



Australian Government

Australian Trade and Investment Commission

Australian Quantum Technology

Industry Capability Report

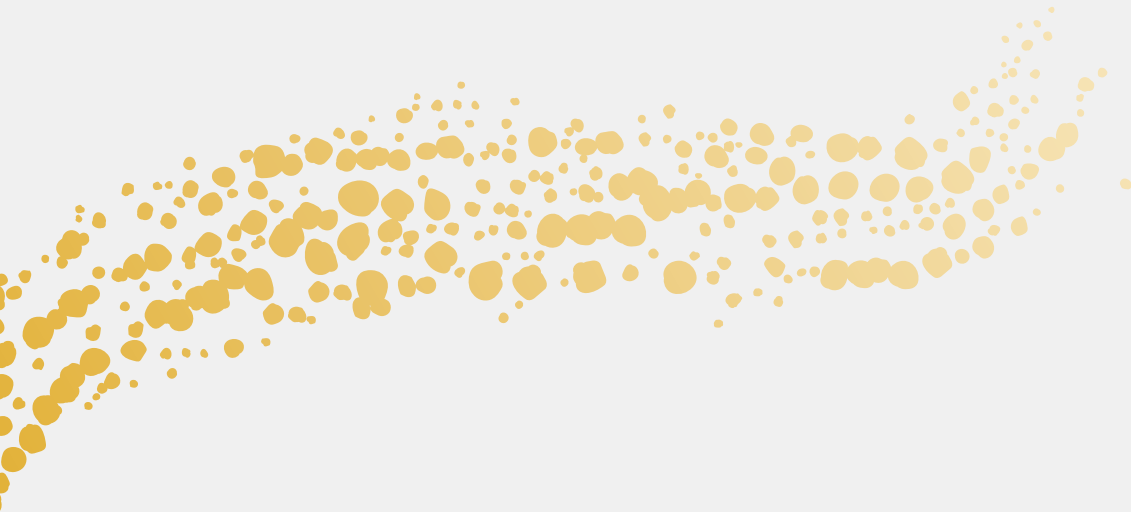
About Austrade

The Australian Trade and Investment Commission (Austrade) is Australia's national trade and investment promotion agency.

Austrade connects global businesses to Australian opportunities, including supporting international businesses seeking to source Australian quantum products and services, or to invest in the local Australian quantum technology industry. Through tailored assistance, Austrade can connect you with leading quantum companies, research institutions, and emerging startups, provide market intelligence on capabilities and trends, and guide you through collaboration, trade and investment opportunities.

Whether you are looking to procure quantum technology products and services, partner with Australian universities on research initiatives, invest in an Australian quantum technology presence, or engage in talent exchange, there are numerous pathways to participate.

To explore opportunities in Australia's quantum technology ecosystem, visit **www.Austrade.gov.au**. Our team is ready to help you tap into the potential of Australian quantum and build impactful international partnerships.



Quantum Australia

This report was developed by Quantum Australia in partnership with Austrade. Quantum Australia is the national centre for Australia's quantum growth, a government-funded consortium established to advance the nation's quantum technology sector. It serves as a hub connecting industry, research, and government, aiming to accelerate the development and adoption of quantum technologies.



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Executive Summary

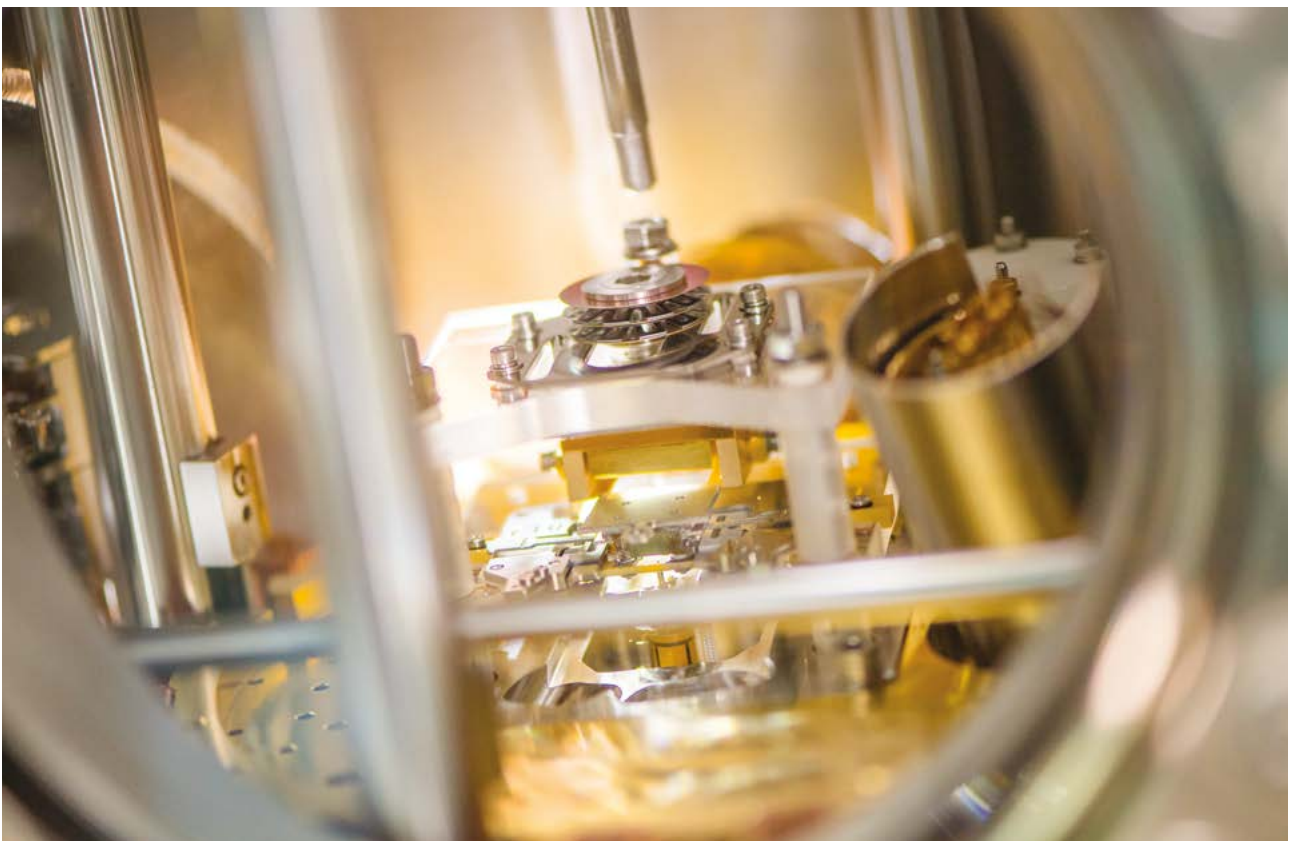
The Australian quantum technology ecosystem developed from nearly 30 years of sustained investment by government and universities into the core building blocks of Australia's quantum capability. This long-term commitment has enabled Australian companies to commercialise and export internationally recognised products across quantum computing, communications and sensing technologies and services, as well as producing quantum-enabling and supporting ventures, and quantum educational technologies and services.

Australia's quantum capability rests on a solid foundation of academic leadership, strategic national policy, and government support as well as focused commitment to translating innovation into investment and export-ready applications.

