

# ABQ-Net: New Mexico's National Asset Quantum Network

April 2026

## Executive Summary

ABQ-Net is the first open-access quantum network in the United States, distributing entanglement, a special type of quantum information, across Albuquerque's existing telecom infrastructure, today. The network is essential for researchers, students and industry developing new quantum protocols, testing new hardware, and training the future quantum workforce on real systems over live infrastructure.

The network is poised to grow, connecting students and researchers from colleges and universities across the region. As an open-access quantum network, ABQ-Net is the first of its kind and a National asset, becoming the connective tissue for New Mexico's quantum innovation ecosystem.

This white paper calls out how New Mexico can improve ABQ-Net's capabilities and realize its full economic and scientific potential through a two-phase expansion that would:

- Extend the network to CNM, UNM and the Quantum Demo Facility managed by Roadrunner Ventures Studio, (Phase 1)
- Connect to Los Alamos National Laboratory, and New Mexico Tech (Phase 2 a & b).

## What is ABQ-Net?

Built by Qconnect, with Roadrunner Venture Studios, through a 2025 Quantum Ecosystem Award administered by New Mexico's Economic Development Division, ABQ-Net is a fiber network currently spanning 25 kilometers from Qconnect's downtown Albuquerque facility co-located with bigbyte Data Center to the Center for Integrated Nanotechnology (CINT), a user facility managed by Sandia National Laboratories.

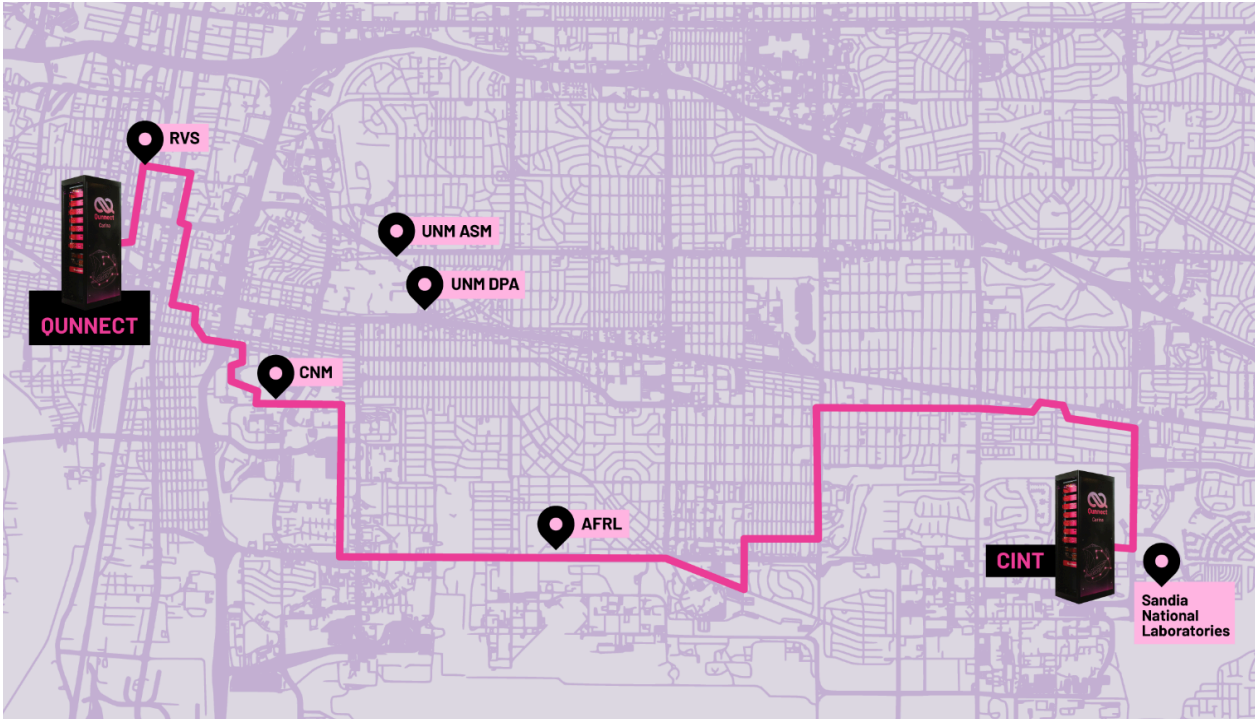
ABQ-Net is a fiber-based network that transmits quantum and digital information between connected nodes. It supports research and commercial application development for use cases such as secure communications, connection of quantum computers, and precision timing. The network is open-access, meaning any qualified user from government, academia, or industry can apply to connect hardware and run experiments. The open-access network is a unique asset on the National stage and complimentary to other Federal/State funded technology hubs to support a variety of quantum computing platforms.

**Global governments have committed over \$44.5 billion to quantum technologies,** with China investing nearly double the United States<sup>1</sup>. The total quantum technology market is projected to reach **\$97 billion by 2035**<sup>2</sup>. As Europe and China invest aggressively in quantum networking infrastructure, the United States needs domestic testbeds where industry, government, and academia can develop quantum technologies.

<sup>1</sup> Quantum Economic Development Consortium, 2025 State of the Global Quantum Industry Report

<sup>2</sup> McKinsey, Quantum Technology Monitor 2025

# ABQ-Net in Albuquerque Today



Today's ABQ-Net connects two nodes – one outside Sandia National Lab and the other at bigbyte's data center downtown.

