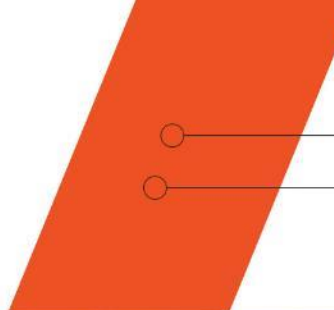




 ¹²CQ TECHNOLOGY
 BIOCHIP TECHNOLOGY

 **ARCHER**

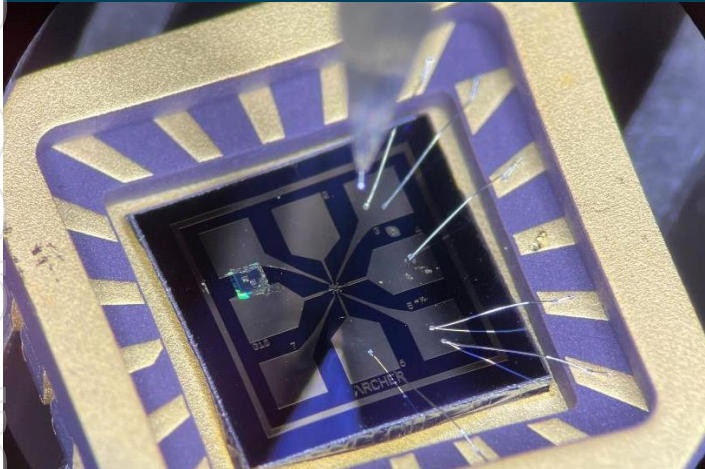


Archer Materials

Investor Presentation | November 2024

Archer Materials is building on its foundation of carbon-based technologies to develop products that will help solve critical problems.

Quantum Technology



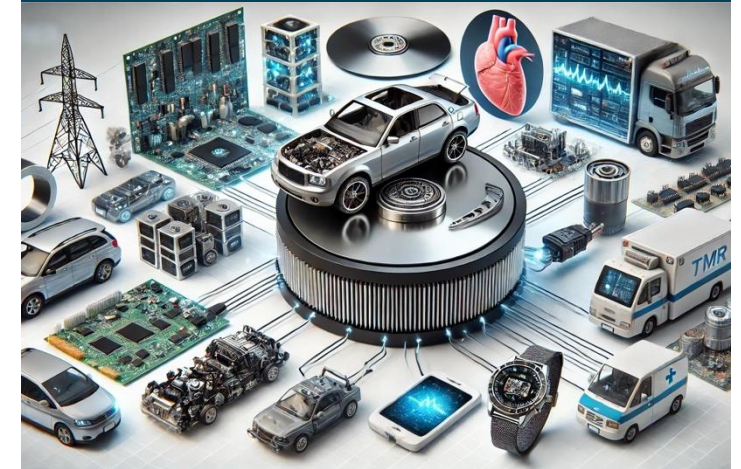
A carbon-based quantum device for applications like sensing and computing and the possibility of integrating with other electronics.

Biochip



Highly sensitive, chip-based graphene sensors for at-home management and treatment of chronic diseases.

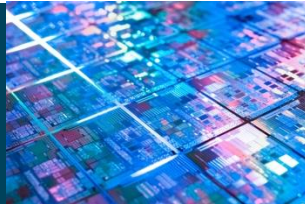
TMR Sensor



TMR sensors are more sensitive, have higher bandwidth and lower power consumption.

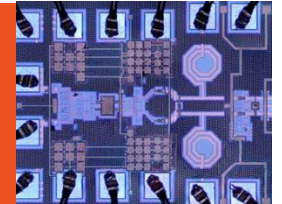
Technology development strategy focussed on megatrends.