Australia's quantum ecosystem spans the full value chain, consisting of a rapidly growing commercial sector, with more than 40 quantum-related businesses, 26 dedicated quantum research organisations, over 60 academic research groups conducting cutting-edge work, and 53 specialised facilities and labs advancing quantum R&D.

This report outlines Australia's capabilities and expertise in quantum technology and highlights the achievements of Australian quantum technology companies. A diverse cohort of Australian quantum companies are delivering globally competitive solutions in sensing, communications and computing, as well as quantum enablers, adjacent ventures and those with education focused products.

Backed by world-class research, a coherent national strategy and a growing cohort of export-focused companies, Australia is an ideal partner for next generation quantum technologies.



Key Quantum Definitions

- **Quantum Technologies:** Devices that utilise quantum mechanical effects for specific tasks, including computing, communications, sensing across first- and second-generation technologies.
- **Quantum Companies / Organisations:** Businesses whose primary mission, products, or services are directly focused on the development and commercialisation of quantum technologies. This includes quantum computing, sensing, and communications, which includes quantum cybersecurity.
- **Quantum Enablers:** Businesses that are enabling the development of quantum technologies but do not develop full hardware or software stacks themselves. These organisations provide essential enabling tools, platforms, or services that directly support quantum research, development, deployment, or commercialisation. This includes fabrication, testing, control systems, and quantum-specific simulation or education platforms.
- **Quantum Adjacent:** Businesses that are not necessarily primarily focused on quantum technologies but are either key to the supply chain supporting quantum businesses or are integrators and solution providers incorporating quantum technologies into products or services. These organisations often support quantum efforts through collaborations or secondary applications, such as advanced materials, photonics, metrology, or semiconductor manufacturing.
- **Quantum Ecosystem:** The collection of academic and commercial research, commercial products and services, consulting, government programs, standardisation, regulation and national security organisations looking to develop, deploy or utilise quantum technologies.
- **Quantum End Users:** Organisations or individuals who deploy and exploit quantum technologies to aid in other commercial activities.
- **Quantum Education and Literacy:** Organisations or individuals who are deploying tools to educate users in quantum technology and build a future ready workforce to support the quantum ecosystem, and foster widespread understanding and acceptance of quantum technologies across the general population.

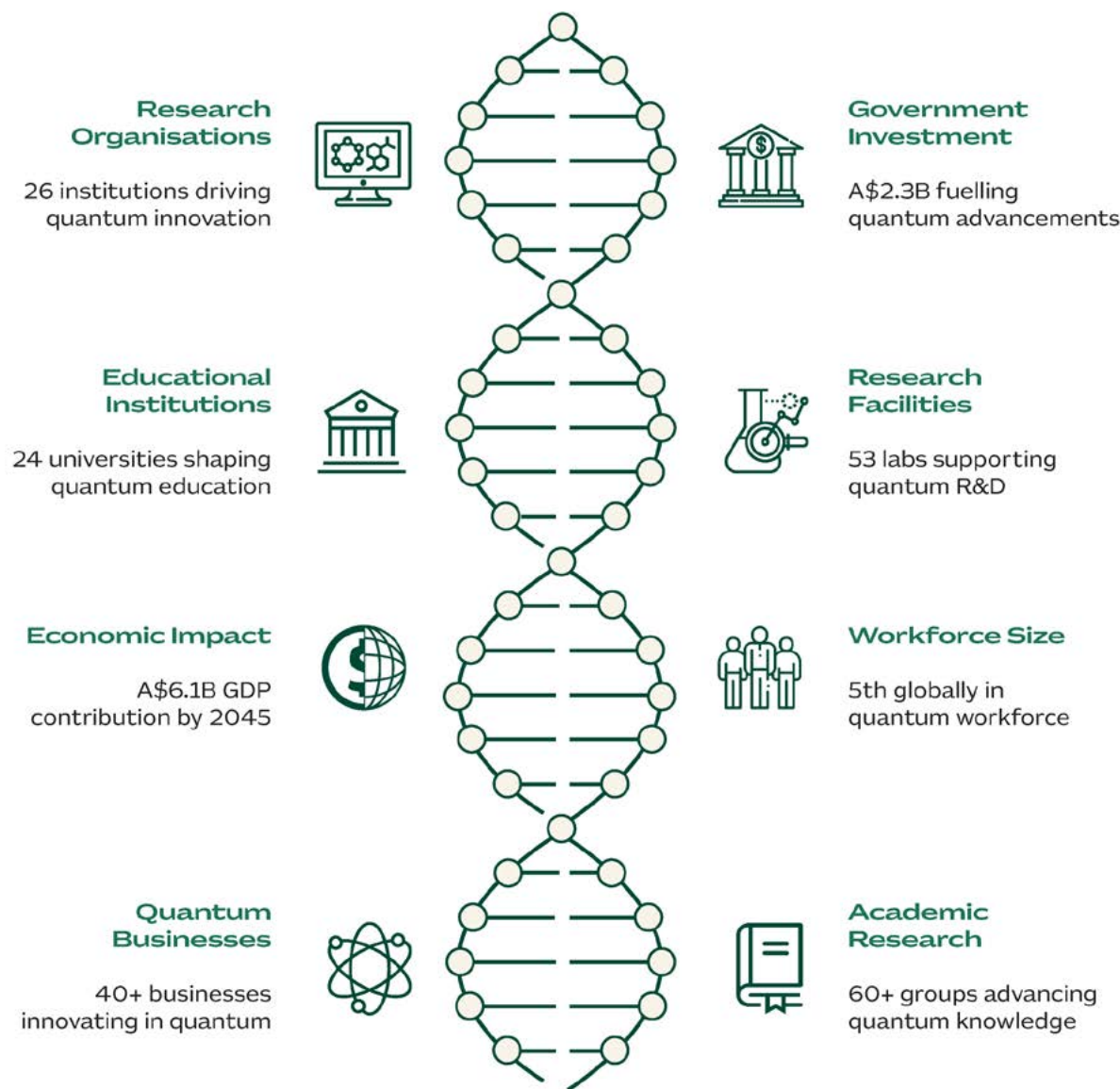


Australia's Quantum Competencies

Sector Landscape

Australia's strength in quantum technologies is based on a broad range of competencies. The country's quantum capability rests on a solid foundation of academic leadership, strategic national policy, and strong government support as well as focused commitment to translating innovation into investor and export-ready applications.

Figure 1. Overview of Australian Quantum Ecosystem.



As shown in Figure 1 (left), Australia's current capabilities include:

- 26 dedicated quantum research organisations, and more than 60 academic research groups conducting cutting-edge work across quantum computing, sensing, and communications.
- A strong educational backbone, with 24 universities teaching quantum subjects and 53 specialised facilities and labs advancing quantum R&D.
- A rapidly growing commercial sector, with 40+ quantum-related businesses, many emerging as spinouts within the past five years.
- Global recognition for workforce scale, ranking 5th in the world for quantum talent capacity.

