

# Forward Edge-AI Ships First Quantum-Resistant Hardware to National Central University in Taiwan and Secures 5th Patent

*Milestone patent allowance and international partnership advance*

*quantum-safe cybersecurity for critical infrastructure and defense research.*

SAN ANTONIO, TX, UNITED STATES, December 2, 2025 /EINPresswire.com/ -- [Forward Edge-AI, Inc.](#),

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Q-Day isn't a distant risk; it's a certainty. Our solution delivers the trust fabric needed to secure communications across defense, finance, and critical infrastructure sectors in the quantum era.”

*Eric Adolphe, CEO*

a leader in trusted autonomy and quantum-resilient cybersecurity, today announced two major milestones in advancing quantum-resistant communications: successful delivery of its Isidore Quantum® [One-Way Data Diode](#) to the National Central University (NCU) in Taiwan; and a Notice of Allowance by the United States Patent and Trademark Office (USPTO) for its attack-resilient, zero-trust communication solution.

Breakthrough Deployment to National Central University:

The delivery of Isidore Quantum® configured as a one-way data diode to National Central University marks a significant milestone in cross-national research collaboration on next-generation cyber defense technologies. The deployment advances quantum-resistant data security research and demonstrates the operational readiness of Forward Edge-AI's technology in critical infrastructure environments. Traditional one-way diodes, which rely on fiber optic hardware isolation, cannot support encryption, encryption typically requires two-way exchanges for key negotiation. Isidore Quantum achieves a breakthrough: it enables true one-way data flow while simultaneously supporting NIST-approved post-quantum encryption using AES-256 GCM and ML-KEM.

This capability is unique and addresses a critical vulnerability: one-way diodes use fiber-optic hardware isolation that cannot support encryption, which normally requires two-way communication for key negotiation. Without encryption, data flowing through conventional diodes remains vulnerable to interception and future decryption. Isidore Quantum solves this by combining unidirectional enforcement with quantum-resistant encryption, ensuring captured data remains protected even against future quantum computers.

Additionally, unlike traditional one way transfer solutions that require expensive fiber optic infrastructure, Isidore Quantum operates seamlessly on both fiber and copper networks. This means organizations can deploy quantum-safe, one-way data protection without costly infrastructure replacement, dramatically reducing deployment time and capital expense.

#### Patent Secures Leadership in Post-Quantum Communications:

The patent, U.S. Patent No. 12,452,301 B2, titled "Methods, Systems, Apparatuses, and Methods for Facilitating Attack-Resilient Communications Between Devices," secures Forward Edge-AI's leadership

in developing hardware-based cryptographic resilience for critical communications, a foundational advance for post-quantum security. The patented system introduces a trusted network switch architecture that maintains secure communications between devices, even under attack or when exposed to compromised networks. Unlike traditional encryption, which relies solely on software protocols, Forward Edge-AI's solution embeds cryptographic verification and isolation directly into the network hardware layer. This ensures message integrity, authenticity, and confidentiality, even in environments where adversaries have advanced computational capabilities.

The innovation enables:

- Tamper-resistant encryption relays between trusted elements
- Dynamic re-encryption and authentication of data packets in transit
- Hardware-enforced trust boundaries that isolate compromised components
- Cryptographic switching as low as sub-millisecond when under attack—a critical breakthrough for operational continuity

Traditional security requirements mandate cryptographic failover within 30 seconds or less during attack scenarios. Forward Edge-AI's patented architecture achieves switching as low as sub-millisecond under attack conditions, exceeding government specifications by orders of magnitude. While switching times can vary based on network conditions, ranging from sub-millisecond to as high as six seconds, the system consistently performs well below the 30-second



True One Way Data Transfer and PQC that is not Distance Limited

threshold that no competing solution has yet met.

This innovation was made possible through U.S. Government support under Agreement Number FA8075-23-C-0003, awarded by the U.S. Air Force (AFWERX). The government retains certain rights in this invention, underscoring its national security relevance.

Preparing for Q-Day and the HNDL Threat:

As global cybersecurity leaders warn of Q-Day, the moment quantum computers can break today's encryption, Forward Edge-AI's technology addresses the urgent need to defend against Harvest Now, Decrypt Later (HNDL) attacks. Isidore Quantum encrypts data unidirectionally using AES-256 ML-KEM and ML-DSA post-quantum algorithms, ensuring that data captured today remains protected well into the future of quantum computing, a capability traditional one-way diodes cannot provide.

Isidore Quantum has been tested and validated in 30 pilots across the U.S. Army, Air Force, Navy, Space Force, and the private sector, achieving <0.5 millisecond latency and up to 2 Gbps throughput. The device consumes less than 8 watts of power, operates silently without fans, and is exportable under license exception ENC (ECCN 5A002). "Every competitor still has something in the lab. We have something in the field," said Ross Coffman, President of Forward Edge-AI and retired U.S. Army Lieutenant General. "Given the federal mandate to begin the post-quantum transition by December 2025, only proven solutions like ours can meet the deadline."

The White House's Executive Order 14144 requires all federal agencies to begin the post-quantum transition by December 2025 and complete it by 2030. Isidore Quantum allows organizations to comply instantly, without disruption, re-certification, or re-architecture.

#### About Forward Edge-AI

Forward Edge-AI, Inc. is a leader in AI-driven cybersecurity solutions and quantum-resistant technologies for defense, government, and critical infrastructure. The company's flagship product, Isidore Quantum®, combines post-quantum encryption, AI-enabled resilience, and software-defined network control to deliver future-proof protection against emerging digital threats.

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