

FLORIDA QUANTUM ECOSYSTEM

A Strategic Assessment of
Florida's Quantum Technology
Position and Opportunities

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Position and Opportunities



FLORIDA'S QUANTUM OPPORTUNITY

\$1.7T

STATE ECONOMY
4th in the US | ~15th globally

23M+

RESIDENTS
3rd most populous | 11M+ workforce

#1

TO START A BUSINESS
WalletHub 2026

3RD

STARTUPS PER CAPITA
high startup density

FOREWORD

Quantum technologies use the behavior of matter and energy at atomic and subatomic scales to provide new capabilities in computing, sensing, communications and security, and are already part of Florida's economic, research and security landscape, even if this is not yet widely recognized. It will affect how sensitive information is protected, how communications networks are secured, how defense systems navigate and sense, and how complex industrial systems are modeled and optimized. These issues matter directly to Florida's economy, national security and long-term competitiveness.

Florida starts from a position of strength. Its \$1.7 trillion economy is supported by nationally significant assets in defense, space, logistics, healthcare, life sciences, financial services and higher education. The state hosts three combatant command headquarters, more than 20 major military installations, Cape Canaveral and Kennedy Space Center, 16 public deepwater seaports and a large network of universities, colleges and research facilities.

Florida also has an unusually strong quantum relevant asset base. The National High Magnetic Field Laboratory, operated by Florida State University, the University of Florida and Los Alamos National Laboratory, supports high field, low temperature and advanced materials research; the University of Florida's HiPerGator provides one of the nation's leading university supercomputing platforms; CREOL at the University of Central Florida brings nationally recognized photonics expertise; and Florida LambdaRail provides research connectivity relevant to secure communications and future quantum networking. Recent developments add momentum, including D-Wave's headquarters relocation to Boca Raton, Florida Atlantic University's acquisition of an Advantage2 quantum computer, the planned Florida LambdaRail and IonQ quantum-secure

corridor, the Florida Alliance for Quantum Technology, FloridaQuantum and Palm Beach State College's Quantum Innovation Center for workforce training.

The opportunity now is to turn these strengths into economic and strategic value. Florida's quantum opportunity is likely to be deployment led: connecting research and innovation to users in sectors where the state already has scale and national importance. Defense is central to that opportunity, especially through post-quantum cryptography, quantum sensing, resilient navigation and secure communications, with related civilian applications in healthcare, ports, infrastructure resilience, environmental resilience, advanced manufacturing and public safety.

Florida has the assets, talent and operating environments to turn quantum into a driver of economic growth, national security and high value jobs. The task now is to connect those strengths with focus and discipline, so Florida can compete for the companies, investment, federal partnerships and workforce opportunities that will shape this next technology frontier.

J. Alex Kelly
Secretary of Commerce

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EXECUTIVE SUMMARY

Florida's economic scale is central to its quantum opportunity.

The state is widely known for tourism, beaches, theme parks and retirement, but those are only part of its economic story. It is also a **\$1.7 trillion economy**, the fourth-largest state economy in the United States and roughly the **15th largest** economy in the world if measured as a country. It has more than **23 million residents**, one of the fastest-growing populations in the country and a diversified industrial base spanning defense, space, life sciences, healthcare, logistics, financial services, advanced manufacturing and critical infrastructure.

That matters for emerging technologies like quantum. Florida's economy contains large, complex operating environments where new technologies can be tested against practical problems. The state is a launchpad for America's space economy, anchored by Cape Canaveral and Kennedy Space Center. It hosts **U.S. Central Command** and **U.S. Special Operations Command** at MacDill Air Force Base, **U.S. Southern Command** in Doral and more than 20 major military installations. Its life-sciences and healthcare ecosystem spans Palm Beach County, Tampa and Miami, while its ports, airports, highways, utilities and logistics networks create demand for secure data, resilient operations, complex scheduling and rapid recovery after disruption.

The quantum connection is practical. Defense and space systems need resilient navigation, secure communications and trusted timing. Financial institutions, public agencies and federal contractors need to prepare for post-quantum cryptography. Ports, logistics networks and emergency management systems face routing, scheduling and asset-allocation challenges. Healthcare and life sciences depend on better sensing, imaging, modeling and secure data

systems. These needs map onto three main capability areas: quantum computing for optimization, simulation and discovery; secure communications and post-quantum cryptography for data protection and network security; and quantum sensing for navigation, imaging, detection and measurement.

This is Florida's quantum moment because decisions being made now will shape where quantum companies, talent, investment and applied capability concentrate. Florida already has the demand, infrastructure and strategic operating environments to put quantum to work in defense, space, finance, healthcare, logistics and critical infrastructure. The competitive window is narrowing, but Florida is well placed to compete if it now connects its assets with focus and discipline.

Seizing that opportunity will require stronger coordination, targeted capital, delivery mechanisms and practical connections between research universities, industry, defense and national security partners, infrastructure operators and workforce institutions.

\$1.7T

economy

4THlargest state
economy in the US**15TH**largest economy in
the world as a country**23**

million residents

Evidence Base

This report is based on **targeted stakeholder engagement** and desk research. The study included **23 stakeholder interviews** across Florida's quantum and quantum relevant ecosystem, covering research, government and economic development, defense, transport and logistics, manufacturing, investment, workforce development and quantum technology. Interview themes were coded by distinct contributor rather than by total mentions, so the analysis reflects breadth of evidence rather than repetition by a small number of voices.

This engagement was combined with desk research covering Florida's sector base, defense economy, research infrastructure, university activity, public announcements, peer state quantum strategies and federal policy signals. The analysis also included a global review of **130 defense relevant and quantum-secure programs across 25 countries**, used to assess where defense quantum activity is moving from research toward trials, platform linked testing and early deployment.

Targeted outreach was undertaken to defense stakeholders, reflecting the importance of defense demand to Florida's quantum opportunity. Defense perspectives are included in the evidence base, although the level of engagement was lower than for some other stakeholder groups. Further consultation with defense agencies, installations, primes and mission users should inform subsequent strategy development and delivery planning.

"Florida should build around its existing strengths in defense, aerospace, and advanced electronics. Invest in shared resources between industry and academic research, sustain statewide coordination, and position itself strongly for funding opportunities and continuity."

- RF/microwave hardware supplier

Why Quantum Matters for Florida

Quantum matters for Florida because the state has real world operating environments where quantum technologies could address practical problems. Defense, space, ports and logistics, healthcare and life sciences, advanced manufacturing, financial services, energy systems and research institutions all depend on secure data, resilient infrastructure, complex scheduling, advanced sensing and high-performance modeling. Figure 1 summarizes why that combination creates a practical deployment opportunity for quantum technologies.

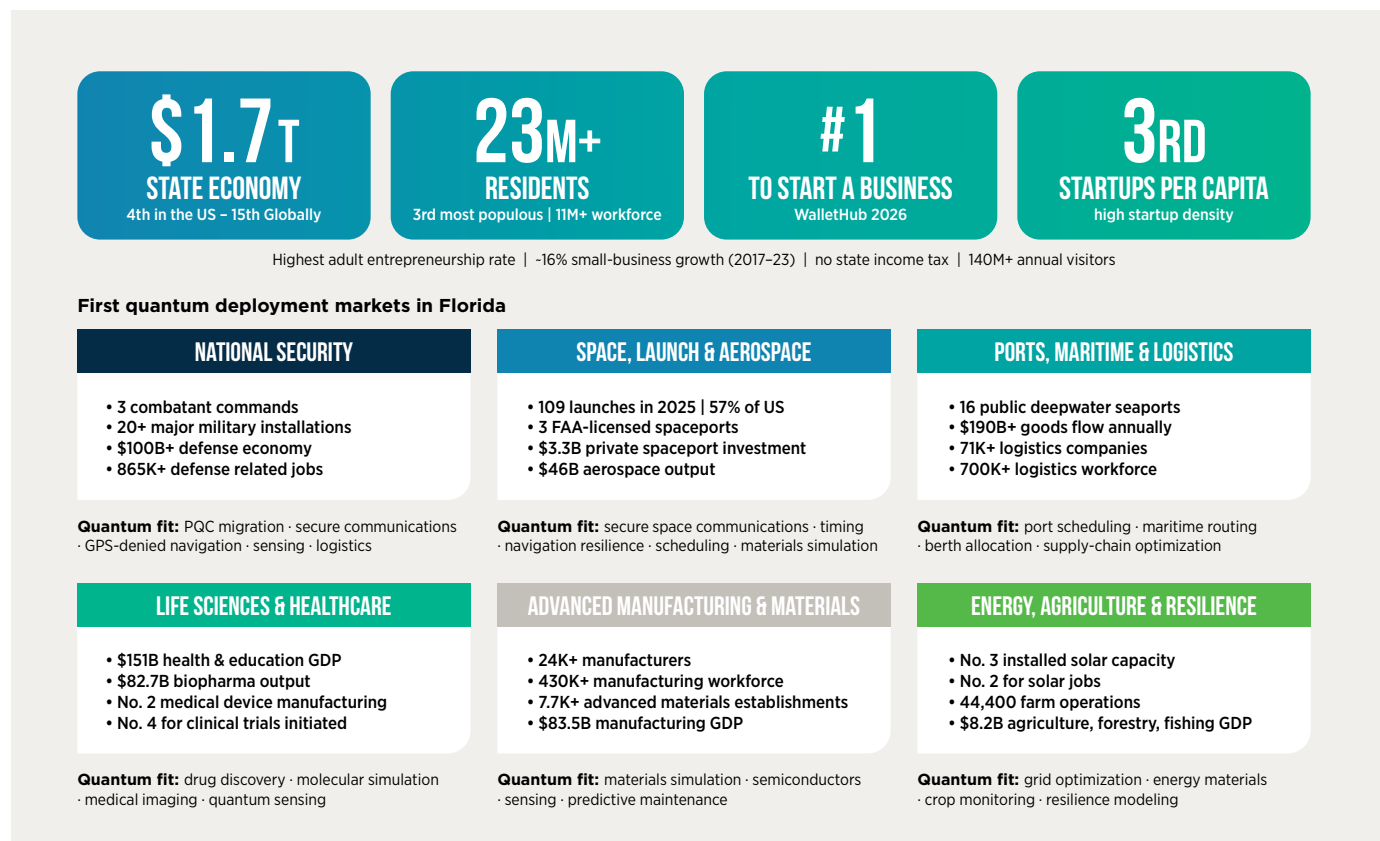


Figure 1: Florida's quantum opportunity: deployment at scale.

Figure 1 shows why Florida's quantum opportunity is deployment-led. The state has several large sectors where quantum-relevant problems already exist at scale. Healthcare and life sciences, professional and technical services, manufacturing, and transportation and logistics together account for more than \$430 billion in economic output. Florida's universities also conduct ~\$3.5 billion in annual research and development across engineering, computing, physical sciences, life sciences and related disciplines. This gives Florida two important foundations for quantum: **sizable markets where applications could be tested and a research base that can help develop, validate and adapt** those technologies.

The significance is how Florida's sector base aligns with the problems quantum technologies are being developed to address. Defense and space create demand for secure communications, resilient positioning, navigation and timing, sensing and mission planning. Ports, logistics

and infrastructure create optimization and resilience challenges. Healthcare and life sciences create opportunities in sensing, imaging, secure data and longer-term simulation. Manufacturing and materials create pathways for advanced design, inspection, testing and process optimization.

The external context strengthens the case. Federal security requirements, post-quantum cryptography migration, defense demand for advanced sensing and navigation, and the emergence of quantum capabilities in space systems are creating nearer-term pathways for quantum adoption. Florida's sector base and institutional capabilities sit close to these pathways, as summarized in Figure 2.



Figure 2: External drivers and Florida capabilities shaping the near-term environment for quantum technology deployment.

Florida Research Ecosystem

Florida already has a substantial quantum-relevant research base. Universities across the state support activity in quantum science and in the enabling fields quantum technologies depend on, including photonics, advanced materials, computing, sensing and engineering. Dedicated quantum activity is anchored by a core group of institutions, while a wider set of universities and partners contribute adjacent capability, specialist infrastructure, workforce development and applied research capacity. Figure 3 summarizes these foundations.

Florida's research ecosystem combines strong life sciences research, advanced materials capability and defense-connected engineering expertise. These capabilities align closely with emerging quantum applications including sensing, secure communications, materials simulation, and hybrid quantum-classical computing.

However, this capability is **distributed rather than concentrated**, with activity spread across multiple universities and regions rather than anchored in a single national laboratory or research cluster. While this aligns with Florida's large operational sectors including defense installations, aerospace infrastructure, healthcare systems and port logistics networks, it also creates challenges in coordination and delivery.

At present, there are limited mechanisms to connect research capability with end users, support collaborative development, or enable the testing and validation of quantum technologies in real-world environments.

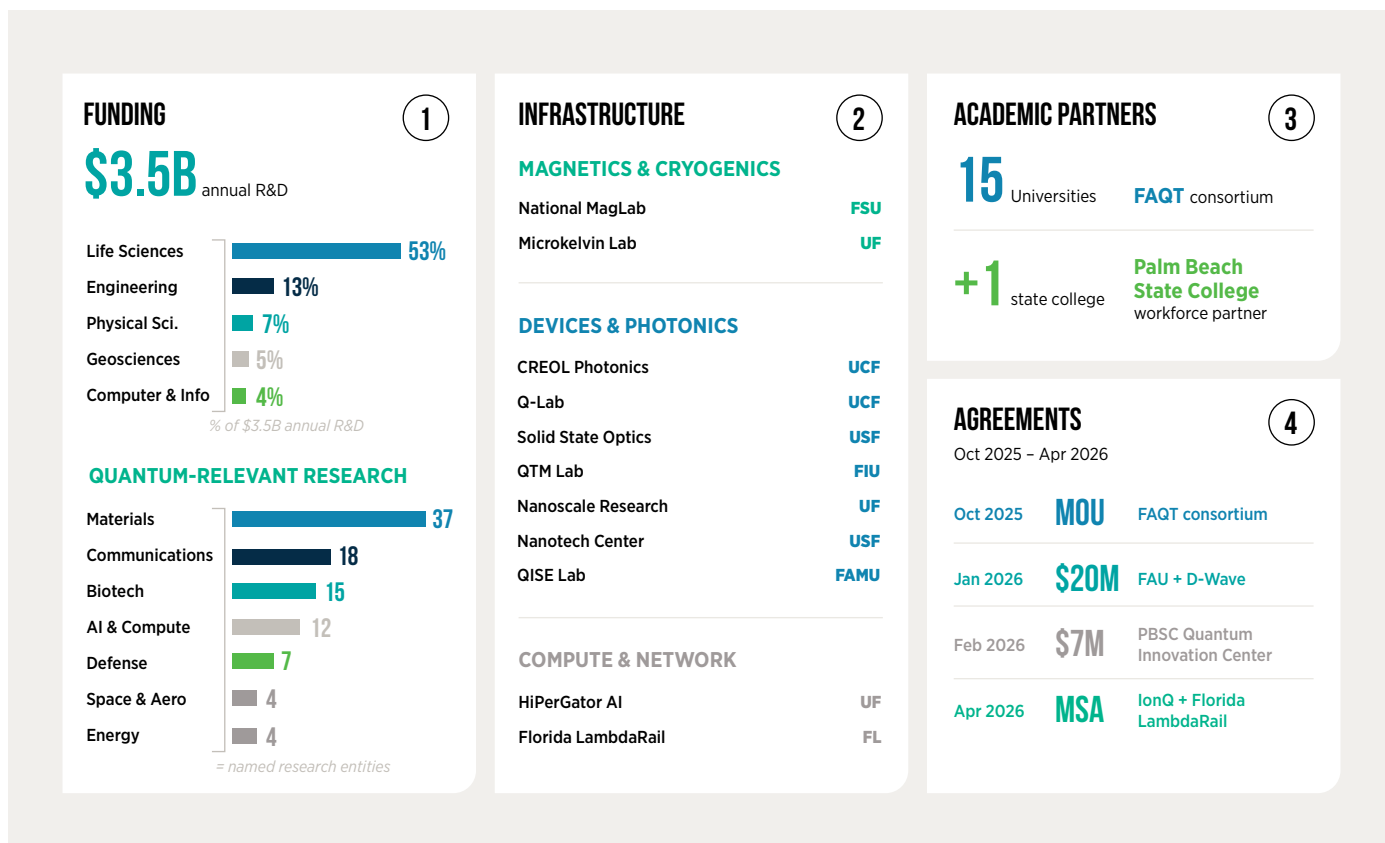


Figure 3: Florida's quantum relevant research and infrastructure base. The figure summarizes four components of Florida's emerging quantum ecosystem: **1** research expenditure and quantum relevant fields; **2** supporting infrastructure across magnetics, photonics, nanotechnology, computing and networks; **3** Florida Alliance for Quantum Technology (FAQT) academic coordination and PBSC workforce partnership; and **4** recent agreements spanning consortium formation, hardware, workforce and quantum-safe networking. Not exhaustive.

From Ecosystem to Real-world Deployment

The analysis in this report leads to a clear conclusion: Florida already has many of the elements required for a competitive quantum technology ecosystem, but these are not yet connected into a state-wide system capable of supporting deployment.

Research programs, workforce pipelines, industry participants, and operational end users remain largely separate. There are few coordinated pilot programs, limited shared infrastructure for testing and validation and no dedicated state-level funding mechanism to incentivize quantum technology development.

While scientific capacity continues to grow, Florida's challenge is not the absence of capability, but the absence of integration. The next phase of development requires connecting these elements into a system that supports real-world deployment.

Closing this gap requires coordinated action across several areas:

- **Connecting** universities with end users through structured partnerships
- **Building** workforce pipelines aligned to both research and industry
- **Developing** shared testing infrastructure
- **Improving** access to early-stage capital
- **Aligning** state initiatives with federal quantum programs.

These priorities form the basis of the **COSINE framework** set out in section 8 of this report: Cohesion, Orchestration, Stimulation, Integration, Networking and Execution. COSINE provides a practical approach to linking research capability with deployment and supporting the development of a dual-use quantum technology ecosystem in Florida.

What Florida Should Do Now

Florida should move from ecosystem building to coordinated delivery. It has many of the elements required for a competitive quantum ecosystem, but they are not yet connected into a statewide system that can support deployment at scale.

The next 12 months should focus on five priorities:

- 1 Use COSINE as the operating framework:** align partners, clarify roles, identify gaps and track progress across the ecosystem.
- 2 Create an applied research and talent fund:** support student-led and industry-linked projects that build talent and translation capacity together.
- 3 Build a connected network of quantum hubs:** reflect regional strengths while operating as part of one statewide system.
- 4 Launch priority pilots and testbeds:** focus on practical areas such as post-quantum cryptography readiness, quantum-secure communications, sensing, resilient positioning and timing, logistics optimization and infrastructure resilience.
- 5 Make post-quantum security a statewide readiness priority:** help public agencies, defense suppliers, infrastructure operators, healthcare systems, financial institutions and major employers prepare for mandated cryptographic transition.

Florida starts with credible quantum assets. Its competitive position now depends on organizing them quickly; fragmentation would give other states more room to shape quantum funding, testbeds and deployment.

The case for urgency is clear. Quantum defense systems are moving into real-world testing, federal post-quantum cryptography deadlines are approaching and FAQT gives Florida its first formal quantum coordination mechanism. Florida has credible assets, but other states are packaging their quantum ecosystems more aggressively through public funding, anchor institutions, federal bids, testbeds, tax incentives and formal coordination mechanisms.

If Florida does not act within this timeframe, several risks follow:

- **Fragmented activity:** quantum activity may remain dispersed across institutions without clear statewide direction.
- **Lost partners and investment:** companies and federal partners may look elsewhere.
- **Workforce misalignment:** workforce programs may develop without alignment to industry and defense demand.
- **Slower adoption and higher costs:** Florida's major operating sectors may face slower adoption, weaker supplier readiness, higher transition costs and reduced ability to shape how quantum technologies are tested and deployed.

The remainder of this report sets out the evidence, strategic choices and 5-year roadmap needed to move from recognition to execution.

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1. FLORIDA IN CONTEXT

1.1 Geography, Population and Growth

Florida is the third most populous US state with over 23 million residents.¹ Over the past two decades it has been one of the fastest growing states in the country, driven by a combination of domestic migration from higher-cost and higher-tax states, international immigration and natural population increase. The state's population growth has been sustained rather than cyclical, and current projections indicate continued expansion through at least 2035.²

Geographically, Florida occupies a distinctive position within the United States. Its peninsular form and more than 1,350 miles of coastline, spanning both the Atlantic Ocean and its western Gulf-facing coast, have produced a distributed coastal urban system rather than a single dominant metropolitan center.

This dual coastline underpins two complementary economic corridors: an Atlantic-facing system closely linked to international trade and finance, particularly with Latin America, and a western coastal system oriented toward domestic logistics, defense activity and advanced manufacturing. Florida's proximity to Latin America and the Caribbean has reinforced its role as a primary US gateway to these regions, shaping trade flows, corporate presence and business connectivity.

Florida's flat topography and extensive transport infrastructure have enabled rapid urban expansion and strong connectivity between major metropolitan areas including Miami, Orlando, Tampa and Jacksonville. At the same time, its eastern seaboard hosts critical national aerospace infrastructure, including Cape Canaveral Space Force Station and Kennedy Space Center, the principal United States orbital launch sites. In 2025, 109 launches took place from Florida, accounting for ~57% of the US total.³

Taken together, Florida's sustained population growth, coastal geography and infrastructure base have produced a large, distributed and well-connected economic system. This structure supports a range of advanced industries and provides a foundation for the development of emerging technologies, including quantum.

1.2 Economy and Business Environment

Florida's economy is the fourth largest among US states by output and would rank fifteenth in the world if it was an independent nation.⁴ The state's industrial base is more diversified than its public image suggests. Tourism remains a major sector, but state output is dominated by services-providing industries (~\$1.38 trillion of \$1.73 trillion in 2024),⁵ with substantial contributions from real estate, finance and insurance, healthcare, professional and technical services, manufacturing and logistics. Florida's business environment has been ranked first nationally for ease of starting a business by WalletHub (2026 ranking),⁶ fourth for state business tax climate by the Tax Foundation,⁷ and second nationally for foreign trade zone network coverage.⁸ The state has no personal income tax, which has been a recurring factor in its inward-migration trends.

The depth of new business formation is captured in the Florida Department of State Sunbiz registry: 670,459 new business entities were formed in Florida in 2025, of which ~84% were Domestic Limited Liability Companies.⁹ This rate of formation underlines the operating environment in which quantum-applied businesses will be expected to scale and is consistent with Florida's first-place national ranking on business-formation indicators.

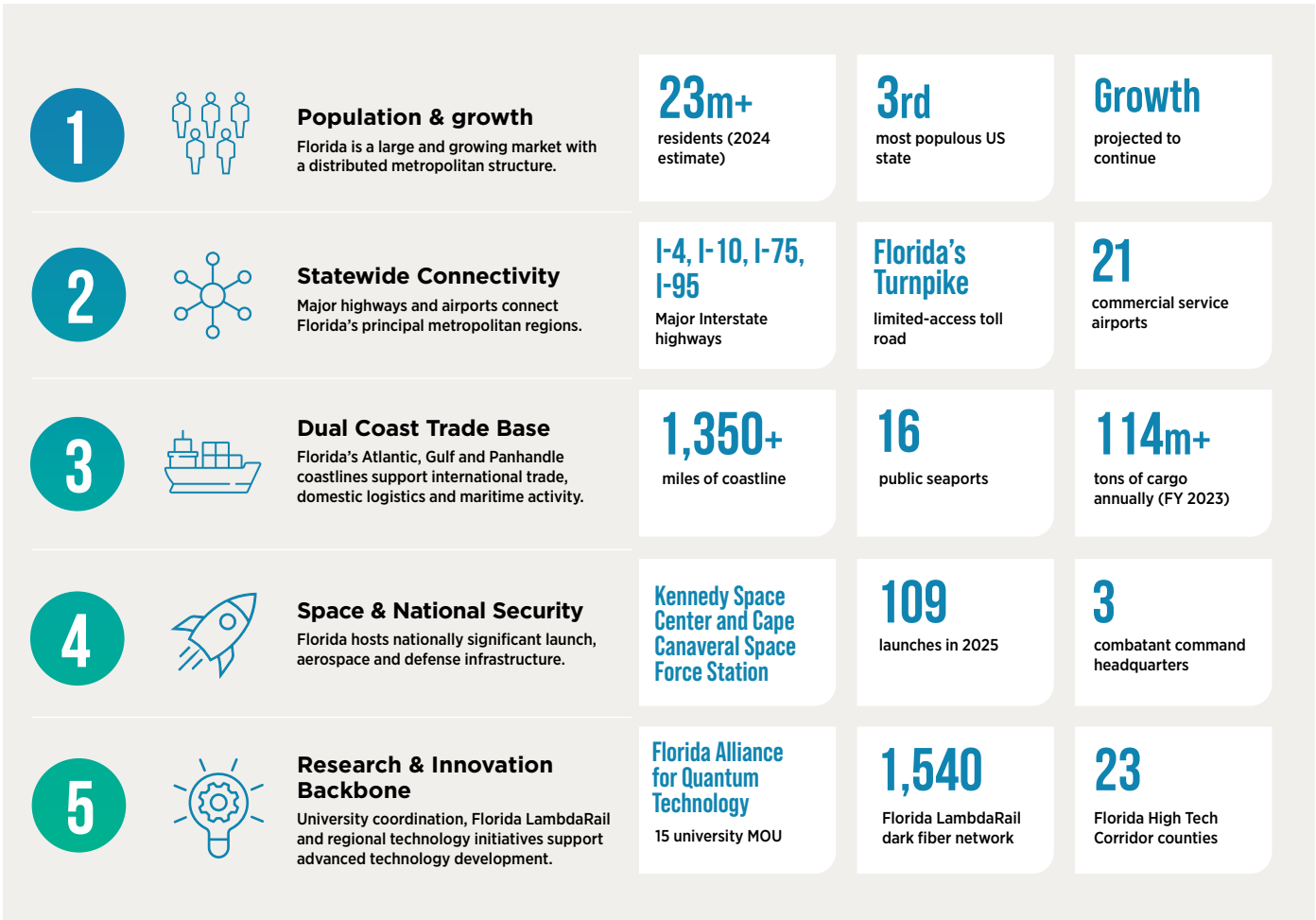


Figure 4: Florida in context: scale, connectivity and strategic assets (non-exhaustive). Five foundations of Florida's economic geography: **1** population growth; **2** statewide transport connectivity; **3** dual coast trade infrastructure; **4** space and national security assets; **5** research and innovation infrastructure.

Source note: Data points are drawn from multiple public sources. Population figures use U.S. Census Bureau 2024 estimates; transport and airport data use Florida Department of Transportation sources; seaport and cargo figures use Florida Ports Council data; launch and space infrastructure figures use Space Florida and Space Launch Delta 45 materials; defense figures use Florida Defense Support Commission materials; research and network infrastructure figures use Florida LambdaRail, Florida High Tech Corridor and FAQT public materials.