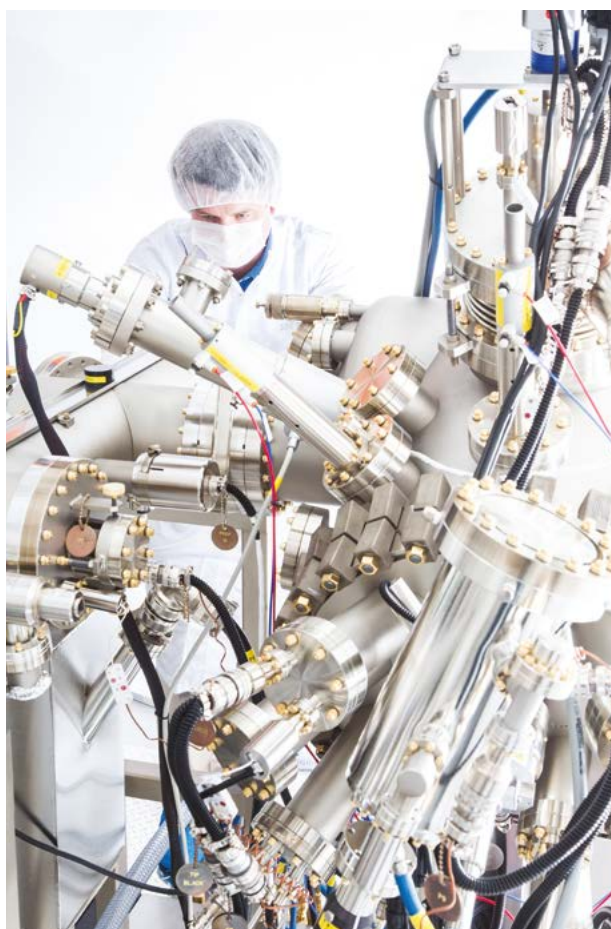
Over A\$2.3 billion in public investment has been made in fundamental quantum research over the past 25 years, establishing the infrastructure and expertise that underpin today's innovation. According to the CSIRO Quantum Technology Roadmap, this investment is forecast to contribute A\$6.1 billion to Australia's gross domestic product (GDP) by 2045, driven by the commercialisation of quantum computing, communications, and sensing technologies.

The launch of the National Quantum Strategy in May 2023 significantly amplifies this trajectory. It establishes a clear, long-term framework to position Australia as a trusted global quantum partner. The Strategy defines seven key goals – from fostering commercialisation and investment pipelines, to supporting infrastructure and championing responsible innovation. At its core, it prioritises efforts to:

- Build sovereign capability and expand talent pipelines,
- Accelerate commercialisation through targeted funding, and
- Strengthen international partnerships and global positioning.

These ambitions are already translating into action:

- Quantum Australia is Australia's front door to the quantum industry and ecosystem.
- Proposed testbeds, software networks, and international collaborations, are creating the connective base for a globally competitive ecosystem.



- Major public investments, including AU\$940M into PsiQuantum, AU\$40M into Silicon Quantum Computing, A\$15M into QuintessenceLabs and AU\$13M into Quantum Brilliance, reflect a decisive push toward industry readiness.
- Institutions like the Sydney Quantum Academy and new Australian Research Council-funded training centres are growing Australia's future workforce.

To support this momentum, Australia is rapidly growing its workforce through coordinated national efforts. Under the guidance of the National Strategy and CSIRO Roadmap, supervision capacity and postgraduate pathways are now expanding nationwide, ensuring Australia's talent pipeline keeps pace with commercial and global demand.

Australia's quantum sector is at an inflection point. Backed by world-class research, a coherent national strategy, and a growing cohort of export-focused companies, Australia is not only keeping pace with global developments, but also actively shaping them.

Australia's National Capability

Australia's quantum sector combines strategic depth, technical maturity, and global relevance. This section highlights the ecosystem's capabilities across core domains, from research to commercial and export-ready technologies.

Australia's Key Strengths

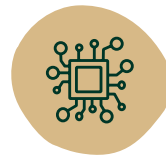
Australia's quantum ecosystem spans the full value chain, from foundational scientific research, through R&D to commercial deployment, with particular strengths in several core areas (see next page for summary matrix):



Quantum Computing (Hardware and Software): Australia has growing leadership in both quantum hardware and software. Companies such as

Diraq, Silicon Quantum Computing, Quantum Brilliance, Emergence Quantum, Iceberg Quantum, and Q-CTRL are advancing scalable quantum processors, control platforms, and quantum software. These firms are engaged in active R&D with growing international footprints, supported by strong public and private investment. Products are already being trialled or sold in markets including the USA, Germany, Japan, India and South Korea, targeting key sectors such as computing and information technology, mining, energy, finance, healthcare, transport and logistics, national security, and research.

cryptography systems, with current deployments focused on critical infrastructure, cybersecurity, and defence sectors internationally.



Quantum Enabling Technologies:

Australia has a strong base of companies delivering components, subsystems, and support services that underpin global quantum systems. Companies such as Emergence Quantum, Iceberg Quantum, Q-CTRL, Redback Systems, Elemental Instruments, and Eigensystems are supplying software tools, control hardware, spectroscopic instruments, and/or education platforms. These offerings are being adopted internationally and are often integrated into broader global quantum platforms.



Quantum Sensing: This is one of Australia's most advanced quantum domains, with several companies nearing or achieving product deployment. Firms such

as Q-CTRL, QuantX Labs, Nomad Atomics, and Chromos Labs are developing precision magnetic sensors, atomic clocks, gravimetric sensors, gravimeters and accelerometers, and imaging systems for use in navigation, mining, defence, and medical diagnostics. Several of these technologies are commercially available or in advanced pilot stages, and in some cases, with field trials being undertaken locally and internationally with industry and defence partners.



Quantum-Adjacent Technologies:

Several Australian firms operate in adjacent sectors, including photonics, semiconductors, advanced sensing, and Artificial Intelligence (AI), which intersect directly with quantum technology development. Companies like Advanced Navigation, Liquid Instruments, BluGlass, and Silanna Group produce technologies that support quantum R&D and feed into quantum supply chains. These companies are commercially active, often with established export markets and cross-sector collaborations.



Quantum Communication and Security: Australia's capabilities in quantum-secure communications are led by companies like Quintessence Labs,

VeriQuantix, and Lumi Quantum. These firms are developing and deploying quantum key distribution, random number generation, and post-quantum



Quantum Knowledge and Workforce Development:

Australia is home to a growing set of quantum education and consulting providers who support talent development and industry capability. Organisations such as Q-CTRL, Eigensystems, and H-bar Consultants are delivering scalable quantum education platforms, workforce training, and/or technical consulting across government, academia, and enterprise.

