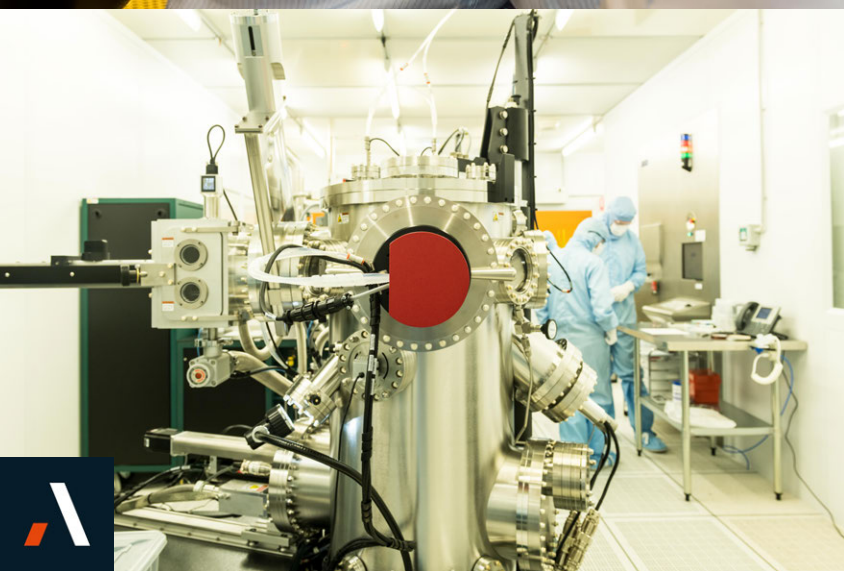




ARCHER

Stocks Down Under Semiconductor Conference
November 2022



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This presentation contains information which was reported in ASX announcements lodged between 1 October 2017 and 15 November 2022 (together the “Announcements”). All material assumptions and technical parameters set out in the Announcements continue to apply and have not materially changed. The Announcements can be viewed online at <https://www.archerx.com.au>.

Certain statistical and other information included in this presentation is sourced from publicly available third party sources and has not been independently verified.



Archer is developing advanced semiconductors for commercialisation in global markets...

... currently creating value by



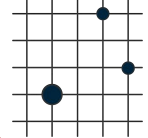
Attracting and retaining pioneering innovators and technologists



Working with tier-one international tech institutes and companies



Technology development backed by world-class R&D



Patents granted in the US, China, South Korea, Japan, Hong Kong, Australia, and Europe

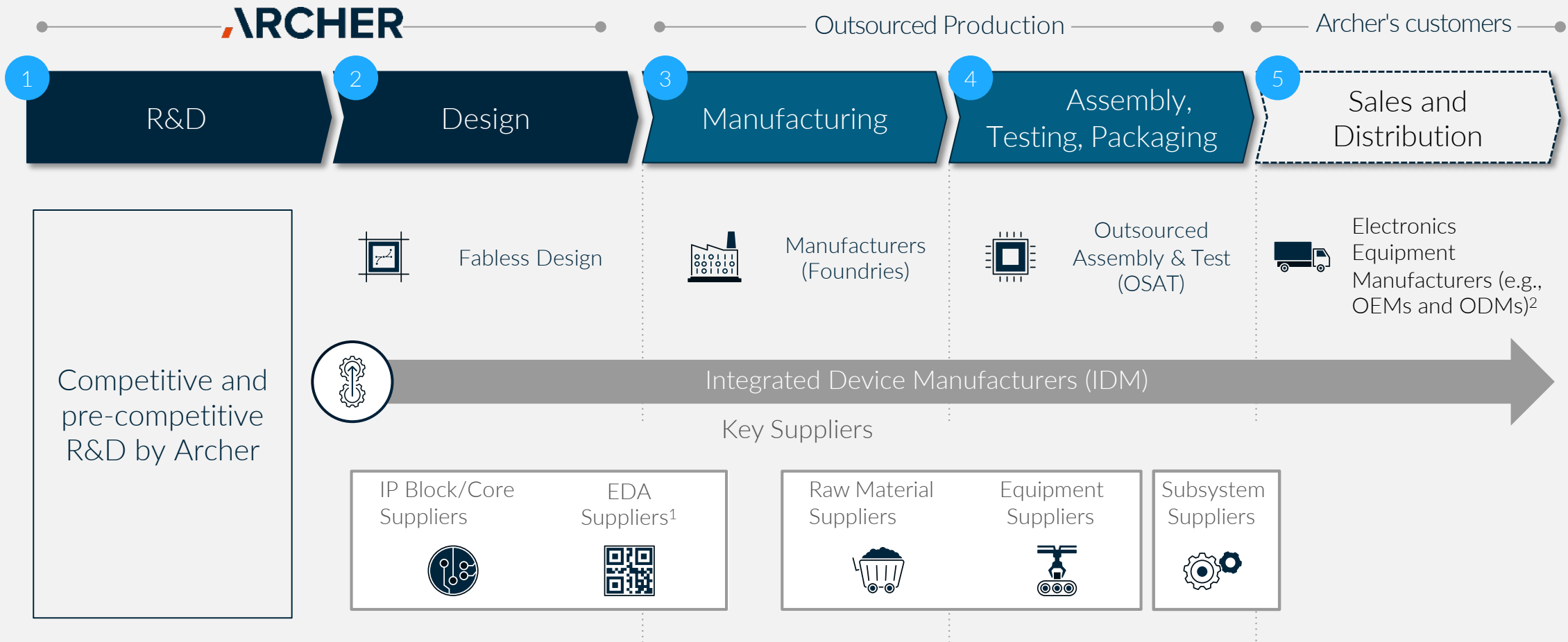


Efficient use of funds with A\$25.3M cash and no corporate debt*



Access to \$1B+ of deep-tech infrastructure and facilities

Archer's semiconductor device development is relevant to quantum technology and medical diagnostics




1. Electronic Design Automation; 2. Firms engaged in branding, marketing, designing, and manufacturing electronic equipment that incorporates semiconductor content into electronic products including Original Equipment Manufacturers (OEM) and Original Design Manufacturers (ODM); Source: Gartner; BCG Analysis



The Archer development team is led by pioneering physicists, chemists, biologists, semiconductor engineers, and nanotechnologists.