The state’s working-age population exceeds eleven million. Florida hosts more than 48,000 high-technology firms with over 335,000 information-technology professionals.¹⁰

Among the nation’s top producers of STEM graduates and bachelor’s degree holders, Florida supports its research and education community through the Florida LambdaRail (FLR), the state’s dedicated research and education optical network. FLR covers around 1,540 miles of dark fiber, meaning unused fiber optic cable that can be activated and configured for high-capacity research and education networking, across 11 network nodes.¹¹

1.3 Defense, Aerospace and National Security

Florida’s defense footprint is substantial. According to the Florida Defense Support Commission’s 2024 Florida Military and Defense Economic Impact Study, the state’s total defense economic impact is \$102.6 billion, comprising \$85.32 billion in direct defense spending and supporting 865,937 direct and indirect jobs.¹² Florida hosts more than twenty major military installations and three combatant command headquarters: US Central Command, US Special Operations Command and US Southern Command.

Approximately 66,971 active-duty personnel, 24,965 reservists and 12,086 National Guard members are stationed in the state, alongside 32,950 civilian defense employees and 1,450,597 veterans (the third-largest veteran population in the United States and the second-largest population of military retirees).¹³

The aerospace dimension reinforces this position. Florida accounts for ~57% of US orbital launches, with 109 launches recorded in 2025 from Cape Canaveral Space Force Station and Kennedy Space Center. The state's aerospace output is approximately \$46 billion annually, supporting 124,380 jobs.¹⁴ Major employers include SpaceX, Blue Origin (with more than \$3 billion invested in the New Glenn facility), United Launch Alliance, L3Harris, Lockheed Martin (with approximately 17,000 Florida employees) and Northrop Grumman. Patrick Space Force Base hosts the headquarters of US Space Training and Readiness Command (STARCOM), supporting more than 14,000 military Guardians.¹⁵

Florida's defense governance is supported by two state instruments. The Florida Defense Alliance, authorized under F.S. 288.980(1)(b), is a statewide advisory body for military bases, missions and host communities.¹⁶ The Florida Defense Support Commission, established in 2011 under F.S. 288.987, as a Task Force, makes recommendations on missions, defense industry growth, and education and employment for service members.¹⁷ Florida's defense grant programs include the FDSC Grant Program, administered by the Commission (through Commerce staff), and the Defense Reinvestment and Defense Infrastructure grant programs, administered by Commerce. Together, these programs total approximately \$3.6 million annually.

1.4 Technology and Innovation Economy

Florida's technology economy has expanded significantly over the past decade, but not through a single dominant hub. Its strength lies in a distributed set of regional specialisms that together support finance, life sciences, aerospace, cybersecurity, simulation, defense technology and advanced industry.

Palm Beach County illustrates this shift. West Palm Beach has become increasingly associated with the "Wall Street South" label as financial services firms, hedge funds, private equity firms and family offices have expanded in the area. The county also has a growing life-sciences base, with Scripps, Max Planck and Florida Atlantic University contributing to research capacity in neuroscience, biomedical science and related fields. Miami adds a fintech and startup economy. Orlando brings nationally significant modeling, simulation and training capability serving defense and commercial customers. Tampa Bay combines cybersecurity, defense technology and proximity to U.S. Central Command and U.S. Special Operations Command at MacDill Air Force Base. The Space Coast anchors aerospace engineering, launch operations and space-related supply chains. The Panhandle adds defense and information warfare training capacity through the Navy's Information Warfare Training Command at Corry Station in Pensacola.¹⁸ The 23-county Florida High Tech Corridor provides a wider platform for technology-economy coordination across the state.¹⁹

This distributed structure matters for quantum because the state's relevant capabilities are also spread across regions, sectors and institutions. Florida's higher-education system supports the technology economy through 12 State University System institutions, 28 Florida College System colleges and a substantial private higher-education sector. State universities conduct approximately \$3.5 billion in annual research and development across engineering, computing, physical sciences, life sciences and related disciplines. FAQT, established by a 2025 memorandum of understanding among 15 universities, is an emerging statewide alliance intended to coordinate quantum research, education and workforce activity across Florida's university system.²⁰

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2. THE QUANTUM LANDSCAPE

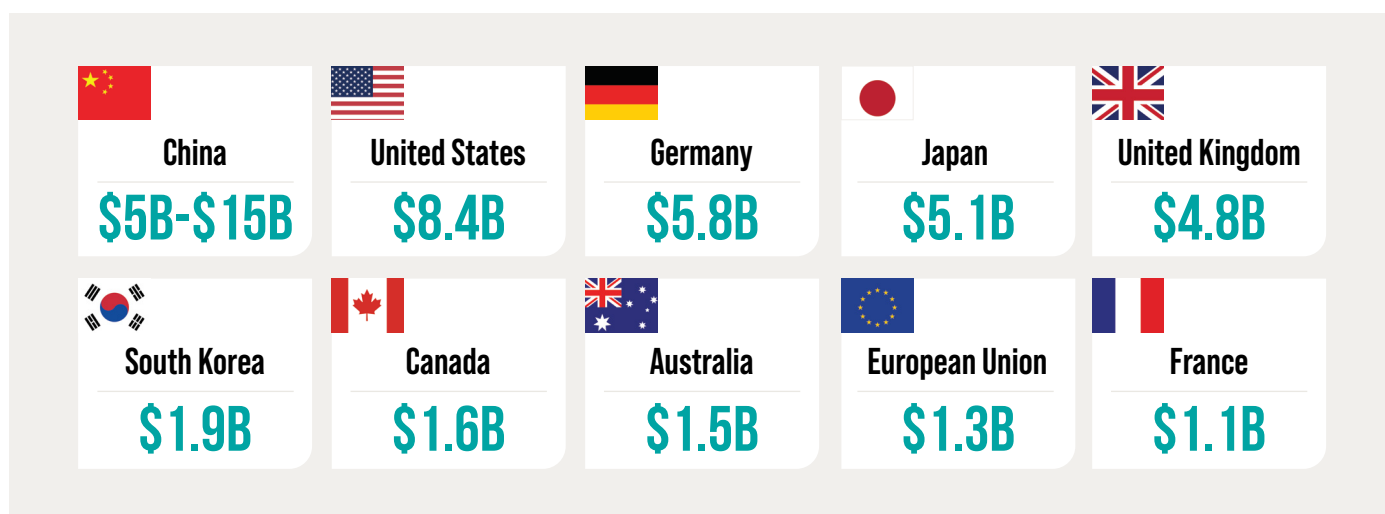


Figure 5: Global public investment in quantum technologies. Comparison of the ten largest publicly announced government commitments to quantum technology programs, shown in USD billions and including historical and active investment. China is shown as a range because public estimates vary. Source: The Quantum Insider Intelligence.

2.1 Global Investment, U.S. Policy and State Level Action

Quantum technologies are becoming a strategic area of national investment because of their relevance to defense, intelligence, secure communications, advanced sensing, computing, and long-term economic competitiveness. Governments worldwide have launched national programs to support quantum research, infrastructure, workforce development, and commercialization. Publicly announced investments are estimated at approximately \$54 billion cumulatively to date,²¹ with the ten largest government commitments shown below.

Global market activity is moving in the same direction as public investment. According to the Quantum Insider Intelligence, quantum technology investment reached **\$10 billion in 2025**, up **~4 times** from 2024.²¹ Separately, McKinsey's Quantum Technology Monitor 2026 projects that quantum computing company revenues could grow at around 47% per year through 2028 and estimates \$1.3 trillion to \$2.7 trillion in industry value at stake from quantum computing by 2035.²²

These figures should not be read as precise forecasts or as Florida specific estimates. They show why states are competing now for companies, talent, infrastructure and applied use case development.

In the United States, quantum research and technology development are supported through the National Quantum Initiative Act of 2018²³ and related federal programs across agencies including the Department of Energy (DOE), National Science Foundation (NSF), National Institute of Standards and Technology (NIST), Department of Defense (DOD), and elements of the intelligence community.

Within this national framework, states play an important role in determining where quantum capabilities are developed, tested and translated into use. State-level investments in research partnerships, workforce development, infrastructure and industry engagement help shape the environments in which emerging quantum technologies can move from laboratory research toward defense relevant and dual use applications.

For example, Illinois has committed major state funding to quantum infrastructure, including \$500 million in state support for quantum initiatives tied to the Illinois quantum campus and the Illinois Quantum and Microelectronics Park.²⁴ Maryland has partnered with DARPA on the Capital Quantum Benchmarking Hub to evaluate quantum computing systems for national security and commercial applications.²⁵ Colorado has also made significant state-backed investments in its quantum ecosystem, including a \$74 million refundable tax credit program,²⁶ while California has launched Quantum California to coordinate state, university, national lab and industry activity.²⁷ Together, these examples show that state action now plays a growing role in the geography of U.S. quantum development, especially where it links research assets, infrastructure, workforce programs and defense demand.

2.2 Quantum Technologies in Brief

Quantum technologies use the behavior of matter and energy at the quantum scale to enable capabilities that are difficult to achieve with conventional technologies. Some important concepts include:

- **Superposition:** a quantum system can be prepared in a combination of states rather than only one fixed state. This is one of the features that gives quantum computers their potential value, especially for problems involving complex simulations, optimization and some forms of data analysis.
- **Entanglement:** two or more quantum systems can share a connection that is stronger than ordinary classical correlation. This connection can hold even when the systems are physically separated. Entanglement is important for quantum communications, quantum networking and some forms of sensing.
- **Interference:** quantum states can reinforce or cancel each other. In sensing, this can make very small changes easier to detect. In computing, it can help amplify useful results and suppress less useful ones.

For defense and national security, these principles matter because they may affect how information is protected, how complex systems are modeled and how accurately the physical world can be measured.

The field is usually grouped into three technology domains: quantum computing, quantum communications, and quantum sensing. These domains are at different stages of development. Some quantum sensing applications are already being tested in realistic settings, while many quantum computing and networking applications still require further progress in hardware performance, error correction, standards and integration with existing infrastructure.

Table 1: Opportunities and risks across quantum technology domains. Selected examples of defense relevant and dual use opportunities and risks in quantum computing, quantum communications, and quantum sensing. Non-exhaustive.

Quantum tech	Opportunities	Challenges
 Quantum Computing compute beyond classical limits	• Pilot selected use cases in pharma, logistics, finance and defense modeling. • Develop quantum software, algorithms and systems talent. • Position Florida as a testbed for hybrid quantum classical approaches.	• Future quantum computers could break some widely used public key encryption. • Dependence on foreign hardware suppliers could create supply chain and security risks. • Domestic supply of specialized quantum hardware, including cryogenic systems, remains limited.
 Quantum Communication quantum-safe network links	• Pilot quantum secure and quantum resilient network approaches for defense, energy, finance and research infrastructure. • Build domestic capability in Quantum Key Distribution (QKD) and secure networking subsystems. • Establish enhanced security links for selected critical infrastructure use cases.	• QKD and quantum networking remain technically and commercially immature at scale. • Standards, hardware and deployment models for quantum networking are still developing. • Different approaches to QKD, quantum networking and post-quantum cryptography may complicate adoption.
 Quantum Sensing ultra-precise measurement	• Support GPS denied or GPS independent navigation, magnetic anomaly detection and underground sensing. • Develop sensors for defense, medical, environmental and energy applications. • Develop export potential in precision sensors for civilian and defense markets.	• More capable sensors could, over time, place pressure on submarine stealth and underground concealment. • Dual use sensors may create technology transfer and export control risks. • Scaled domestic manufacturing capacity for specialized quantum components remains uneven.

For Florida, the practical implication is that quantum should not be treated as a single market or a single technology. It is a set of related capability areas, each with different defense relevance, timelines, infrastructure needs, workforce requirements and risks.

2.2.1 Quantum Computing

Quantum computing uses quantum bits, or qubits, to process information in ways that differ from classical computing. Rather than replacing conventional computers, quantum computers are expected to be most useful for specific classes of problems where quantum effects can be used to model complex systems, search large solution spaces or improve certain forms of optimization and analysis.

Table 2: Leading qubit approaches for quantum computing. Selected physical qubit approaches, strengths and technical challenges. Non-exhaustive.

Platform	Qubit Approach	Strengths	Main Challenge
 Trapped Ion	Charged atoms are held in electromagnetic traps and controlled with lasers.	High fidelity, long coherence and established commercial vendors.	Slower gate speeds, optical control complexity and scaling interconnects.
 Superconducting	Josephson junction circuits behave as artificial atoms at cryogenic temperatures.	Fast gate speeds, a large development ecosystem and broad cloud access.	Cryogenic operation, wiring density and error correction overhead.
 Neutral Atom	Neutral atoms are trapped with lasers and arranged in programmable arrays.	Scaling potential, reconfigurable layouts and flexible connectivity.	Gate fidelity, error correction and system maturity.
 Photonic	Photons encode and transmit quantum information.	Room temperature operation, chip based optical control and interconnect potential.	Photon loss, weak photon interactions and reliable large-scale integration.
 Diamond NV Centers	Nitrogen vacancy defects in diamond act as solid state quantum systems.	Long coherence, room temperature operation and solid-state integration potential.	Processor scaling, defect control and consistent fabrication.
 Semiconductor Spins	Electron or hole spins in semiconductor quantum dots act as qubits.	Compact devices, potential CMOS compatibility and alignment with semiconductor manufacturing.	Consistent devices, precise control, readout and coherence.

Commercial deployment is increasing, with systems available through cloud platforms, dedicated installations and partnerships with government, research and enterprise users. However, the field remains technically early. Current machines are valuable for research, algorithm development, benchmarking, workforce training and testing hybrid quantum classical workflows, but most high value applications still require improvements in qubit quality, scale, error correction and integration with classical computing infrastructure.

For defense and national security, the importance of quantum computing lies in both opportunity and risk. It could support future advances in modeling, logistics, materials, sensing data analysis and machine learning, while also creating long term risks to widely used public key cryptography.

Table 2 summarizes leading qubit platforms, while Table 3 outlines selected application areas where quantum computing may become relevant as hardware and algorithms mature.

Table 3: Example quantum computing use cases and sectors served. Selected areas where quantum computing may support simulation, optimization, security testing and advanced analysis as hardware and algorithms mature. Non-exhaustive.

Domain	Use Cases	Sectors Served	Why it Matters
 Drug Discovery & Life Sciences	Molecular simulation, protein ligand binding, drug target analysis and selected biomedical modeling.	Pharma, biotech, academic life sciences and healthcare R&D.	Could improve modeling of complex molecules and support earlier stage drug discovery workflows.
 Finance & Logistics	Portfolio optimization, risk and fraud analysis, supply chain planning and routing problems.	Banking, insurance, asset management, logistics and retail.	Targets combinatorial problems where even modest performance gains could have operational value.
 Materials, Energy & Chemistry	Catalyst design, battery and energy materials, semiconductor design and carbon capture chemistry.	Energy, chemicals, advanced manufacturing and semiconductors.	Could support clean energy and advanced materials development by improving simulation of quantum systems.
 Defense, Security & AI	Cryptanalysis, post-quantum security testing, signal processing and selected machine learning workflows.	Defense, intelligence, cybersecurity and high-assurance computing.	Cryptographic implications make this a strategic national security domain.

2.2.2 Quantum Communications

Quantum communications cover technologies that use quantum effects to protect, transmit or verify information. The field includes quantum key distribution (QKD), quantum random number generation (QRNG), quantum-secure authentication, quantum repeaters and longer-term concepts such as the quantum internet. These technologies are relevant to defense because secure communications, trusted identity, assured encryption and resilient networks are core national security requirements.

Post-quantum cryptography (PQC) moved from research into formal standardization in 2024, when the U.S. National Institute of Standards and Technology (NIST) finalized its first three post-quantum encryption standards.²⁸ The National Security Agency's Commercial National Security Algorithm Suite 2.0 (CNSA 2.0) sets transition

requirements for National Security Systems, with phased milestones beginning in 2026 and a target to complete migration to quantum resistant algorithms by 2035.²⁹

The maturity of these technologies varies significantly. QRNGs are already commercially available and used in security systems.³⁰ QKD has been demonstrated in fiber and free space networks, including satellite-based links,³¹ but wider deployment still faces practical constraints around cost, integration, standards, distance and operational assurance. Quantum repeaters and the quantum internet remain at a much earlier stage as they require reliable quantum memories, entanglement distribution and network protocols that are not yet mature.³²

Table 4: Selected quantum communications technologies and applications. Overview of quantum enabled communications, security and networking technologies, with indicative uses and technical constraints. Non-exhaustive.

Technology	What it is	Where it Fits	Main Constraint
 Post-Quantum Cryptography	Classical cryptographic algorithms designed to resist attacks from future quantum computers.	Software based migration for government, cloud, finance, defense and critical systems.	Migration complexity, legacy systems and implementation risk.
 QKD over Fiber	Quantum key distribution over optical fiber links.	High security links for defense, banking, data centers and critical infrastructure.	Distance limits, trusted nodes and specialist hardware.
 Quantum Random Numbers	Random number generation from quantum physical processes.	Key generation, security modules, simulations and cryptographic systems.	Certification, integration and assurance of entropy quality.
 Satellite QKD	Free space quantum key distribution using satellite to ground links.	Long distance, cross border and hard to reach secure communications.	Weather, pointing accuracy, ground stations, cost and operational complexity.
 Quantum Repeaters	Devices intended to extend quantum links using entanglement and quantum memories.	Future long distance quantum networks beyond direct fiber limits.	Memory performance, fidelity and scaling remain technically difficult.
 Quantum-secure Authentication	Quantum or quantum enhanced methods for authenticating devices, users or supply chains.	Hardware identity, anti counterfeiting, supply chain integrity and high assurance access.	Limited standardization and mostly targeted pilots.
 Quantum Internet	Networks of quantum processors, sensors and memories exchanging quantum states.	Long term distributed quantum computing, sensing and secure multi party applications.	Requires repeaters, memories, protocols and large-scale network integration.

Table 5: Quantum communication and security application domains. Selected domains where quantum resistant cryptography, quantum key distribution, quantum random number generation and future quantum networking may support secure communications, trusted systems and long-term network resilience. Non-exhaustive.

Domain	Use Cases	Sectors Served	Why it Matters
 Cryptographic Foundations	Post-quantum cryptography, quantum random number generation, QKD and quantum-secure authentication.	Government, finance, cloud, defense and systems with long life data.	Provides a foundation for protecting data and systems against future quantum enabled threats.
 Critical Infrastructure	Government and defense communications, banking and finance networks, telecom backbones, healthcare and energy systems.	Public sector, financial services, telecom, healthcare and utilities.	Failures in these systems can have systemic effects on national security, public services and the economy.
 Long Distance & Network	Satellite QKD, intercity fiber links, quantum repeaters and cross border secure links.	Telecom carriers, defense, government and multinational enterprises.	Extends quantum-secure links beyond local networks and supports hard to reach or geographically dispersed users.
 Future Quantum Internet	Distributed quantum computing, networked quantum sensing, multi party secure computation and blind quantum computing.	Research, defense and long horizon commercial use cases.	Provides a long-term vision for connecting quantum processors, sensors and memories into a network.

For Florida, the opportunity is to identify specific use cases where quantum secure or quantum resilient communications could strengthen defense, space, critical infrastructure and high assurance commercial systems, rather than treating quantum networking as a single deployable capability.

This is already beginning to take shape: in 2026, IonQ and Florida LambdaRail announced an agreement to support a statewide quantum-safe network initiative, with an intended first phase creating a nearly 100-mile quantum corridor from Palm Beach County to Miami-Dade using QKD over existing Florida LambdaRail fiber.³³

2.2.3 Quantum Sensing

Quantum sensing applies quantum effects to measurement. It includes atomic clocks, quantum magnetometers, gravimeters, inertial sensors, photon detectors and related devices that can measure time, magnetic fields, gravity, motion, light or temperature with very high precision. These capabilities are relevant to defense because they may support GPS independent navigation, submarine and underground detection, electronic warfare, space systems, geophysics and resilient timing networks.

Operational progress in this domain is more advanced than is often recognized. In 2024, the French Navy took delivery of a quantum gravimeter for seabed mapping.³⁴ In 2025, the UK Royal Navy reported live sea trials of quantum navigation technology³⁵ and Q-CTRL announced a

Table 6: Selected quantum sensing technologies and defense relevant applications. Overview of quantum-enabled sensors, indicative use cases and deployment constraints across timing, magnetic sensing, photon detection, gravity measurement, inertial navigation, RF sensing and temperature measurement. Non-exhaustive.

Technology	What it is	Where it Fits	Main Constraint
 Atomic Clocks	Timekeeping based on stable atomic transitions.	Telecom, finance, GPS, positioning, navigation and timing systems, and resilient national networks.	Size, cost, environmental hardening and deployment integration.
 Quantum Magnetometers	Sensors for weak magnetic fields using NV centers, optically pumped atoms or SQUIDs.	Medical imaging, geophysical surveys, undersea-domain awareness research and magnetic anomaly detection.	Noise, environmental interference, platform motion and system integration.
 Photon Detectors	Single photon level detection for optical and quantum systems.	Quantum communications, LiDAR, remote sensing, astronomy and space systems.	Efficiency, dark counts, cooling requirements and system integration.
 Quantum Gravimeters	Atom interferometers that measure small variations in gravity.	Underground mapping, civil engineering, resource exploration, navigation research and Earth observation.	Size, vibration isolation, field robustness and survey speed.
 Quantum Inertial Sensors	Atomic accelerometers and gyroscopes that measure motion without external signals.	GPS independent navigation for aircraft, submarines, spacecraft and autonomous systems.	Miniaturization, drift control and operation outside laboratory conditions.
 Quantum Electrometers	Sensors for weak electric or RF fields using Rydberg atoms or solid state defects.	RF sensing, spectrum monitoring, cyber physical monitoring and low noise communications.	Dynamic range, calibration, packaging and real-world interference.
 Quantum Thermometers	Temperature sensors using quantum states or solid state defects.	Cryogenic systems, semiconductor control, biomedical sensing and quantum hardware monitoring.	Calibration, packaging, stability and integration into operating systems.

Table 7: Quantum sensing application domains and sectors served. Selected defense relevant and dual use applications for quantum sensing across medical diagnostics, positioning, navigation and timing, space systems, and underground and remote sensing. Non-exhaustive.

Domain	Use Cases	Sectors Served	Why it Matters
 Imaging & Diagnostics	Brain imaging (MEG), cardiac sensing, biomedical monitoring and selected veteran health applications.	Healthcare, defense medicine, biotech and research hospitals.	Higher sensitivity and lower interference could improve early detection, monitoring and recovery assessment in clinical and defense medicine settings.
 Navigation & PNT	GPS denied navigation, inertial sensing, precision timing and strategic communications timing.	Defense, aviation, maritime, space and autonomous systems.	Provides alternatives to GPS dependent navigation and timing, improving resilience in contested, jammed or spoofed environments.
 Space & Aerospace	Satellite gravimetry, Earth observation, space surveillance, deep space navigation and astronomy.	Space agencies, defense, aerospace primes and scientific research.	Improves environmental awareness, orbital operations, navigation and mission assurance, with Florida relevant to payload integration and access to space missions.
 Underground & Remote Sensing	Mineral exploration, oil and gas mapping, submarine and undersea detection, and buried munitions detection.	Energy, mining, defense and environmental services.	Improved detection of gravity, magnetic and other weak signals could support undersea awareness, buried object detection, resource mapping and infrastructure monitoring.

maritime quantum navigation trial with the Royal Australian Navy.³⁶ The U.S. Space Force’s eighth X-37B mission, launched from Kennedy Space Center in August 2025, also included a quantum inertial sensor intended to support navigation in GPS-denied environments.³⁷

For Florida, the relevance lies in the fit between state assets and defense need. Space launch, maritime operations, aviation, resilient positioning and timing, and critical infrastructure protection all create pathways for quantum sensing pilots and partnerships.

2.3 Post-Quantum Cryptography and CNSA 2.0

Post-quantum cryptography migration is the most concrete near-term federal quantum requirement. The National Security Agency’s Commercial National Security Algorithm Suite 2.0 (CNSA 2.0) applies to National Security Systems and sets future requirements for quantum-resistant algorithms used in public cryptography. Its transition schedule is phased by technology category. Traditional networking equipment, including VPNs and routers, is expected to support and prefer CNSA 2.0 algorithms by 2026 and exclusively use them by 2030. Web browsers, servers, cloud services, operating systems, niche equipment and legacy applications have separate timelines, with NSA expecting the overall transition for National Security Systems to be complete by 2035.³⁸



INSIGHT

South Korea's Sector Based PQC Pilots

South Korea provides a useful example of how governments are beginning to operationalize post-quantum cryptography migration. In 2026, South Korea's Ministry of Science and ICT expanded its PQC pilot conversion program to telecommunications, finance, transportation, defense and space, following earlier pilots in energy, medical and administrative systems.³⁹ The aim is to apply PQC in real infrastructure settings, identify technical issues and develop repeatable migration procedures.

The relevance for Florida is the sector-based approach. Florida faces similar exposure across defense, space, transport, healthcare, finance and critical infrastructure. A state led PQC readiness program could follow the same logic: start with defined sectors, identify vulnerable systems, test migration approaches with willing operators and develop repeatable models for broader adoption.

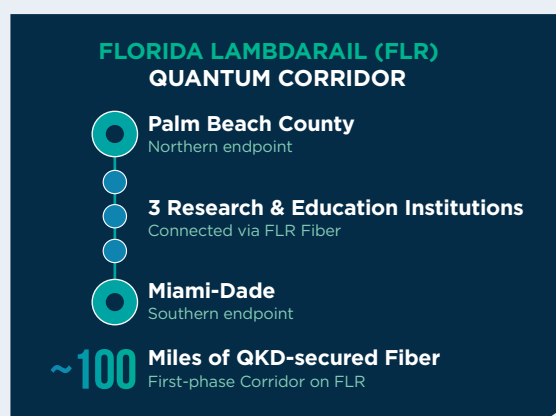


INSIGHT

Florida's First Quantum-Secure Corridor

Florida is beginning to see early movement in quantum-secure communications infrastructure. In April 2026, Florida LambdaRail (FLR) announced a Master Service Agreement (MSA) with IonQ for a planned QKD-secured corridor between Palm Beach County and Miami-Dade, using existing FLR fiber.³³

The initiative shows how Florida's research and education network could provide a practical testbed for quantum-secure communications, while leaving wider deployment dependent on funding, technical validation and stakeholder participation.



Florida Quantum-Safe Network Initiative

- **First phase:** a nearly 100-mile quantum corridor from Palm Beach County to Miami-Dade.
- **Network:** three research and education institutions connected over existing Florida LambdaRail fiber.
- **Technology:** IonQ quantum key distribution (QKD), intended to detect interception attempts and strengthen protection against future cyber threats.
- **Strategic relevance:** early real-world deployment of quantum-secure communications infrastructure on an existing statewide research and education network.
- **Scale potential:** the initial corridor could support wider deployment across Florida LambdaRail's statewide fiber network, subject to funding and stakeholder participation.