	Quantum Hardware	Quantum Software	Quantum Hardware	Quantum Software	Quantum Hardware & Software	Quantum Hardware & Software	Quantum Supply chain	Quantum Education and Literacy	Quantum Foundational Research
Capability Area	Quantum Computing		Quantum Communications		Quantum Sensing	Quantum Enablers	Quantum Adjacent	Quantum Knowledge	
Globally Competitive		●			●	●	●	●	●
Competitive Funding Environment		●			●	●		●	
Current Commercial Products	●	●	●	●	●	●	●	●	N/A
Actively Exporting	●	●	●	●	●	●	●	●	N/A
Expanding Internationally	●	●			●	●	●	●	N/A



Commercial Maturity and Export Readiness

Australia's quantum sector is not only research-driven, but also commercially engaged and globally connected. Analysis of more than 30 companies highlights this trend:

- Several firms are already exporting commercially ready products, including quantum clocks (e.g. QuantX Labs), magnetometers and sensing systems (e.g. Nomad Atomics, Elemental Instruments, Q-CTRL), encryption software and Quantum Key Distribution (QKD) hardware (e.g. Quintessence Labs, VeriQuantix), and subsystem components such as quantum control software, spectrometers, and chip-scale devices (e.g. Q-CTRL, Redback Systems).
- Several companies have established international operations and partnerships, including in the USA, Germany, Japan, and the United Kingdom (UK), such as Quantum Brilliance, Diraq, Q-CTRL, Nomad Atomics, and Quintessence Labs.
- There is growing evidence of repeatable commercial models, particularly in quantum sensing (e.g. QuantX Labs, Nomad Atomics), enablers (e.g. Redback Systems, Elemental Instruments), and control software and algorithms (e.g. Q-CTRL, Q Factorial).
- Emerging firms (e.g. FeBI, Deteqt, ExeQuantum) are leveraging university spinouts and early-stage investment to target high-value, near-term export markets, especially in health, defence, and critical infrastructure.

While Australia's quantum sector is still developing relative to global leaders (USA, UK), it is showing strong indicators of export readiness, intellectual property development, early commercial traction, and strategic international engagement and collaboration.



Strategic Alignment and Ecosystem Integration

Australia's quantum capability is further strengthened by strong connections between public investment, talent development, and a coherent national strategy which allows for partnerships and strong export opportunities. Many companies have benefited from:

- Targeted investment from the National Reconstruction Fund (e.g. Quantum Brilliance, Quintessence Labs), supporting scale-up and commercial readiness.
- Access to world-class research talent from top universities and education initiatives, including the Sydney Quantum Academy, Australian National University, Griffith University, Macquarie University, Monash University, RMIT, Swinburne, University of Adelaide, University of Melbourne, University of New South Wales, University of Sydney, University of Queensland, University of Western Australia, and University of Technology Sydney.
- Participation in national programs and growth initiatives, such as Quantum Australia, the Australian Research Council (ARC) Training Centres, and the Australian Economic Accelerator (AEA).
- Strategic co-funding grants that promote research-industry collaboration and innovation, including the ARC Linkage Program, ARC Centres of Excellence program, Critical Technologies Challenge Program (CTCP), AEA, and Cooperative Research Centres (CRCs). These mechanisms have played a critical role in leveraging partnerships and attracting follow-on investment across the quantum ecosystem.

The Australian quantum landscape also demonstrates a high degree of interoperability. Many firms operate across multiple subdomains — blending hardware, software, sensing, and enabling technologies.

Examples include:

- Q-CTRL, which spans quantum sensing, AI-driven quantum control infrastructure software, workforce development, and education;
- Quantum Brilliance, which integrates software emulators with compact Nitrogen Vacancy (NV)-diamond hardware;
- VeriQuantix, which combines photonics, optics, and secure communications in a single platform.

This cohesion ensures that Australia's quantum sector is collaborative, connected, and export-ready across multiple points in the value chain.

Australia's broader quantum capability is also anchored by a network of university-led R&D programs, state-based alliances, and national centres of excellence that provide a foundational layer of research leadership and

translation, workforce development, and strategic coordination. These institutions, include initiatives such as Quantum Australia, leading ARC Centres of Excellence, and specialised state programs like the Queensland Quantum Decarbonisation Alliance. Connection between the quantum sector and broader Australian industries is led by the Australian Quantum Alliance as the peak industry body representing a national alliance of quantum companies.

The Australian quantum ecosystem also benefits from the local presence of global quantum companies such as Inflection Australia which brings global expertise from its international offices, labs and manufacturing capabilities.

Together, this ecosystem of partnerships, institutions, and funding mechanisms ensures that Australia is not only building sovereign capability, but also shaping and influencing the direction of the global quantum technology landscape.



Export Opportunities

Current Australian Opportunities

Australia hosts a diverse mix of quantum technologies that are market-ready or near-deployment.

These opportunities have applications across a variety of high impact sectors.

Quantum Computing

Australia's quantum computing industry features innovative hardware platforms that are attracting international interest. Quantum computers have the potential to drive breakthroughs across a wide range of industries, from pharmaceuticals and materials design to defence, finance, energy, and engineering. By tackling problems too complex for even the most powerful classical supercomputers, quantum systems could reshape how we model molecules, optimise logistics, detect fraud, or manage energy networks.



With these capabilities in development, Australian quantum computing firms are well-positioned to supply next-generation hardware to international markets.

At the core of quantum computing are quantum bits, or qubits, units of information that leverage quantum properties like superposition and entanglement. Unlike classical bits, which are either 0 or 1, qubits can exist in both states at once, enabling a fundamentally different and more powerful mode of computation.

Australia is a recognised global leader in several of these areas. Local companies like Silicon Quantum Computing and Diraq are pioneering scalable processors using silicon spin qubits, while Quantum Brilliance is developing quantum computers based on NV centres in diamond a promising platform that operates at room temperature and offers significant potential for edge computing and integration into existing hardware.

These advancements are supported by world-class research institutions, national initiatives, and a vibrant ecosystem connecting academia, industry, and government.

Application	Potential verticals	Provider and system	Availability
Quantum Computing Hardware	<ul style="list-style-type: none">ResourcesAgricultureTransportFinancialDefenceAdvanced TechMedicalEnergyGovernmentResearch	Diraq , spin/quantum dot (Silicon quantum dots)	In development
		Silicon Quantum Computing , spin/quantum dot (Phosphorus atoms in silicon)	In development
		Quantum Brilliance , Diamond NV-centres	Available
		Archer Materials , Electron spin resonance, (Carbon nanospheres in chip)	In development

Quantum Sensing

Australia is emerging as a global leader in quantum sensing, with first-generation systems already reaching the market. While it remains to be seen whether quantum sensors will consistently outperform existing technologies, quantum sensing is currently the most commercially advanced and deployment-ready segment of the quantum landscape.



Australian companies are developing precision quantum sensing tools with appeal across industries such as defence, mining, healthcare and infrastructure. These technologies offer advanced capabilities in magnetic field detection, biological sensing, gravitational measurement, and high-precision timing, to name a few.

Application	Potential verticals	Provider and system	Availability
Magnetic Field Sensing	<ul style="list-style-type: none"> Underwater Navigation and Defence Space and Aerospace Minerals and Resources Infrastructure Monitoring and Civil Engineering Defence and Security Energy and Utilities Healthcare and Medical Diagnostics Transportation and Navigation 	Q-CTRL Iron Opal	Preorders now
		Deteqt , NV diamond sensor	In development
		QuantX Labs , Sentio	In development
		Archer Materials	In development
		Phasor Innovation	Preorders now
Biological Magnetic Field Sensing	<ul style="list-style-type: none"> Healthcare Biotechnology Neuropharmaceuticals Life Sciences Medical diagnostic devices 	Chromos Labs	In development
		Radetec	Available
		Archer Materials	In development
Gravitational Field Sensing	<ul style="list-style-type: none"> Resource Exploration & Mining Navigation Defence & Aerospace Environmental Monitoring 	Q-CTRL , Ironstone Opal	In development
		Nomad Atomics	Available
		Advanced Navigation	Available
High Precision Timing and Clocks	<p>Timing standards are critical for a wide range of sectors that rely on precision and synchronisation. These include:</p> <ul style="list-style-type: none"> Defence & Security Telecommunications & Data Networks Global Positioning & Navigation Systems Finance & Trading Space & Satellite Systems Critical Infrastructure & Energy Grids 	QuantX Labs	Available

Quantum Communication

Australia is establishing itself as a credible provider of quantum-enhanced secure communication technologies. Quantum communication systems, including random number generators, quantum key distribution (QKD), and post-quantum cryptographic tools, are among the first quantum technologies to find commercial application.