Quantum Technologies



- Quantum computing offers unprecedented processing power for solving complex problems
- Advanced quantum sensors allow for highly precise measurements
- Quantum computing accelerates AI algorithms, enhancing machine learning, pattern recognition, and data processing

ARCHER TECHNOLOGIES
¹²CQ Project



Ageing Population



- Increased focus on “at home” care.
- Development of easy-to-use home diagnostic tools that allow elderly users to monitor chronic conditions like diabetes, cardiovascular health, and kidney function.
- Focus on cost-effective solutions that make home testing affordable, potentially reducing the burden on the public healthcare system

ARCHER TECHNOLOGIES
Biochip

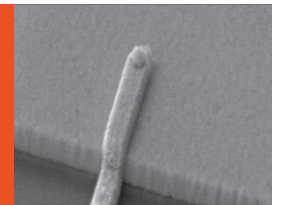


Digitalisation



- Increasing use of data analytics and big data technologies – exponential growth in data centres
- New technologies required to make data centres more efficient and cost-effective
- Technological advancement driving exponential growth in the digital economy

ARCHER TECHNOLOGIES
TMR sensor



Decarbonisation



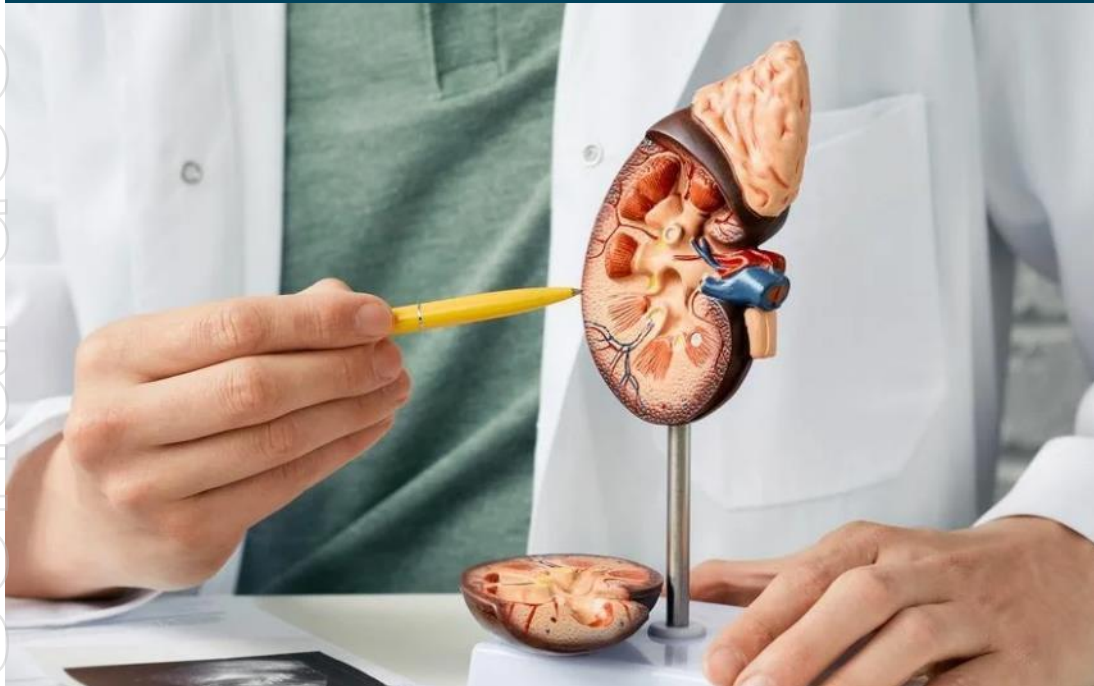
- Structural trend driving exponential growth of renewable energy sources
- Existing transmission network unable to cope with influx of renewable energy
- AI and technology solutions are required to make the network stable

Archer is assessing
new technologies
for development



Biochip – the problem & addressable market

Archer is developing a biochip that uses the highly sensitive, high speed, low power sensors to detect ions that could be integrated into a lab-on-a-chip device for advanced medical diagnostics.



Chronic kidney disease affects more than 850 million people (>10% of the population).¹

Abnormal potassium levels can be lethal → kidney disease patients are at high risk as the kidneys control electrolytes like potassium.

Testing can only be done in a clinical setting with analysis done via a lab. Current testing is performed monthly, which is too slow and not done frequently enough.

>US\$3B total addressable of the >US\$80B renal disease market.²

Extendable to heart disease and treatment.