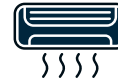




ARCHER IS ONE OF A FEW COMPANIES IN THE WORLD DEVELOPING QUBIT PROCESSOR TECHNOLOGY

^{12}CQ has unique advantages
over other quantum tech...

... with potential for



Room-temperature operation



Integration with common electronics



Compatibility with smaller form factors, e.g. mobile



Simplicity in operation and maintenance

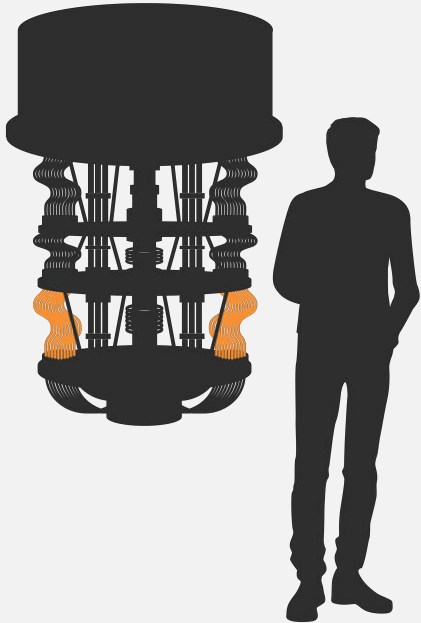


Low-latency, on-premise integration inside data centres



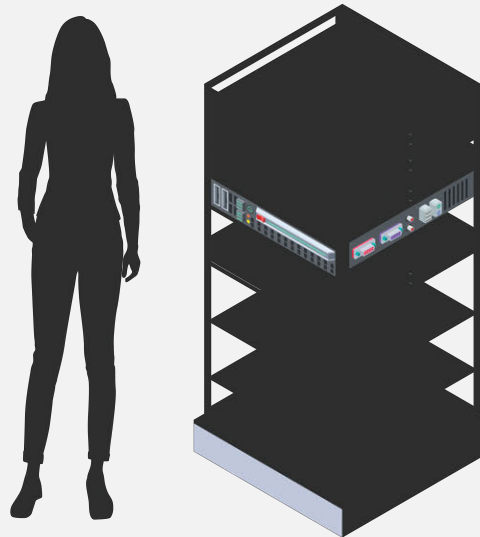
Highly sensitive mobile use cases with co-located encryption and compute

Potential solution to push quantum access and use beyond cloud and edge...



Cloud-based

Require ultra-low temperatures and infrastructure to operate.
Accessed via the cloud.
e.g. Superconductor, silicon, topological.



Edge and/or Cloud-based

Operate at room temperature but are difficult to integrate into modern devices. Installed on-site.
e.g. Photonic, ion-traps, diamond.

... to your mobile

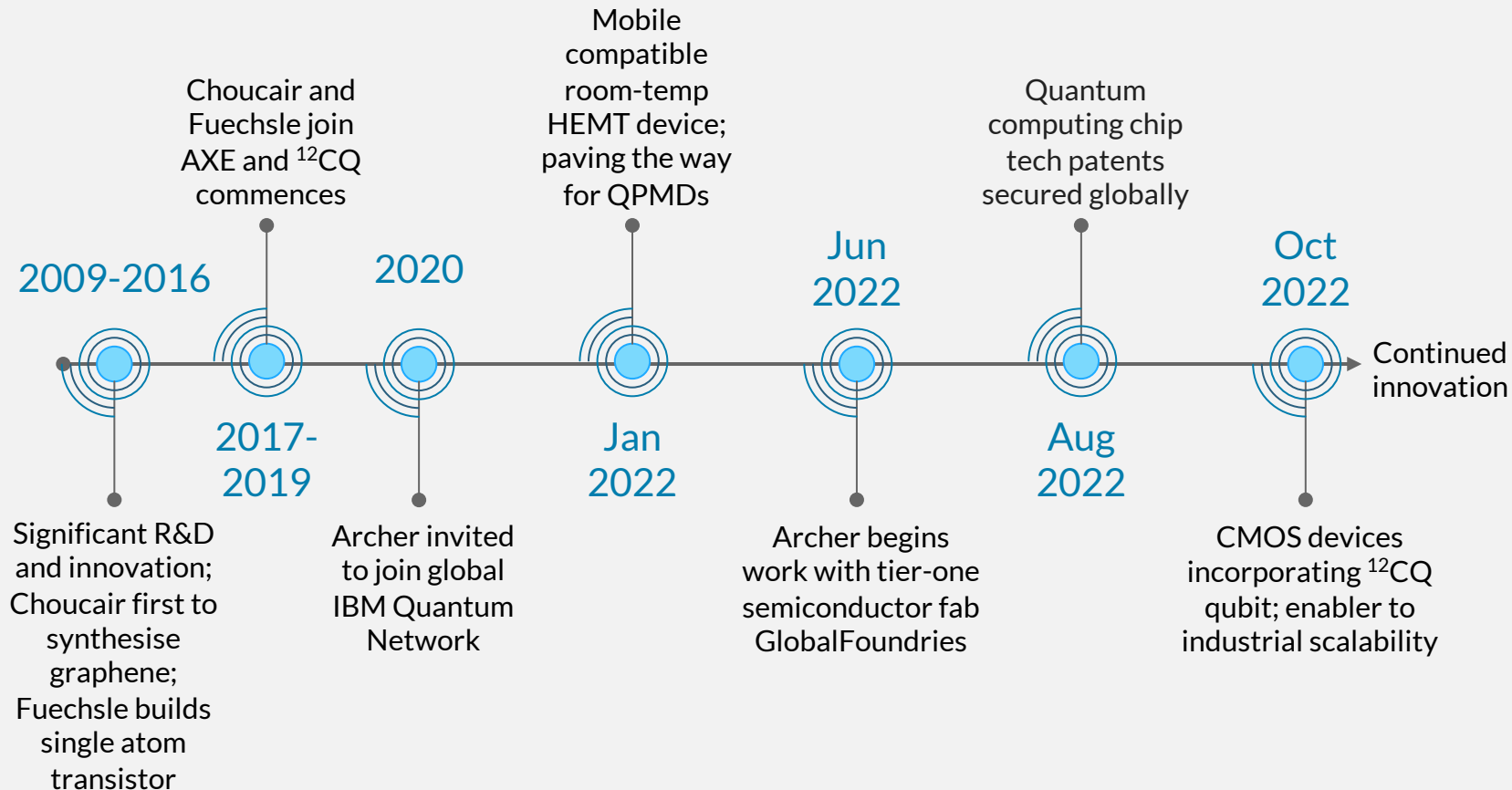


Quantum Powered Mobile Devices

QPMDs will require practical qubit processors that integrate into modern devices.
e.g. ^{12}C chip development.