Australian companies are already delivering products to customers in cybersecurity, defence, and telecommunications, helping global organisations future-proof their infrastructure against quantum-era threats.

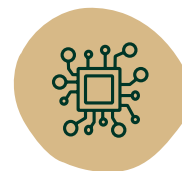
Post-Quantum Cryptography (PQC) refers to cryptographic algorithms specifically designed to resist attacks from quantum computers. With global deadlines for adoption by 2030, including mandates from the U.S. National Institute of Standards and Australia's Cyber Security Centre for this transition is now urgent for governments, financial institutions, critical infrastructure providers, and digital security firms.

Application	Potential verticals	Provider and system	Availability
Quantum-secure communications	<ul style="list-style-type: none"> Banks and financial institutions Telecommunications Defence Government agencies Cybersecurity firms 	QuintessenceLabs	Available
		ExeQuantum	Available
		VeriQuantix	In development
Quantum Key Distribution Systems	<ul style="list-style-type: none"> Financial Institutions & Banks, Government Agencies, Critical Infrastructure Providers, Cloud and Data Centre Operators, Aerospace & Space Agencies, Satellite-based QKD 	QuintessenceLabs	Available
		Lumi Quantum	Available

Quantum Enablers

A growing cohort of Australian companies is building the essential tools that underpin global quantum systems. These technologies, ranging from control software and hardware to systems engineering and consultancy, are not full-stack quantum solutions themselves but are critical to making them work.

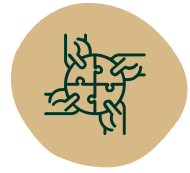
Australia's enabler ecosystem supports quantum computing, sensing, and communication platforms and is increasingly being recognised for its export-ready components, deep expertise, and strategic value to international hardware developers and investors.



Application	Potential verticals	Provider and system	Availability
Quantum Control Software	<ul style="list-style-type: none"> Quantum computing, communications or sensing companies. 	Q-CTRL, Fire Opal and Boulder Opal	Available
		Aqacia	In development
		Q Factorial	Available
		QDX	Available
Quantum Control Hardware	<ul style="list-style-type: none"> Quantum hardware developers or researchers looking for support for system infrastructure 	Emergence Quantum	In development
		Analogue Quantum Circuits	In development
		Archer Materials	In development
	<ul style="list-style-type: none"> Experimental quantum researchers or other hardware companies looking for spectrographic systems. 	Redback Systems	Available
		Elemental Instruments	Available
		Lumina Corp	Available
System design	<ul style="list-style-type: none"> Quantum computing firms wishing to integrate error-correction codes into their systems 	Iceberg Quantum	Available
Consultancy	<ul style="list-style-type: none"> Includes technical investors, due diligence consultants, IP analysts, and strategic advisory firms seeking market and ecosystem mapping, and commercial readiness evaluations to inform investment decisions or guide technology commercialisation 	H-bar Consultants	Available
		Quantum Australia	Available

Quantum Adjacent

Australia's broader deep-tech sector is contributing vital support to the quantum ecosystem through adjacent technologies and services. This includes, but not limited to, high precision sensing, enriched materials, photonics, semiconductors and specialist consultancies, all of which play a foundational role in quantum research, development and adoption. These adjacent offerings, while not exclusive to quantum, are already embedded in global supply chains and offer strong commercial alignment across several high-value sectors.



Application	Potential verticals	Provider and system	Availability
Consultancy, security	<ul style="list-style-type: none"> Any organisation seeking due diligence and assessment/ reporting services or targeted consultancy-based software solutions to general quantum technology related consultants and firms 	Agora High Tech	Available
		Seneca	Available
Other Sensing Technology	<ul style="list-style-type: none"> Mining and Resource Exploration Companies Infrastructure and Civil Engineering Firms Defence and Security Agencies Environmental Monitoring and Compliance Bodies Hydrogen and Clean Energy System Providers Construction and Materials Testing Companies 	mDetect	In development
		Aurora Materials	In development
		MagnaTerra	Available
		Jovian Tech	In development
		Teraglo	Available
		Phasor Innovation	In development
System design	<ul style="list-style-type: none"> Quantum computing firms wishing to integrate error-correction codes into their systems 	Iceberg Quantum	Available
Scientific Equipment	<ul style="list-style-type: none"> IResearch Quantum computing hardware Advanced R&D; Quantum Labs; Universities; Aerospace & Defence; Electronics Testing 	Liquid Instruments	Available
		Innofocus Technology	Available
		BluGlass	In development
		Elemental Instruments	Available
		Lumina Corp	In development
		Silex	Available

Quantum Education

Australia is becoming a critical contributor in quantum education and literacy, with a number of platforms now available to build the future workforce and raise awareness across industry, universities and schools. These offerings range from various training environments to accessible tools for students and workforce development. Quantum education-focussed companies are helping bridge the skills gap and ensure that quantum capabilities are supported by a strong and informed talent pipeline for both domestic and international markets.



Application	Potential verticals	Provider and system	Availability
Quantum Technology Training	<ul style="list-style-type: none"> Universities or companies aiming to provide education services to train future quantum technologists. Generally targeting customers who do not have internal capability to produce their own education-focused courses or who need an out of the box solution. 	Q-CTRL, Black Opal	Available
		Eigensystems, Quokka	Available
Quantum Literacy	<ul style="list-style-type: none"> Schools or other organisations looking to target younger students and introduce them to quantum technologies or redraft how traditional topics in STEM are taught. 	Eigensystems	Available
		Lumi Quantum	In development



Case Study:

Diraq

Scalable Silicon Quantum Processors for Global Commercial Deployment

Challenge

Diraq is redefining scalable quantum computing by enabling millions of qubits on a single chip – far beyond the hundreds available today – to unlock practical, commercial quantum applications.

Solution

Our proprietary technology, backed by over 20 years of research and more than \$150 million in grant and venture capital funding, and protected by 11 patent families, leverages existing silicon CMOS manufacturing and foundries to accelerate development and reduce costs – paving a faster, more efficient path to market.

Key capabilities/differentiators include:

- CMOS-compatible quantum architecture, using the same manufacturing technology that produces the chips in laptops, phones and other devices.
- Quantum dot-based qubits using silicon ‘quantum dot’ technology.
- Roadmap to delivering full scale, fault-tolerant quantum computing.