Extendable to other ion sensing applications in medicine and agriculture.

1. Kidney Care UK "1 in 10 people...", Hill N. et al. PLOS ONE (2016)
2. Yole "Biosensors Marketing Report 2024-32", Market Research Future "Renal Disease Market Report". Bottom-up estimate using refs above

Biochip – a ‘lab-on-a-chip’ for at home testing

Developing a biosensor, based in graphene field effect transistors (gFET) to test for potassium in chronic kidney disease.

High accuracy to bring testing for diseases like chronic kidney disease into the home at a low cost.



High frequency of testing enables physicians to more effectively monitor and manage patients with the best available therapies and treatment.



Improved treatment for dialysis patients.



Potassium lowering drugs produced by pharmaceutical companies could be safely and regularly prescribed.



Patients in remote areas are empowered to take-action before its too late.

MUTUAL BENEFIT FOR ARCHER AND DRUG COMPANIES

Biochip – Potassium Sensing - Status

Proof of concept

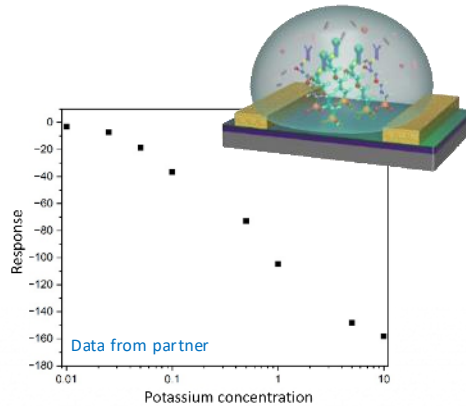
Feasibility

Development & Optimisation

----- Launch

BEGINNING THESE PHASES

- Initial data
- Foundry supplier sourced
- Academic support



Work ramping up in Sydney-Archer

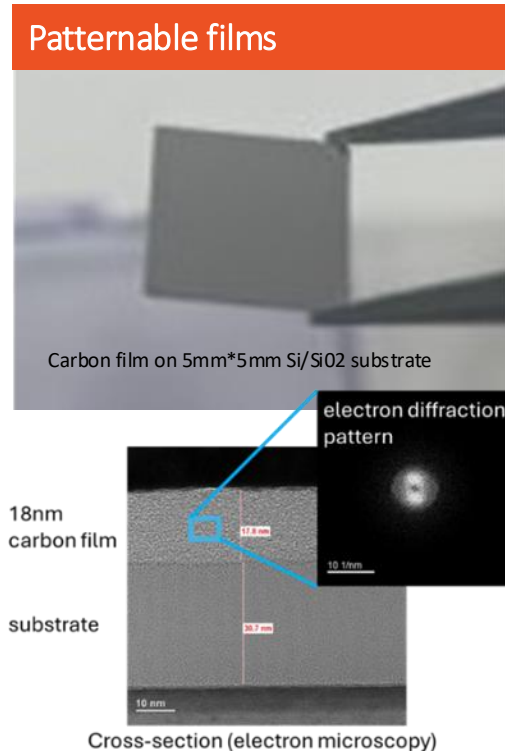
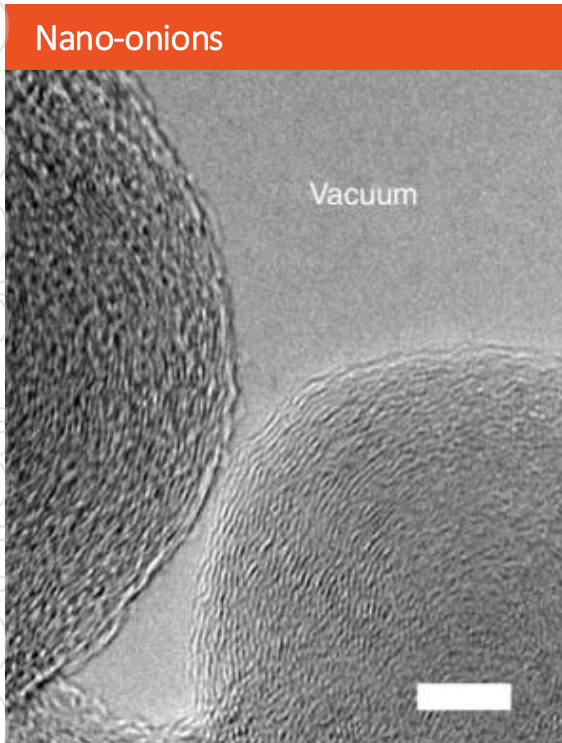
Forming partnerships with global diagnostics companies