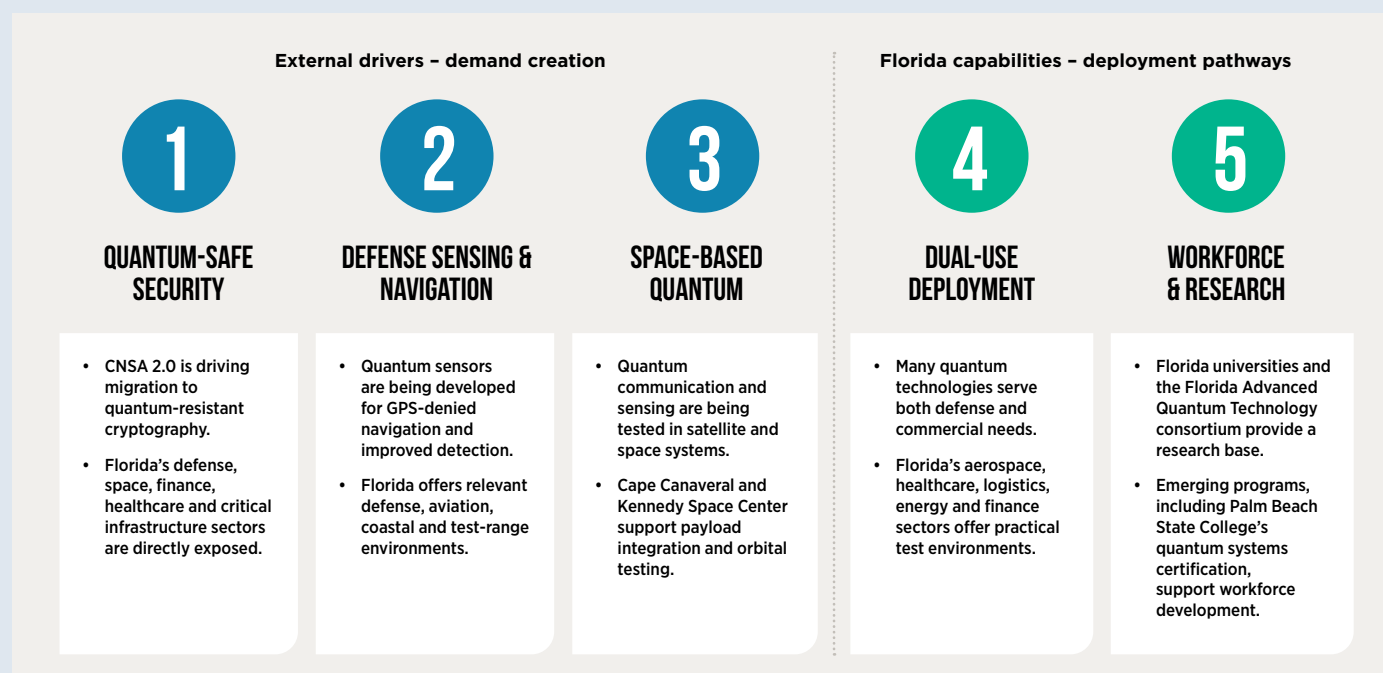


Figure 6: Strategic drivers and Florida capabilities shaping near-term quantum opportunities. Summary of external demand signals and state-level assets relevant to quantum-safe security, defense sensing and navigation, space-based quantum systems, dual-use deployment and workforce development.

Florida is directly affected by this transition because of its defense, space, critical-infrastructure, healthcare and financial-services footprint. The state hosts major defense and intelligence-relevant activity, a federal-contractor base, regulated healthcare providers, critical-infrastructure operators and a growing financial-services presence in South Florida. These organizations are not all directly covered by CNSA 2.0, but many will face adjacent pressure through federal contracts, procurement requirements, cybersecurity assurance, customer expectations and the need to protect data with long confidentiality lifetimes.

Post-quantum cryptography does not depend on future quantum-computing breakthroughs to create demand. The migration is already being driven by federal security timelines, procurement rules and the long lead time required to inventory, upgrade and validate cryptographic systems.

2.4 Florida's Emerging Quantum Position

The preceding sections show that quantum is moving from a research topic into a set of defense-relevant and dual-use transition pathways: post-quantum cryptography migration, quantum-secure communications, advanced sensing and navigation, and space-enabled systems. Florida does not need to compete across the full quantum stack to be relevant. Its opportunity lies where external demand signals intersect with state assets, including defense installations, launch infrastructure, aviation and maritime activity, critical infrastructure, research capacity and workforce development.

Figure 6 summarizes this logic. External drivers are creating demand for quantum capabilities, while Florida's existing assets provide potential environments for testing, integration and early deployment.

 INSIGHT

South Florida's Applied Quantum Computing Anchor

D-Wave's decision to move its corporate headquarters from Palo Alto to Boca Raton before the end of 2026 gives South Florida a visible quantum computing anchor.⁴⁰ The move is more than a corporate relocation: D-Wave has identified Boca Raton as a key U.S. R&D facility for its annealing quantum computing roadmap, with core research, testing and support functions expected to be housed at the Boca Raton Innovation Campus.

The parallel agreement to install an Advantage2 annealing quantum computer at Florida Atlantic University (FAU)'s Boca Raton campus, representing a \$20 million FAU commitment, strengthens the industry-university link. Together,

D-Wave's headquarters, its R&D presence and FAU's system create a practical platform for applied quantum computing in Florida.

The value for the state lies in use-case development rather than broad claims of quantum computing leadership. Quantum annealing and hybrid quantum-classical workflows are most relevant to optimization problems, including logistics, manufacturing, finance, transport, infrastructure and defense planning. This gives Florida a concrete entry point for engaging companies, public agencies and universities around real operational problems where applied quantum computing can be tested over time.

The same logic applies beyond defense. The highest-value quantum use cases are forming in sectors where Florida already has scale: finance, life sciences, aerospace and defense, transport and logistics, manufacturing and energy. Florida will not capture this value automatically, but it has credible environments for applied pilots, customer discovery and industry co-development. This is why the state's sector base should be treated as part of its quantum opportunity, not just as background economic context.

Florida also has a growing base of quantum-relevant activity across universities, research infrastructure, quantum and adjacent industries, public initiatives, workforce programs and capital. The current ecosystem is still distributed rather than fully integrated, but that is also the opportunity: with clearer links between research, testing, commercialization and defense or dual-use adoption pathways, Florida could turn existing assets into a more coherent quantum ecosystem. One early signal of ecosystem formation is the emergence of a South Florida applied quantum computing anchor.

The broader ecosystem is still distributed across universities, research infrastructure, quantum and adjacent industries, public initiatives, workforce programs and capital. The market map below shows selected actors across this emerging ecosystem.

The market map reinforces the central point that Florida has the ingredients for a quantum ecosystem, but they are unevenly connected. The state's near-term opportunity is to turn visible anchors such as D-Wave, FAU's quantum computing investment, FAQT coordination activity, university research groups, infrastructure assets and workforce programs into a more coherent system. That system will need to link research, companies, public agencies, capital and end users around practical use cases. The defense sector is one of the clearest places to begin, because it combines urgent demand, federal funding, operational test environments and strong alignment with Florida's existing assets.



Figure 7: Florida Quantum Ecosystem Map. Overview of selected Florida actors across the quantum value chain, including academic research, quantum industry, capital, government programs, research infrastructure, workforce development and adjacent industry players. Non-exhaustive.

INSIGHT

Quantum Coast Capital: Specialist Capital on Florida's Quantum Coast

Quantum Coast Capital is a Palm Beach County-based investment firm founded in 2024 to back early-stage quantum technology companies across sensing, networking, hardware, post-quantum security and applications.

Its significance is that quantum investing requires specialist understanding. Investors need to assess technical risk, long development cycles and the pathway from research capability to deployable systems, not just conventional market potential.

The firm has also helped convene Quantum Beach 2025 and signed an MOU with the Florida Opportunity Fund to support quantum investment and innovation in the state.

For Florida, Quantum Coast Capital is an early signal that a specialist capital layer is beginning to form around the state's quantum ecosystem.

QUANTUM AND THE DEFENSE SECTOR

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3. QUANTUM AND THE DEFENSE SECTOR

Quantum technologies are becoming relevant to defense because they address practical mission needs: secure communications, cryptographic resilience, GPS-denied navigation, advanced sensing, space operations and future computing advantage. The defense opportunity is not uniform across the quantum stack. Some areas, particularly post-quantum cryptography, quantum-secure communications and positioning, navigation and timing, are already moving into procurement, trials and early deployment. Others, including many quantum computing and advanced sensing applications, remain earlier-stage but strategically important.

Florida's defense economy, launch infrastructure, test ranges, maritime operating environment, federal-contractor base and research assets create credible pathways for quantum technologies to be tested and integrated in operationally relevant settings. The question is where these assets align with concrete defense demand, and where focused action could give the state a clearer role in the national quantum-defense landscape.

3.1 Quantum Defense is Moving Beyond Research

Quantum defense remains uneven, but it is no longer confined to laboratories. Evidence reviewed for this study identified 130 active defense-relevant or quantum-secure programs across 25 countries. The sample is illustrative rather than exhaustive, but it shows a clear pattern: 15% of identified programs are deploying or operationally fielded, 64% are tied to a real platform and nearly three-quarters were launched since 2022. This points to a shift from general research toward trials, contracts and early fielded capability.



INSIGHT

From Demonstration to Operational Use: France's Quantum Gravimeter

A useful example of quantum defense moving beyond research is the French Navy's adoption of a quantum gravimeter for seabed mapping.³⁴ In 2024, the French Navy took delivery of its first serial-produced quantum-technology sensor: a quantum gravimeter developed through France's defense innovation and industrial base. The system is relevant because gravimetry can support seabed mapping and, over time, may contribute to navigation or undersea detection applications where GPS is unavailable or unreliable.

The significance for Florida is not the specific French system, but the maturity signal. Quantum sensing is beginning to move from laboratory research into naval, maritime and operational environments. That matters for Florida because the state has maritime infrastructure, naval activity, test ranges, launch assets and coastal operating conditions that could support similar pathways for sensing, PNT, undersea awareness and infrastructure monitoring.

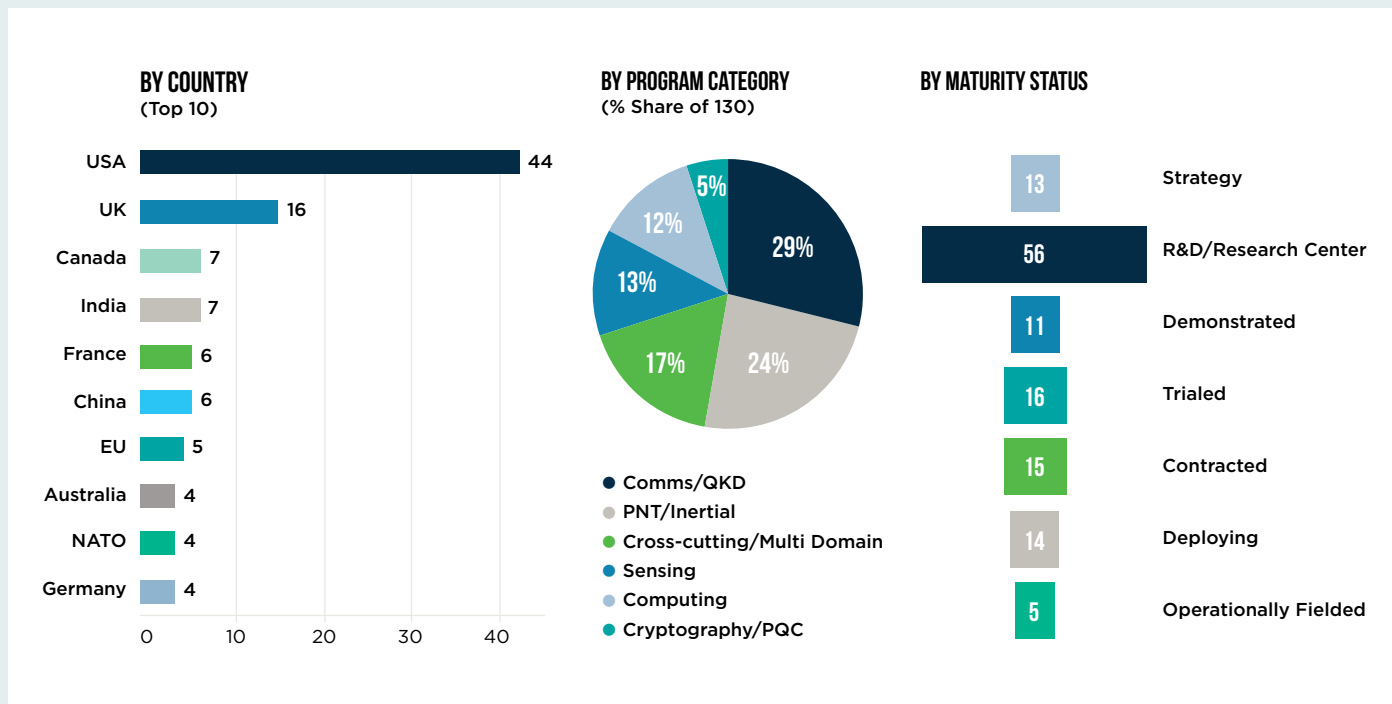


Figure 8: Defense-relevant quantum activity by country, technology area and maturity status. Analysis of an illustrative sample of 130 defense-relevant or quantum-secure programs across 25 countries, showing the top 10 countries by program count, technology mix as a share of the sample and maturity progression from strategy to operational fielding. Non-exhaustive.

Note: Cross-cutting and multi-domain initiatives include strategy, coordination, infrastructure and mixed-technology programs. They should not be interpreted as a single deployable technology category.

Figure 8 summarizes this pattern across three dimensions: where activity is concentrated geographically, which technology areas are attracting the most defense-relevant activity and how far programs have progressed toward fielding.

The distribution shows where defense demand is strongest. Communications and QKD account for the largest share of identified activity (29%), followed by positioning, navigation and timing (PNT) and inertial sensing (24%). Together, these two categories account for just over half of the sample, reflecting near-term demand for secure networks, quantum-safe communications and GPS-independent navigation. Cross-cutting and multi-domain initiatives account for a further 17%, but these often reflect coordination, strategy or infrastructure activity rather than a deployable technology.

The maturity profile remains mixed. Many programs are still in research, demonstration or early coordination, but a smaller and strategically important share has moved into trials, contracting, deployment or operational use.

For Florida, the signal is the movement from research toward platform-linked testing and integration. This is where the state's defense infrastructure, launch assets, test ranges, maritime environment and communications networks can create practical value.

The year-by-year trend reinforces the same point. Identified program starts rose from 9 in 2022 to 31 in both 2024 and 2025, showing a sharp increase in defense-relevant quantum activity. The 2026 count is partial, but contracted entries already appear in the sample, suggesting that momentum is continuing rather than tapering off. This trend is illustrated in Figure 9.

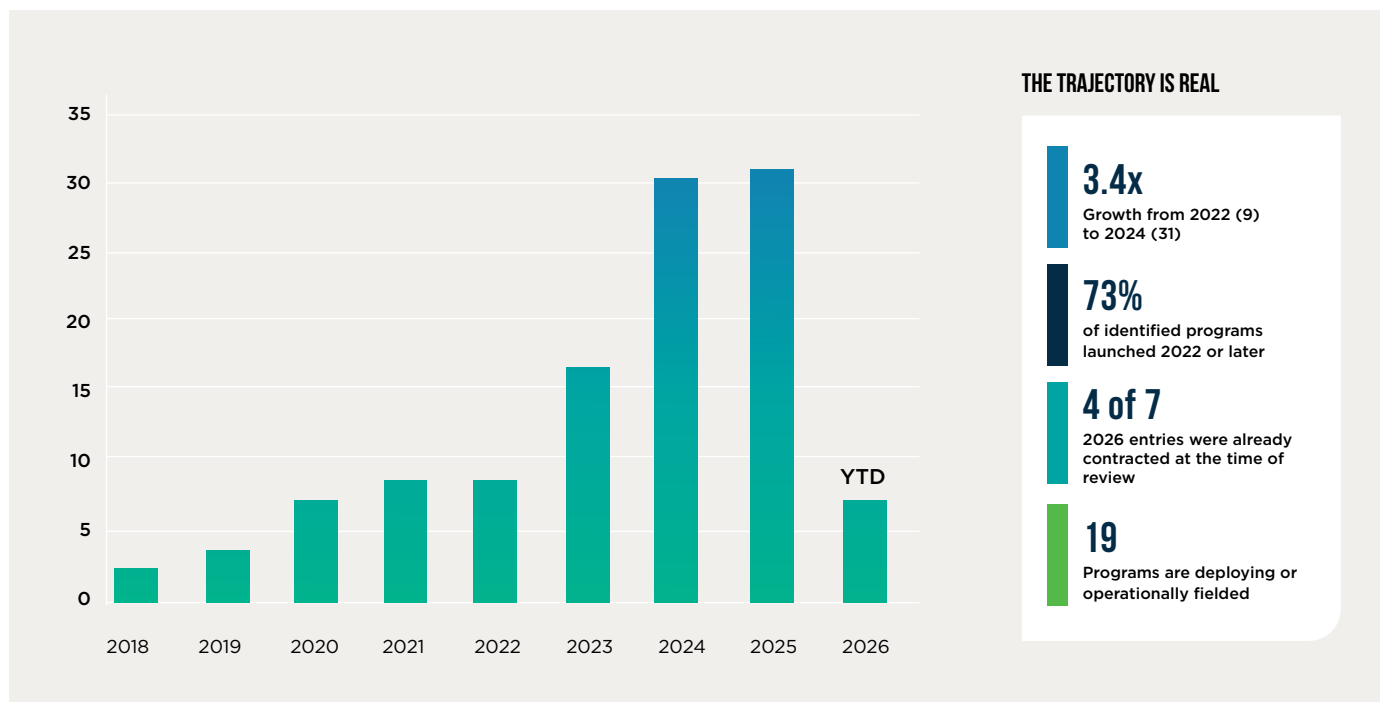


Figure 9: Growth in identified defense-relevant quantum programs, 2018 to 2026. Annual launch counts from an illustrative sample of 130 defense-relevant or quantum-secure programs. The 2026 count is year-to-date (YTD).

3.2 The U.S. Defense Quantum Landscape

The United States accounts for the largest share of identified defense-relevant quantum activity in the evidence sample, but the activity is not evenly distributed across the country. It is concentrated around federal agencies, national laboratories, major defense contractors and states with established quantum or defense R&D infrastructure.

Within the U.S. sample, activity is led by a small number of federal anchors, including DARPA, the National Security Agency (NSA), the Air Force Research Laboratory (AFRL), the Army Research Laboratory (ARL), the Naval Research Laboratory (NRL), the Defense Innovation Unit (DIU) and the Department of Energy (DOE) national laboratory system. These organizations shape the national opportunity landscape because they fund early-stage research, set security requirements, create test and evaluation pathways and determine where promising technologies move toward procurement or operational use.

The U.S. sample also shows that activity is clustered by state and technology area. The heatmap below is not a full census: darker cells indicate more identified programs in the evidence sample. Florida appears in the sample under PNT and communications, but these entries should be read carefully. The PNT entry reflects Florida's role as the launch and operational access point for the X-37B Mission 8 quantum inertial sensor demonstration. It does not indicate confirmed in-state development of the sensor itself. The communications entry reflects the planned Florida LambdaRail QKD corridor and is therefore a stronger signal of emerging in-state quantum-secure networking activity.

For Florida, the priority is alignment. The state does not need to originate every defense quantum program, but it does need clearer pathways into federal mission priorities. Its strongest opportunities are likely to come through partnerships that connect universities and companies with federal agencies, defense primes, test ranges, installations and infrastructure operators. The value lies in turning Florida's existing research, defense and infrastructure assets into credible environments for testing, integration and operational validation.

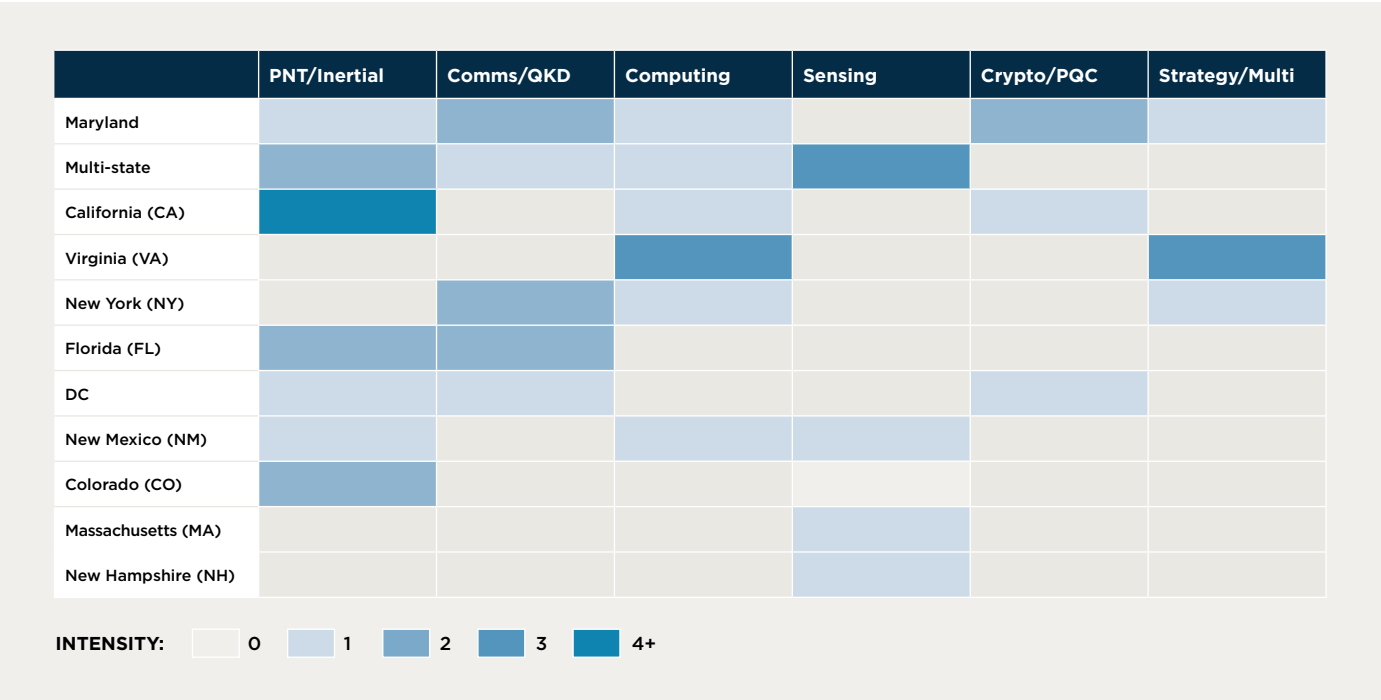


Figure 10: Relative concentration of identified U.S. defense-relevant or quantum-secure programs by state and program category. Darker cells indicate more programs in the evidence sample. Based on an illustrative sample of 44 U.S. programs within the wider 130-program evidence base. Non-exhaustive.

3.3 Florida’s Defense Foundation

Florida has one of the largest defense economies in the United States. The 2024 Florida Military and Defense Economic Impact Summary reports a statewide defense economic impact of \$102.6 billion, equivalent to 7.3% of Florida’s economy, supporting 865,937 direct and indirect jobs.¹³

The state’s military infrastructure is broad and operationally diverse. Florida hosts three unified combatant command headquarters, the military’s only East Coast space launch facility, two of the country’s four deep-water naval ports with adjacent airfields, the Eastern Gulf Test and Training Range and several research, development, training and evaluation centers. Florida also ranks fourth in defense spending and fifth in DOD personnel.⁴¹

This matters for quantum because the most defense-relevant near-term applications require more than laboratory capability. GPS-denied navigation, secure communications, quantum sensing, space payloads and cryptographic migration all require test environments, operational use cases, integration partners and

procurement pathways. Florida’s defense base provides several of these conditions, particularly through its launch infrastructure, ranges, maritime facilities, aviation activity and concentration of defense contractors.

3.4 Where Florida Can Compete

Florida’s defense foundation does not automatically create a quantum-defense cluster. The opportunity lies in selected areas where national defense demand, technology maturity and Florida assets overlap.

The evidence reviewed for this study points to six priority areas: post-quantum cryptography implementation, GPS-denied PNT and maritime sensing, quantum-secure communications and QKD, space-based quantum systems, RF and electronic-warfare sensing, and defense quantum computing access. These should be treated differently: some are near-term implementation or deployment opportunities, while others are positioning plays for future federal programs.

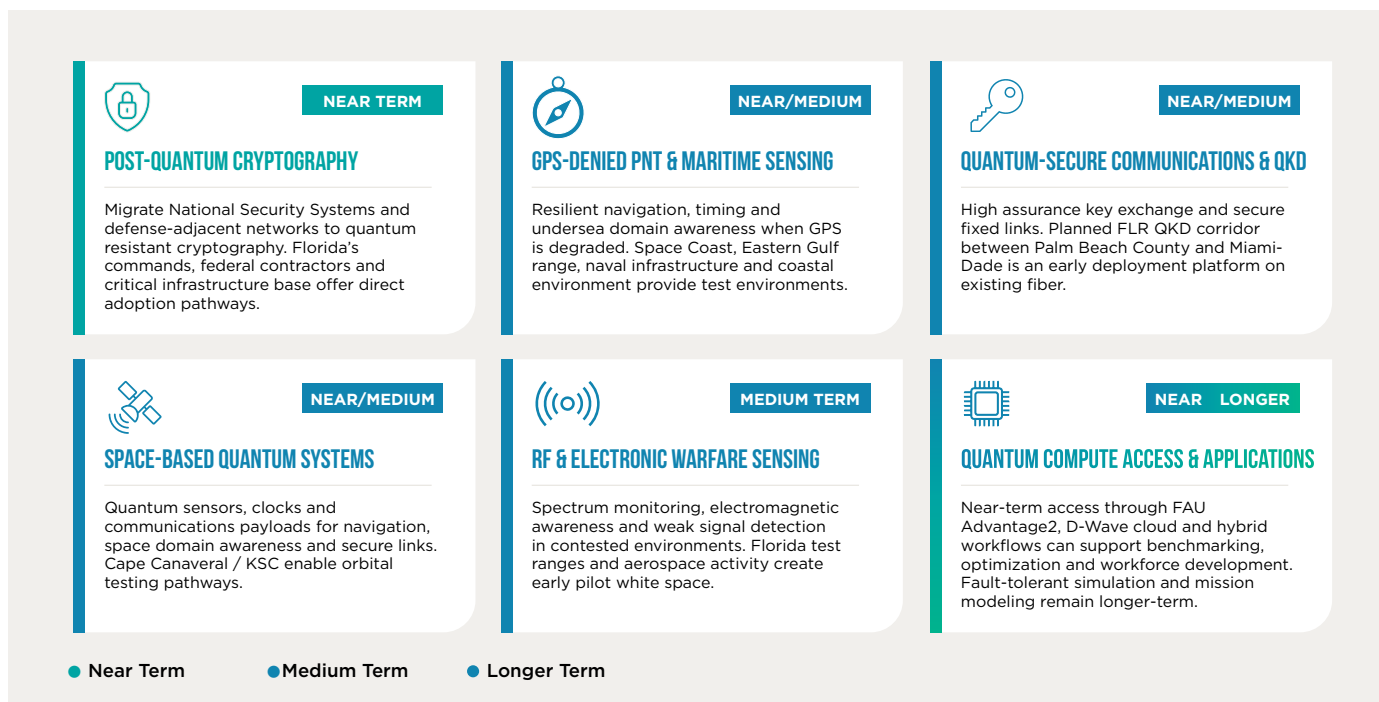


Figure 11: Priority defense quantum opportunity areas for Florida. Selected areas where national defense demand, technology maturity and Florida assets overlap. Time horizons distinguish near-term implementation opportunities, near-to-medium-term sensing, communications and space-system pathways, and quantum computing opportunities that range from near-term applied access to longer-term fault-tolerant applications.