Partnership / Market Entry

- Diraq, a UNSW spin-out, is a full-stack quantum computing company, delivering quantum hardware and software as a cloud-accessible service.
- Major global engagements include:
 - Awarded a Stage A contract for USA Defence Advanced Research Projects Agency’s (DARPA) Quantum Benchmarking Initiative (QBI).
 - Partnerships with international foundries including imec and GlobalFoundries for high-precision mass-manufacture.
 - Numerous quantum technology partners including HRL Laboratories, NVIDIA, Quantum Machines, Maybell and Riverlane.

Outcome / Impact

- Received more than \$150 million in grant and venture capital funding from top-tier investors including Quantonation, Main Sequence Ventures, Uniseed, UniSuper and Taronga Ventures.
- First silicon quantum dot qubits integrated using a CMOS-compatible platform.
- Roadmap to first commercially available quantum computer by 2029 and utility-scale system by 2033.
- Recognised for pioneering IP and scalable quantum chip design.
- Strong engagement with the USA defence ecosystem through DARPA QBI, partnership with Fermilab, and ongoing funding through the ARO and AFOSR.

Export Pathway Enablers

- Participation in DARPA QBI, with direct access to USA federal procurement.
- Leveraging international semiconductor supply chains for mass-manufacture and other quantum computing vendors to accelerate delivery.
- Strong research foundation in University of New South Wales, partnerships with other universities e.g. RMIT (Melbourne, Victoria), and both recipient and industry partner for numerous grants from the Australian Research Council.
- Globally relevant IP portfolio and scalable design for full scale, fault-tolerant quantum computers.

Global Opportunity: DARPA Quantum Benchmarking Initiative (QBI)

Diraq is one of only two Australian companies selected for Stage A of the DARPA QBI, an eight-year program led by the USA Department of Defence which aims to rigorously assess whether any quantum computing approach can

reach utility scale by 2033. Of the 18 companies selected globally, Diraq was chosen alongside participants from the United States of America, United Kingdom, France, and Canada.

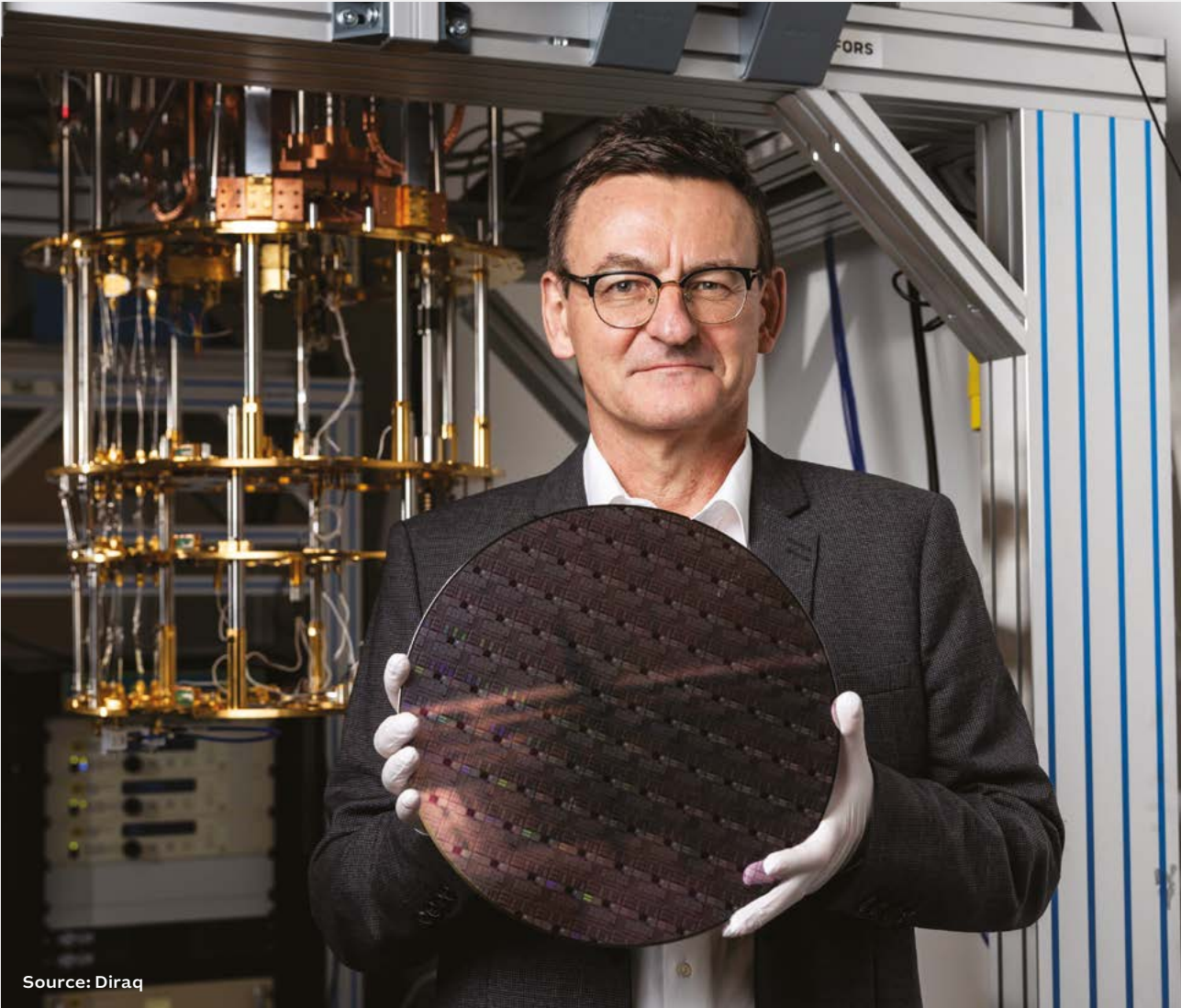
Significance

QBI provides a clear pathway into the USA federal procurement ecosystem, positioning Diraq to benchmark its performance against the world’s top quantum computing companies.

Strategic Value

Participation in QBI validates Diraq’s technical feasibility, commercial viability and export readiness, supports international visibility, and accelerates its roadmap to delivering a utility scale quantum computer.

QBI Phase	Funding	Objective
Stage A	US\$1M / 6 months	Proof of concept
Stage B	Up to US\$15M / 12 to 18 months	Demonstration of scalability
Stage C	Up to US\$350M / up to 5 years	Procurement of utility-scale systems



Source: Diraq

Case Study:

Eigensystems

Revolutionising Quantum Education Through Play, Storytelling, and Accessibility

Challenge

Quantum computing remains out of reach for most people. It is complex, abstract, and difficult to teach using traditional educational tools. There is a growing need for engaging, hands-on experiences that make quantum concepts accessible to students and educators globally.

Solution

A tactile, narrative-driven suite of quantum learning tools centred around the Quokka Puck, a personal, 30-qubit educational quantum system.

Product range includes:

- Quokka Puck – Portable quantum learning device (US\$395)
- Quokka Basic – Programming and simulation interfaces
- Quokka Advanced – Curriculum-aligned lesson plans
- Quokka Stories – Narrative-based learning experiences
- Quokka Collectibles (*coming soon*) – Scale replicas of real-world quantum systems
- Education Content-as-a-Service – Custom quantum programs for schools and universities

Partnership / Market Entry

- Founded in 2023 in Sydney, Eigensystems expanded to the US (Texas) in 2024. Launched the first Kickstarter in quantum education, raising US\$100K in pre-orders.
- Strategic Collaborations include:
 - Diraq (Australia) and Pasqal (France) for hardware-linked Quokka Collectibles.
 - Educational partnerships with QURECA and OpenQuantum (UK), and Okinawa Institute of Science and Technology (Japan).
 - Partnership with Fishermans Bend precinct (Melbourne, Australia) for national outreach.