Building access to clinical advisors, potential trial locations

Building academic partnerships in Australia

Quantum technology

Carbon Materials



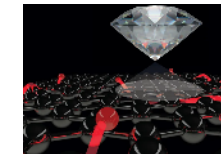
Applications



Magnetometers



MHz to THz detectors



Magnetic microscopes



Qubits

NEARER TERM

LONGER TERM

Quantum computing enables hundreds of use cases each with significant value-creation potential.



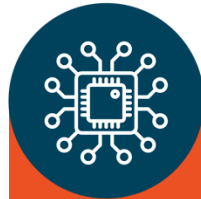
4 types

of computational problems and how quantum computing addresses them.

100+

USE CASES

Machine learning applications will impact most, if not all, industries.



SIMULATION

Precisely and efficiently simulate the dynamics of a quantum system.

- **Pharma:** drug discovery
\$40 billion to \$80 billion
- **Aerospace:** computational fluid dynamics
\$10 billion to \$20 billion
- **Chemistry:** catalyst design
\$20 billion to \$50 billion
- **Energy:** solar conversion
\$10 billion to \$30 billion
- **Finance:** market simulation (used in derivatives pricing)
\$20 billion to \$35 billion



OPTIMISATION

Efficiently optimise solutions from complex and large data.

- **Logistics:** network optimization
\$50 billion to \$100 billion
- **Insurance:** risk management
\$10 billion to \$20 billion
- **Finance:** portfolio optimization
\$20 billion to \$50 billion
- **Aerospace:** route optimization
\$20 billion to \$50 billion



MACHINE LEARNING

Process data sets to reduce noise and simplify computations faster.

- **Automotive:** autonomous vehicle AI algorithm design
Up to \$10 billion
- **Finance:** money laundering and fraud prevention
\$20 billion to \$30 billion
- **Tech:** generative, foundation and horizontal AI
\$50 billion to \$100 billion