“Florida’s massive defense and space industrial base creates a natural demand pull for quantum technology, especially for sensing and simulation. SOCOM and AFSOC are key early adopters of new tech.”

– Venture capital investor and ecosystem convener

The time horizon for quantum computing should be read carefully. Access to quantum compute is already a near-term entry point, particularly through cloud platforms, hybrid workflows and the FAU D-Wave Advantage2 system. This makes applied optimization and algorithm development relevant now for logistics, manufacturing, finance, transport and selected defense planning problems. The longer-term opportunity is different: high value fault-tolerant applications in areas such as advanced simulation, cryptographic risk and complex mission modeling. Florida should therefore keep quantum computing active as a near term applied lane while treating fault-tolerant computing applications as a longer-term strategic position.

The common thread across these opportunity areas is that Florida’s advantage is not only technical. It is the ability to connect research, defense demand, infrastructure, capital and industry around use cases that can be tested in operationally relevant settings. Florida already has strong pockets of activity, but the state needs a clearer mechanism to coordinate early adopters, align them with federal mission priorities and move promising technologies from demonstration toward adoption.



Figure 12: Florida's Space ecosystem relevant to quantum deployment. Selected government, launch, industrial and adjacent space assets that could support quantum sensing, PNT, secure communications and payload-testing pathways. Non-exhaustive.

Florida's space ecosystem is one of the state's clearest routes into defense-relevant quantum activity. Launch infrastructure, Space Force presence, aerospace companies and adjacent suppliers create conditions for payload integration, orbital testing and mission-focused demonstrations.

Florida's opportunity is to capture more of the technology stack while also providing the launch, test and integration environment needed to move selected quantum systems from demonstration toward operational use.

Testbeds will be important, but they will not be sufficient on their own. If Florida only provides locations for external companies to test technologies, it risks becoming a temporary

proving ground rather than a durable quantum economy. The stronger model is to pair testbeds with commercialization support, supplier development, workforce pipelines and incentives that help successful pilots translate into Florida-based activity.

Workforce cuts across all opportunity areas. Near-term demand is not limited to quantum physicists. Defense-relevant quantum programs also require enabling skills in cryogenics, photonics, RF engineering, systems integration, software, controls and test engineering. Florida's universities are therefore important not only for research, but also as sources of the highly technical workforce needed to support future defense quantum programs.

A related challenge is the gap between research strength and deployable capability. Florida's universities can generate valuable intellectual property, but defense-relevant impact will depend

on mechanisms that help researchers and startups move from proof of concept toward engineered prototypes, customer validation and procurement-ready solutions. This is especially important for quantum technologies, where the difficult middle stage between laboratory validation and commercial adoption often determines whether an idea becomes a usable system.

For Florida, the practical requirement is coordination. The state needs a platform that can connect universities, defense firms, installations, infrastructure operators, investors and federal agencies around specific use cases. To be effective, it must identify early adopters, support rapid prototyping, track measurable outcomes and create routes from pilot activity to procurement, commercialization or follow-on federal funding.

The defense lens therefore leads naturally into a broader dual-use argument. Many of the same capabilities that matter for defense, including secure communications, resilient PNT, advanced sensing, optimization and high-performance computing, also apply to agriculture, energy, healthcare, logistics and critical infrastructure.

Florida's advantage lies in using defense demand as an anchor while building dual-use deployment pathways across sectors where the state already has operational scale.

QUANTUM-DEFENSE IS REAL

3.4x

Growth from 2022 (9)
to 2024 (31)

73%

of identified programs
launched 2022 or later

4 OF 7

2026 entries were already
contracted at the time of review

15%

of identified programs deploying
or operationally fielded

DUAL-USE DEPLOYMENT PATHWAYS IN FLORIDA

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4. DUAL-USE DEPLOYMENT PATHWAYS IN FLORIDA

4.1 From Sector Assets to Deployment Pathways

Florida's strongest quantum opportunities are likely to emerge where sector demand, public infrastructure and defense relevance overlap. The state has operational scale in ports, aviation, manufacturing, healthcare, energy, agriculture, finance, public safety and critical infrastructure. These sectors provide practical settings where selected quantum technologies could be tested, piloted or adopted over time.

In this report, "testbed" is used in two related but distinct ways:

- **Demand-side testbeds:** operational environments where quantum relevant technologies can be tested against real problems, such as ports, defense ranges, health systems, logistics networks, utilities and public safety systems.
- **Supply-side testbeds:** the research, computing, networking, fabrication and validation assets that allow technologies to be developed, accessed and assessed.

Analysis by McKinsey of global quantum computing use cases points to the largest potential value in energy and materials, finance, pharmaceuticals, advanced industries, including aerospace and defense, and travel, transport and logistics.

Florida has both: a broad set of operational environments and a set of specialist infrastructure assets that can support testing, validation and early deployment.

The market opportunity is uneven by sector. Analysis by McKinsey of global quantum computing use cases points to the largest potential value in energy and materials, finance, pharmaceuticals, advanced industries, including aerospace and defense, and travel, transport and logistics. Together, these sectors account for much of the estimated \$1.3 trillion to \$2.7 trillion in industry value at stake by 2035.²² These figures should not be read as precise forecasts or as Florida specific estimates. They are useful because they show where demand is likely to form, and why Florida's ports, logistics networks, manufacturing base, healthcare systems, financial services, utilities and defense assets are relevant test environments.

The use cases also differ in maturity. Post-quantum cryptography, selected optimization applications and some quantum-secure communications use cases are nearer-term implementation opportunities. Quantum sensing for healthcare, infrastructure, agriculture and environmental monitoring has strong potential, but adoption will depend on evidence generation, engineering maturity, workflow integration, procurement readiness and a clear case for value over existing approaches. Quantum simulation for drug discovery, materials and advanced manufacturing remains a longer-term capability area.

Figure 13 summarizes this logic. Florida's existing foundations provide practical settings for sector-specific deployment pathways, which can in turn support broader outcomes in resilience, productivity, cybersecurity and workforce development.

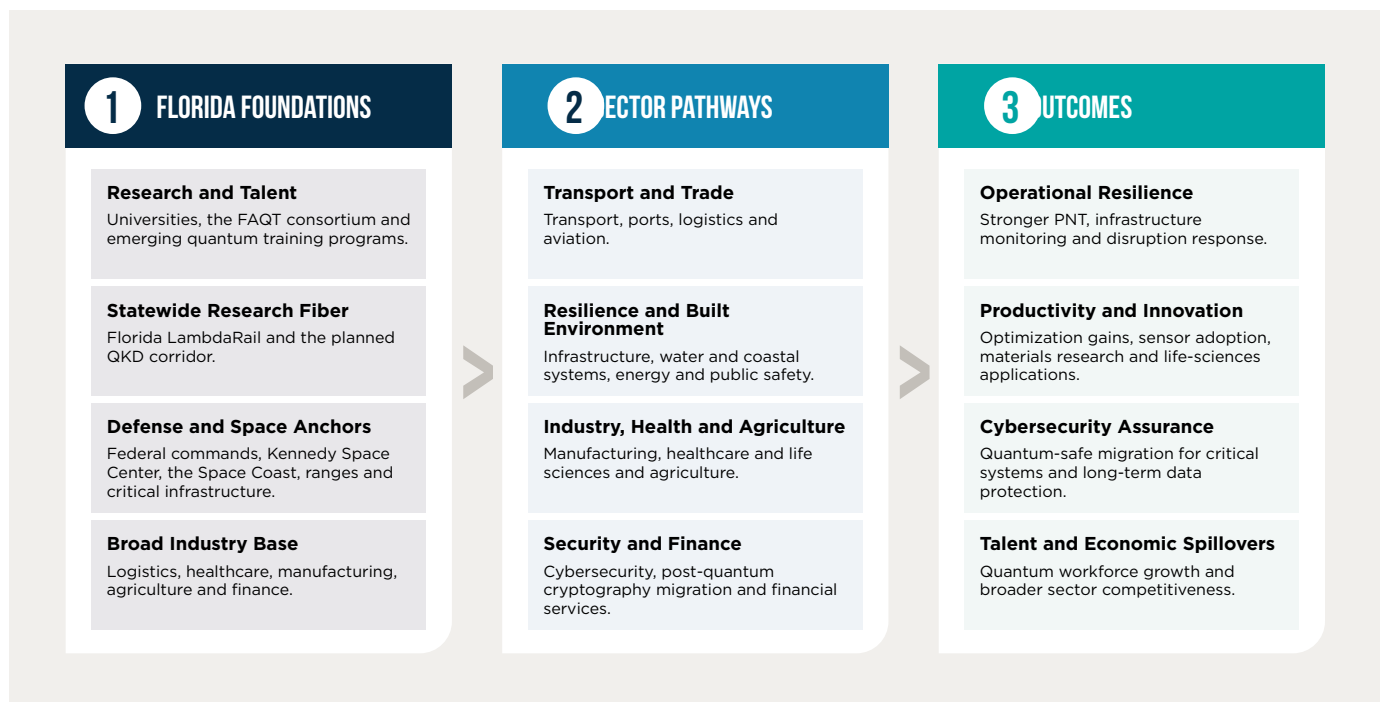


Figure 13: Logic model for Florida's dual-use quantum deployment pathways. Summary of how Florida's research, infrastructure, defense and industry foundations can support sector-specific quantum deployment pathways and broader state outcomes.

4.2 Transport, Ports, Energy and Critical Infrastructure

Florida's transport, ports, energy and critical-infrastructure systems create one of the clearest environments for quantum-relevant pilots because they combine scale, complexity and operational pressure. The state's seaports, airports, highways, utilities and logistics networks move people, freight, energy and data through one of the largest economies in the United States. These systems are also exposed to congestion, hurricanes, cybersecurity risk, infrastructure stress and recovery requirements after disruption.

The strongest use cases are operational. Ports need to move cargo and passengers through constrained terminals. Transport agencies need to model evacuations, improve safety, optimize corridors and manage traffic flows. Utilities and infrastructure operators need to monitor assets, secure operational technology and restore services quickly after storms or other incidents. These are routing, scheduling, asset-allocation, sensing and cybersecurity problems that matter to commerce, public safety, defense mobility and critical-infrastructure continuity.

The near-term opportunity is to build the data, connectivity and pilot infrastructure needed to test advanced optimization, sensing and cybersecurity tools against defined problems. PortMiami and the Florida Department of Transportation (FDOT) illustrate the point from different angles: PortMiami shows the pressure of constrained land, cargo movement, cruise traffic and terminal coordination, while FDOT reflects the scale of statewide mobility, safety and evacuation challenges. Quantum should enter through well-defined pilots with specific users, usable data, agreed performance measures and a realistic path from test to adoption.

PortMiami⁴² provides a practical example. The port operates on a 520-acre man-made island and handles ~1 million TEUs of cargo containers and ~9 million cruise passengers annually. Its physical footprint is constrained, while cargo and cruise activity interact on the same site. This creates pressure around congestion, cargo visibility, vehicle flows, terminal coordination and use of existing infrastructure. PortMiami is already piloting AI tools using camera infrastructure to classify vehicle types, identify congestion points

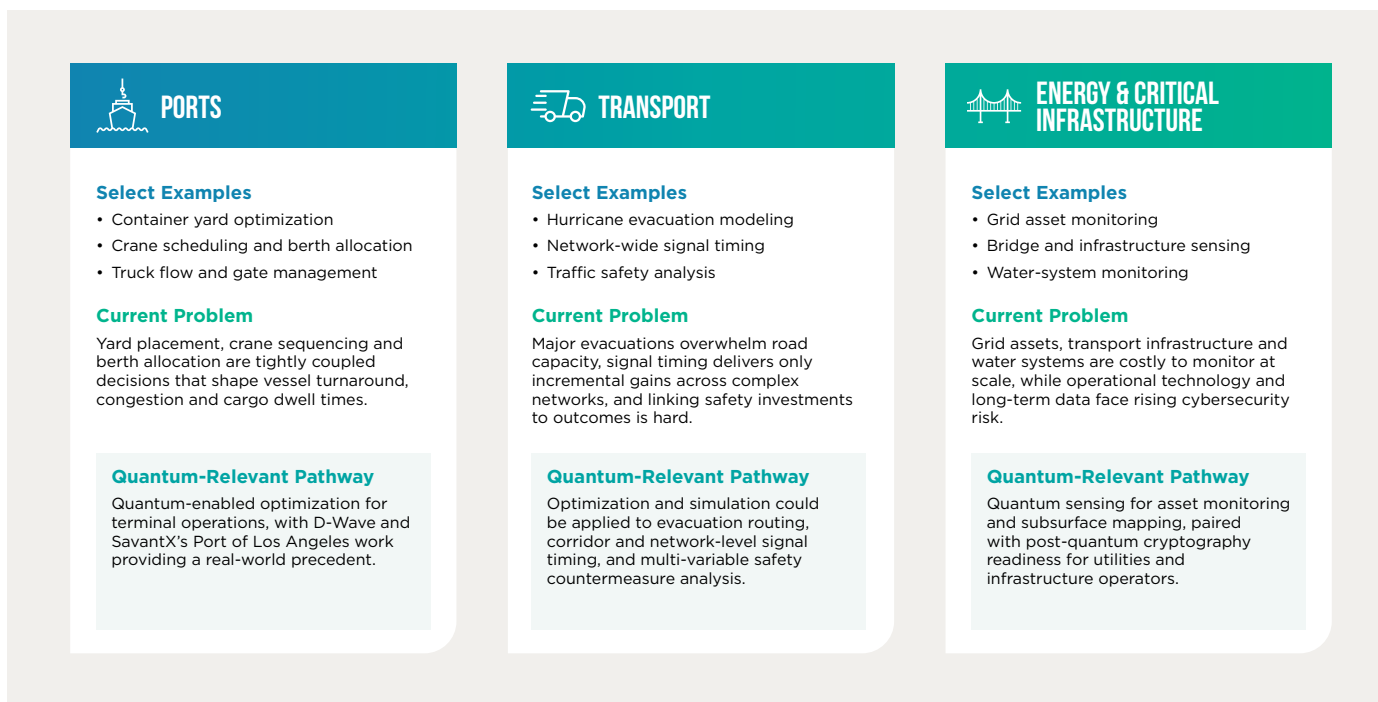


Figure 14: Illustrative Transport, Port and Critical Infrastructure Use Cases for Quantum in Florida. Selected operational problems where quantum-enabled optimization, quantum sensing or quantum-secure systems could be tested against current methods.

and understand the interaction between cargo and cruise traffic. The immediate barrier is not demand, but the digital infrastructure needed to turn port activity into usable operational data: stronger connectivity, wider sensor coverage, data standardization and a centralized data hub.

The same logic applies beyond ports. Transport corridors, utilities, water systems and communications networks all depend on secure operational technology, reliable data flows and rapid recovery after disruption.

Energy and critical infrastructure add a further layer. Utilities, grid assets, power generation, water systems, communications networks and transport infrastructure all face long-term cybersecurity and resilience challenges. The most concrete near-term pathway is post-quantum cryptography readiness: identifying where quantum-vulnerable cryptography is embedded, assessing long-term data and system risk, engaging vendors and testing migration approaches. In parallel, sensing and optimization pilots may be relevant for asset inspection, grid management, infrastructure monitoring, storm recovery and resilience planning.

“PortMiami is a 520-acre man-made island handling 1 million TEUs of cargo and 8.6 million cruise passengers a year – the cruise capital of the world... We cannot grow physically. That space constraint is the single biggest driver of our need for innovation.”

– Major seaport operator



Figure 15: Florida Transport, Ports, Energy and Critical Infrastructure Market Map. Selected ports, logistics, utility and infrastructure assets relevant to quantum optimization, secure communications, post-quantum cryptography migration, sensing and resilience applications. Non-exhaustive

Florida should treat this pathway as a staged deployment opportunity. The first stage is to strengthen the data, connectivity and cybersecurity foundations that ports, transport agencies and infrastructure operators already need. The second is to select a small number of operational problems where advanced optimization, sensing or quantum-safe security can be tested against current approaches.

The aim is not to apply quantum everywhere, but to use Florida's logistics and infrastructure systems as practical settings for focused pilots with clear users, measurable outcomes and a route to adoption.

4.3 Healthcare, Biotech and Life Sciences

Florida's healthcare, biotech and life-sciences base give the state several routes into quantum-enabled health innovation. Relevant opportunities include specialist sensing for diagnostics and monitoring, secure handling of sensitive clinical data, quantum-enabled biomedical research and longer-term simulation for drug discovery and personalized medicine.

However, the nearer-term opportunity is more credible in quantum sensing, diagnostics, secure clinical data and translational research, because these align more directly with the state's health systems, medical-device base and clinical research capacity.

Quantum sensing is likely to offer the clearest near-term to medium-term healthcare pathway because it connects to existing needs in diagnostics, monitoring and medical imaging. Florida can position its health systems, universities and medical-technology companies to engage with emerging technologies as they mature, rather than waiting for fully established clinical markets to form elsewhere.

The strategic value of quantum sensing is that it could change where and how some healthcare measurements are made. More sensitive, compact and lower-infrastructure sensors could move selected diagnostics and monitoring away from large specialist systems and closer to patients, including community clinics, mobile facilities and potentially home-based settings. This matters because earlier detection, more continuous monitoring and easier access to diagnostics could support a shift from late intervention toward prevention, treatment planning and longer-term condition management.

Relevant technologies being developed internationally include optically pumped magnetometer magnetoencephalography (OPM-MEG),⁴³ bulk NV diamond magnetometry,⁴⁴ SPAD-enabled optical diagnostics and photon-counting imaging.⁴⁵ These technologies are at different levels of maturity. Some are already used in research settings, while many next-generation quantum sensing technologies still need clinical evidence, regulatory approval, procurement and reimbursement routes, and integration into care pathways before wider adoption.

Potential use cases include brain imaging for epilepsy and dementia, cardiac sensing, specialist diagnostics, point-of-care monitoring and selected cancer applications. Globally, OPM-MEG is being developed for high-resolution brain imaging without cryogenic cooling, while bulk NV diamond technologies are being explored for magnetoencephalography, magnetocardiography and cancer applications.

At the University of Florida, researchers are developing a possible laparoscopic application for bulk NV-diamond cancer sensing, although the route to adoption still depends on prototype development, preclinical validation, regulatory engagement and clinical approval.

The market map below shows the breadth of Florida's healthcare, biotech, diagnostics, research and supply-chain base that could support these pathways.

For Florida, the strongest route is translational piloting rather than broad clinical deployment.



Figure 16: Wearable OPM-MEG System Developed by Cerca Magnetics. Optically pumped magnetometer magnetoencephalography systems use cryogen-free quantum sensors to measure brain activity in more flexible, patient-friendly settings than conventional MEG systems. **Image:** Cerca Magnetics, UK.

Florida can position its health systems, universities and medical-technology companies to engage with emerging technologies as they mature, rather than waiting for fully established clinical markets to form elsewhere.



Figure 17: Florida Healthcare, Biotech and Life Sciences Market Map. Selected healthcare providers, pharma and biotech firms, device and diagnostics companies, research institutions and supply-chain actors relevant to potential quantum applications in sensing, diagnostics, secure data, biomedical modeling and longer-term drug discovery. Non-exhaustive.

Pilots should start with defined clinical or operational needs, then bring together health systems, universities, clinical researchers and medical-technology companies to test whether quantum sensing or secure data infrastructure can add value in realistic settings. Priority areas include epilepsy and dementia-related brain imaging research, cardiac monitoring, specialist diagnostics, selected cancer-sensing pathways and secure clinical-data infrastructure. Over time, more portable and sensitive sensing technologies could also support a shift in care models, moving selected diagnostics and monitoring from specialist hospital settings into community or home-based environments.

Drug discovery and personalized medicine remain part of the opportunity set, but they are longer-term. Quantum computing may eventually support molecular simulation, compound screening and biomedical modeling, while the nearer-term value for Florida is likely to come from partnerships, research access, clinical data readiness and workforce capability.

Quantum for Healthcare should be treated as a staged pathway: translational pilots first, followed by clinical evidence, regulatory engagement, procurement planning and broader adoption where the case for value is clear.

DEFENSE PRIMES	AVIATION & AIRCRAFT	SPACE & SATELLITES	SEMICONDUCTORS, PHOTONICS & ELECTRONICS
Lockheed Martin Ocala · Pinellas Park RTX / Raytheon Largo L3Harris Technologies Palm Bay Northrop Grumman Melbourne Panama City BAE Systems Jacksonville	Embraer Melbourne · Jacksonville Pratt & Whitney West Palm Beach Sikorsky West Palm Beach GE Aerospace Jacksonville Pensacola Piper Aircraft Vero Beach	Blue Origin Merritt Island SpaceX Kennedy Space Center · Cape Canaveral Airbus OneWeb Satellites Merritt Island Boeing Space & Launch Titusville Redwire Jacksonville L3Harris-Aerojet West Palm Beach	SkyWater + BRIDG NeoCity, Osceola imec USA NeoCity Jabil St. Petersburg Luminar Technologies Orlando Plasma-Therm St. Petersburg
MEDICAL DEVICES	PHARMA & LIFE SCIENCES	POWER & PROPULSION	MARINE & SHIPBUILDING
Johnson & Johnson Vision Jacksonville Bausch + Lomb Tampa Arthrex Naples · Ave Maria Medtronic Jacksonville Beckman Coulter Miami	ADMA Biologics Boca Raton B. Braun Medical Daytona Beach Catalent Tampa Bay · St. Petersburg Thermo Fisher Scientific Miami · Alachua	GE Vernova Pensacola Siemens · Mitsubishi Lake Mary Jupiter Bach Pensacola Aero propulsion OEMs West Palm Beach · Jacksonville Hanwha (PSM) Jupiter Chromalloy Palm Beach Gdns.	Eastern Shipbuilding Group Panama City · Allanton Brunswick Merritt Island · Edgewater BAE Systems Jacksonville Fincantieri Marine Repair Jacksonville Tampa Ship Tampa

Figure 18: Florida Manufacturing and Industrial Sector Map. Illustrative map of selected manufacturing and industrial companies with Florida operations across defense, aviation, space, electronics, medical devices, life sciences, power systems and marine manufacturing. Non-exhaustive.

4.4 Manufacturing, Materials and Industrial Systems

Florida's manufacturing and industrial base creates another route for quantum technologies, particularly in sectors where advanced materials, aerospace systems, photonics, electronics, medical devices and defense manufacturing require high-precision design, testing and production.

Florida is already a significant manufacturing state: according to Florida TaxWatch, manufacturing output grew from \$42.1 billion in 2014 to \$80.7 billion in 2024, and the sector supports more than 430,000 jobs.⁴⁶ The next priority is productivity, including wider adoption of advanced technologies across the manufacturing base.

Market analysis points to future quantum computing opportunities in energy and materials, advanced industries, semiconductors, aerospace and defense, and chemicals. These are not Florida-specific forecasts, but they align with the state's manufacturing base in aerospace, defense, electronics, medical devices, marine manufacturing and advanced materials. The most

relevant applications are productivity related: workflow optimization, production planning, inventory management, supplier coordination, maintenance planning, materials design, process optimization and quality assurance.

For Florida manufacturers, this creates three practical areas of opportunity:

- **Optimization:** production scheduling, inventory management, supplier coordination and maintenance planning.
- **Sensing and inspection:** precision measurement, non-destructive testing, process monitoring and quality assurance.
- **Longer-term simulation:** materials design, advanced packaging, thermal management and biomedical materials.

A manufacturing precedent is BASF's 2025 work on quantum approaches to manufacturing workflow efficiency.⁴⁷ This should be treated as early industrial exploration rather than proof of broad quantum adoption, but it points to practical problems such as workflow optimization, production planning, inventory coordination

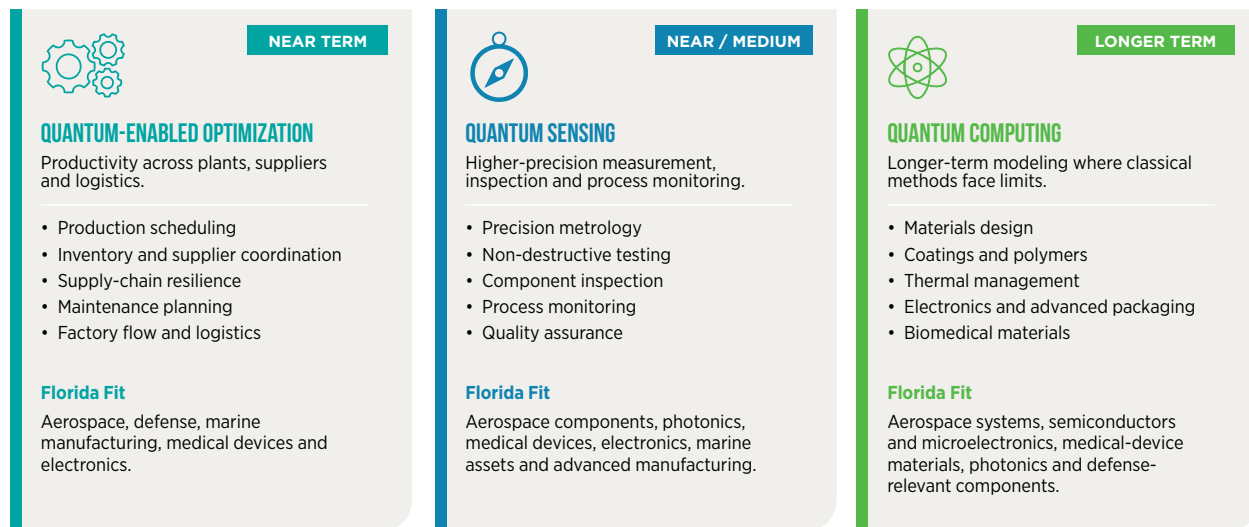


Figure 19: Manufacturing, Materials and Industrial Quantum Use Cases for Florida. Illustrative applications where optimization, sensing and longer-term quantum computing could support Florida's aerospace, defense, marine, electronics, medical-device and advanced manufacturing base. Non-exhaustive.



INSIGHT

Quantum Supply Chain and Enabling Components

Quantum technologies depend on specialist components and materials as much as finished systems. Key inputs include low temperature systems, helium 3, lasers, photonics, RF and microwave hardware, vacuum systems, quantum grade materials, control electronics, packaging, test equipment and specialist fabrication capability.

For Florida, the opportunity is not to supply every part of the quantum hardware stack. The more practical route is to identify where the state already has capability in enabling technologies. Relevant areas include cryogenics and low temperature engineering, photonics and optical components, RF and microwave systems, silicon

carbide, diamond, superconducting materials, wide bandgap semiconductors, advanced packaging, metrology and reliability testing.

This matters for defense and space as well as commercial deployment. Secure communications, resilient PNT, RF sensing, quantum sensors and future space-based systems will depend on trusted components, validated hardware and reliable maintenance routes. A focused Florida quantum supply chain map would help identify existing firms, facilities and workforce programs, highlight out of state or overseas dependencies, and show where supplier development could help Florida companies enter quantum relevant markets.

