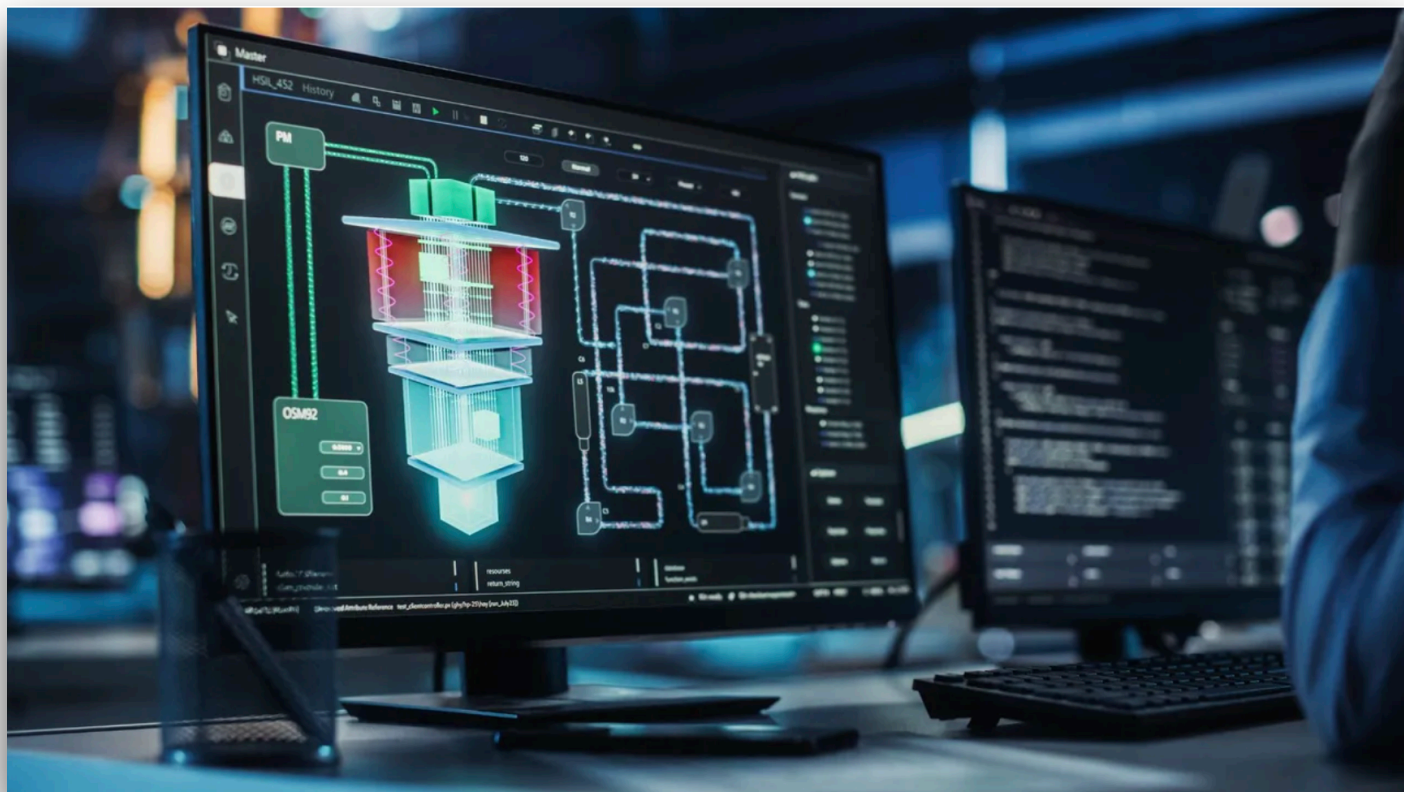




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27 July 2026 | Features | Patents | Erik Huestis, Alexander Akhiezer

Quantum computing's picks-and-shovels moment: What the new US executive orders signal for IP

Twin executive orders send a signal to the quantum computing market, with the supply chain emerging as a critical focus, say Erik Huestis and Alexander Akhiezer of Foley Hoag.

On June 22 2026, the White House issued two executive orders focused on the post-quantum cryptography (PQC) transition and fostering innovation in quantum computing, sensing, and networking.