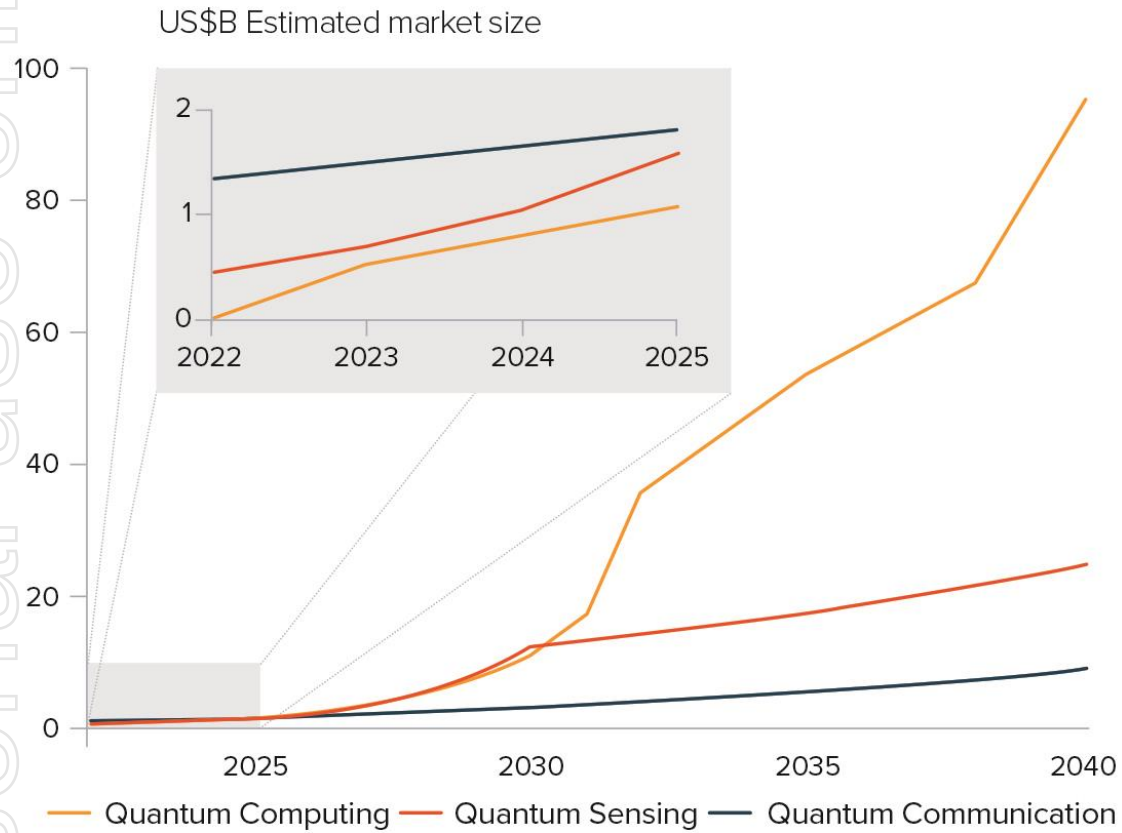


CRYPTOGRAPHY

Improve encryption protecting critical information.

- **Government:** encryption and decryption (related to secure communications and cybersecurity)
- **Corporate:** encryption (related to secure communications and cybersecurity)
Up to \$10 billion

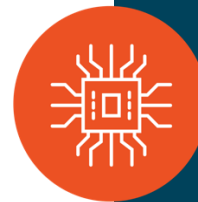
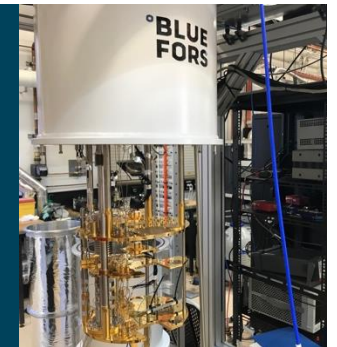
Archer considers quantum technology to be the next great technological advance.
Expected large scale adoption after 2030.



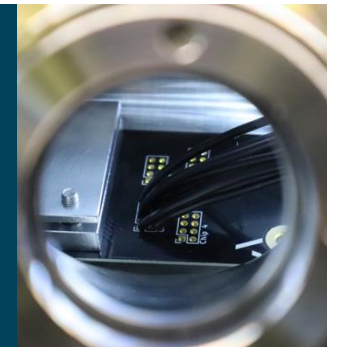
Sources:
BCG analysis
Krelna, "Quantum technology for military applications" EPJ Quantum Technology (2021); IBM quantum roadmap; IonQ quantum roadmap