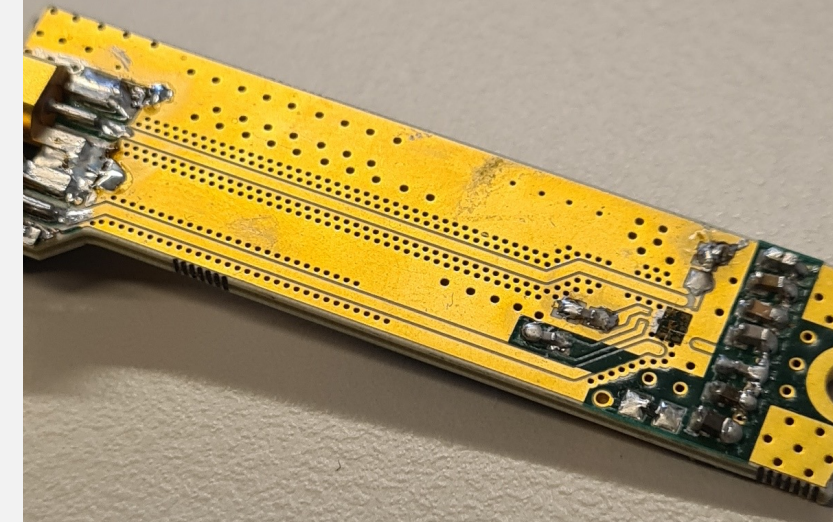
In-depth analysis: <https://www.bcg.com/en-au/publications/2021/building-quantum-advantage>
More information, by Dr M. Choucair, Mar 26 2021: <https://www.ibm.com/blogs/ibm-anz/why-quantum-deserves-your-attention/>

Archer's record setting innovation is at the forefront of international quantum development



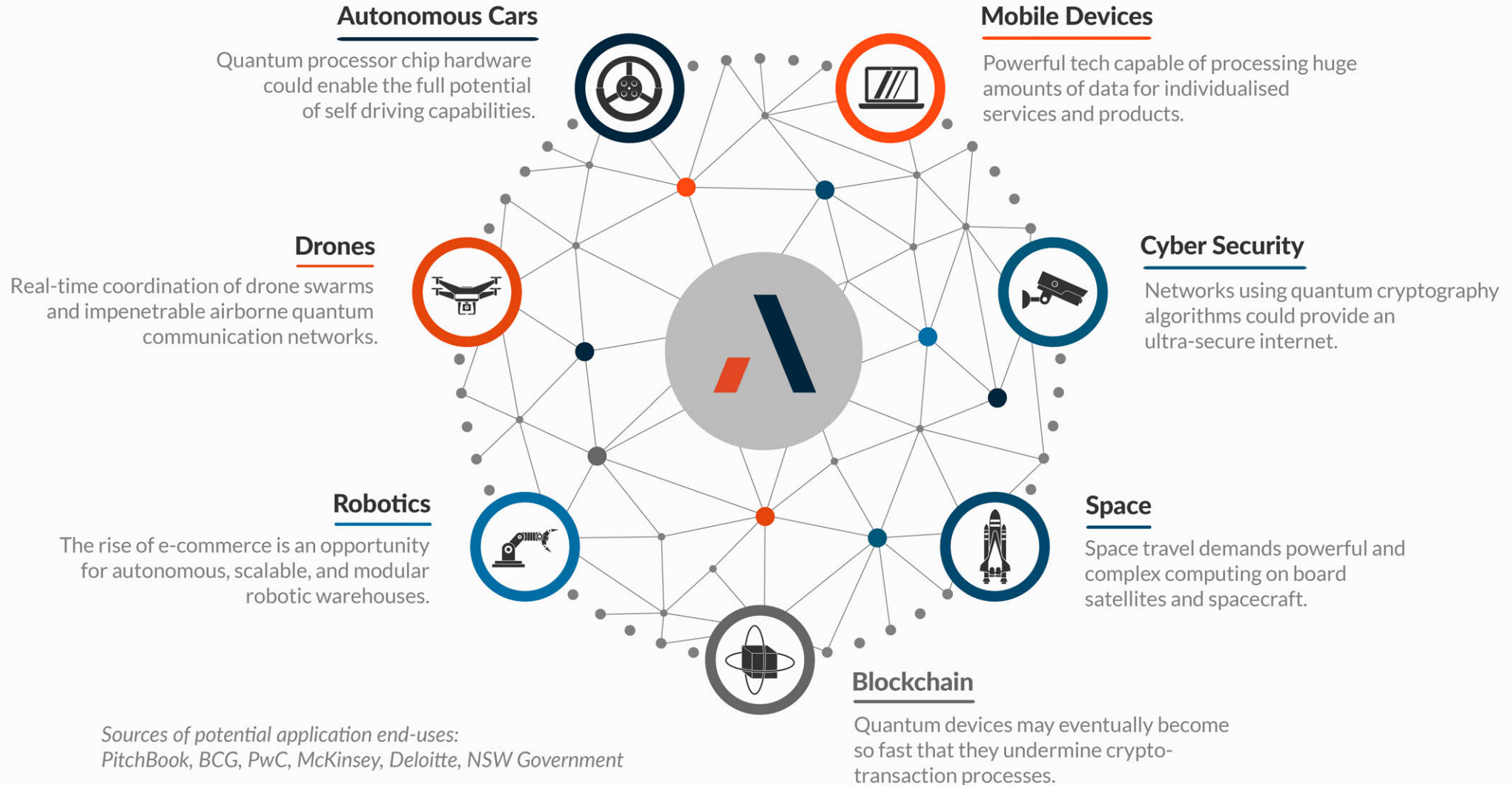
[†] References: <https://www.nature.com/articles/nnano.2008.365>; <https://www.nature.com/articles/nnano.2012.21>; <https://www.nature.com/articles/ncomms12232>; <https://pubs.acs.org/doi/10.1021/nl202866q>; <https://doi.org/10.1016/j.carbon.2014.03.046>; <https://patentscope.wipo.int/search/en/detail.jsf?docId=WO2017091870>

*HEMT (High Electron Mobility Transistor) *QPMD (Quantum Powered Mobile Device) *CMOS (Complementary Metal–Oxide–Semiconductor)



Mobile compatible HEMT device developed to detect quantum information in Archer's ^{12}CQ qubit material.