Outcome / Impact

- Hundreds of Quokka Pucks shipped to educators and enthusiasts worldwide.
- Adopted by leading institutions: Aalto University (Finland), Keio University and OIST (Japan), YooBee (New Zealand), University of Costa Rica.
- Pilot quantum literacy programs launched in Australia, Finland, New Zealand.
- Educational study with 11–13 year-olds in Okayama, Japan (2025).
- Winner of the 2024 Australian Good Design Award.
- Showcased at Quantum Australia Conference 2024.
- They are now shipping globally.

Export Pathway Enablers

- Kickstarter crowdfunding and early community validation.
- Visibility through Quantum Australia Conference.
- Recognition via Australian Good Design Award.
- Support from international university networks and state innovation hubs.
- Partnerships with quantum tech leaders and global educational institutions.

Case Study:

QuantX Labs

Delivering Precision Timing for Defence, Space, and Global Infrastructure

Challenge

Dependence on Global Positioning Systems (GPS) and Global Navigation Satellite Systems (GNSS) systems creates critical vulnerabilities for defence, space, and vital infrastructure sectors. Resilient, sovereign alternatives for position, navigation, and timing (PNT) are essential to maintain secure operations in contested or degraded environments.

Solution

A suite of quantum-enabled precision timing technologies designed to deliver ultra-stable, low-noise signals for mission-critical applications.

Key products include:

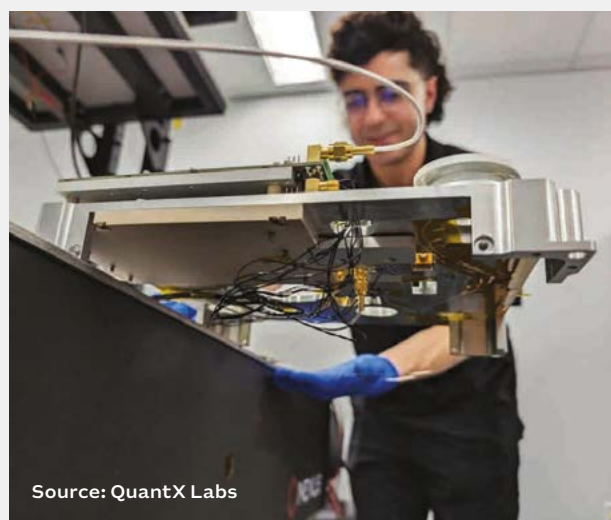
- TEMPO – Compact optical atomic clock delivering up to 10x performance improvement over current GNSS-based systems.
- SYNCHRO (*in development*) – Time-transfer system using quantum and classical signals over fibre and free-space links.

Other Technologies

- Cryoclock – The world's purest microwave and radio frequency signal generator, offering ultra-low phase noise and exceptional frequency stability.
- Sentio (*in development*) – Quantum sensor for resilient and sovereign PNT solutions.

Partnership / Market Entry

- Founded in 2016 as a spin-out from the University of Adelaide, QuantX Labs has rapidly established itself as a national leader in precision timing and quantum sensing.
- Key milestones include:
 - Cryoclock selected for Australia's \$1.2B AIR2025 JORN Phase 6 defence upgrade.
 - TEMPO to launch on a SpaceX mission with Exotrail (France) in December 2025.
 - Defence-funded mobile timing testbed to be delivered to Defence Science and Technology Group Edinburgh in 2025.



Source: QuantX Labs

- Based at Lot Fourteen innovation precinct in Adelaide (Australia), with a team of 40+ employees.

Outcome / Impact

- Defence identified as primary funder and adopter of early deployment of sovereign timing systems.
- Cryoclock recognised as critical national capability for secure communications and radar systems.
- Expansion into space infrastructure through TEMPO's space-ready atomic clock platform.
- Advancing globally competitive quantum PNT solutions aligned with Australia's strategic priorities.

Export Pathway Enablers

- Funded by Australian Department of Defence, including Defence, Science and Technology Group and AIR2025 programs.
- International partnership with Exotrail (France) for space deployment.
- Access to commercialisation and talent pipelines via Lot Fourteen innovation precinct.
- Supported by University of Adelaide's quantum R&D and technology transfer ecosystem.

Case Study: Q-CTRL

Global pioneer delivering AI-powered quantum infrastructure software

Challenge

Overcoming performance limitations in quantum computing and quantum sensing hardware and enabling error-resilient, scalable and deployable quantum systems through advanced control and automation.

Solution

Quantum infrastructure software and tools that optimise, stabilise, and scale quantum technologies across computing, sensing, and education.

Key products include:

- Black Opal – Interactive learning platform to educate users in the fundamentals of quantum computing.
- Fire Opal – Performance management and optimization software to maximize the potential of today's quantum computers.

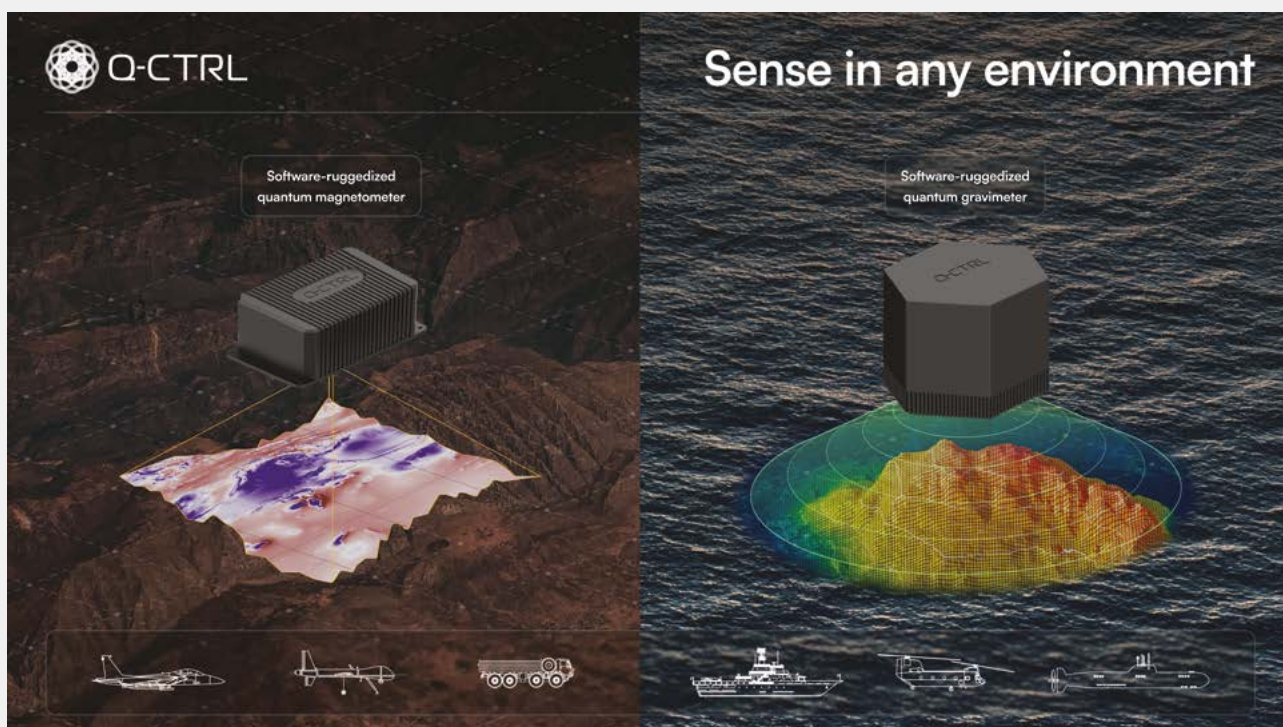
- Boulder Opal – AI-powered quantum control software to accelerate quantum hardware development.
- Ironstone Opal – Commercial and defence-grade quantum-assured navigation system for crewed and uncrewed airborne, maritime and land platforms.