The headline benchmark is the establishment of a “quantum computer at a scale intended to initiate the era of quantum-enabled scientific discovery”.

Irrespective of the mechanics and efficacy of the orders, they telegraph urgency and direction.

The US now unequivocally treats quantum technology as a national security matter, and the executive orders embody the view that quantum innovation across computing, sensing and networking is foundational to the next wave of disruptive technology.

A vulnerable network

The coordinated, high-priority framing highlights the supply-chain vulnerability of the quantum space and points to the sheer number of far-flung enabling components.

[Executive Order 14412](#), “Securing the Nation Against Advanced Cryptographic Attacks,” aims to accelerate the federal government’s move to post-quantum cryptography. It sets an aggressive timeline for key establishment by December 31 2030 and digital signatures by December 31 2031.

The “harvest now, decrypt later” exposure has become more salient as quantum timelines have accelerated.

[Executive Order 14413](#), “Ushering in the Next Frontier of Quantum Innovation,” is the more telling document. This executive order crystallises the accelerated quantum timeline.

Quantum technology has transitioned from a matter of abstract research with distant implications to a matter of deployment, commercialisation and industrial-scale competition.

Although the executive orders align with the broad consensus that the quantum runway is shortening, there is no consensus on what modality or modalities will stand the test of time.

Superconducting, trapped-ion, neutral-atom, photonic, and silicon-spin approaches represent various trade-offs in gate speed, coherence, scalability, and cooling.

No universal victor has emerged, and there will likely remain specialised uses for each modality for decades even as the broader market consolidates.

US-based companies are active across every qubit modality: IBM, Google and Rigetti in superconducting circuits, IonQ and Quantinuum in trapped ions, QuEra and Atom Computing in neutral atoms, and PsiQuantum in photonics.

Whichever approaches achieve market dominance, enduring value increasingly lies in the components that they share.

Supply chain challenges

Unlike a pharmaceutical product built around a single active ingredient, an integrated quantum system has no single point of value. Its risk surface is spread across a broad supply chain, and its IP exposure is spread just as widely.

A large retinue of component providers are at once critical and platform-neutral, supplying the picks and shovels to the quantum gold rush.

The executive orders recognise these weak points. They emphasise strengthening domestic supply chains, developing “quantum-enabling component technologies”, and removing “[Quantum Information Science and Technology] manufacturing barriers”.

The component layer, critical to quantum processing unit (QPU) makers across multiple modalities, is therefore key strategic terrain. It is also an area where a domestic manufacturing base is sorely lacking.

Although different qubit modalities rest on different physics, the enabling technology stack has significant overlap.

Cryogenics and dilution refrigerators, control electronics and cryo-CMOS, precision lasers, ultra-high-vacuum systems, photonic components, and single-photon detectors form a mosaic of critical technologies, each spanning multiple modalities.

Cryogenics, for example, reaches beyond superconducting (with its photogenic dilution refrigerators) into neutral-atom, trapped-ion, and silicon-spin systems.

Even ostensibly room-temperature photonic devices still require cooling their superconducting single-photon detectors.

The overlap in enabling technologies causes a constraint in one component layer that can ripple across otherwise unrelated quantum programmes.

Major ‘chokepoints’

On the neutral-atom and trapped-ion side, the Rydberg-excitation and trapping lasers come from a very short list of ex-US suppliers. On the superconducting side, dilution-refrigerator capacity and cryogenic supply are key constraints.

The industry’s reliance on a tenuous international supply chain is mirrored in the executive order provisions on international engagement.

Quantum IP chokepoints track the supply chain constraints, and the land grab is already in progress. From 2014 to 2024, annual patent filings in quantum technologies increased [approximately fivefold](#).

In 2024, the China National Intellectual Property Administration (CNIPA) accounted for around 60% of these filings, with the US Patent and Trademark Office (USPTO) in second place at around 19% and the World Intellectual Property Organization (WIPO) rounding out the top three at around 9%.

Quantum-related patent filings are on a meteoric rise but the diversity of modalities renders the space very different from more mature technologies.