Adoption of quantum tech expected to increase with quantum hardware maturity

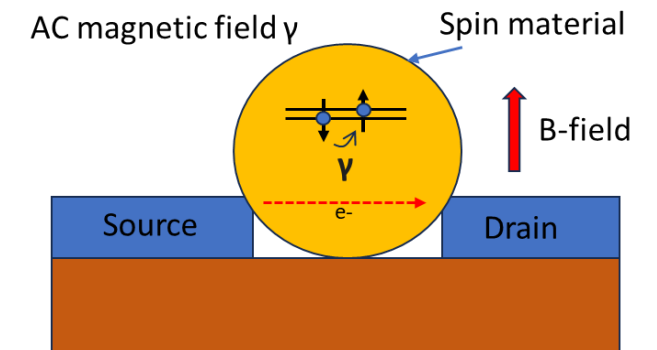
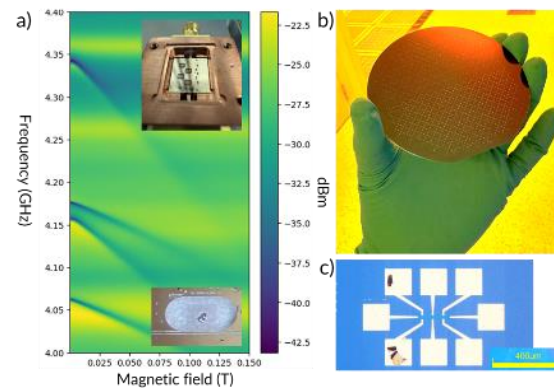
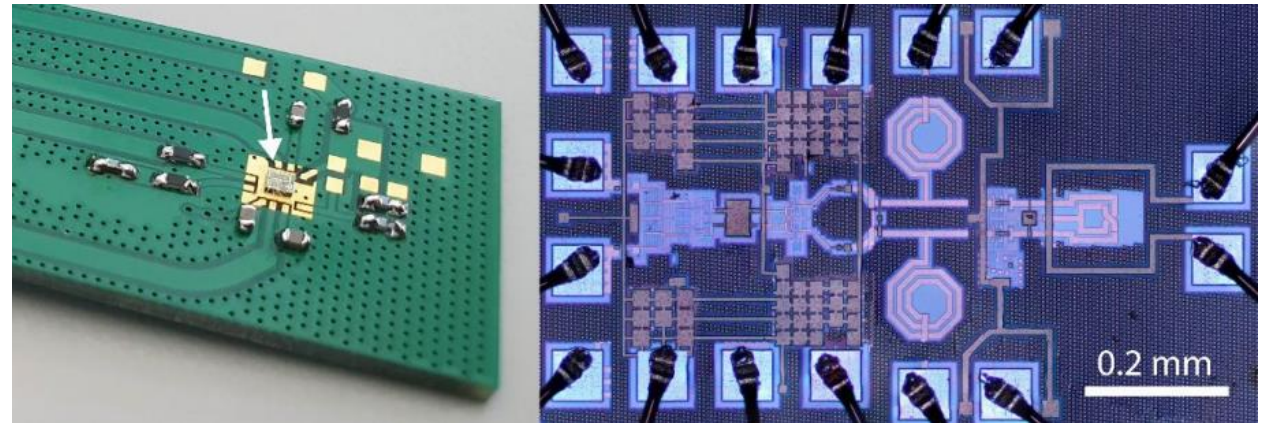


Quantum computing is expected to rapidly increase in share of total quantum value



Quantum technology – Status

- Recently bolstered manufacturability and scalability with a new carbon film.
- Probing microscale volumes of carbon material using pESR chip.
- Working with external collaborators to make progress on three fronts:
 - Improving materials properties and scaling to wafer-scale synthesis and processing;
 - Developing microwave resonant circuits to both probe and later control electron spin; and
 - Begun work on electrically detected spin resonance for readout.
- Building on team's expertise to investigate TMR sensors