Archer expects ^{12}CQ quantum technology to enable industry-wide innovation



Era of Quantum Technology

Value for investors in the quantum computing economy is expected to increase as quantum hardware is developed:

- + The Australian Government's Blueprint and Action Plan for Critical Technologies sets a national vision & strategy for critical technologies, including quantum technology[‡].
- + The CSIRO[§] reported Australian quantum tech could create A\$4 billion revenue and 16,000 new jobs by 2040.
- + The US National Quantum Initiative Act was signed into US law on Dec 21, 2018* with the US planning to invest US\$170+ billion on advanced tech**.
- + The International Roadmap for Devices and Systems lists Quantum Computing a key tech in the 'post-Moore' era[‡].

[‡] <https://www.pmc.gov.au/resource-centre/domestic-policy/blueprint-critical-technologies> and <https://www.pmc.gov.au/resource-centre/domestic-policy/action-plan-critical-technologies>

[§] <https://www.csiro.au/en/work-with-us/services/consultancy-strategic-advice-services/csiro-futures/futures-reports/quantum>

* <https://www.congress.gov/bill/115th-congress/house-bill/6227>

** <https://www.congress.gov/bill/117th-congress/senate-bill/1260>

[‡] https://en.wikipedia.org/wiki/International_Roadmap_for_Devices_and_Systems

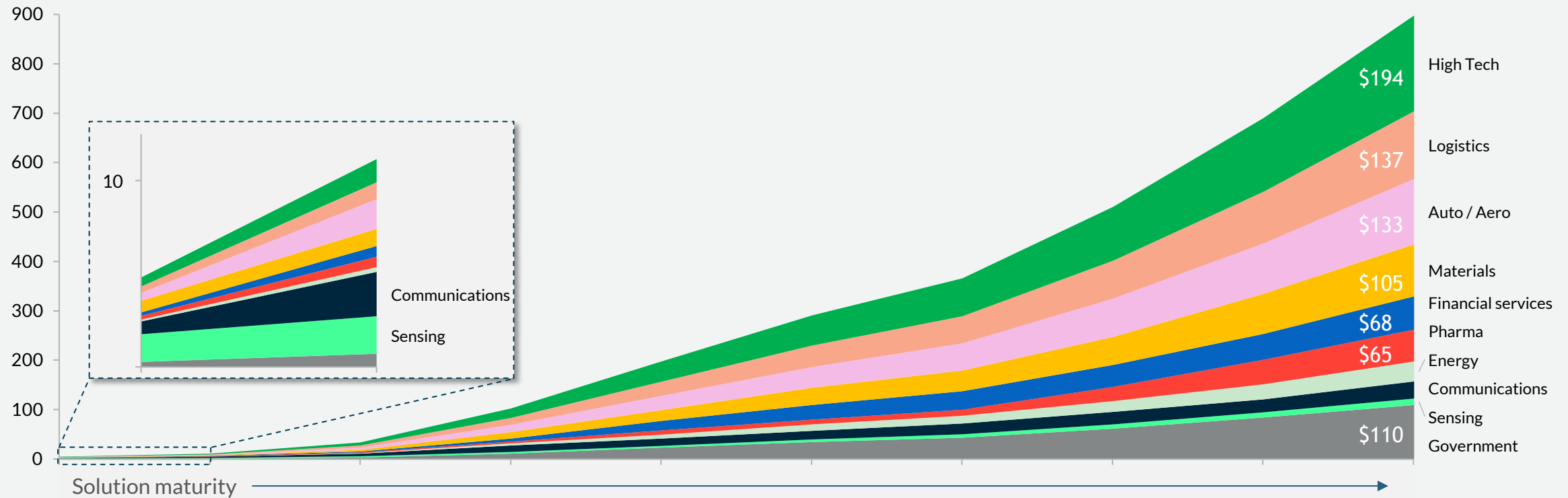


US\$900B in total value creation for end users as quantum technologies reach maturity

Current: Quantum Comms. and Sensing most mature markets

Future: Quantum computing expected to drive transformative value across sectors

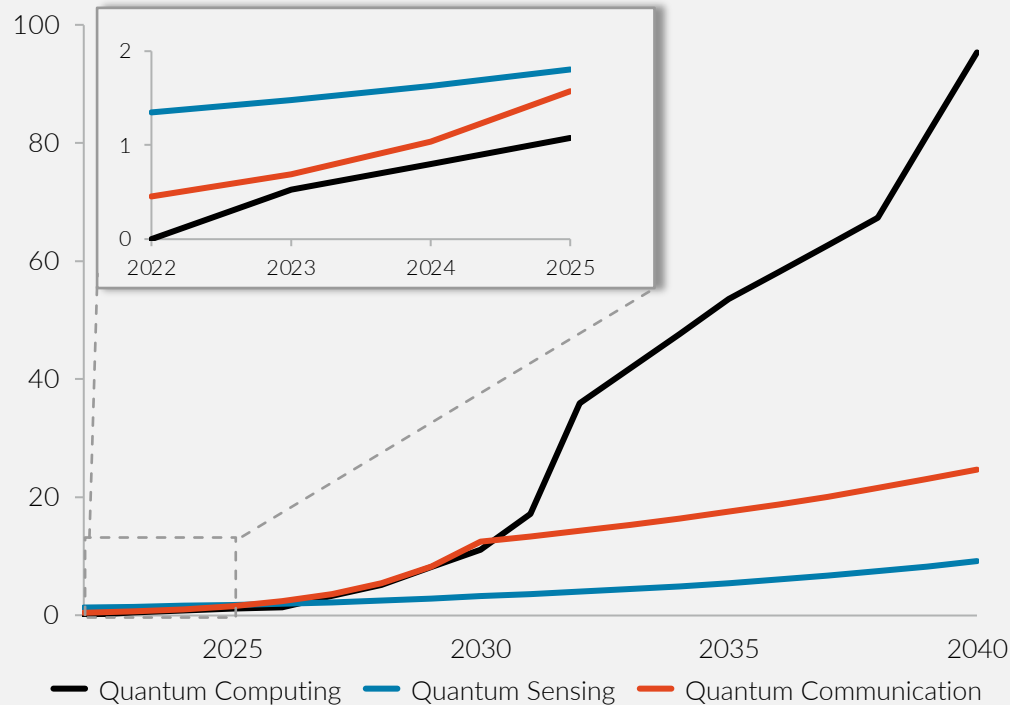
Value created for end users (US\$B)



Note: End user value creation defined as incremental revenue/value generated for the end user in using quantum technology, including Quantum Computing, Quantum Communications and Quantum Sensing. Auxiliary revenue from quantum technology not included.
Source: BCG analysis

The quantum market is growing rapidly...