## Quantum Networking Capabilities Unlocked

Quantum Security	Communications & Synchronization	Networked Sensors	Quantum Compute Clusters	Future Internet
Quantum-enabled secure comms protocol development	Atomic clock synchronization and quantum-enhanced timing signals	Networking quantum sensors for navigation, geology, and defense	Connecting processors for distributed quantum computing	Testing for next-generation quantum internet protocols

## Why ABQ-Net Matters for New Mexico and the United States

### For New Mexico

New Mexico's national laboratories (Sandia, LANL), universities, and federal research programs represent millions in annual quantum investment. ABQ-Net turns these isolated assets into a connected quantum ecosystem, attracting private sector partners, retaining PhD talent, and creating high-wage jobs that keep graduates in state.

### For the United States

Quantum networks are strategic national security infrastructure. Europe and China are investing aggressively. The U.S. needs domestic testbeds where industry and government can develop and harden quantum communication standards. ABQ-Net, connected to LANL and Sandia, is uniquely positioned to serve that role.

# Economic Opportunity

Quantum networking is the foundation of a new technology sector, one that governments and private companies worldwide are racing to build. In New Mexico, ABQ-Net will position the state as a leader in American innovation.

## The global race is already underway.

Governments worldwide have **committed** over \$44.5 billion to quantum technologies, with China investing nearly double the United States. The European Union's Quantum Flagship program has been running since 2018.

## New Mexico is strategically positioned to lead in the United States.

Sandia and Los Alamos represent billions in annual federal research investment and employ thousands of PhD-level scientists. The University of New Mexico, New Mexico Tech and Central New Mexico Community College produce quantum-relevant graduates who will follow the greatest opportunities.

## Providing access to New Mexico's quantum learning lab and venture studio

New Mexico has made a multi-million dollar investment in creating the quantum ecosystem for innovation through its quantum venture studio led by Roadrunner Venture Studios and Quantum Learning Lab developed by Sandia, CNM and UNM. Providing access to the start-ups and students taking part in these programs increases their capabilities and the quantum innovation emerging from New Mexico.

## The jobs follow the infrastructure.

Quantum networking requires a workforce that doesn't fully exist yet, including engineers who can operate live systems, technicians trained on real hardware, and researchers with access to operational testbeds rather than simulations. ABQ-Net is a unique platform for teaching and research for the quantum workforce providing unique direct engagement with New Mexico's federal laboratories and private sector.

## Private sector investment follows public infrastructure.

Qunnect's GothamQ network connects Columbia Univ., NYU, Stony Brook Univ., and Brookhaven National Lab, allowing quantum companies and researchers to test locally rather than abroad. In 2026, Qunnect and Cisco **broke the world record** for entanglement swapping on deployed commercial fiber, an experiment that was only possible due to the availability of the GothamQ developmental testbed. ABQ-Net replicates that model in a market with a strong research foundation.

# Industry Use Cases

ABQ-Net serves multiple industries, each with distinct needs that quantum networking:

Quantum/Tech	Telecom	Defense	Energy	Financial Services
Quantum research, protocol development and operational testing	Quantum repeater development and next-gen secure telecom networks	Mission sensitive comms, navigation, C2, and sensor networks	Advanced grid security, precision timing, predictive load balancing	Ultra-secure interbank anti-spoofing, intruder alarming
Algorithm verification & test on real world infrastructure	Quantum clock synchronization for 5G/6G networks	Quantum radar and long-baseline sensing	Quantum-enhanced monitoring of critical infrastructure	Quantum random number generation for cryptography

## Academic Value Proposition

ResearchABQ-Net provides university researchers with access to operational quantum networking infrastructure – something no simulation can replicate. Faculty at UNM and NMT will perform experiments on cutting edge technology, develop curriculum for their students, publish results based on real-network data, and attract federal grants that require demonstrated access to quantum testbeds.

## Developing The Future Quantum Workforce

Central New Mexico Community College and UNM nodes will host dedicated Qunnect Carina teaching racks – allowing students at all levels to train on the same hardware used in operational quantum networks. This creates a talent pipeline from CNM’s two-year programs through UNM graduate research directly into industry and national laboratory careers.



Qunnect Carina hardware

## Connecting the National Laboratories

The Phase 2 expansion would connect Los Alamos National Laboratory (LANL) via Santa Fe, creating a quantum corridor between the state’s premier federal research institutions. The Santa Fe & LANL segment (~60km) is achievable with Qunnect’s currently deployed hardware, validated in a recent demonstration with Deutsche Telekom at over 100km. Intermediate nodes along the Albuquerque & Santa Fe corridor would also serve as quantum repeater research sites – among the most sought-after experimental platforms in the field. Expanding south to Socorro extends the network to key research institutions (NMT, NSF, White Sands Missile Range, etc.) and provides expanded research opportunities.



Proposed Phase 2 statewide expansion

## Future State: Growing Capabilities and Value

Near Term (Phase 1)	Mid Term (Phase 2)	Long Term
4-node metro network across Albuquerque. Quantum Learning Lab and Quantum Venture Studios nodes active.	Statewide backbone connecting ABQ with Santa Fe, LANL Socorro (NM Tech). Quantum repeater nodes established.	New Mexico as a critical lead node in the National Quantum Internet. Establishing commercial quantum cloud services and secure communications statewide.

## Investment Summary

Phase	Year 1 Buildout	Ongoing / yr	5-Year Total
Phase 1: Intra-Albuquerque	\$6.5M	\$2.0M	\$14.5M
Phase 2a: Santa Fe / LANL	\$7.0M	\$1.5M	\$13.0M
Phase 2b: Socorro / NM Tech	\$5.0M	\$1.5M	\$11.0M
<b>Total</b>	<b>\$18.5M</b>	<b>\$5.0M</b>	<b>\$38.5M</b>



For technical briefings, site visits, or more information about ABQ-Net, contact Qunnect at [contact@qunnect.com](mailto:contact@qunnect.com)

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