

AI in the Crosshairs: Why Japan's Multi-Core Fiber Vision Is Now a Global Security Imperative

By Gary M. Weiner
Founder and CEO, Apriori Network Systems

Figure 1: Conceptual illustration of secure multi-core fiber. (Insert cross-sectional diagram showing central data core surrounded by chaff-filled outer cores).

As artificial intelligence becomes deeply embedded in every sector of society—from healthcare and finance to diplomacy and defense—the questions we ask AI and the answers we receive have become some of the most valuable and sensitive data in existence. These AI interactions are often transmitted over optical fiber links that are, shockingly, physically vulnerable to covert interception. Light leaking from a slightly bent strand of unprotected fiber is enough for a skilled eavesdropper to silently siphon off information, without detection, across just a few meters of cable.

This is not a theoretical risk. It is a current and unmitigated security gap in office buildings, data centers, and campuses around the world. The implications are profound: AI-generated trade secrets, legal strategies, defense modeling, and even medical diagnostics are being transmitted over fiber links that are not intrinsically secure.

While encryption offers a protective layer, it is not foolproof—especially when the very existence of a tap goes unnoticed. Once a transmission is copied, the clock begins ticking for eventual decryption. In this context, true privacy must begin at the physical layer: the fiber itself.

This is where Japan's long-term vision is beginning to bear fruit. More than two decades ago, Japanese researchers and suppliers—Sumitomo Electric Industries, Furukawa, and NTT among them—began investing in multi-core fiber (MCF), a bold evolution in optical transmission. Originally conceived to increase capacity, MCF bundles multiple independent cores into a single strand, enabling entirely new architectures for secure communications.

Despite its early promise, MCF fell into the background. The cost per meter was high, and when compared to the massive capital and labor investment needed to bury fiber over millions of miles, the incremental cost advantage for bandwidth alone seemed like a rounding error. But times have changed—and so has the best use case for MCF.

Today, with the right integration of optically modulated chaff and signal interference, MCF enables a revolutionary defense: the ability to isolate data into a central core while flooding adjacent cores with protective signals that disrupt and reveal any physical tap. This turns the fiber from a passive conduit into an active guardian of privacy.

The best use case for multi-core fiber is no longer long-haul transmission. It is short, secure links installed within buildings—specifically in multi-tenant environments where physical access to cable runs is easily compromised. A small U.S.-based late-stage research and development company, Apriori Network Systems, is now close to partnering with a Japan-based global leader to deliver this security-enhanced fiber to the world.

This collaboration proposes a clever model: privacy-assured transmission sold “as-a-service” to ISPs, who deploy the links inside buildings. With zero capital expenditure and near-zero operating cost for the ISPs, the fiber provider shares in the revenue while giving ISPs a competitive edge in security-conscious markets.

Japan now stands at a critical juncture. What began as an engineering triumph to boost bandwidth has become a potential cornerstone of global digital security. By scaling up domestic deployment and exporting secure intra-building fiber links, Japan can set a new global standard—where questions whispered to AI are no longer vulnerable to silent interception, and answers meant for one pair of eyes never end up in the wrong hands.

This is more than a business opportunity. It is a strategic imperative. In an age where AI increasingly drives decisions of consequence, Japan’s early and sustained leadership in multi-core fiber should be recognized, revived, and recommitted—both as a national priority and as a gift to a world in urgent need of privacy-assured infrastructure.



About the Author

Gary M. Weiner is the Founder and CEO of Apriori Network Systems, a U.S.-based company pioneering physically secure fiber-optic transmission using multi-core fiber technology. He has over 30 years of experience in the semiconductor and telecommunications industries, with a focus on high-assurance systems and privacy-enhancing technologies. He previously led global business development efforts at NEC Electronics and has deep expertise in fiber-optic security and infrastructure.