Estimated market size (US\$B)

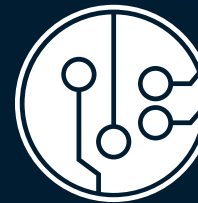


Note: Auxiliary revenue from quantum technology not included.
Source: BCG analysis

...expected large scale adoption **after 2030**



Adoption of quantum tech expected to increase with quantum hardware maturity

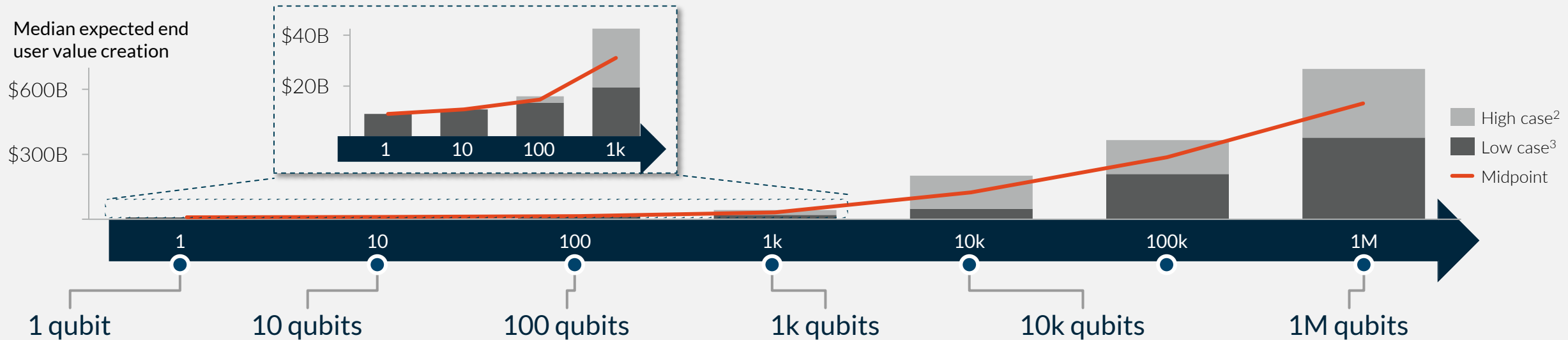


Quantum computing is expected to rapidly increase in share of total quantum value

Source: Krelina, "Quantum technology for military applications" EPJ Quantum Technology (2021); IBM quantum roadmap; IonQ quantum roadmap

The potential of quantum processing increases with qubit volume, but even one qubit technology could bring incredible value to end users

End user value creation expected to reach between US\$450B and US\$820B at 1M qubits



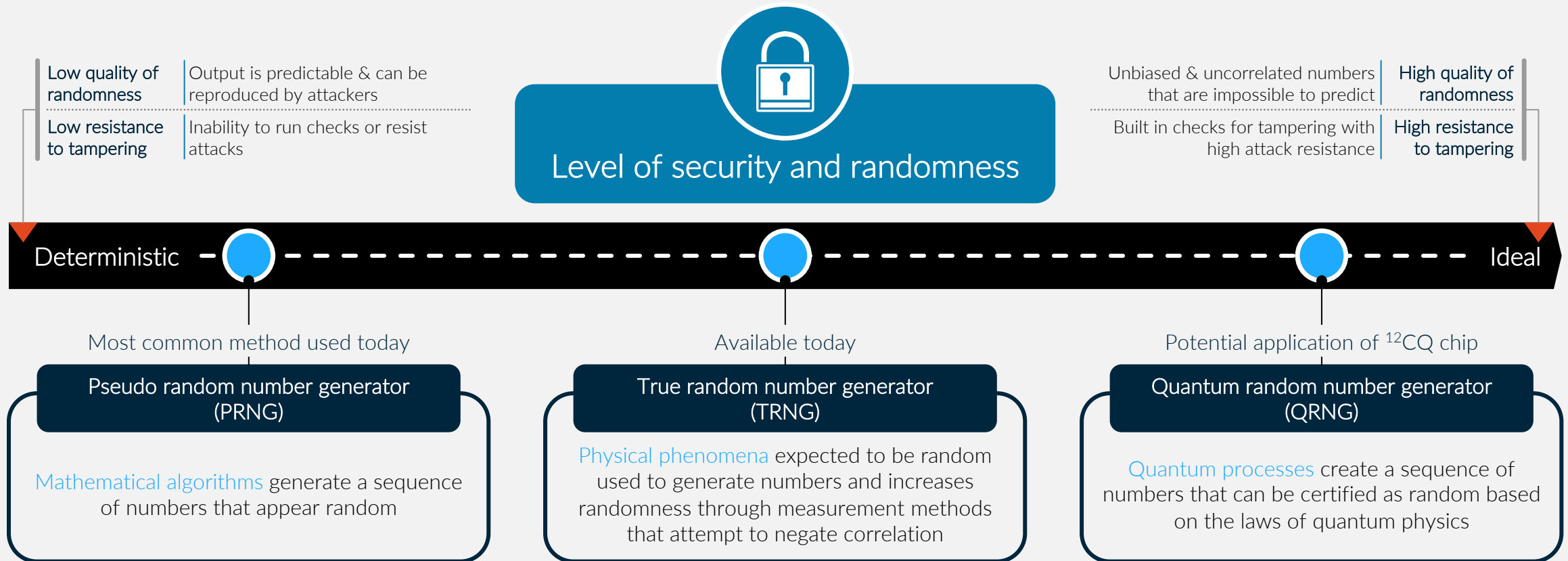
Applications where quantum surpasses classical solutions based on number of qubits¹

