliminating exposure to external threats. “Dark fiber, like a private dedicated network can be routed away from the rest of the world. They can utilize it in a way that they’re not touching a public network, which provides a level of security through obscurity,” explained Andersen.

Take for instance, a forward operating base in a high-risk region. When deploying new surveillance and intelligence systems, it generates classified data that must be transmitted securely to command centers. With a mix of lit and dark fiber, this data stays on a dedicated private network, avoiding public or commercial routes reducing cyber vulnerabilities.

5. Enabling 5G & tactical edge connectivity: Leveraging dark fiber as a component of a broad connectivity solution set

The integration of 5G technology has enhanced battlefield communications, enabling real-time operation of unmanned systems (UAVs), autonomous vehicles, and IoT devices in even the most remote and contested environments. The DoD requires ultra-low latency and secure, high-bandwidth connections. The connection fabric that will benefit the DOD offers a combination of private network, latency and connectivity type options from dark fiber to 5G.

The combination of existing lit network fiber and dark fiber can take the DoD to the next step of efficiency and speed. For instance, a tactical UAV conducting reconnaissance in a denied or degraded environment needs to transmit high-resolution, real-time video to a command center for immediate decision-making. Or consider an autonomous convoy relaying sensor data across the battlefield to detect threats and adjust its route dynamically. In both cases, the combination of lit and dark fiber ensures seamless, high-speed data transmission without reliance on vulnerable public networks..

Where traditional networks fail, dark fiber bridges the gap between tactical edge devices and central command, enabling massive data transfers, supporting emerging AI-driven battlefield analytics, and ensuring real-time situational awareness and response.

Conclusion

Dark fiber can be a powerful tool for the DoD, with the ability to empower creating a secure connection structure that will fully embrace security, applications, AI and its many attributes, as well as creating a framework to implement future state technologies. By offering high-performance, low-latency, and secure connectivity, dark fiber can help the DoD stay ahead of emerging threats and maintain not just a technological edge, but a true strategic advantage in defending the nation.

Scan to learn more

www.verizon.com/business/service_guide/reg-20241015/Dark-Fiber.pdf
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