The filing growth is spread over many different technical areas and scopes, avoiding gridlock, but the highest value IP holdings sit in the cross-cutting components and techniques every modality must touch.

Those cross-cutting layers are also the most concentrated.

[Toptica Photonics](#) of Germany is generally considered the [dominant supplier of lasers for quantum technology](#).

The [failure in 2025](#) of M Squared Lasers of the UK, a specialist provider of Ti:sapphire lasers, highlights the potential fragility of the narrow base of laser suppliers. A single-node failure can have significant impact across modalities.

The dilution refrigerator market is similarly concentrated. Bluefors of Finland and Oxford Instruments of the UK collectively hold [more than 70% of global share](#) by some accounts.

The market is further rendered fragile by its reliance on [scarce, nuclear-weapon-derived helium-3](#).

IP chokepoints sit atop and mirror these supply-chain chokepoints. A blocking patent on a universal component provides as much leverage or disruption potential as a supply-chain limitation on a key cross-cutting component.

This creates a host of potential licensing gauntlets, irrespective of which quantum modality is dominant in the 2030s.

Impact of patent pools and new standards

The Intellectual Property (IP) Alliance for Quantum Computing Industry, formed by Chinese organisations including Baidu and the Beijing Academy of Quantum Information Sciences (BAQIS) announced a [patent pool in 2023](#).

The pool targets quantum measurement and control, quantum security and encryption, quantum architecture and software, quantum error correction, and quantum algorithms.

This echoes the prior emergence of standard-essential patent pools in the telecom industry, and highlights both the criticality of cross-cutting IP and the limitations of single-modality patents in a still-emerging field.

An alternative path towards standard-setting was adopted by NIST, which required that any PQC submissions making their way into a standard be [licensed freely](#).

Both of these approaches will figure prominently in a company's quantum IP strategy, but the speed of iteration in the field requires a careful assessment of the shelf life of any given IP right.

A mixture of patents, trade secrets, and open innovation will be required, and should be assessed on a layer-by-layer basis across the technology stack.

The relative stability of enabling technologies points to the strategic value of IP holdings that cut across modalities.

What in-house counsel should know

For in-house counsel, the state of the industry suggests several best practices. First, there is no analogue to an active ingredient patent.

Enterprises focused on integrated quantum systems such as computers should be building a filing pipeline, not a single trophy patent.

Filing early and iterating, and not being afraid to prune as the market develops, allows nimble tracking of the innovation front.

For key components, both supply-chain and freedom-to-operate threats should figure into partnering and sourcing strategy. Freedom to operate and indemnity for patent risk should be part of early discussions with suppliers, and in some instances should go so far as to dictate platform design choices.

Monitoring of the macro licensing environment will also be increasingly critical. Patent pools and standards-setting will evolve significantly over the coming years.

Alignment with these efforts will mitigate IP risk and may give smaller market participants additional leverage through the collective weight of industry-spanning organisations.

Even where commercial strategy is focused on integrated systems, counsel should be on the lookout for components shared among qubit modalities. These building blocks can provide licensing opportunities down the road, and can hedge platform risk as the field continues to evolve.

Security concerns

Finally, the national security nature of quantum infrastructure, as conveyed by the executive orders, requires increased awareness of international trade factors, export control limitations and consolidation risk. Quantum technologies require politically aware IP strategy.

As the quantum computing industry matures, the contest for advantage is unlikely to be settled by any single qubit modality in the near future.

With no clear architectural winner, durable value and durable risk alike collect in the quantum picks and shovels: the cryogenics, lasers, control electronics, and vacuum systems that every platform draws upon.

Given this allocation of value, the executive orders treat the enabling supply chain as security-relevant national infrastructure. Because those same cross-cutting components are where patent filings concentrate and where blocking positions form, the IP chokepoints track the supply chain chokepoints.

The strongest IP position favours modality-spanning building blocks over a single trophy patent, and stays alert to patent pools, standards-setting, and trade and export-control pressures.

In the picks-and-shovels era of quantum, the companies that map their IP holdings onto the supply chain's real failure points will be best placed as platform consolidation progresses.

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<https://www.worldipreview.com/patent/quantum-computings-picks-and-shovels-moment-what-the-new-us-executive-orders-signal-for-ip>