Quantum sensing Quantum random number generation ('QRNG')	Improved sensing and QRNG Classical-assisted Monte Carlo simulations Non-quantum advantaged compute	Classical assisted quantum algorithms (e.g. VQE)	Classical-assisted machine learning	Quantum network applications (e.g. transmitting quantum information)	Advanced search Optimisation Machine learning and AI Materials research, chemical simulation
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1. Physical qubits. 2. High case based on 100:1 ratio of physical to logical qubits. 3. Low case based on 1000:1 ratio of physical to logical qubits.
Source: Krelina, "Quantum technology for military applications" EPJ Quantum Technology (2021); Perdomo-Ortiz et al, Quantum Sci. Technol. (2018)



Qubit-based QRNGs are a potential solution to encryption keys that are generated randomly and cannot be guessed



Source: BCG analysis. Note: A 'key' is used within an encryption algorithm and is a group of random characters in a particular order. Encryption protocols use a key to alter data so that it is scrambled, and so that anyone without the key cannot decode the information. Like a physical key, it locks (encrypts) data so that only someone with the right key can unlock (decrypt) it.



The global need for digital asset encryption, privacy, and security is increasing

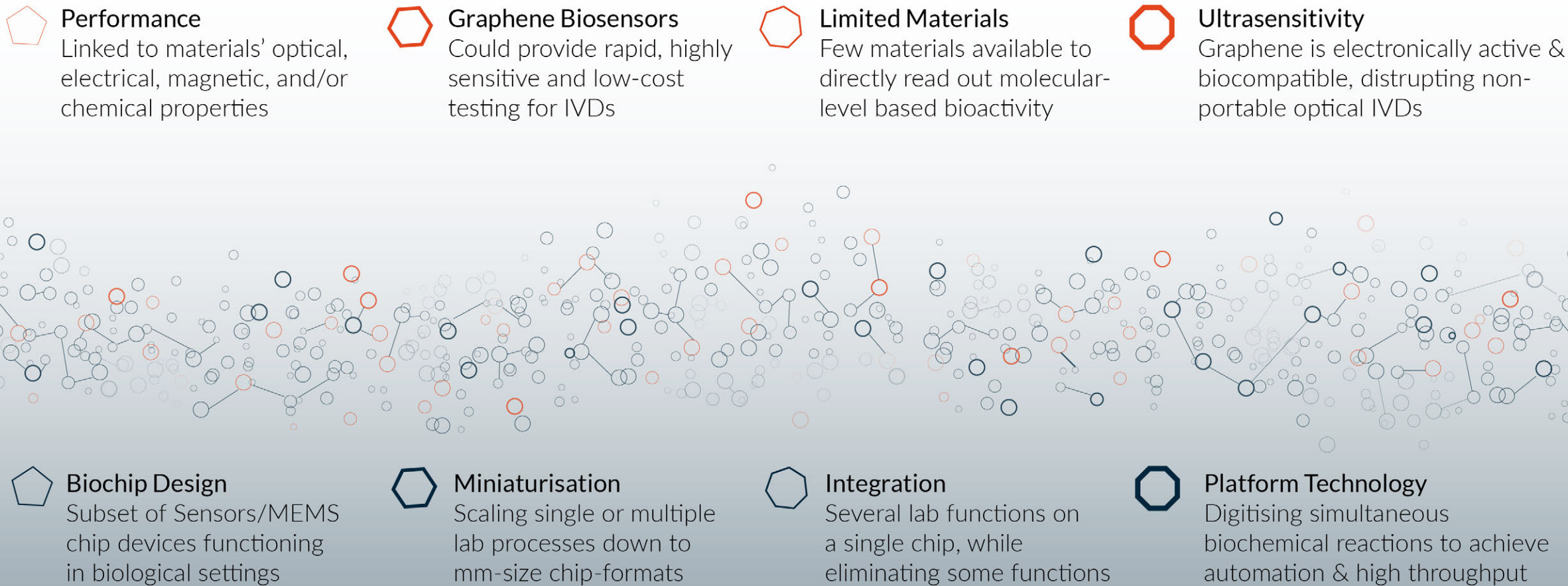
Sectors	Potential QRNG use cases
 Banking & Finance	<ul style="list-style-type: none"> • Random numbers for encryption to facilitate higher cybersecurity resistance • Quantum 'vaults' to store digital keys • Protection of financial transfers and trading algorithms
 Cloud & Data Centres	<ul style="list-style-type: none"> • Improved data encryption in data centers with high-quality random numbers • Randomness generation as a cloud offer for the end customers ('QRNGaaS')
 IoT Devices	<ul style="list-style-type: none"> • Improved security for IoT devices, including where higher-end devices with enough memory are used e.g., cars, industrial IoT, smart cities, smart logistics, etc.
 Smartphones	<ul style="list-style-type: none"> • QRNG chips in smartphones for more secure communications at the point of data creation • E-commerce and mobile payments
 Network Security (incl. 5G)	<ul style="list-style-type: none"> • Improved encryption in telecom infrastructure • Protection of information obtained from sensors in smart grids and other energy infrastructure
 Defence & Government Data Security	<ul style="list-style-type: none"> • Protecting secret and confidential documents from intruders and hackers • Supporting police, domestic security, state healthcare, defence and intelligence services, and embassies
 Other Cryptography Applications	<ul style="list-style-type: none"> • Internal and external sources of high-quality random numbers that can be used in encryption across industries (incl. QRNG as a part of Hardware Security Modules, combination of QRNG with post-quantum cryptography)
 Other Non-cryptography Applications	<ul style="list-style-type: none"> • Source of randomness for R&D, online gaming, lotteries, and software development

Source: BCG Analysis; IQT; Press search; Expert interviews

A person wearing a blue cleanroom suit, hood, and gloves is working with industrial machinery. The person is leaning over a piece of equipment, possibly a cleanroom workstation. The background shows a cleanroom environment with various pieces of equipment and a yellow wall.