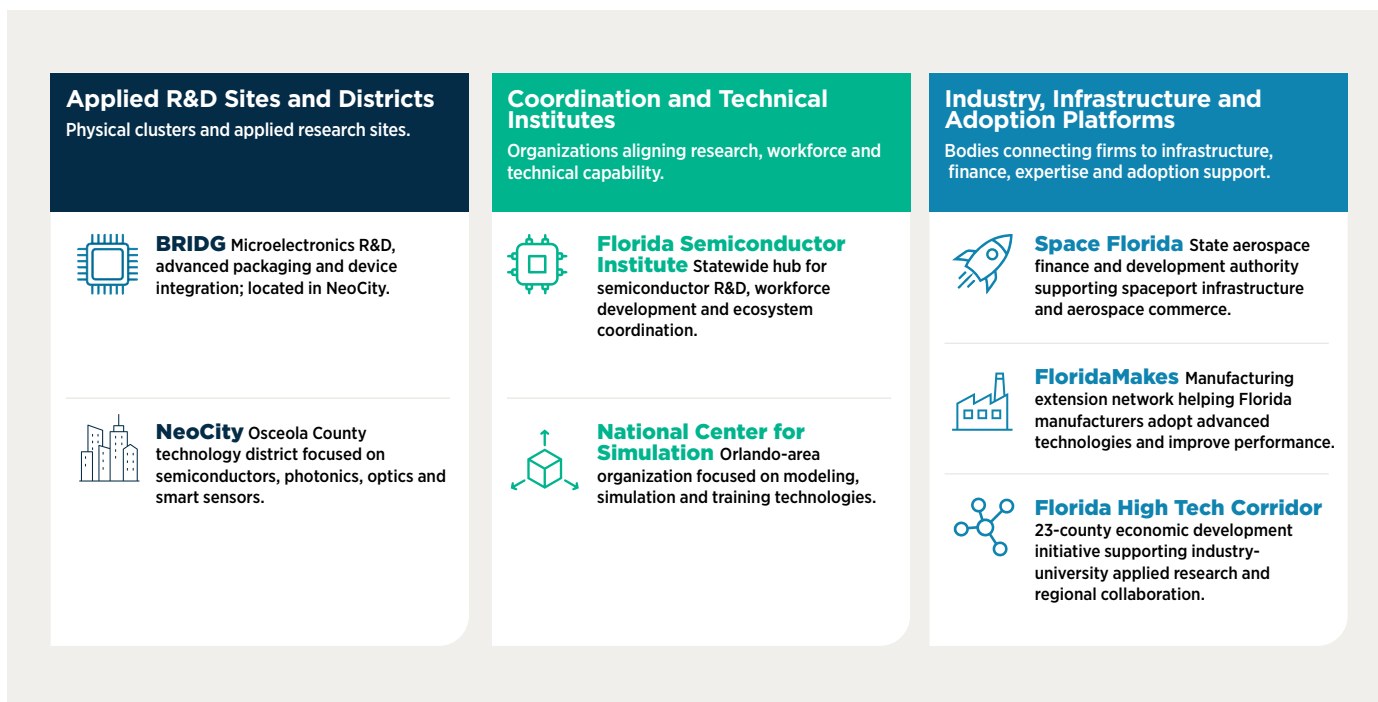


Figure 20: Florida Ecosystem Partners and Enabling Platforms. Selected applied R&D sites, technical institutes, state authorities and industry support networks that can support quantum-relevant applied research, prototyping, workforce development and industry adoption. Non-exhaustive.

and supplier resilience. For Florida manufacturers, the comparable opportunity is to identify specific production, design, inspection or materials problems where quantum or hybrid methods can be benchmarked against current tools.

Florida's relevant manufacturing strengths include aviation and aerospace, defense manufacturing, marine manufacturing, machinery, medical devices, pharmaceuticals, computer and electronic products, semiconductors and microelectronics. The point is not that firms in these sectors are already adopting quantum technologies, but that they operate in industries where advanced sensing, simulation, secure systems and optimization could become relevant.

Florida also has ecosystem partners and enabling platforms that can help connect firms with applied research, prototyping, testing, workforce development and advanced technology adoption. These assets are not quantum-specific in every case, but they provide useful infrastructure for translating quantum-relevant research into industry-facing projects.

Together, these assets strengthen Florida's ability to move from research capability to applied industrial pilots. Near-term activity should focus on selecting the right problems, benchmarking quantum or hybrid approaches against current tools and building the workforce needed to use them. Longer-term opportunities may emerge in quantum simulation for materials, product design and industrial process modeling.

4.5 Agriculture, Water and Environmental Resilience

Florida's agriculture, water and environmental systems create a distinct set of quantum-relevant use cases. These are not near-term mass deployment opportunities, but they matter because they connect sensing, optimization and secure data to some of the state's most important resilience challenges: food production, water management, coastal exposure, saltwater intrusion, flooding and environmental monitoring.



Figure 21: Florida Agriculture, Water and Environmental Resilience Market Map. Selected agriculture, water management, utilities, environmental monitoring, resilience and conservation organizations relevant to potential quantum applications in sensing, optimization, secure data, infrastructure monitoring and climate resilience. Non-exhaustive.

In agriculture and food systems, potential use cases include crop stress detection, citrus disease monitoring, irrigation optimization, soil and water monitoring, cold-chain logistics and supply-chain resilience. The strongest approach would be targeted pilots around high-value crops, water stress or disease pressure, rather than broad claims about quantum agriculture.

Water and environmental resilience create related opportunities. Florida's aquifers, wetlands, coastal infrastructure and exposure to storm surge and saltwater intrusion create demand for better subsurface mapping, contamination monitoring, groundwater assessment and infrastructure sensing. Quantum sensing may become relevant where higher sensitivity or different measurement methods can improve existing monitoring approaches.

4.6 Finance, Cybersecurity and Public Safety

Finance, cybersecurity and public safety are best treated together because they all depend on trust, continuity and secure data. For Florida's financial services firms, insurers, healthcare organizations, utilities, public agencies and defense-adjacent companies, the most pressing near-term quantum issue is post-quantum cryptography readiness.

This includes identifying where current encryption is used, assessing which systems and data are most exposed to future quantum risk, engaging vendors, planning migration and testing quantum-resistant algorithms in controlled environments. The immediate priority is protection of sensitive systems and long-term data, because organizations need time to identify vulnerable systems, coordinate with suppliers and plan migration to quantum-resistant encryption.



Figure 22: Florida Finance, Cybersecurity and Public Safety Market Map. Selected finance, insurance, cybersecurity, defense technology, emergency management, law enforcement, ports, health system and public safety organizations relevant to potential quantum applications in secure communications, post-quantum cryptography, optimization, risk modeling, critical infrastructure protection and incident response. Non-exhaustive.

McKinsey identifies finance as one of the largest potential markets for quantum computing, estimating that the technology could create \$400 billion to \$600 billion in global economic value for the sector by 2035.²² The main use cases are specific problems in fraud detection, risk modeling, derivative pricing, portfolio optimization, collateral optimization and liquidity management. These are not Florida-specific forecasts, but they are relevant to South Florida's finance, fintech, wealth-management and insurance footprint.

Florida's finance opportunity is reinforced by South Florida's growing financial services footprint. The Business Development Board of Palm Beach County has actively promoted the region's "Wall Street South" position,⁴⁸ supporting relocation and expansion activity in financial services, investment management, banking and wealth management. This matters for quantum because a growing concentration of financial firms creates a stronger potential user base for quantum-safe cybersecurity, risk analytics, optimization and secure data infrastructure.

For Florida's finance and insurance sectors, the practical opportunity sits in three areas:

- **Cybersecurity and quantum-safe migration:** identifying vulnerable encryption, protecting long-life data and preparing regulated systems for quantum-resistant security.
- **Risk, pricing and fraud analytics:** fraud detection, risk modeling, derivative pricing, claims analytics and compliance monitoring.
- **Optimization:** portfolio optimization, collateral optimization, capital allocation and liquidity management.

Public safety and emergency management add a further application layer. Florida faces recurring operational challenges around hurricanes, evacuation planning, emergency logistics, infrastructure disruption, power restoration and secure interagency data sharing. Quantum, quantum-inspired or hybrid optimization could eventually support these challenges, while quantum-safe cybersecurity could help protect critical public systems and sensitive data during major incidents.

The practical route is to start with readiness and targeted pilots. For finance and cybersecurity, that means encryption discovery, risk assessment and migration planning. For public safety, it means using real emergency-management problems, such as evacuation routing or restoration logistics, to test whether advanced optimization methods improve decision quality, speed or resilience compared with existing approaches.

4.7 Implications for Pilot Design

The sector pathways above point to a common conclusion: Florida should not treat quantum deployment as a single statewide program or a general technology push. The stronger approach is to select a small number of practical pilots where the operational problem is clear, the end user is engaged and the route to adoption is realistic.

Priority pilots should meet six conditions:

- 1. Address a high-value problem.**
- 2. Have access to usable data or test environments.**
- 3. Involve a committed public or private sector user.**
- 4. Define baseline performance against current methods.**
- 5. Have a credible path to procurement, commercialization or follow-on funding if successful.**
- 6. Identify specialist supply chain dependencies, including any need for cryogenics, helium 3, photonics, RF and microwave components, quantum grade materials, fabrication, packaging, control electronics or testing capability.**

Florida's role should be to create the conditions for these pilots: convening users, researchers and companies; supporting data readiness; linking pilots to university and industry capability; helping navigate procurement and regulatory barriers; and ensuring that successful demonstrations can lead to adoption. Supply chain awareness should be part of that role, so that pilots can connect to local facilities, suppliers and workforce programs rather than remain isolated demonstrations.

FLORIDA'S RESEARCH AND INNOVATION ECOSYSTEM

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5. FLORIDA’S RESEARCH AND INNOVATION ECOSYSTEM

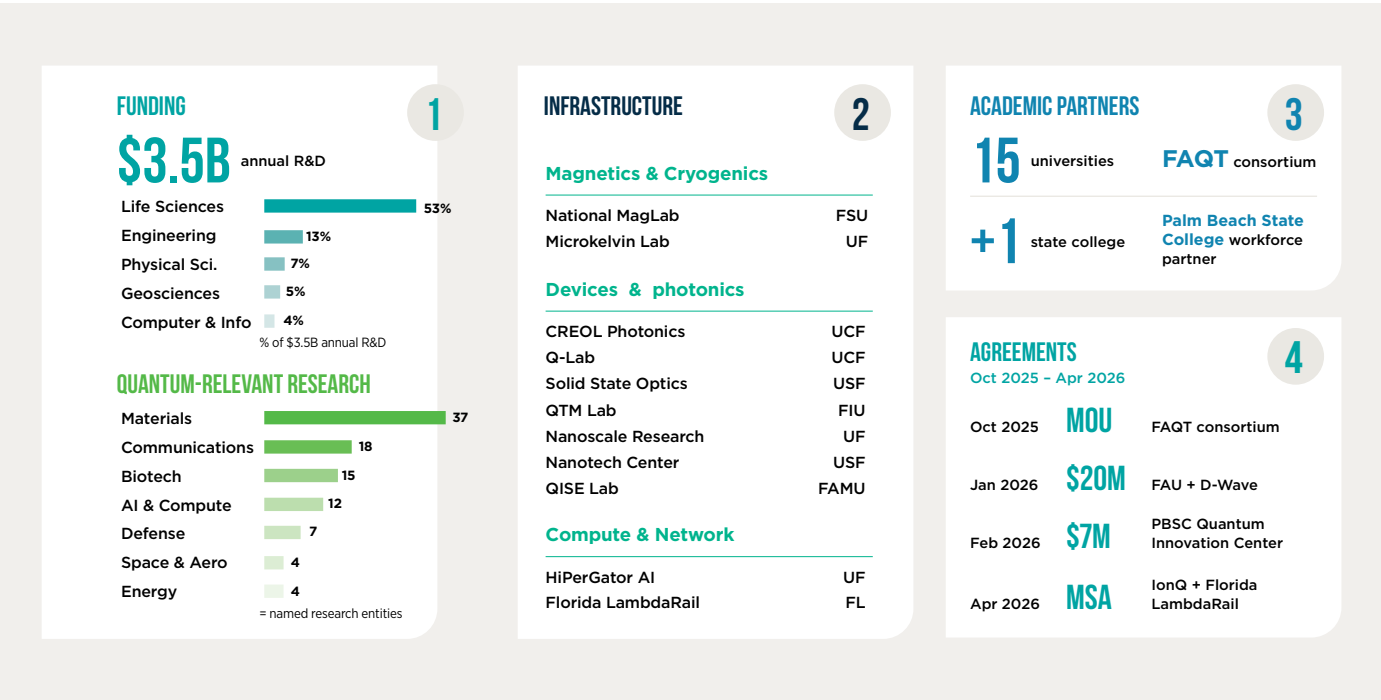


Figure 23: Florida’s quantum relevant research and infrastructure base. Summary of selected components of Florida’s emerging quantum ecosystem: **1** research expenditure and quantum relevant fields; **2** supporting infrastructure across magnetics, photonics, nanotechnology, computing and networks; **3** FAQT academic coordination and PBSC workforce partnership; and **4** recent agreements spanning consortium formation, hardware, workforce and quantum-safe networking. Non-exhaustive.

Source: Resonance analysis based on desktop research using public materials from the National Science Foundation HERD Survey,⁴⁹ Florida university and facility websites, FAQT public materials,²⁰ Palm Beach State College announcements,⁵⁰ FAU and D-Wave announcements, and Florida LambdaRail and IonQ announcements.³³

Florida already has a substantial quantum-relevant research base. Universities across the state support activity in quantum science and in the enabling fields quantum technologies depend on, including photonics, advanced materials, computing, sensing and engineering. Dedicated quantum activity is anchored by a core group of institutions, while a wider set of universities and partners contribute adjacent capability, specialist infrastructure, workforce development and applied research capacity.

Quantum technologies draw on a broad stack of capabilities: materials, devices, photonics, fabrication, cryogenics, control systems, algorithms, cybersecurity, high-performance computing and systems engineering. Florida has credible assets across many of these layers, and early coordination is already taking shape through FAQT, new hardware agreements, workforce initiatives and quantum-secure networking activity. The opportunity is to build on that momentum by making these connections more visible and easier for research, industry and public-sector partners to use.

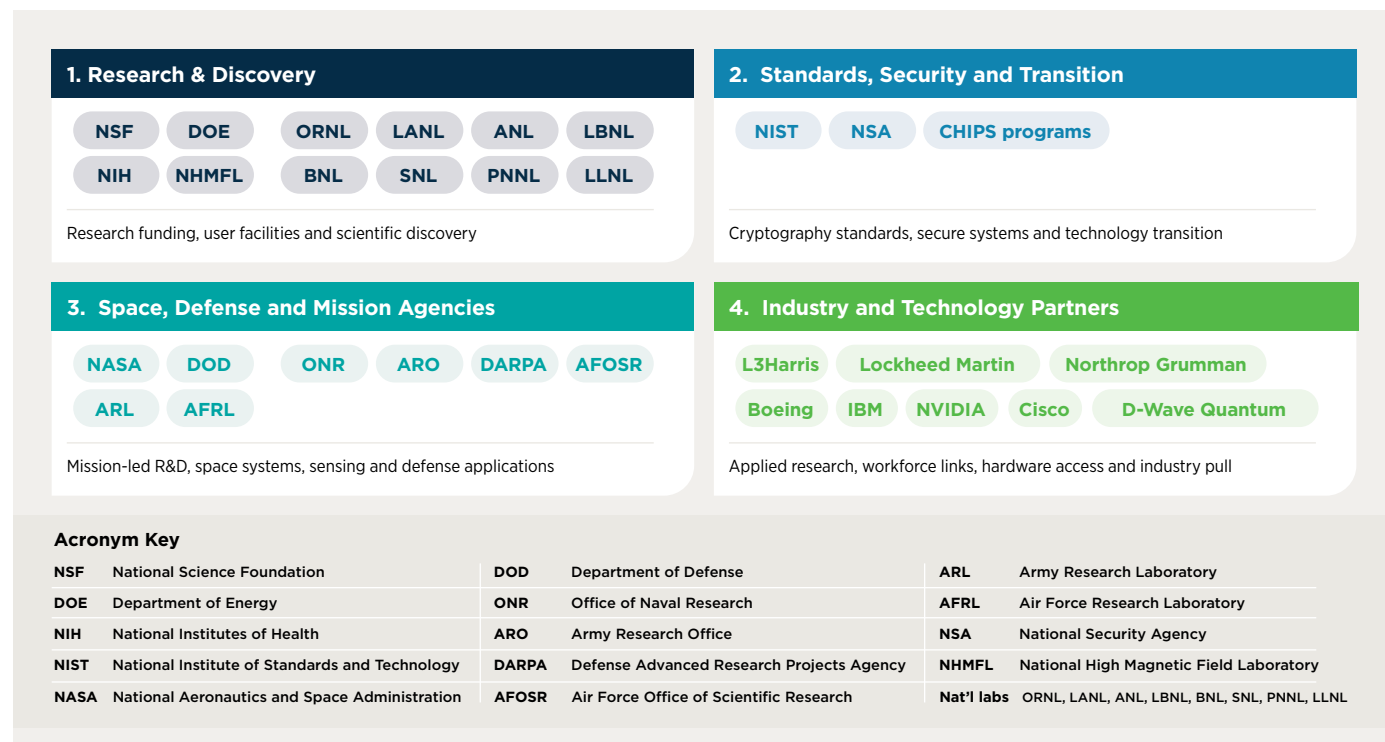


Figure 24: Federal and Industry Connectivity Across Florida's Quantum-Relevant Research Base. Summary of 97 federal touchpoints across 23 agencies and eight industry partners, grouped by science agencies, defense and intelligence channels, national laboratories and industry or defense partners. Counts aggregate distinct university-agency connections across mentions, partnerships, funding and facility access. Non-exhaustive.

Figure 23 summarizes the research and infrastructure base that Florida can build from. It highlights the state's university R&D base, quantum-relevant research fields, specialist infrastructure, academic coordination through FAQT and recent agreements in hardware, workforce development and quantum-secure networking.

Florida's research ecosystem already provides a substantial foundation for quantum technology development. Its strengths are distributed across quantum science and adjacent fields including photonics, advanced materials, computing, sensing and engineering. That distribution is a source of resilience and reach, because it mirrors Florida's wider sector geography. It also creates a coordination task: connecting university capability, specialist infrastructure, workforce initiatives and industry demand into a more coherent statewide system. FAQT provides a potential mechanism for that coordination, but its role and operating model will need to be clarified as the ecosystem matures.

5.1 Current Research Strengths

Florida's quantum-relevant research strengths are best understood by capability area rather than by institution alone. The strongest areas are materials and devices, photonics and networks, optimization and hybrid computing, cybersecurity and post-quantum cryptography, and applied systems for defense and industry.

Key capability areas include:

- **Materials and devices:** UF and FSU provide strengths in quantum materials, condensed matter, cryogenics, high magnetic fields, nanoscale fabrication and device research. These capabilities support quantum sensors, qubits, emitters, cryogenic electronics, transduction systems and secure microelectronics.
- **Photonics and networks:** UCF's Center for Research and Education in Optics and Lasers (CREOL) gives Florida depth in optics and

photonics, which are central to quantum communications, quantum networking, photonic devices, transduction and some sensing platforms.

This also connects to Florida LambdaRail and the planned quantum-secure communications corridor discussed earlier in the report.

- **Optimization and hybrid computing:** FAU's D-Wave Advantage2 system and South Florida's growing quantum computing activity create a route into applied quantum and hybrid optimization, with relevance to ports, logistics, finance, manufacturing, transport and defense planning.
- **Cybersecurity and post-quantum cryptography:** UF, USF, Cyber Florida, Florida Institute for Cybersecurity Research (FICS) and related university groups provide relevant capability in hardware trust, secure systems, cryptography and post-quantum migration. This aligns with federal transition requirements and Florida's defense, healthcare, finance, utility and critical-infrastructure exposure.
- **Applied systems:** Florida's research strengths connect to operational sectors including defense and space, healthcare, ports, aviation, energy, manufacturing, finance and public safety. This creates a route to organize research around testable use cases rather than academic capability alone.

The headline is that **Florida's quantum-relevant research base already connects to 97 federal touchpoints across 23 agencies and 8 industry partners.** These links include research funding, facility access, standards and post-quantum security, space and defense mission needs, and industry routes into sponsored research, workforce development and applied pilots. The opportunity is to make those links easier to coordinate across institutions, so that federal proposals, shared testbeds, workforce programs and applied projects can be developed at statewide scale.

5.2 Key Research and Innovation Facilities

Florida's research ecosystem includes several assets that are nationally significant or strategically distinctive. Their value lies in the enabling layers of quantum technology: high magnetic fields, ultra-low-temperature research, photonics, high-performance computing, applied quantum hardware access and device fabrication. These capabilities help move quantum research from theory and laboratory discovery toward devices, testbeds, training and applied use cases.

These capabilities cover different parts of the quantum technology stack:

- **MagLab** provides high-field and cryogenic research infrastructure for quantum materials, spin systems, superconducting platforms and device research.⁵²
- **UF's Microkelvin Research Lab** supports ultra-low-temperature physics, quantum fluids, superconductivity and low-temperature device research.
- **UCF's CREOL capability** anchors Florida's optics and photonics strength, which is relevant to quantum communications, QKD, photonic systems, networking, transduction and sensing.⁵³
- **HiPerGator and the UF-NVIDIA AI Initiative** provide high-performance computing, GPU and AI capacity for quantum simulation, materials discovery, algorithm development and hybrid quantum-classical workflows.⁵⁴
- **FAU's D-Wave Advantage2 system** gives Florida a visible platform for applied quantum optimization, hybrid workflows, training and use-case development.⁵¹
- **Florida's fabrication infrastructure**, including UF's Nanoscale Research Facility⁵⁵ and BRIDG at NeoCity,⁵⁶ supports prototyping, packaging, characterization and iteration of photonic devices, sensors, MEMS/NEMS, semiconductor devices and emerging quantum hardware.



Figure 25: Signature Research Infrastructure and Capabilities Supporting Florida's Quantum Ecosystem. Selected research and technology assets relevant to quantum materials, cryogenics, photonics, fabrication, high-performance computing and applied quantum optimization. Figures indicate publicly reported facility scale or capability. Non-exhaustive.

Florida LambdaRail adds a further networking layer, with relevance to research connectivity, quantum-secure communications and the planned QKD corridor between Palm Beach County and Miami-Dade.³³

These assets form Florida's supply-side testbed base: the research, computing, networking, photonics, fabrication and applied quantum platforms that can support testing, validation, training and early deployment. Their strategic value lies in how they can be connected, through shared access models, industry-facing pilots, workforce pathways and larger federal proposals, rather than treated as separate facilities.

5.3 Florida LambdaRail as Statewide Network Infrastructure

Florida LambdaRail adds a statewide networking layer to Florida's quantum relevant infrastructure. Its fiber footprint connects major university and research nodes across the state, with high-capacity backbone services, dedicated wavelengths and links to regional, national and international research networks. This makes FLR relevant not only for research connectivity, but also for quantum-secure communications pilots and multi-institution testbeds.

That role has become more concrete through the April 2026 Master Service Agreement between Florida LambdaRail and IonQ. The agreement supports FLR's vision for a quantum-safe network spanning Florida, with an intended first phase establishing a nearly 100 mile, three-node corridor between Palm Beach County and Miami-Dade over the existing FLR fiber network. The system is expected to use IonQ's quantum key distribution technology and connect selected research and education institutions.³³

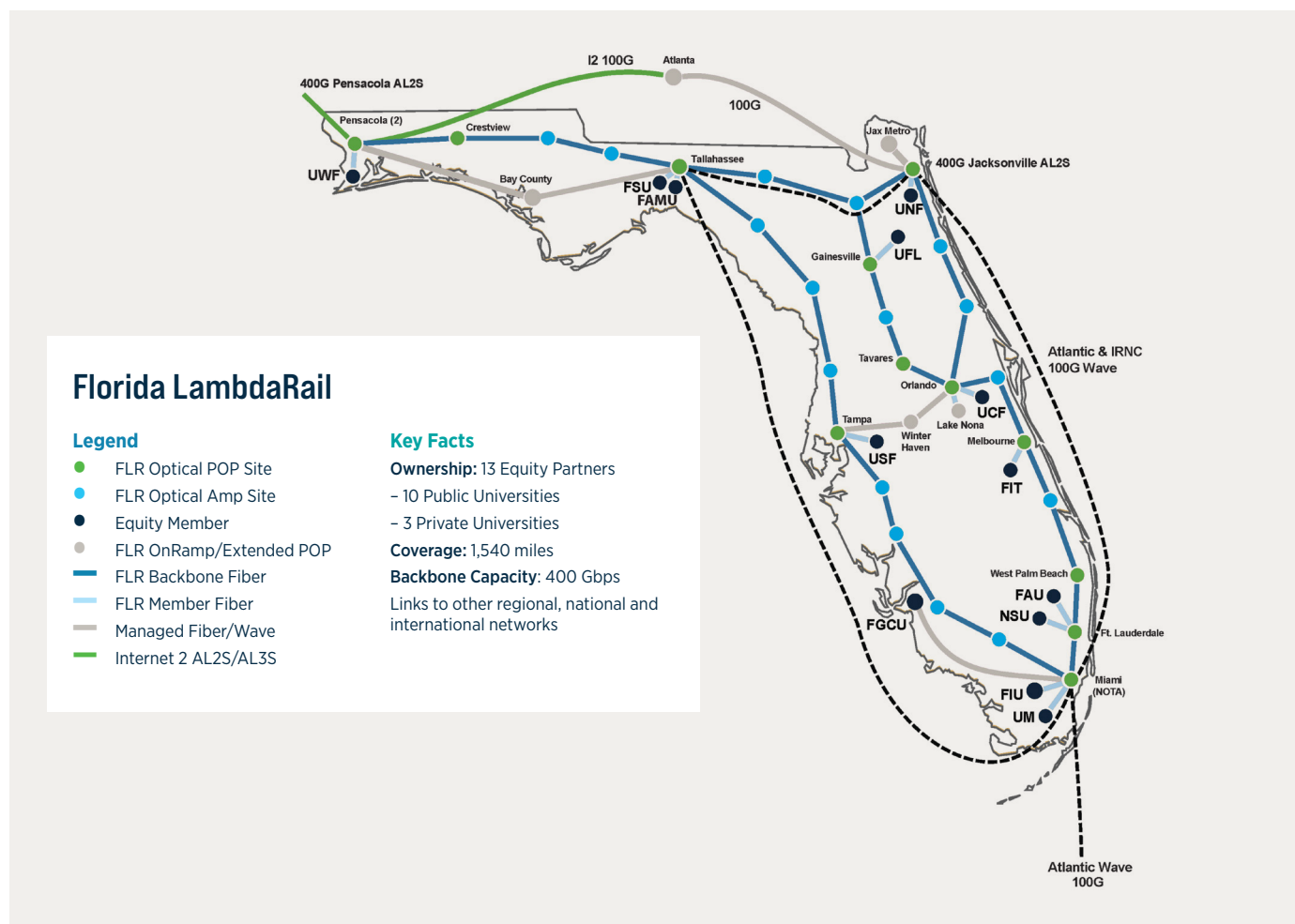


Figure 26: Florida LambdaRail Statewide Network Footprint. The network includes more than 1,540 miles of fiber coverage, 400 Gbps backbone capacity and links to regional, national and international research networks. Source: Florida LambdaRail topology map, 2023.