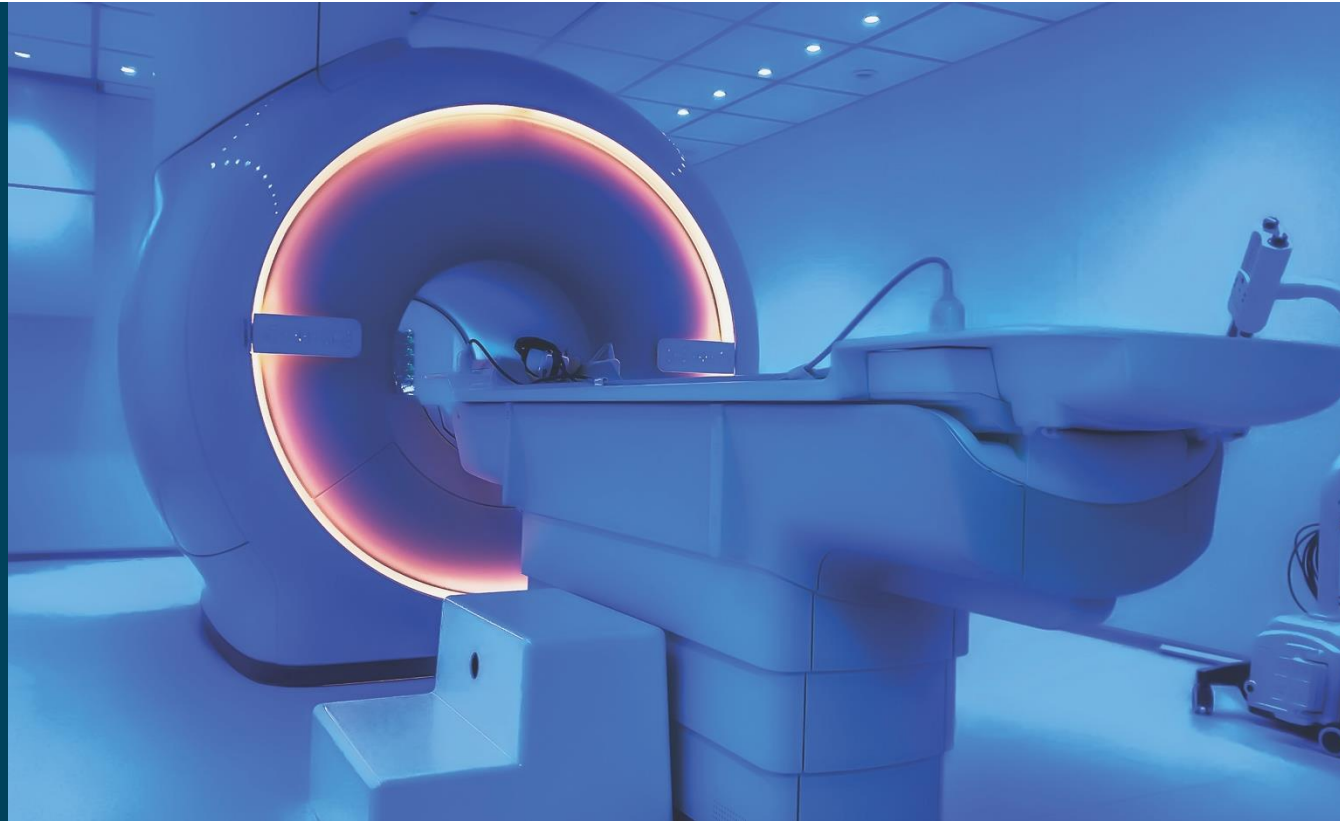
Archer set to tap into high growth TMR sensor market

- Overseas foundry to develop a tunnel magnetoresistance (“TMR”) sensor for Archer for commercial use in industrial applications.
- TMR sensors are ideal for many applications, including artificial intelligence, data centres, automotive, and the Internet of Things (IoT).
- TMR leverages quantum phenomena to provide a performance edge over classical incumbents.
- Part of Archer’s ^{12}CQ project, and leveraging its expertise in quantum mechanics to design advanced TMR sensors.
- Archer will finalise its TMR sensor design in the coming weeks, with the first prototypes to be delivered before the end of the year.
- Early next calendar year, Archer will commence work to optimise the TMR sensor design and engage with potential customers, potentially bringing forward revenue opportunities while it continues ^{12}CQ quantum development.



TMR Sensors – Key benefits

- High Sensitivity and Accuracy
- Ideal for detecting very small magnetic fields.
- Bidirectional sensing capabilities
- Low Power Consumption
- Enables use in battery-powered devices.
- Versatility
- Suited for various industries, including (but not limited to) automotive, medical devices, and IoT.



Two-Year Milestones

Year 1

Complete R&D phase and prototyping with MultiDimension Technology.

Secure partnerships with manufacturers in key industries.

Year 2

Begin commercialisation and sales.

Launch pilot projects in key verticals with initial customers.

Archer has the foundations in place to advance its technology towards commercialisation in global markets.

Future technologies

Archer's devices look to solve high value problems.

Strong partnerships

Archer has partnerships with foundries to help manufacture its technologies and with leading research institutions to help develop its technologies.

Growing markets

Archer's technologies have a range of applications across growing markets such as medical diagnostics, data centres, IoT, and automotive.

IP portfolio

A growing IP portfolio of granted and pending patents across key markets such as North America, APAC, and Europe.

Thank you

ASX Code: AXE

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

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