ARCHER IS DEVELOPING A GRAPHENE-BASED BIOCHIP

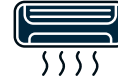
The potential for lab-on-a-chip technology goes beyond simple detection by miniaturising and integrating a number of medical diagnostic lab tests



*More information on Australian regulations related to In-vitro Diagnostics (IVDs): <https://www.tga.gov.au/medical-devices-ivds>
Learn more about Lab-on-a-Chip technology developments: <https://www.rsc.org/journals-books-databases/about-journals/lab-on-a-chip/>

Archer is fabricating atom-thin biochip components...

... for next-gen medical diagnostic devices



Room-temperature operation eliminates cold-logistics



Sensing pathways developed in-house to detect genetic information



100% owned IP with patent applications pending in Australia and the US



In-house capability spanning biochemistry and chip device nanofabrication

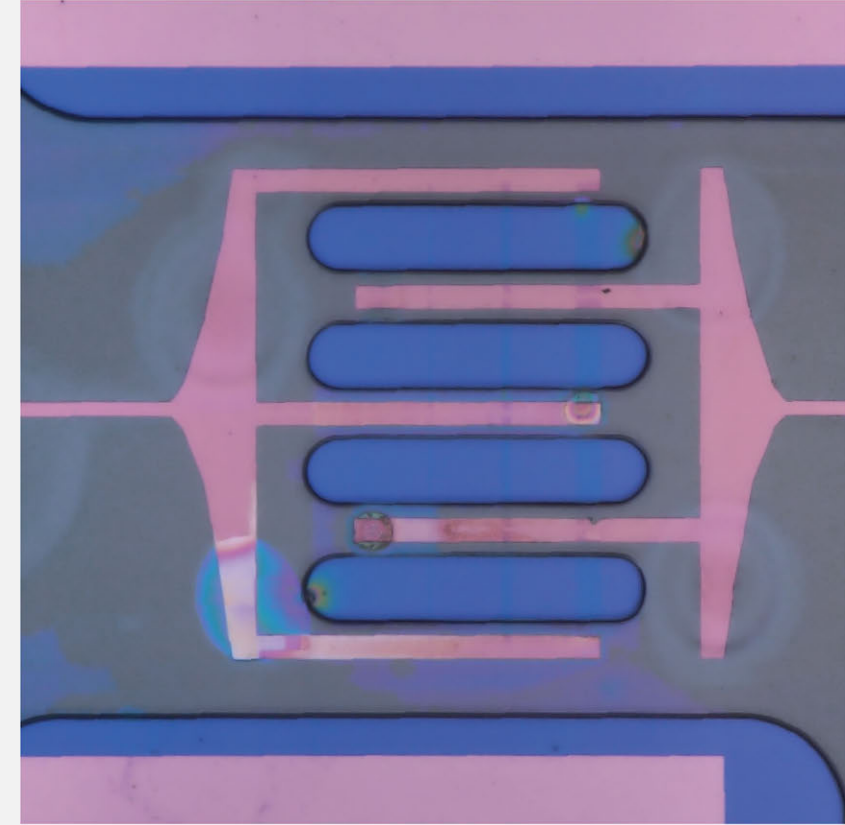
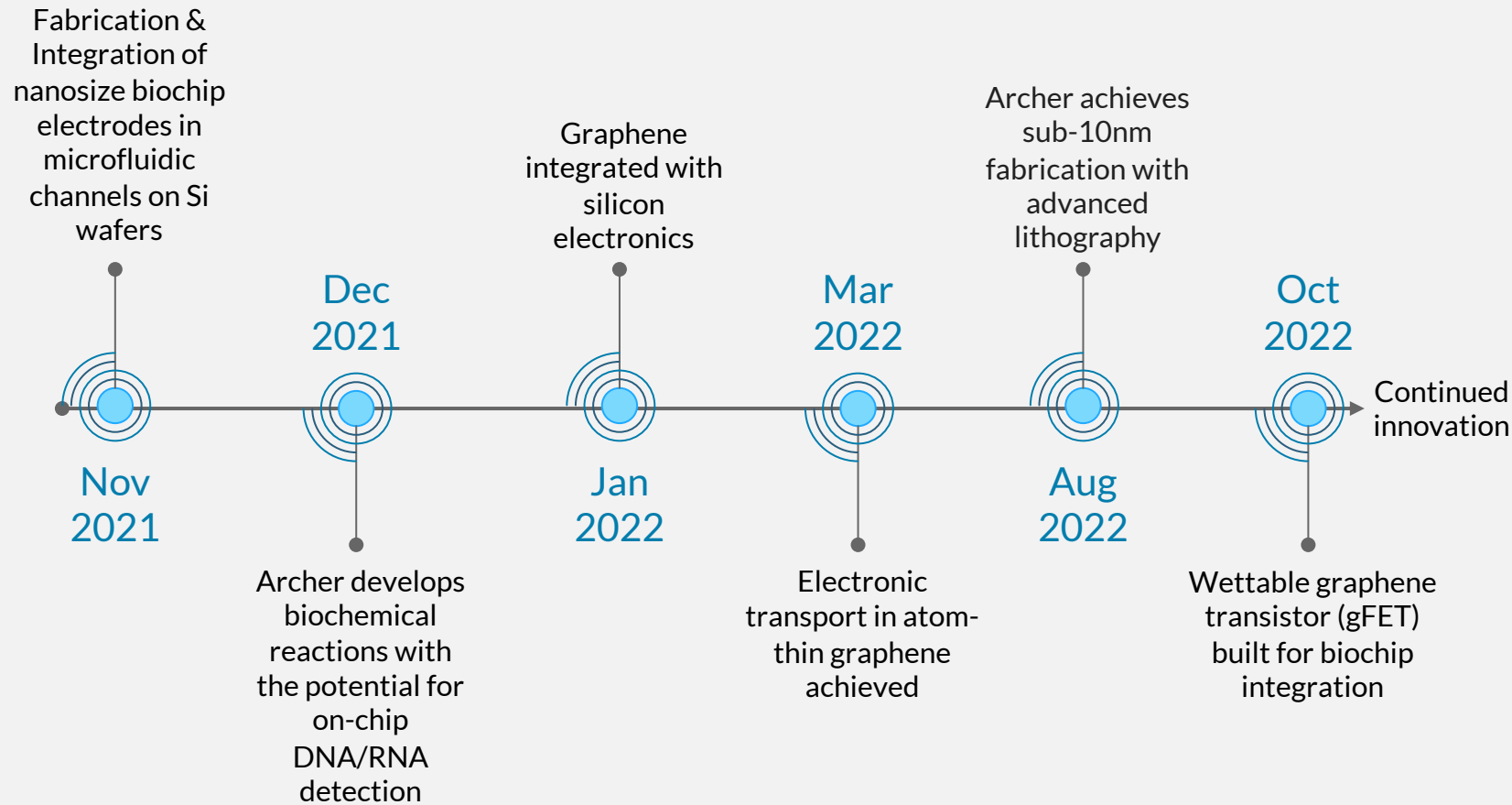