For quantum strategy, the importance of FLR is practical. Quantum-secure communications, QKD pilots and distributed research testbeds need trusted network infrastructure as much as laboratory capability. FLR gives Florida a potential statewide spine for connecting universities, facilities, workforce sites and industry partners around secure networking and advanced communications experiments.

5.4 Emerging Ecosystem Structures: FAQT and FloridaQuantum

Florida's quantum ecosystem is beginning to take shape through two related but distinct efforts: **FAQT**,²⁰ and **FloridaQuantum**.⁵⁷

FAQT is the university led research and education alliance. In October 2025, 15 Florida universities signed an MOU forming FAQT to coordinate statewide expertise in quantum engineering and science, and to align university activity with state agencies, private sector innovators and investors around research, commercialization and workforce development.

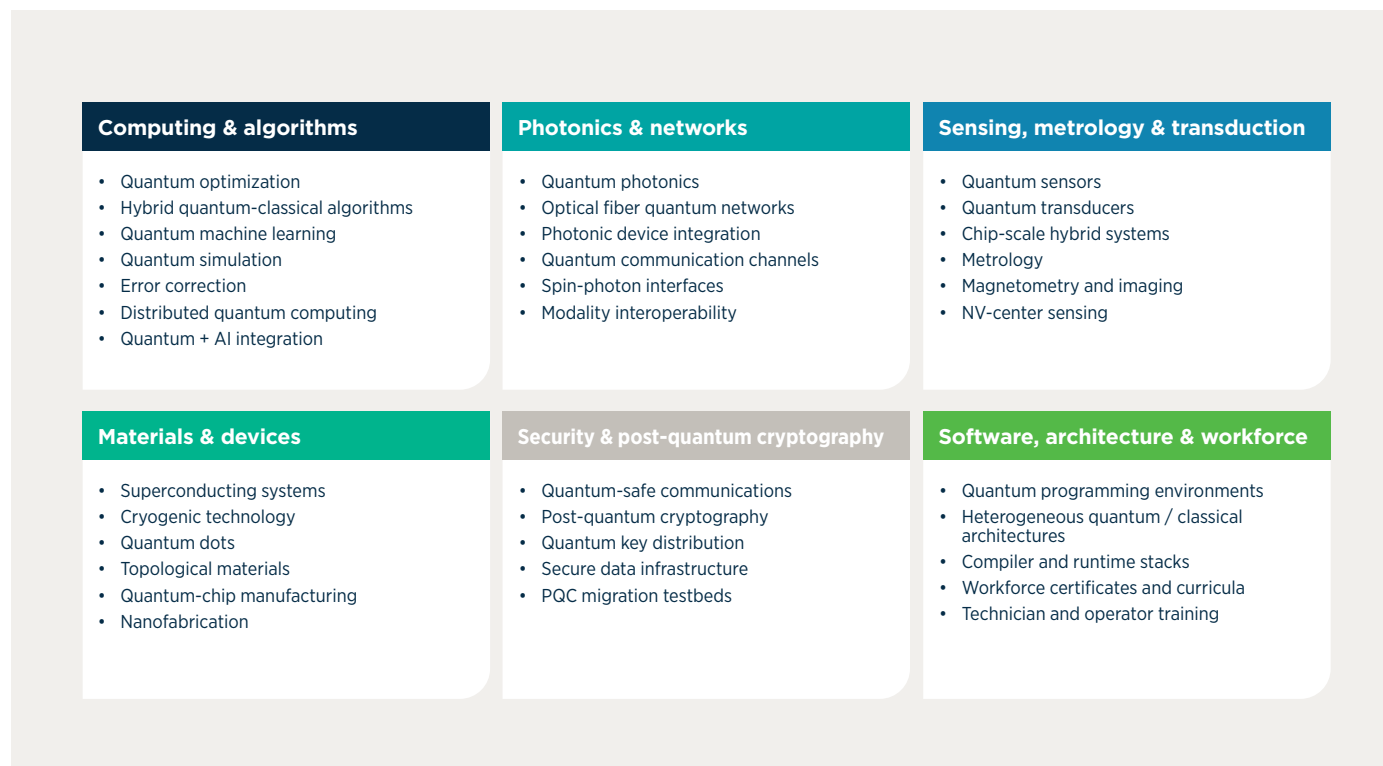


Figure 27: FAQT Research Themes and Topic Areas. Illustrative taxonomy of quantum research areas being explored across FAQT, grouped into six themes. Non-exhaustive.

FAQT combines a university research and workforce base with external partners that can support translation. University members provide research capability, education and talent development. Partners add links to defense and aerospace, quantum companies, enabling hardware and instrumentation, manufacturing support, economic development and public sector coordination. Examples include L3Harris, Amazon Quantum, Riverlane, NVIDIA, IBM, Keysight Technologies, Rohde & Schwarz, FloridaCommerce, FloridaMakes, the Business Development Board of Palm Beach County and the Orlando Economic Partnership.

FloridaQuantum has a broader ecosystem role. Launched in December 2025, it is a statewide initiative intended to help organize Florida's quantum economy by connecting universities, companies, investors, federal and private partners, accelerator programs and workforce initiatives. It can sit alongside FAQT by providing a wider industry, capital and commercialization interface for the university and research base.

The two efforts address different parts of the ecosystem. FAQT brings university collaboration, technical depth and partner links. FloridaQuantum can provide a broader interface for industry, capital, commercialization and ecosystem visibility. Both matter if Florida's research strengths are to translate into pilots, companies, talent pipelines and applied use cases.

5.5 From Research Hubs to Economic Engines

Florida's quantum strengths are spread across the state. Different institutions bring different capabilities, including photonics, materials, cryogenics, computing, cybersecurity, optimization, defense and space-related research. This reflects Florida's wider economy, where major sectors are also spread across regions.

A quantum hub model offers one way to turn that distributed base into a more connected research and innovation system. A hub can help build shared capability through testbeds, training

FIVE CAPABILITY HUBS

- 1 MATERIALS & CRYOGENICS**
MagLab • Ultra-low-T • Quantum Materials
- 2 QUANTUM + AI & DEVICES**
HiPerGator + NVIDIA • Sensing • Transduction
- 3 PHOTONICS & NETWORKS**
CREOL • Florida LambdaRail • QKD
- 4 OPTIMIZATION & HYBRID**
FAU D-Wave • Hybrid Workflows
- 5 CYBERSECURITY & DISTRIBUTED SYSTEMS**
PQC • RF • Advanced Packaging

HUB ENGINE: FROM CAPABILITY TO VALUE

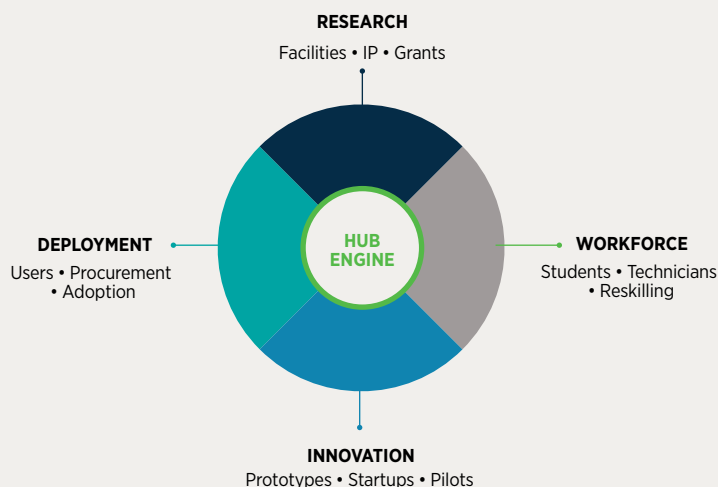


Figure 28: From Quantum Capability Hubs to a Hub Engine. Conceptual model showing how five capability hubs could organize Florida's distributed quantum strengths, and how research, workforce, innovation and deployment functions can turn those strengths into wider ecosystem value

pathways, industry engagement and larger multi-institution proposals. It can also act as a federal anchor by giving agencies a clearer basis for funding network-scale activity alongside institutional projects. A hub becomes an engine when these activities reinforce one another: research supports training, training builds talent, talent supports pilots and companies, and use cases catalyze routes to commercialization and adoption.

The quantum capability hub concept is shown in Figure 28. The left side shows five capability areas that can organize Florida's distributed quantum strengths. The right side shows the engine cycle: research, workforce, innovation and deployment. The model is conceptual, but it helps explain how research capability can become more useful to students, companies, public agencies and federal funders.

5.6 Spotlight: Materials as a Quantum Engine

Materials underpin the quantum stack. Quantum devices depend on materials that can preserve fragile quantum behavior under demanding conditions, including ultra-low temperatures, vacuum environments, high magnetic fields, nanoscale confinement and precisely controlled defects or interfaces. This makes materials science a foundation for quantum sensors, qubits, emitters, transducers, cryogenic electronics, secure microelectronics and longer-term quantum computing platforms. For Florida, strength in materials creates a route from research capability into devices, systems and applied quantum technologies.

The University of Florida's quantum materials architecture is a good illustration. The architecture connects theory and simulation, materials discovery, specialist facilities, device development and potential industry or defense applications.

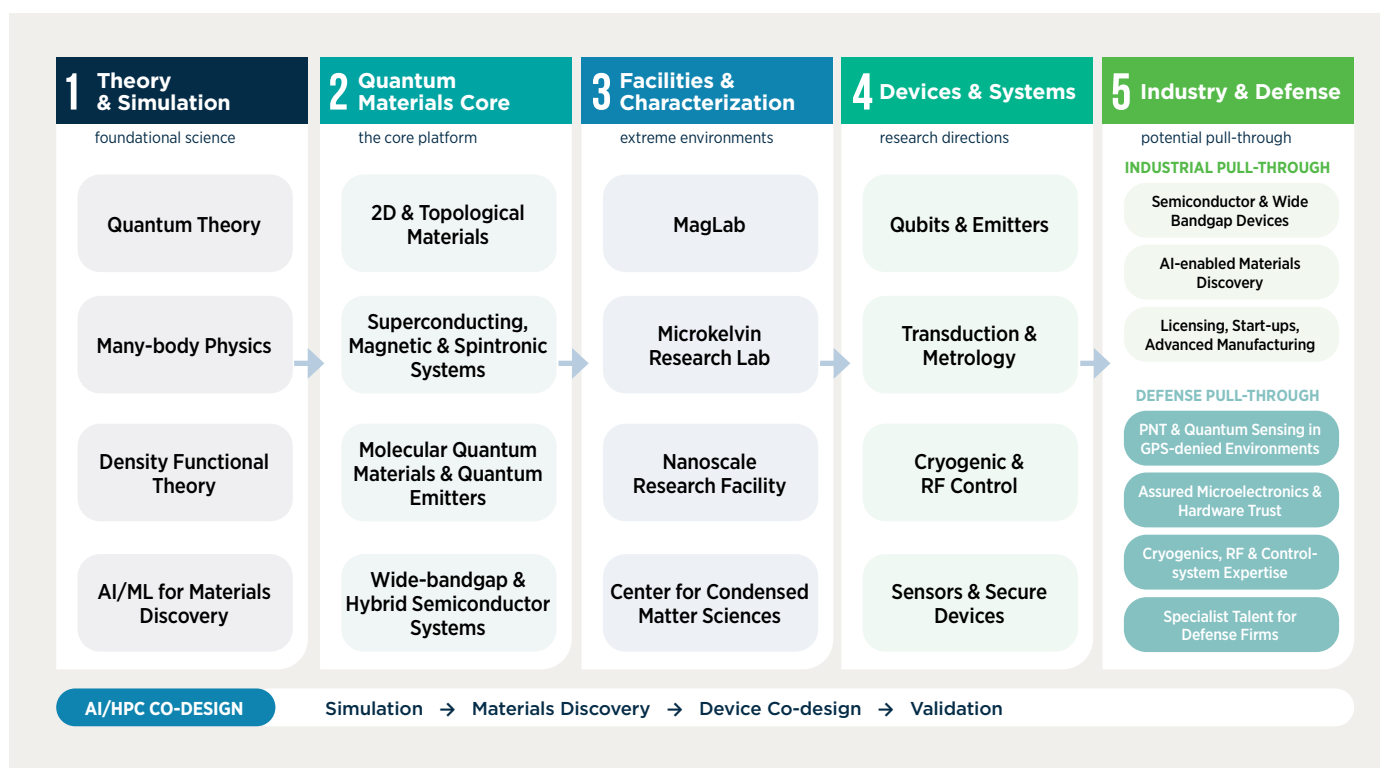


Figure 29: UF Quantum Materials Engine. Simplified pipeline showing how UF’s materials capability can connect theory and simulation, materials platforms, specialist facilities, device development and industry or defense pull-through.

“Materials are central to quantum – what makes quantum real. Materials simulation, fabrication of quantum-grade devices, and pure-grade substrates like silicon carbide are foundational not just for quantum but for adjacent industries.”

– Research university

It draws on long-standing strengths in quantum theory, many-body physics, density functional theory (DFT), topology and artificial intelligence or machine learning for materials discovery.

Its material platforms span several strategically important families: two-dimensional and topological materials, superconducting and magnetic systems, molecular quantum materials, wide-bandgap semiconductors, quantum emitters and hybrid superconducting-semiconductor systems.

The detail matters because different material families support different routes into quantum devices, from sensors and emitters to qubits, transducers and cryogenic electronics.

This pipeline connects materials research to industrial and defense needs through cryogenics, fabrication, artificial intelligence, high-performance computing and device development. The defense relevance is broader than quantum devices alone. Defense firms also need enabling expertise in

cryogenics, radio-frequency systems, sensing, secure microelectronics, hardware trust, packaging, control electronics, materials characterization and validation under demanding conditions. In that sense, the materials engine supports both future quantum applications and the specialist workforce needed by defense and advanced-technology employers.

Florida's materials base already shows how a hub engine could work in practice: specialist facilities, technical talent, device development, industry pull and defense-relevant requirements are all present.

The next challenge is coordination and scale.

Connections between research groups, facilities, companies and end users need to become easier to navigate and more consistently available across the state. This would allow materials strength to support a broader set of applications in semiconductors, sensing, secure hardware, advanced manufacturing and defense systems.

5.7 Workforce, Translation and Commercialization

The hub engine model depends on more than research strength. Florida will need to grow its quantum-ready workforce and strengthen the translation mechanisms that allow university capability to move into applied settings. This does not mean every research project should become a company or every facility should serve industry users. The purpose is to make research capability usable beyond the lab: in skills development, applied projects, new companies and technology adoption.

That workforce will need to be broader than PhD-level research talent. Florida will also need engineers, technicians, software developers, algorithm developers, photonics specialists, cryogenic engineers, RF and microwave specialists, cybersecurity professionals, semiconductor and packaging specialists and systems integrators. Degree programs and graduate certificates will matter, but so will internships, technician training, professional short courses and reskilling for workers already in adjacent sectors.

“If you’re going to train people for a workforce that will use multiple quantum systems, a college degree shouldn’t lock them to one platform. We need partnerships with companies that let students earn badges or certificates across different architectures... so they’re employable across whichever vendor wins.”

– Research university

Translation is equally important. The difficult stage for many quantum technologies is the middle of the readiness curve: moving from laboratory validation toward prototype demonstration and early operational testing. In technology readiness level (TRL) terms, this is often the TRL 4–6 range, where technologies need engineering support, test environments, integration partners, validation data and early users. Florida's research base will create more value if they can focus on this middle stage: prototyping support, shared testbeds, customer discovery, IP guidance, procurement advice and investor readiness. Universities, colleges, incubators, economic development organizations, industry partners and public agencies each have a role in making that translation process work.



INSIGHT

Building the Applied Quantum Workforce Layer

Palm Beach State College's (PBSC) Quantum Innovation Center gives South Florida an important workforce and translation asset. The center has received more than \$2 million in federal funding, building on \$4.95 million from the Florida Job Growth Grant Fund, bringing total public investment in the project to nearly \$7 million.⁵⁰ It is being developed with the Business Development Board of Palm Beach County and Quantum Coast Capital as a regional hub for workforce training in quantum computing and related high technology fields.

The center is expected to include advanced laboratory and co-working spaces for students, startups and emerging technology companies, and PBSC has announced plans to develop Florida's first public Quantum Systems Certification Program. Its significance is practical: quantum workforce development cannot rely only on PhD level researchers. The ecosystem will also need technicians and applied specialists who can work with quantum hardware, control systems, measurement equipment, cybersecurity, AI and adjacent high technology platforms.



INSIGHT

FAU and D Wave as a Translation Model

In January 2026, Florida Atlantic University and D-Wave signed a memorandum of understanding setting out a four-year framework for collaboration in quantum computing education, research and applied innovation. The agreement is separate from FAU's \$20 million acquisition of a D-Wave Advantage2 system, but it explains how the university and company intend to turn hardware access into a broader capability.

The MOU covers integration of D Wave technology into FAU's Quantum Computing Initiative, a proposed D-Wave Quantum Applications Academy, paid internships, training courses for students and faculty, ideation workshops, hackathons and joint research proposals. It also identifies applied use case areas including logistics, supply chains, transportation, emergency management, healthcare, defense, finance, quantum machine learning and heterogeneous computing.

5.8 What this Means for Florida

PBSC and FAU illustrate two complementary parts of the translation system. PBSC strengthens the applied workforce layer, while FAU and D-Wave link hardware access, curriculum, internships and use-case development. The wider opportunity is to connect these elements across Florida: technician training, industry-facing projects, shared testbeds, startup support, clear IP routes and early users willing to test emerging applications. This is where the hub engine model becomes practical, by linking research, workforce, innovation and deployment in one operating logic.

Florida has meaningful quantum-relevant research depth, specialist infrastructure, federal touchpoints, industry links and emerging structures such as FAQT and FloridaQuantum. The value lies in making these parts work more coherently as a statewide research and innovation ecosystem.

This does not require every institution to become a full quantum center. It requires clearer roles, shared access to facilities and testbeds, stronger workforce links and better routes for companies and public agencies to engage with university capability.

Four key areas stand out:

- 1 Deepen coordination:** combine university strengths, federal relationships and industry links more effectively.
- 2 Focus on translation:** support the difficult TRL 4–6 stage between laboratory validation and early operational testing.
- 3 Build workforce breadth:** train researchers, technicians, engineers, algorithm developers, photonics specialists, cybersecurity professionals and systems integrators, including reskilling routes for veterans and workers from adjacent sectors
- 4 Use investment and incentives:** provide dedicated funding, co-investment and incentives for coordination, shared testbed access, workforce programs and industry-facing pilots.

STAKEHOLDER PERSPECTIVES

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6. STAKEHOLDER PERSPECTIVES

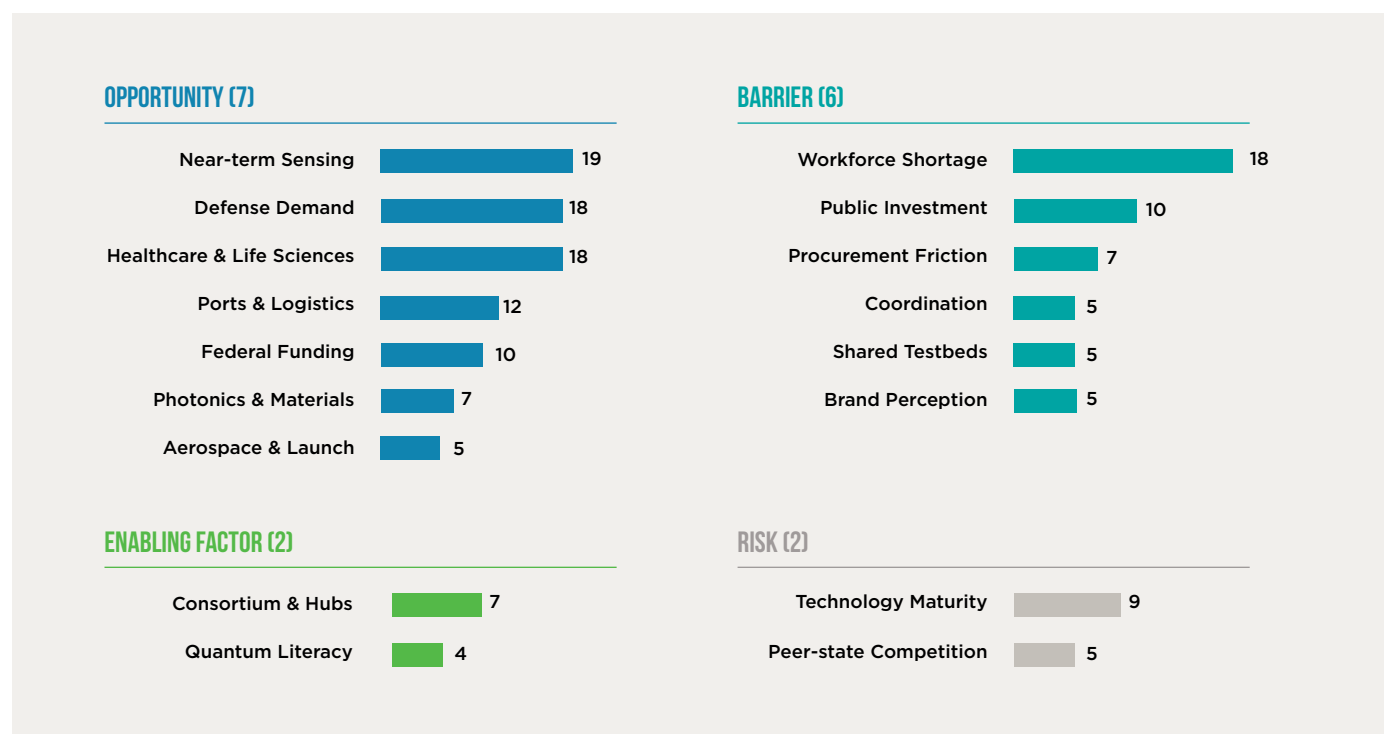


Figure 30: Major Themes from Stakeholder Interviews. Recurring themes from 23 stakeholder interviews, grouped by theme type and ranked by the number of distinct contributors who raised them. Counts show breadth of stakeholder evidence, not total mentions.

The stakeholder analysis draws on 23 interviews across Florida's quantum and quantum relevant ecosystem, covering research, government and economic development, defense, transport and logistics, manufacturing, investment, workforce development and quantum technology.

The interviews confirm strong interest in Florida's quantum opportunity, but they also show that the next challenge is practical: how to organize, fund and translate the assets already in the state. Stakeholders did not point to a lack of potential. They pointed to choices about sequencing, workforce, infrastructure, investment and deployment.

Themes were coded by distinct contributor rather than by number of mentions, with areas of disagreement retained rather than collapsed into a single consensus view. The analysis focuses on three questions: where stakeholders align, where choices remain open and what this means for strategy.

Figure 30 summarizes the most frequently raised themes. The chart separates opportunities, barriers, risks and enabling factors, and ranks each theme by the number of distinct contributors who raised it. This shows where there was broad stakeholder support rather than repeated emphasis from a small number of interviews.

6.1 Where Stakeholders Align

The stakeholder evidence shows a clear pattern. Interviewees saw Florida's strongest quantum opportunities in areas where the state already has operational scale: sensing, defense, healthcare, ports and logistics, aerospace, photonics and materials. The most frequently cited opportunity was **near term sensing**, raised by 19 contributors, followed by **defense demand** and **healthcare and life sciences**, each raised by 18 contributors. Ports and logistics, federal funding, photonics and materials, and aerospace or launch use cases also appeared repeatedly.

The barrier side was also clear. **Workforce** was the most frequently cited constraint, raised by 18 contributors. Public investment, technology maturity, procurement friction, coordination, shared testbeds and brand perception were also recurring concerns. This does not suggest a lack of interest in quantum. It suggests that stakeholders see Florida's opportunity as dependent on execution: workforce, funding, coordination, testbeds and practical routes into adoption.

"Florida won't be starting from ground zero, because there is already so much inherent expertise – what's needed is a coordinated structure with industry partners that have skin in the game..."

– Research university

Another way of reading the evidence is that Florida has both **use case pull** and **implementation friction**. The use case pull comes from sectors with real operating needs: defense, healthcare, logistics, infrastructure and aerospace. The implementation friction comes from the difficulty of moving quantum relevant activity from research, prototypes and early pilots into usable systems, procurement processes and workforce programs.

6.2 Issues Raised by Stakeholders

The interviews also surfaced issues where contributors differed on sequencing, emphasis or implementation. These differences are useful because they show where the strategy needs careful design rather than a single slogan. Table 8 summarizes seven recurring issues and what they suggest for Florida's quantum ecosystem.

Florida does not need to choose between the two views in each row. In most cases, the better answer is sequencing and portfolio design: pilots with data readiness, research with testbeds, federal bids with state match, certificates with progression and defense demand alongside civilian applications.

6.3 What the Stakeholder Evidence Adds

The interviews sharpen the strategy challenge in three ways. First, stakeholders saw the strongest opportunity where quantum connects to existing Florida operating environments, especially defense, ports and logistics, healthcare, aerospace, photonics and materials. Second, they emphasized that opportunity depends on enabling conditions: workforce, testbeds, procurement routes, funding and coordination. Third, they showed that Florida's strategy cannot be built around a single technology lane. It needs a portfolio that combines nearer term sensing, post-quantum security, secure communications and selected optimization pilots with longer term research in computing, materials and advanced systems.

Table 8: Issues Raised by Stakeholders.

Issue	Stakeholder Views	What this Suggests
Pilot Readiness	View A – Data, connectivity and integration must come first.	Stage pilots around specific problems, with data readiness, operational partners and measurable outcomes.
	View B – Selected optimization and sensing pilots can be scoped now.	
Research and Testbeds	View A – Sustained foundational research remains important.	Treat research and testbeds as linked investments: discovery base plus engineering and validation venues.
	View B – Shared testbeds, prototyping capacity and applied infrastructure are also needed.	
Federal Funding and State Match	View A – Federal funding is a major opportunity.	Package federal and industry co-funded opportunities with state match, pilot funding and TRL 4 to 6 support.
	View B – Florida also needs match funding, pilot funding and operating capacity.	
Technology Roadmap	View A – Quantum computing and hybrid optimization should remain active.	Prioritize near-term sensing, PQC and secure communications while continuing computing pilots with real users.
	View B – Nearer-term advantage may sit in sensing, PQC and secure communications.	
Commercialization Route	View A – Universities bring research, IP and spinout potential.	Build market-facing translation: customer discovery, anchor partners and capital access.
	View B – Investors and industry bring customer discovery, anchor partners, capital and market access.	
Workforce Progression	View A – Applied certificates can train technicians quickly.	Build workforce ladders: employer validation, credit recognition, internships and progression routes.
	View B – Value depends on employer recognition and routes into higher credentials.	
Defense and Public Benefit	View A – Defense is an important anchor customer.	Use defense demand as an anchor while protecting civilian applications, with governance for security, export control and access.
	View B – Healthcare, ports, environmental monitoring and civilian infrastructure also matter.	