Partnership / Market Entry

- Founded in 2017 in Sydney, with more than 170 staff across Sydney, Los Angeles, San Francisco, Oxford and Berlin.
- Pioneered the establishment of the global quantum infrastructure software sector.
- Advancing quantum computing utility and performance through commercial relationships with IBM, Rigetti, IonQ, Oxford Quantum Circuits, Diraq, Quantum Machines, QuantWare, Qblox, Keysight, Aqarios, qBraid, and Wolfram.



Source: Q-CTRL



Source: Q-CTRL

- Delivering quantum-assured navigation technology in partnership with DARPA, the US Defense Innovation Unit, UK Royal Navy and commercial providers such as Airbus and Lockheed Martin.
- Engaged in education and workforce development by deploying Black Opal across universities, the private sector and government departments.

Outcome / Impact

- Raised over A\$200 million in venture capital from global investors including Main Sequence Ventures, Airbus Ventures, Bullhound Capital, Lockheed Martin Ventures, NTT Finance, Salesforce Ventures, DCVC, Horizons Ventures, Square Peg, and others, supporting rapid global expansion and R&D leadership.
- World's first native integration of quantum control infrastructure into IBM hardware.
- First public demonstration of quantum advantage for navigation in GPS-denied environments through airborne trials.

- Awarded A\$38 million under DARPA's Robust Quantum Sensors program to develop next-generation quantum sensors for airborne, maritime and land navigation.
- mUpskilled 30,000+ users of Black Opal across universities, research institutions, industry, and government.
- Recognised through multiple global innovation awards.

Export Pathway Enablers

- Global team of world-class experts in quantum computing, sensing and engineering.
- Enabled by government funding programs across AUKUS, EU, Japan, India and elsewhere.
- Strong engagement with global research collaborations and hardware partners.
- Strategic positioning in major global quantum markets.

Case Study:

QuintessenceLabs

Enabling Quantum-resilient Cybersecurity for a Post-Quantum World

Challenge

Rising cybersecurity threats, compounded by the future risk of quantum computers breaking current encryption, are driving urgent demand for new cryptographic infrastructure that is secure, scalable, and future-proof.

Solution

Quantum-resilient cybersecurity solutions that safeguard sensitive data today and in the quantum future. Product capabilities include:

- Quantum Random Number Generation (QRNG)
- Quantum Key Distribution (QKD)
- Post-Quantum Cryptography (PQC)

Seamlessly integrated into enterprise-grade security infrastructure to defend against both classical and quantum attacks.

Partnership / Market Entry

- Founded in 2008 in Canberra, QuintessenceLabs is one of the world's earliest quantum startups.
- Entered the US federal market via a 2024 strategic partnership with Carahsoft, delivering quantum-resilient solutions to government agencies.
- International expansion, now supported by a network of 19 global partners across data centres, security, and infrastructure.
 - Formed a global partnership with Equinix (2024–2025), enabling delivery of quantum-powered encryption and key management solutions through Equinix's worldwide data centers.
 - Partnered with Fortinet (2023–2025) to integrate quantum-enhanced cryptography into advanced network security solutions for enterprise customers.
 - Joined the F5 Technology Alliance Program, supporting integration of quantum-safe technologies into global application delivery and security infrastructure.



Outcome / Impact

- Deployed in 20+ countries across government, defence, critical infrastructure, and enterprise sectors.
- Customers include Fortune 500 companies and national security agencies.
- Raised A\$70+ million, including A\$15M from the National Reconstruction Fund (2025), with additional backing from private and institutional investors such as Main Sequence Ventures, Telus Ventures, and Chevron Technology Ventures to support manufacturing expansion and global growth.
- First to offer online quantum random number generator as a commercial service.
- Offices in Australia and the United States.
- Winner of 20+ awards, including the Australian Export Awards and recognition as a World Economic Forum Technology Pioneer.

Export Pathway Enablers

- Recognition from Australian Export Awards and World Economic Forum .
- Backed by early investment from one of Australia's leading big four banks, Westpac, and supported by state and federal grants.
- Strategic funding from the National Reconstruction Fund (NRF).
- Active member of the Australian Quantum Alliance and global cybersecurity networks.

Appendix:

Full Company Analysis Matrix

	Quantum Hardware	Quantum Software	Quantum Hardware	Quantum Software	Quantum Hardware	Quantum Software	Quantum Hardware	Quantum Software	Data Security	Supply Chain	Education Services	Consulting & Due Diligence
AUSTRALIAN COMPANIES	Quantum Computing		Quantum Communications		Quantum Sensing		Quantum Enablers		Quantum Adjacent		Quantum Knowledge	
Advanced Navigation					●					●		
Agora High Tech												●
Aqacia		●						●				●
AQC							●			●		
Archer Materials	●				●		●					
BluGlass							●			●		
Chromos Labs					●	●						
Deteqt					●	●						
Diraq	●	●										
Eigensystems							●				●	
Elemental Instruments							●			●		
Emergence Quantum							●			●		
ExeQuantum			●									
FeBI					●	●						
H-bar Consultants								●				●
Innofocus Technology					●							
Iceberg Quantum		●						●				●
Liquid Instruments							●			●		
Lumi Quantum			●			●	●		●		●	
Lumina Corp							●			●		
MagnaTerra					●							
mDetect					●							
Nomad Atomics					●	●						

	Quantum Hardware	Quantum Software	Quantum Hardware	Quantum Software	Quantum Hardware	Quantum Software	Quantum Hardware	Quantum Software	Data Security	Supply Chain	Education Services	Consulting & Due Diligence
AUSTRALIAN COMPANIES	Quantum Computing		Quantum Communications		Quantum Sensing		Quantum Enablers		Quantum Adjacent		Quantum Knowledge	
Phasor Innovations					●	●	●			●		
PrioriAnalytica		●										
Quantum Brilliance	●	●			●					●		
Q-CTRL		●			●	●		●		●	●	●
Q Factorial						●		●			●	
QuantX Labs					●	●				●		
Quintessence Labs			●	●					●			●
Redback Systems							●			●		
Silanna Group							●			●		
Silex Systems							●			●		
Silicon Quantum Computing	●	●										
Teraglow					●							
VeriQuantix			●						●	●		

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