Access to state-of-the-art bio facilities and advanced chip prototyping, testing and development



Potential for on-chip detection of pathogens without the need for PCR

Archer is using graphene transistors as ultrasensitive sensors to detect and analyse disease



Right Bottom: Schematic of the liquid-gated gFET. The transistor is specially fabricated to prevent liquids from shorting the integrated circuit. Several advanced lithographic processes are required to fabricate the device 'layers', while solving for complex fluid dynamics. Right Top: shows an actual microscope image magnifying the gFET sensing region with 'open wells' where analytes in fluids would be detected by the miniaturised integrated graphene components.



ARCHER IS DEVELOPING REVOLUTIONARY DEEP-TECH

The deep-tech journey
requires Archer to break
through barriers...

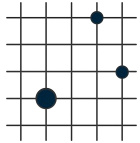
...by systematically
pushing each limit



Growing the Archer team and expanding access to world-class tech development infrastructure in Australia and abroad



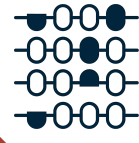
Establishing and strengthening strategic commercial partnerships



Patent prosecution and IP portfolio growth



Advance biochip fabrication steps that link to potential future operation



World-first tech development towards **1 qubit** with mobile compatibility

Archer is primed to become a global semiconductor company

The future of tech will look fundamentally different

Archer's complementary quantum devices offer the potential to overcome significant limitations in traditional digital technologies.

Tier-one supply-chain links

Archer's partnerships are strong with clear goals. We work with multinationals, startups, and leading R&D labs around the world.

Talented team to rival any

The Company is developing advanced semiconductor devices based on the breakthrough scientific discoveries of our staff.

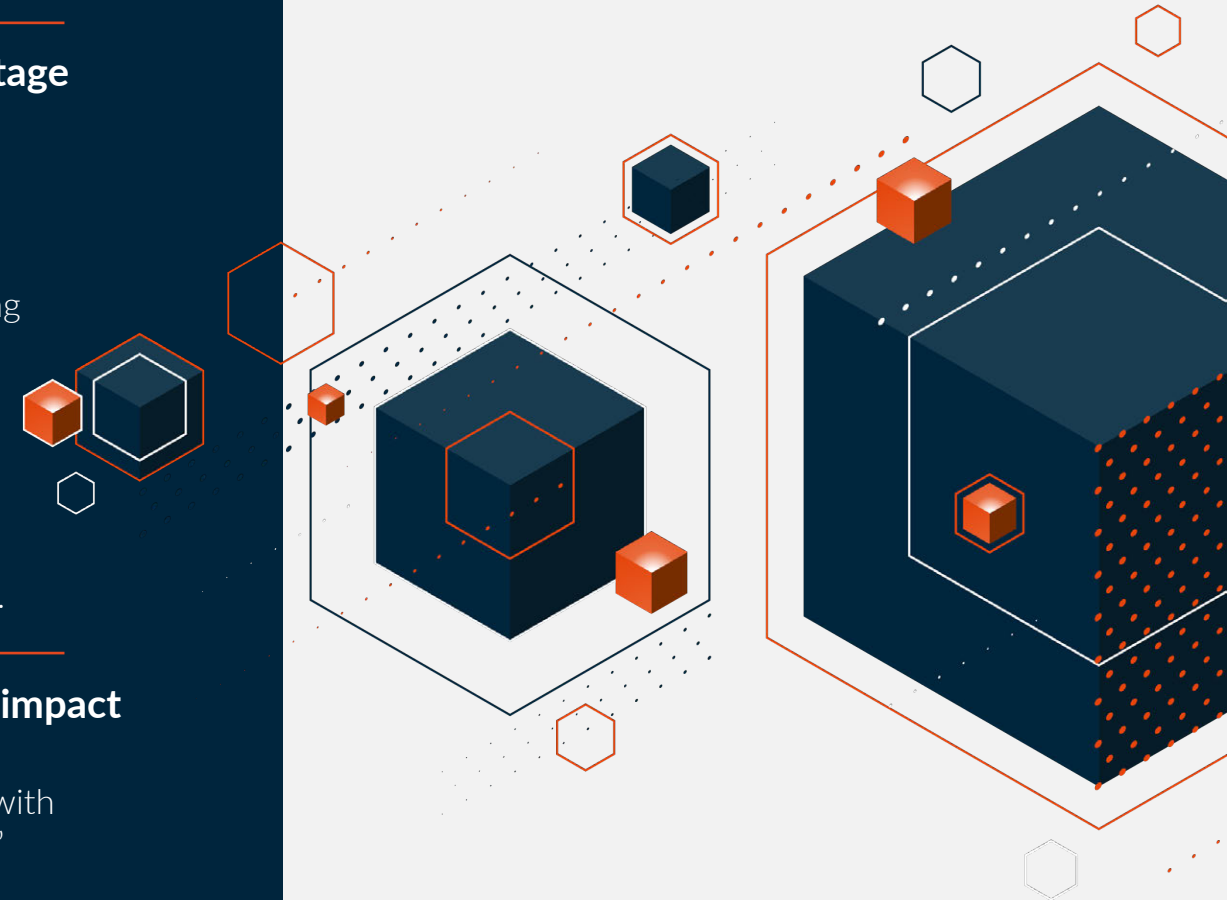
Global competitive advantage worth protecting

Archer is the only ASX listed company and one of a few players in the semiconductor industry with patents protecting qubit processor technology.

The Company has a growing IP portfolio of granted and pending patents for potentially commercialising step-change advances in its R&D Programs.

Activities with significant impact

Archer has a solid track record delivering on ambitious goals, with a strong pipeline of 'news flow' expected over the next year.



ASX Code: AXE

ACN: 123 993 233

The Board of Archer authorised this announcement to be given to ASX.

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