The most important message is that the challenge is not asset discovery alone. Stakeholders were not only asking whether Florida has relevant quantum assets. They were asking whether the state has the operating model, workforce, capital, testbeds and public sector commitment needed to turn those assets into usable capability.

This also explains why the interviews repeatedly returned to the middle of the readiness curve. Stakeholders raised the need for pilot funding, shared testbeds and TRL 4 to 6 support because this is where promising technologies often stall: beyond research, but not yet ready for procurement or large-scale commercial adoption. For Florida, this points toward repeatable translation mechanisms: scoped use cases, test environments, validation data, industry partners and follow on funding.

6.4 Implications for Strategy

The stakeholder evidence points toward a strategy built around execution rather than asset discovery. Florida's asset base is visible; the harder question is how to organize it, fund it and connect it to users. The interviews point to four practical messages for strategy:

- 1 Move from interest to operating capacity:** FAQT, FloridaQuantum and related structures will need clear roles, delivery capacity and funding if they are to support coordination rather than only visibility.
- 2 Treat pilots as translation instruments:** pilots should be designed around real users, data readiness, validation criteria and routes to procurement, private capital or federal funding.

The stakeholder evidence points to a positive but practical conclusion. Florida has enough research depth, sector demand and institutional momentum to move from opportunity mapping to program building.

3 Build workforce as a portfolio: the state will need researchers, technicians, engineers, algorithm developers, photonics specialists, cybersecurity professionals and systems integrators, with credentials that employers and institutions recognize.

4 Use a sequenced technology portfolio: sensing, post-quantum security and secure communications provide nearer term deployment lanes, while optimization, computing, materials and advanced systems should be developed through targeted pilots and longer-term research.

The stakeholder evidence points to a positive but practical conclusion. Florida has enough research depth, sector demand and institutional momentum to move from opportunity mapping to program building. This includes funded testbeds, recognized workforce routes, industry-facing pilots, coordinated federal bids and clear governance for defense and civilian applications.

STRATEGIC ASSESSMENT

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7. STRATEGIC ASSESSMENT

Table 9: Peer-state quantum strategy comparison.

Sources: Illinois DCEO; Chicago Quantum Exchange; Maryland Department of Commerce; Colorado Governor's Office; MassTech Innovation Institute; New York State; Florida Defense Support Commission; FAQT; stakeholder interviews 2026.

State	Investment / Public Signal	Principal Mechanisms	Anchor Assets
Illinois	\$500M state quantum investment; up to \$140M state match for DARPA Quantum Proving Ground. PsiQuantum investment is private.	Large public signal; quantum campus; DARPA benchmarking and proving ground; PsiQuantum anchor tenant.	IQMP; Argonne; Fermilab; University of Chicago; Chicago Quantum Exchange; PsiQuantum.
Maryland	\$1B Capital of Quantum public-private initiative. DARPA QBI support is results-contingent.	Federal anchor; Capital Quantum Benchmarking Hub; UMD-IonQ partnership; flagship corporate partner.	University of Maryland; IonQ; NIST; UMD ARLIS; Joint Quantum Institute.
Colorado	\$40.5M EDA Tech Hub award; \$74M state quantum tax credit; around \$1B estimated private capital.	Elevate Quantum coalition; federal Tech Hubs designation; targeted incentives across CO, NM and WY.	NIST Boulder; JILA; CU Boulder; Colorado School of Mines; regional quantum companies.
Massachusetts	At least \$8.3M identifiable MassTech grants across UMass Boston, Western New England and Northeastern.	Catalytic state grants; Quantum Jumpstart; university R&D facilities; commercialization support.	MIT; Harvard; UMass Boston; Western New England; Northeastern; dense VC base.
New York	\$300M state investment in SUNY Stony Brook Quantum Research and Innovation Hub.	Dedicated Stony Brook quantum hub; networking focus; broader advanced-tech and semiconductor context.	SUNY Stony Brook; IBM Yorktown; Brookhaven National Laboratory; SUNY system; Long Island Quantum Internet Test Bed.
Florida	No single statewide quantum package identified. Visible commitments include FAU's \$20M D-Wave system, PBSC's nearly \$7M public investment and FLR-IonQ quantum-safe network activity.	Deployment and workforce-led model: FAU-D-Wave hardware access, PBSC workforce center, FAQT university alliance and FLR-IonQ network.	D-Wave Boca Raton; FAU Advantage2; PBSC Quantum Innovation Center; MagLab; HiPerGator; Florida LambdaRail; Cape Canaveral.

Florida's quantum position can be assessed through three lenses:

- How it compares with peer-state quantum ecosystems.
- How its strengths and weaknesses look when tested against market and stakeholder evidence.
- What gaps separate current activity from a more mature statewide ecosystem.

The assessment draws on stakeholder interviews, peer-state benchmarking, the SWOT analysis and the sector-deployment analysis in Chapter 4. It identifies where Florida has a differentiated position, where other states provide useful lessons and which capability gaps need to be addressed in the implementation roadmap.

7.1 Peer-State Benchmark

The peer-state benchmark focuses on five states that provide useful comparators for Florida: Illinois, Colorado, Maryland, Massachusetts and New York. They were selected because they illustrate different state-level approaches to quantum ecosystem development: large public investment, federal leverage, tax incentives, catalytic grants, corporate anchors and integration with semiconductor or advanced-technology strategies. They are not the only relevant quantum states, but they provide a practical reference set for assessing Florida's strategic options.

The comparison shows that state-level quantum strategies can be built in different ways:

- **Illinois:** large public commitments can create a strong signal for federal programs and private anchors.
- **Maryland:** a federal anchor and flagship corporate partner can give a state strategy national visibility.
- **Colorado:** a coalition model, targeted incentives and federal designation can create leverage without Illinois-scale state spending.
- **Massachusetts:** smaller catalytic grants can work where research depth, venture capital and university infrastructure are already dense.
- **New York:** quantum can be embedded inside a broader advanced-technology and semiconductor strategy.

Florida's position is distinct. Its visible investment signal is smaller and more fragmented than several peer states, but it has a different set of advantages: defense demand, launch infrastructure, ports and logistics, healthcare scale, Florida LambdaRail, MagLab, HiPerGator, D-Wave in Boca Raton, FAU's Advantage2 system and PBSC's workforce initiative. Florida can differentiate through operational deployment, workforce development, defense and infrastructure use cases, and coordinated testbeds.

7.2 SWOT Analysis

The peer-state benchmark shows that Florida's position is differentiated but not yet fully packaged. The SWOT analysis below brings together the peer comparison, stakeholder evidence and sector analysis to assess where Florida has strategic advantage, where the ecosystem is constrained and where external risks could affect momentum.

The SWOT also reflects the stakeholder evidence. Interview themes were mapped to SWOT categories by separating internal conditions, such as coordination, workforce, testbed access and visibility, from external conditions, such as federal funding, defense demand, sector adoption and peer-state competition. Stakeholders identified strong opportunity signals around sensing, defense, healthcare, logistics and federal funding capture, while the main barriers were workforce capacity, coordination, funding commitment and procurement or regulatory friction.

Four strategic observations follow from the SWOT:

- 1 **Florida's advantage is deployment led.** The state is unlikely to compete most effectively by replicating the laboratory scale of Illinois, Maryland or Massachusetts. Its stronger position is where quantum capabilities meet operational demand in defense, space, logistics, healthcare, critical infrastructure and communications.

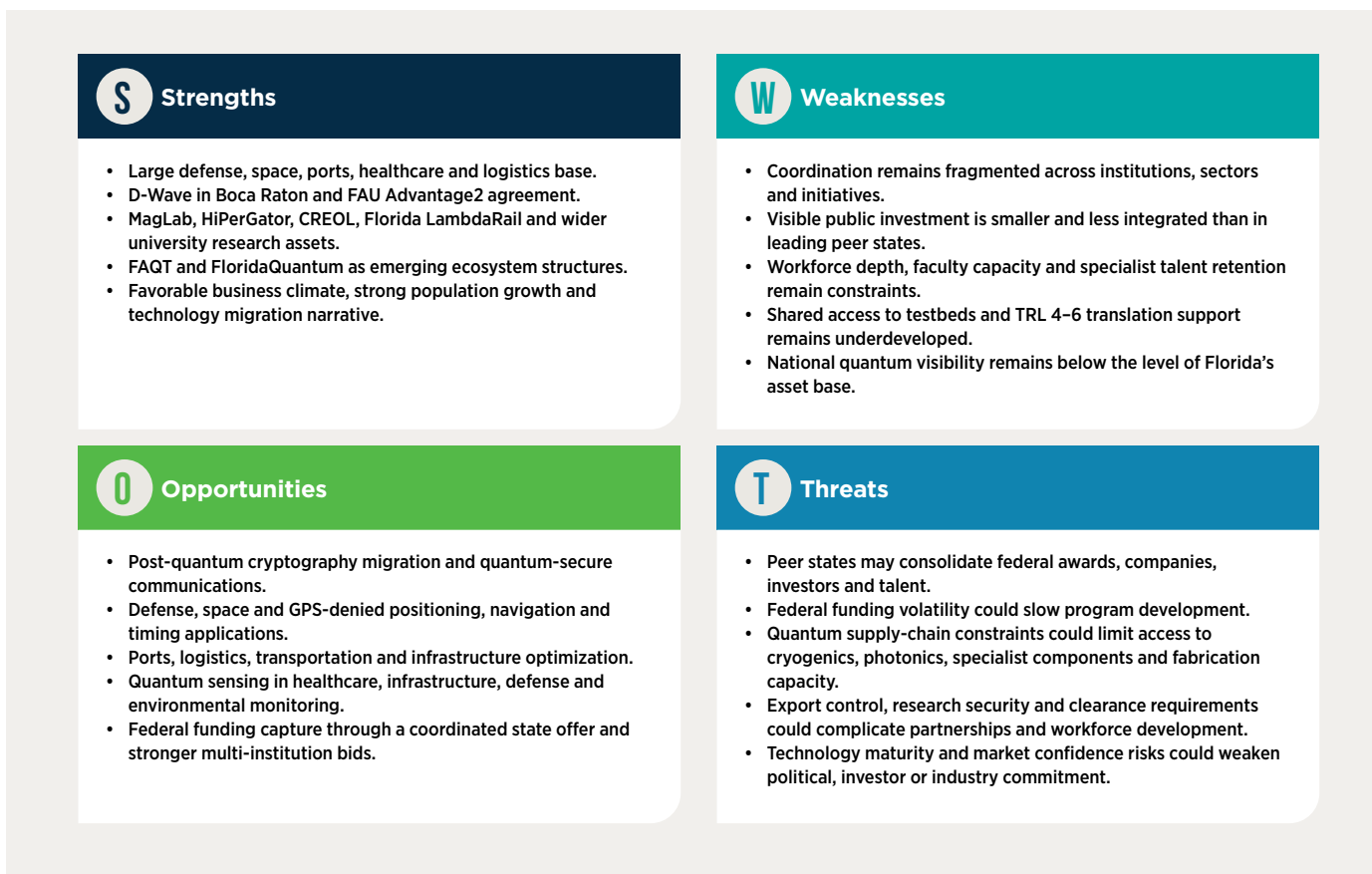


Figure 31: SWOT Analysis for Florida's Quantum Ecosystem. Assessment of Florida's current quantum position across internal strengths and weaknesses, and external opportunities and threats, drawing on the evidence base developed in Chapters 3 to 6.

2 The ecosystem is broad but not yet sufficiently coordinated. Florida has university capability, sector demand, early hardware and networking activity, and emerging structures such as FAQT and FloridaQuantum. The gap is how these pieces are organized into a clearer operating model for federal bids, shared testbeds, workforce programs and industry-facing pilots.

3 Workforce is a scaling issue. Florida will need more than quantum researchers. It will need technicians, engineers, algorithm developers, photonics specialists, cybersecurity professionals, RF and microwave specialists, semiconductor workers and systems integrators, with routes that connect certificates, degrees, internships, reskilling and employer needs.

4 Peer states are moving faster on visible commitments. Florida has credible assets, but other states are packaging their ecosystems more aggressively through public funding, anchor firms, federal bids and national branding. Florida's risk is not lack of relevance. It is losing time while other states convert their assets into clearer offers for companies, talent and federal agencies.

Table 10: Capability Gap Analysis.

Gap	What is Visible Now	What is Missing
Coordination	FAQT, FloridaQuantum, university activity, company partnerships and sector initiatives are all emerging.	A clearer operating model showing roles, owners, delivery capacity and how institutions work together on shared priorities.
Investment	FAU-D-Wave, PBSC, FLR-IonQ and other visible commitments show momentum.	A coordinated funding signal for shared testbeds, TRL 4-6 translation, workforce programs and federal match opportunities.
Workforce	Universities and colleges are beginning to build quantum and quantum-adjacent training routes.	A joined-up talent ladder linking certificates, degrees, internships, reskilling, veteran pathways and employer-recognized credentials.
Testbeds and translation	Florida has important platforms: FAU-D-Wave, Florida LambdaRail, MagLab, HiPerGator, CREOL, UF NRF and BRIDG.	Shared access models, engineering support, validation environments and early users to help move technologies from lab validation toward adoption.
Defense positioning	Florida has major defense, space, maritime and launch assets, plus relevant university and company capability.	A coordinated defense-quantum bid pipeline that links mission needs, test environments, firms, universities and federal agencies.
National visibility	Florida's quantum activity is becoming more visible through D-Wave, FAU, PBSC, FAQT, FloridaQuantum and FLR-IonQ.	A stronger national narrative that presents Florida as a deployment, workforce and infrastructure state rather than a loose set of assets.

7.3 Capability Gap Analysis

Florida has research depth, relevant infrastructure, sector demand, early industry activity and emerging coordination structures. The remaining gaps sit mainly in the connective tissue between these assets: coordination, funding, testbed access, talent progression, defense positioning and national visibility.

Table 10 identifies the main capability gaps limiting Florida's progression from emerging quantum activity to a more mature statewide ecosystem.

The gaps are mutually reinforcing. Weak coordination makes funding harder to target; limited funding slows testbeds and translation; underdeveloped testbeds reduce industry engagement; and workforce progression depends on clearer demand from research and industry. This is why the gaps need to be treated as a system rather than as separate issues.

Table 11: Florida's Competitive Position. Selected assets that support Florida's deployment-oriented quantum position.

Florida Positioning Asset	Strategic Relevance
Defense and space footprint	Creates demand for secure communications, resilient PNT, sensing, cybersecurity and mission-focused test environments.
Ports, logistics and infrastructure	Provides operational settings for optimization, sensing, network security and resilience use cases.
Healthcare and life sciences scale	Supports opportunities in sensing, diagnostics, biomedical modeling, secure data and pharmaceutical discovery.
Florida LambdaRail and quantum-safe networking activity	Provides a statewide research network platform for secure communications pilots and multi-institution collaboration.
D-Wave, FAU Advantage2 and applied computing activity	Gives Florida a visible route into hybrid optimization, training and applied quantum computing use cases.
MagLab, HiPerGator, CREOL and university research assets	Provide enabling capability in materials, photonics, computing, cryogenics, networking and advanced systems.
PBSC and emerging workforce initiatives	Support technician, applied skills and workforce routes needed for deployment-oriented growth.

7.4 Florida's Competitive Position

The capability gaps above show what Florida needs to strengthen. Table 11 summarizes the assets that could define Florida's competitive position if they are organized into a clearer state offer.

These positioning assets, combined with the capability gaps identified above, provide the basis for the COSINE framework and implementation roadmap that follow.

THE COSINE FRAMEWORK

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8. THE COSINE FRAMEWORK

Florida's quantum challenge is now less about identifying assets and more about making the ecosystem work. The previous chapters show that the state has research depth, sector demand, network infrastructure, early company activity, workforce initiatives and emerging coordination structures. The strategic issue is how these pieces are connected, funded and translated into usable capability.



INSIGHT

What is COSINE?

COSINE is the organizing framework used in this report to translate Florida's quantum assets into a coordinated delivery agenda.

- **What is it?** A six-part framework covering Cohesion, Orchestration, Stimulation, Integration, Networking and Execution.
- **Why is it needed?** Florida has strong quantum relevant assets, but they are distributed across institutions, regions and sectors. COSINE identifies the functions needed to connect them.
- **Who is it for?** State leaders, universities, industry, defense and national security partners, infrastructure operators, investors and workforce institutions.
- **Where does it apply?** Across Florida's quantum ecosystem, including research, workforce, infrastructure, pilots, funding and deployment.
- **When should it be used?** Over the next 5 years, starting with near term actions that build coordination, select pilots and create delivery mechanisms.

The COSINE framework provides a way to organize that task. It identifies six functions that a quantum ecosystem needs to mature: **Cohesion, Orchestration, Stimulation, Integration, Networking and Execution.** These are not separate organizations or programs. They describe the functions that need to work together if Florida is to move from distributed activity to a more coordinated and deployment ready quantum ecosystem.

The framework also identifies three cross cutting enablers: Talent and Workforce, Infrastructure and Testbeds, and Capital and Investment. These sit underneath the whole system. They determine whether coordination, pilots, partnerships and deployment can happen at scale.

The framework helps distinguish between different types of ecosystem work. Cohesion gives the ecosystem a shared direction. Orchestration organizes the actors and roles. Stimulation creates the funding, incentives and programs that move activity forward. Integration connects research to testbeds and operational settings. Networking brings together universities, companies, public agencies, investors and end users. Execution turns priorities into owners, milestones, KPIs and delivery accountability.

The stakeholder evidence helps connect the COSINE framework to the findings of the report. When the coded interview themes are mapped against the framework, opportunities cluster most strongly around Integration, while barriers concentrate around Cohesion and Execution. This reflects the central pattern in the report: Florida has specific use-case opportunities, but the conditions needed to coordinate, fund and deliver them are still developing.

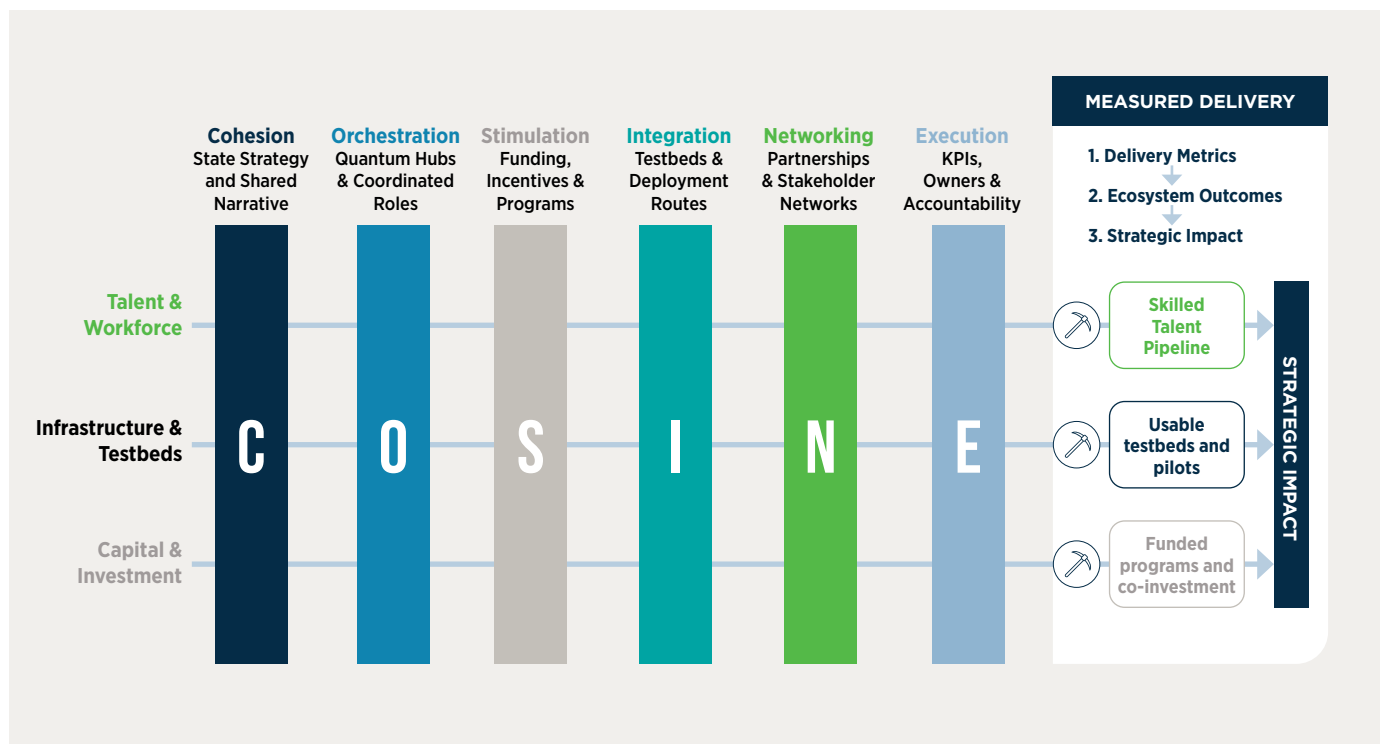


Figure 32: COSINE Framework as a Quantum Ecosystem Circuit. Conceptual framework showing how three cross cutting enablers, talent and workforce, infrastructure and testbeds and capital and investment, pass through six ecosystem functions. The quantum circuit format is used to show that these functions operate in parallel and reinforce one another, rather than as a fixed sequence.

	Opportunity	Barrier	Risk	Enabling Factor
Cohesion	–	3	1	–
Orchestration	–	–	–	1
Stimulation	1	1	–	–
Integration	6	1	1	–
Networking	1	1	–	1
Execution	2	3	1	–

Figure 33: Stakeholder Themes Mapped to COSINE Functions. Interview themes grouped by COSINE function and theme type. The heatmap shows where opportunities, barriers, risks and enabling factors were most concentrated across the stakeholder evidence.

The heatmap adds a useful distinction. Florida's opportunity signal is strongest where quantum capability meets real use cases. Its main friction sits elsewhere – in the shared direction and delivery capacity needed to move those use cases forward. The sections that follow use COSINE to separate those tasks and make the strategy more actionable.

8.1 Cohesion

Cohesion gives Florida's quantum ecosystem a shared direction. Its practical expression could be a statewide quantum strategy: not a long statement of ambition, but a clear proposition that explains where Florida can compete, which domains matter most and how universities, companies, public agencies, investors and workforce partners can engage.

The evidence in this report suggests that Florida's quantum story is still easier to see in parts than as a whole. Activity is emerging through research institutions, companies, infrastructure platforms, workforce initiatives and sector partnerships, but the state proposition is not yet consistently expressed. It's important for external audiences to understand quickly why Florida is relevant and where the state's comparative advantages lie.

A stronger cohesion function would provide:

- 1 A clear proposition:** Florida's role in the national quantum landscape, anchored in deployment, infrastructure, workforce and applied use cases.
- 2 Consistent messaging:** shared language across universities, state agencies, FloridaQuantum, FAQT, Space Florida, Florida LambdaRail and economic development partners.
- 3 A legible ecosystem map:** a simple way to show how research assets, testbeds, companies, workforce programs and sector users connect.

Cohesion should make Florida's quantum activity easier to understand, fund and navigate. It turns a set of promising assets into a clearer state offer.

8.2 Orchestration

Once there is a shared direction, the next question is how the system is organized. Orchestration is the function that defines roles, responsibilities, decision points and sequencing across the ecosystem.

“Florida needs to get organized. We need a game plan. The private and the public sector need to be on the same page... We need dollars allocated, decision makers across both sectors at the same table, and we need to lean into our advantages: defense, aerospace, space.”

– Tech ecosystem convener

Florida already has several relevant actors: FAQT, FloridaQuantum, Florida LambdaRail, universities, state agencies, regional economic development bodies and industry partners. The gap is not the absence of activity. It is the lack of a fully developed operating model showing how these actors work together on proposals, testbeds, workforce activity, sector pilots and federal positioning.

The orchestration function should focus on three practical tasks:

- 1 Clarify roles:** define how the main ecosystem actors contribute and where decision rights sit.
- 2 Organize capability hubs:** use capability areas to coordinate distributed strengths without requiring every institution to play the same role.
- 3 Manage the portfolio:** align pilots, federal bids, infrastructure investments and workforce initiatives around a limited set of priority domains.

For Florida, orchestration is what prevents a broad ecosystem from becoming a loose collection of initiatives. It is the mechanism for turning distributed strengths into coordinated programs.

8.3 Stimulation

Florida will also need mechanisms that put resources behind priority opportunities. This is the role of stimulation: targeted funding, challenge programs, incentives, procurement support and other tools that move activity from discussion into implementation.

“If the state had a legislated quantum industry acceleration fund... that would allow Florida to move at industry timelines rather than the annual budget cycle. That’s how you create a flywheel.”

– State aerospace economic development body

The most important gap is the stage between research and adoption. Many quantum technologies need support to move from laboratory validation into prototype demonstration and early testing. In TRL terms, this is often the TRL 4–6 stage, where projects need engineering support, test environments, validation data, early users and follow-on funding.

A stronger stimulation function could include:

- 1 Funded pilots:** focused projects in areas such as quantum-secure communications, sensing, PNT, logistics optimization, healthcare and critical infrastructure.
- 2 Student application micro-grants:** small awards that support student teams to work with an end user, university lab or technology partner on a defined quantum-relevant problem.

3 Translation support: engineering, validation, customer discovery, investor readiness and procurement preparation for technologies moving through TRL 4-6.

4 Micro-credentials and certification incentives: support for short courses, badges and employer-recognized credentials that help students, technicians and workers from adjacent sectors build quantum-relevant skills.

5 Co-investment mechanisms: combined state, federal, industry and private funding so that public support helps unlock larger commitments.

Stimulation is where strategic priorities become funded activity. It gives researchers, companies, public agencies and workforce providers a reason to collaborate around defined problems, with resources attached and routes to further adoption.

8.4 Integration

Integration is where quantum capability meets real operating environments. It is the function that connects research, testbeds and companies to sectors where Florida already has practical demand, including defense, space, ports, logistics, healthcare, infrastructure, finance, manufacturing and public safety.

For Florida, this is one of the strongest parts of the ecosystem logic. The state does not need to wait for every quantum technology to be fully mature before identifying useful deployment settings. Some areas, including post-quantum cryptography, quantum-secure communications, sensing, PNT and selected optimization use cases, can be developed through carefully scoped pilots and test environments.

The integration function should focus on:

- 1 Use-case definition:** select problems with clear users, data requirements, performance measures and adoption routes.
- 2 Testbed linkage:** connect sector users to research facilities, networks, computing platforms and validation environments.
- 3 Deployment readiness:** prepare projects for procurement, follow-on funding, private capital or operational adoption.

Integration is the discipline of making quantum useful in context. It helps avoid generic pilots by tying projects to real users, real constraints and real routes beyond demonstration.

8.5 Networking

Networking is the relationship layer of the ecosystem. It is how universities, companies, investors, public agencies, infrastructure providers, workforce bodies and end users find one another and form useful partnerships.

Florida already has many connections, but they are not yet consistently organized. Research groups have federal and industry links. Companies are beginning to engage around quantum computing, secure networks and workforce development. Public agencies and sector bodies have relevant demand. The gap is that these relationships are still too dependent on individual contacts, bilateral agreements or one-off announcements.

A stronger networking function should create:

- 1 Regular convening channels:** structured forums for universities, companies, investors, public agencies and end users to identify shared priorities.
- 2 Market-facing translation routes:** ways for researchers and startups to connect with customers, anchor partners, investors and procurement expertise.
- 3 Federal and industry relationship management:** coordinated engagement with mission agencies, national laboratories, primes, quantum companies and sector users.

Networking should make the ecosystem easier to enter and easier to navigate. It is the function that turns scattered relationships into repeatable channels for collaboration, commercialization and adoption.

8.6 Execution

Execution is the delivery discipline behind the framework. It turns strategy, coordination, funding, pilots and partnerships into named actions with owners, milestones and measures of progress.

This is important because Florida's quantum opportunity will not be advanced by visibility alone. A statewide strategy, capability hubs, pilot programs and industry partnerships all need delivery capacity. That means clear responsibilities, operating budgets, program management, reporting cycles and a small number of metrics that show whether the ecosystem is moving.

Execution should focus on:

- 1 Named ownership:** clear responsibility for each priority program, pilot, workforce initiative, testbed and federal bid.
- 2 Milestones and KPIs:** practical measures such as pilots launched, testbed users, students trained, federal bids submitted, match funding secured and companies engaged.
- 3 Public reporting:** a regular progress mechanism so partners can see what has been delivered, what is delayed and where support is needed.

Execution is what makes the framework usable. It ensures that COSINE does not become another planning language, but a way to track whether Florida is building the capacity, partnerships and programs needed for a mature quantum ecosystem.

8.7 From Framework to Roadmap

The COSINE framework identifies what Florida's quantum ecosystem needs to function: shared direction, coordination, resources, deployment routes, partnerships and delivery discipline. It also shows that talent, infrastructure and capital cut across every part of the system.

This creates the bridge between assessment and implementation. Chapters 3 to 7 identify Florida's assets, opportunities, stakeholder priorities and capability gaps. Chapter 8 translates those findings into six ecosystem functions. Chapter 9 turns those functions into a staged roadmap with priorities, sequencing and delivery milestones.

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9. STRATEGIC PRIORITIES AND ROADMAP

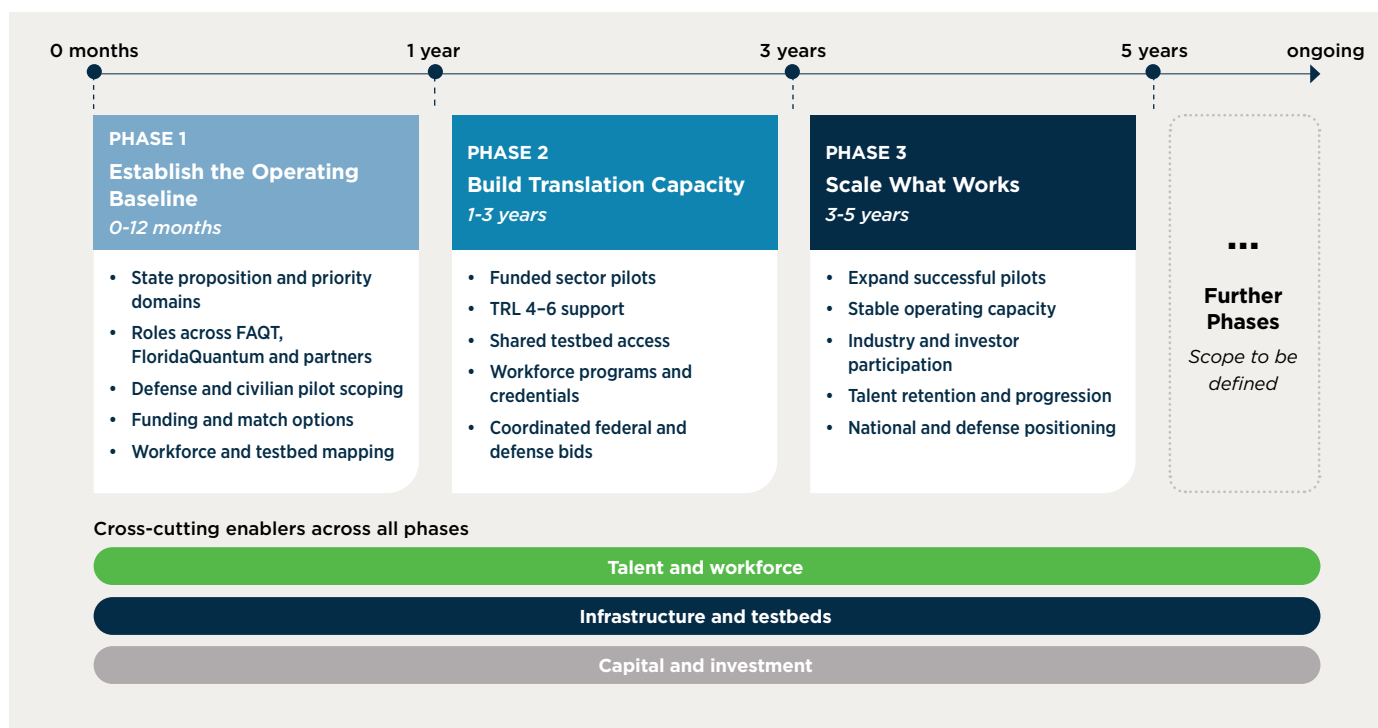


Figure 34: Five-year Indicative Roadmap for Florida's Quantum Ecosystem. Suggested sequencing from operating baseline to translation capacity and longer-term scale. Timings are indicative and should be refined through consultation, funding decisions and partner commitments.

The five-year roadmap is intended as a sequencing guide rather than a final delivery plan. It shows how Florida could move from emerging quantum activity toward a more coordinated statewide ecosystem. The timings are indicative and should be refined through consultation with state agencies, universities, companies, workforce partners, investors and federal stakeholders.

The roadmap follows the logic of the COSINE framework. The first phase establishes the operating baseline: shared direction, role clarity, priority domains, pilot scoping and funding options. The second phase builds translation capacity through funded pilots, shared testbed access, workforce programs and TRL 4 to 6

support. The third phase focuses on scale: expanding what works, strengthening industry and investor participation, retaining talent and improving Florida's national position.

Across all phases, defense should be treated as an important demand anchor, particularly for secure communications, post-quantum cryptography, resilient PNT, sensing, cyber and space related applications, while preserving civilian routes in healthcare, logistics, infrastructure and environmental resilience.

Defense should be treated as a major demand anchor in the roadmap, but not as the only route to value. Florida's defense, space, maritime, cybersecurity and logistics assets create strong

conditions for pilots in secure communications, post-quantum cryptography, resilient PNT, sensing and mission focused optimization. Civilian pathways also need to remain visible, including healthcare, ports, infrastructure, water, environmental resilience and public safety.

The strategic value lies in building dual use capability: technologies, testbeds and workforce routes that can support national security needs while also strengthening Florida's wider economy.

9.1 Establish the Operating Baseline

The first phase should focus on making the ecosystem easier to coordinate and fund. Florida does not need to resolve every long-term question immediately, but it does need a clearer operating baseline: a shared strategy, defined roles, initial priority domains and a small number of pilots scoped around real users.

Indicative priorities include:

- 1** Publish a Florida quantum strategy: define the state proposition, priority domains, initial governance approach and responsibilities across public agencies, universities and ecosystem partners.
- 2** **Clarify operating roles:** set out how FAQT, FloridaQuantum, Florida LambdaRail, universities, state agencies, regional partners and industry-facing organizations should work together.
- 3** **Scope initial pilots:** identify a small number of realistic pilots in areas such as quantum-secure communications, post-quantum cryptography migration, sensing, port or logistics optimization and applied hybrid computing.
- 4** **Prepare funding mechanisms:** explore state match, challenge funding, federal bid support, philanthropy, industry co-funding and investor-linked translation instruments.

- 5** **Map workforce routes:** identify existing and planned certificates, degrees, internships, veteran transition routes, technician training and employer needs, and define where credential recognition or progression routes are needed.

The purpose of Phase 1 is to create the conditions for delivery: shared direction, role clarity, pilot readiness and funding options.

9.2 Build Translation Capacity

The second phase should turn preparation into funded activity. This is where Florida can test whether the ecosystem can support pilots, shared infrastructure access and workforce development at a meaningful scale.

Indicative priorities include:

- 1** **Launch funded pilots:** support projects with defined users, data readiness, technical validation criteria and routes to follow-on funding or adoption.
- 2** **Create TRL 4-6 translation support:** provide engineering, validation, testbed access, customer discovery, procurement guidance and investor readiness for promising technologies.
- 3** **Expand shared testbed access:** connect university facilities, Florida LambdaRail, FAU's quantum computing platform, fabrication assets and sector test environments through clearer access models.
- 4** **Develop workforce programs:** scale technician training, internships, professional short courses, graduate routes and reskilling programs aligned with employer needs.
- 5** **Coordinate federal bids:** use the state's defense, space, communications, sensing, infrastructure and workforce assets to support stronger multi-institution proposals.

The purpose of Phase 2 is to generate evidence: pilots completed, users engaged, students trained, testbeds accessed, federal bids submitted and follow-on funding secured.

9.3 Scale What Works

The third phase should build on evidence from the earlier stages. Not every pilot will scale, but projects that show value should have a route into more durable programs, procurement pathways, company activity, workforce pipelines or federal partnerships.

Indicative priorities include:

- 1 Scale successful pilots:** expand projects that demonstrate value in areas such as secure communications, PQC migration, sensing, optimization, healthcare, infrastructure or defense applications.
- 2 Institutionalize coordination:** move from temporary convening to stable operating capacity, with clear ownership, reporting and decision-making across the ecosystem.
- 3 Deepen industry and investor participation:** use early pilot evidence to attract anchor partners, supplier activity, startups, venture engagement and corporate R&D.
- 4 Strengthen talent retention:** connect workforce programs to jobs, fellowships, internships, veterans transition routes, faculty recruitment and company growth.
- 5 Build national visibility:** position Florida around its distinctive role in deployment, secure infrastructure, workforce and operational test environments.

The purpose of Phase 3 is to make the ecosystem durable: successful programs continue, partnerships deepen and Florida's quantum activity becomes easier for federal agencies, companies, investors and talent to recognize and use.

The roadmap is a suggested sequence, not a fixed plan. It shows what should come first, what should be tested next and what should scale only after there is evidence from pilots, testbeds and workforce activity.

For Florida, the task is to move in stages: set the operating baseline, build translation capacity and scale the activities that prove useful. This gives the state a practical route from emerging quantum activity to a more coordinated and durable ecosystem.

9.4 Looking to the Future

Florida's quantum opportunity is not concentrated in a single institution, facility or region. It comes from the combination of research strengths, specialist facilities, defense and space demand, ports and logistics, healthcare and life sciences, statewide network infrastructure, emerging companies and new workforce initiatives. The evidence shows that these assets are real but not yet connected into a mature statewide ecosystem.

The strongest route for Florida is practical and deployment led. Peer states offer useful lessons, but Florida does not need to copy models built around national laboratories, large fabrication facilities or dense venture clusters. Florida can instead position itself as a state where quantum-secure communications, post-quantum cryptography, sensing, positioning, navigation and timing, optimization, hybrid computing, materials and enabling technologies can be tested, adapted and adopted in real operating environments.

The main challenge is execution. Stakeholders pointed to strong interest and clear use case opportunities, but also to the same practical needs: coordination, investment, shared testbeds, TRL 4 to 6 translation, workforce progression, defense positioning and national visibility. These needs are connected. Better coordination helps funding go further. Funding supports pilots and testbeds. Testbeds create routes for companies and public agencies to engage. Workforce programs give the ecosystem the people needed to scale.

The COSINE framework and roadmap provide a way to organize that next stage. Florida needs shared direction, clearer roles, funded pilots, routes into deployment, stronger partnerships and delivery accountability. The sequence should remain flexible, but the logic is clear: establish the operating baseline, build translation capacity and scale what proves useful.

Five priorities should guide that next stage.

1 Implement COSINE as the state's operating framework. COSINE should be used to align partners, clarify roles, identify gaps and track progress across the ecosystem. It gives Florida a common structure for action without constraining institutional leadership or regional specialization.

2 Create an initial applied research and talent fund. Florida should establish a focused fund to support student led and industry linked applied research projects. The fund should target practical problems in defense, space, logistics, healthcare, finance, cybersecurity, advanced manufacturing and critical infrastructure. Its purpose should be to build talent and translation capacity together.

3 Build a connected network of quantum hubs. Florida should support quantum hubs that reflect regional strengths but operate as part of one statewide system. These hubs should have a shared mandate to coordinate resources, support workforce training, engage industry and accelerate commercialization. They should not become isolated institutional projects.

4 Launch testbeds and pilots in parallel. Florida should move quickly on a small number of practical pilots in areas where the state has clear demand and credible operating environments. Priority areas should include post-quantum cryptography readiness, quantum-secure communications, sensing, resilient positioning and timing, logistics optimization and infrastructure resilience. Each pilot should have a defined user, delivery partner, technical scope, success criteria and route to scale.

5 Make post-quantum security a statewide readiness priority. Post-quantum security is the nearest term quantum requirement and the clearest area for immediate action. Florida should support a voluntary readiness program for public agencies, defense suppliers, infrastructure operators, healthcare systems, financial institutions and major employers. Early activity should focus on awareness, cryptographic inventory, supplier readiness and pilot migrations.

Florida has the foundations of a quantum ecosystem already in place. The opportunity now is to connect those foundations more deliberately, support them with targeted investment and give the ecosystem the operating structure needed to scale.

Defense can provide an important demand anchor, especially in secure communications, sensing, resilient positioning, navigation and timing, cyber and space related applications. Florida's wider opportunity is dual use: building capabilities that support national security while also serving healthcare, logistics, infrastructure, environmental resilience and advanced industry. With sustained focus, Florida can build a quantum position that is distinctive, practical and aligned with both state economic priorities and national technology needs.

APPENDIX A: ACKNOWLEDGEMENTS

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Individual views have been synthesized and anonymized throughout the report. Inclusion in the contributor list does not imply endorsement of findings or recommendations.

Belcan	Magnetics Corporation
D-Wave Systems	Medina Ventures
DeepWork Capital	PortMiami
eMerge Americas	Quantum Innovation Center, Palm Beach
Florida A&M University (FAMU)	Space Florida
Florida Atlantic University (FAU)	SV Microwave
Florida Department of Commerce	University of Central Florida (UCF)
Florida Department of Transportation (FDOT)	University of Florida (UF)
Florida State University (FSU)	University of South Florida (USF)

APPENDIX B: GLOSSARY

Acronyms and technical terms used in the report and accompanying figures and tables.

AFOSR	Air Force Office of Scientific Research.	CHIPS Act	U.S. CHIPS and Science Act; federal program funding semiconductor R&D and manufacturing.
AFRL	Air Force Research Laboratory.	CNSA 2.0	Commercial National Security Algorithm Suite 2.0; NSA framework requiring transition to post-quantum cryptography for national security systems.
AI	Artificial intelligence.	COSINE	Analytical framework used in this report: Cohesion, Orchestration, Stimulation, Integration, Networking, Execution.
ANL	Argonne National Laboratory; DOE multidisciplinary national laboratory near Chicago.	CREOL	UCF College of Optics and Photonics.
ARL	Army Research Laboratory; the U.S. Army's corporate research arm.	Cryogen-free	Quantum sensor or system that does not require liquid cryogenics (e.g., helium), enabling deployment outside specialist facilities; characteristic of OPM-MEG systems.
ARO	Army Research Office; basic-research grant-making office under ARL.	Cryogenic	Operating regime requiring temperatures far below ambient (typically near absolute zero); required by many superconducting and dilution-refrigerator quantum systems.
BASF	BASF SE; multinational chemical company; cited as a manufacturing precedent for industrial quantum workflow applications.	D-Wave Advantage2	Annealing quantum-computing system; FAU has agreed to install one in Boca Raton.
BDB	Business Development Board of Palm Beach County; economic development organization and co-author of this report.	DARPA	Defense Advanced Research Projects Agency.
Belcan	Engineering and technical services firm; stakeholder consulted for this report.	DCEO	Illinois Department of Commerce and Economic Opportunity; state agency referenced in peer-state quantum strategy comparison.
Blue Origin	Commercial space company with more than \$3 billion invested in its New Glenn facility in Florida.	DeepWork Capital	Florida-based venture capital firm focused on early-stage deep technology.
BNL	Brookhaven National Laboratory; DOE national laboratory on Long Island, New York.	DFT	Density functional theory; quantum-mechanical method used to model materials.
BRIDG	Florida microelectronics R&D and advanced packaging facility located in NeoCity.		
Cape Canaveral	Florida's primary orbital launch site on the Space Coast.		
CCMS	Center for Condensed Matter Sciences (UF) — materials synthesis and multimodal characterization.		
Cerca Magnetics	UK quantum-sensing company that develops wearable OPM-MEG brain-imaging systems.		

DIU	Defense Innovation Unit; DOD organization that fields commercial technology for the warfighter; sponsor of the X-37B Mission 8 quantum sensor demonstration.
DOD	U.S. Department of Defense.
DOE	U.S. Department of Energy.
eMerge Americas	Miami-based technology conference and ecosystem-building platform for the Americas.
Entanglement	Quantum correlation between particles whose states cannot be described independently; foundational resource for quantum computing, sensing and networking.
Error correction	Set of techniques (quantum error correction) that protect quantum information from noise and decoherence, required for fault-tolerant computation.
FAA	Federal Aviation Administration.
FAMU	Florida Agricultural and Mechanical University.
FAQT	Florida Alliance for Quantum Technology; statewide quantum coordination consortium.
FAU	Florida Atlantic University.
Fault-tolerant	Quantum computing regime in which logical operations are protected by error correction and can run reliably at scale.
FDOT	Florida Department of Transportation; state agency overseeing mobility, safety and evacuation infrastructure.
FDSC	Florida Defense Support Commission; state body that administers Defense Reinvestment, Defense Infrastructure and the FDSC grant programs.
FDSC Grant Program	Discretionary grant program managed by the Florida Defense Support Commission, totaling roughly \$3.6M annually together with Defense Reinvestment and Defense Infrastructure.
FICS	Florida Institute for Cybersecurity Research at the University of Florida.

FIU	Florida International University.
FloridaQuantum	Statewide quantum-coordination initiative referenced alongside FAQT and PBSC's Quantum Innovation Center.
FLR	Florida LambdaRail; Florida's research and education optical network.
FSU	Florida State University.
GDP	Gross domestic product.
GNSS	Global Navigation Satellite System; general term encompassing GPS and equivalent positioning constellations (see PNT, GPS-denied).
GPS	Global Positioning System.
GPS-denied	Operating environment where GPS signals are unavailable, jammed or spoofed.
GPU	Graphics Processing Unit; massively parallel processor used for AI, simulation and hybrid quantum-classical workflows.
Gravimeter	Instrument that measures local gravitational acceleration; quantum gravimeters use cold atoms or atom interferometry for high sensitivity, e.g., for seabed mapping.
HERD	Higher Education Research and Development survey, run by NSF.
High B/T	High magnetic field combined with very low temperature; specialty quantum-research environment.
HiPerGator	UF's high-performance computing and AI platform; includes 2025 NVIDIA Blackwell B200 GPU upgrade.
HPC	High-performance computing.
IBM	International Business Machines Corporation; major quantum-computing vendor.
ICT	Information and Communications Technology; referenced via South Korea's Ministry of Science and ICT.
Inertial navigation	Navigation technique that tracks position by integrating measured acceleration and rotation, enabling operation without GPS; the X-37B Mission 8 demonstrated a quantum version.

Inertial sensing	Measurement of acceleration and rotation using quantum sensors (e.g., cold-atom interferometers, NV diamond); one of the largest defense-quantum activity categories in this report.
IonQ	Trapped-ion quantum-computing company.
IP	Intellectual property.
KSC	Kennedy Space Center.
L3Harris	Florida-headquartered defense electronics and communications contractor.
LANL	Los Alamos National Laboratory.
Laparoscopic	A type of keyhole surgery where a thin camera is inserted through a small cut so the surgeon can see inside the body and operate with small instruments.
LBNL	Lawrence Berkeley National Laboratory.
LLNL	Lawrence Livermore National Laboratory.
Lockheed Martin	U.S. aerospace and defense prime contractor with approximately 17,000 Florida employees.
MacDill Air Force Base	Tampa installation hosting U.S. Central Command and U.S. Special Operations Command.
MagLab	See NHMFL.
Magnetics Corporation	Florida-based stakeholder organization consulted for the study.
Magnetometer	Sensor that measures magnetic-field strength and direction; quantum implementations include optically pumped, NV diamond and SQUID variants.
Magnetometry	Measurement and mapping of magnetic fields using magnetometers; underpins OPM-MEG brain imaging and NV diamond sensing applications.
Medina Ventures	Florida-based investor and stakeholder organization consulted for the study.

MEG / OPM-MEG	Magnetoencephalography; OPM-MEG uses optically pumped magnetometers for non-cryogenic brain imaging.
MEMS / NEMS	Micro- and nano-electromechanical systems.
Microkelvin	Sub-millikelvin temperature regime; UF's Microkelvin Research Lab is a specialist cryogenics facility.
MOU	Memorandum of understanding.
MSA	Master Service Agreement (commercial contract).
NASA	National Aeronautics and Space Administration.
Nat'l labs	U.S. Department of Energy national laboratories: ORNL, LANL, ANL, LBNL, BNL, SNL, PNNL, LLNL.
NeoCity	Osceola County technology district focused on semiconductors, photonics and smart sensors.
New Glenn	Blue Origin's heavy-lift orbital launch vehicle; manufacturing and operations facility located on the Space Coast.
NHMFL	National High Magnetic Field Laboratory ("MagLab"); NSF user facility headquartered at FSU with sites at UF and LANL.
NIH	National Institutes of Health.
NIST	National Institute of Standards and Technology.
Northrop Grumman	U.S. aerospace and defense prime contractor with significant Florida operations.
NRF	UF Nanoscale Research Facility; cleanroom and nanofabrication.
NRL	U.S. Naval Research Laboratory; the corporate research laboratory for the Navy and Marine Corps.
NSA	National Security Agency.
NSF	National Science Foundation.
NV centers	Nitrogen-vacancy defect centers in diamond; used in quantum sensing and as photon emitters.
NV diamond	Bulk diamond hosting nitrogen-vacancy defect centers used as quantum magnetometers and photon emitters (see NV centers).

NVIDIA	NVIDIA Corporation; GPU and AI-platform vendor; UF partner for HiPerGator.
ONR	Office of Naval Research.
OPM	Optically Pumped Magnetometer; cryogen-free quantum sensor used in non-cryogenic brain imaging (see MEG / OPM-MEG).
ORNL	Oak Ridge National Laboratory.
Patrick Space Force Base	Brevard County installation hosting the headquarters of STARCOM and supporting more than 14,000 Guardians.
PBSC	Palm Beach State College; host of the Quantum Innovation Center providing applied quantum workforce training.
Photonic	Pertaining to photons; describes devices, systems or platforms that use light to carry, process or detect quantum information.
Photonics	Science and engineering of generating, controlling and detecting photons; underpins CREOL's research and Florida's quantum networking and sensing ecosystem.
PNNL	Pacific Northwest National Laboratory.
PNT	Positioning, navigation and timing.
PortMiami	Major Florida seaport used in this report to illustrate constrained-land logistics and quantum optimization use cases.
PQC	Post-quantum cryptography; classical algorithms designed to resist attacks from large quantum computers.
PQC pilot	Sector-based conversion program that migrates real systems from classical to post-quantum cryptography (see PQC).
Q-CTRL	Australian quantum-control software company; announced a maritime quantum-navigation trial with the Royal Australian Navy.
QIP	Quantum information processing.
QKD	Quantum key distribution; cryptographic key exchange that relies on quantum physics.

QRNG	Quantum random number generation.
Quantum advantage	Demonstration that a quantum system solves a useful problem materially faster, cheaper or better than the best classical alternative.
Quantum annealing	Specialized quantum-computing approach that finds low-energy solutions to optimization problems; commercialized by D-Wave (see D-Wave Advantage2).
Quantum Innovation Center	(PBSC) Workforce-training center at Palm Beach State College; provides the applied quantum workforce layer for South Florida.
Quantum transduction	Conversion of quantum information between physical domains (e.g., microwave to optical), enabling networking of disparate quantum platforms.
Quantum-safe	General term for communications, networks and cryptographic systems designed to resist attack by a future large-scale quantum computer (related to PQC).
Qubit	Quantum bit; the basic unit of quantum information.
R&D	Research and development.
R1	Carnegie Classification "R1" — Doctoral Universities with very high research activity.
RF	Radio frequency.
SiC	Silicon carbide; wide-bandgap semiconductor with quantum-relevant defect centers.
SNL	Sandia National Laboratories.
Space Coast	Brevard County region of Florida centered on Cape Canaveral and Kennedy Space Center; hub of state aerospace activity.
Space Florida	State-chartered authority that promotes Florida's aerospace economy and stakeholder of the Florida quantum ecosystem.
SpaceX	Commercial launch provider; major Florida employer operating from Cape Canaveral and Kennedy Space Center.

SPAD	Single-Photon Avalanche Diode; semiconductor detector used in photon-counting imaging and quantum-optical diagnostics.
STARCOM	U.S. Space Training and Readiness Command; headquartered at Patrick Space Force Base, Florida.
STEM	Science, Technology, Engineering, and Mathematics; used to describe graduates and workforce pipelines.
SUNY	State University of New York system.
Superconducting	Class of quantum-computing hardware that uses superconducting circuits cooled to millikelvin temperatures; one of the leading qubit modalities.
SV Microwave	Florida-based RF and microwave components manufacturer; stakeholder consulted for the study.
SWOT	Strengths, Weaknesses, Opportunities, Threats analysis.
The Quantum Insider	Quantum-industry intelligence and media platform; co-author of this report.
Topological	Quantum-computing approach that encodes information in topologically protected states to reduce errors; related to TQFT.
TQFT	Topological quantum field theory.
TRL	Technology readiness level (NASA-derived scale 1–9).
U.S. Space Force	Sixth branch of the U.S. armed forces; operates Patrick Space Force Base and headquarters STARCOM in Florida.
UCF	University of Central Florida.
UF	University of Florida.
UF-NVIDIA AI Initiative	Partnership between the University of Florida and NVIDIA providing GPU and AI capacity that supports quantum simulation and hybrid workflows (see HiPerGator).
ULA	United Launch Alliance; Boeing-Lockheed Martin joint venture providing launch services from Cape Canaveral.
UNF	University of North Florida.

USD	United States Dollar; reporting currency for government investment commitments in this report.
USF	University of South Florida.
VPN	Virtual private network.
Wide bandgap	Semiconductor materials such as SiC, GaN, Ga ₂ O ₃ , AlN with wide energy band gaps; used in power electronics and quantum devices.
X-37B	Reusable robotic spaceplane operated by the U.S. Space Force; Mission 8 carried a quantum inertial navigation sensor launched from Kennedy Space Center.
YTD	Year-to-date; partial-year figure used when the 2026 dataset is incomplete.

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