Archer Materials Limited (ACN: 123 993 233)
Lot Fourteen, Frome Road, Adelaide SA 5000
www.archerx.com.au

ASX Announcement (ASX: **AXE**) 27 July 2021

Fourth Quarter Activities Report

For the three months ending 30 June 2021

Significant Activities

- The Company is well capitalised with approximately $6.24 million cash and no debt.
- New quantum computing agreement signed with IBM.
- Archer to collaborate with Australian Defence Prime NIOA.
- Progress with Max Kelsen in the development of Quantum Neural Networks.
- ^{12}CQ chip development advances with sophisticated qubit control device modelling.
- Semiconductor nanofabrication capabilities and access to deep-tech infrastructure expanded, allowing co-located development of Archer's ^{12}CQ chip and biochip.
- Completion of the sale of two Eyre Peninsula tenements to ChemX Materials and the sale of all remaining mineral tenements to iTech Minerals.
- Completion of the sale of all remaining tenements should allow Archer to change its GICS code to "Semiconductors" and seek inclusion in the S&P/ASX All Technology Index.

Archer Materials Limited ("Archer", the "Company", "ASX: **AXE**") is pleased to report on its activities for the three months ending 30 June 2021 ("Quarter").

Commenting on the fourth quarter activities, Greg English, Executive Chairman of Archer, said, "We are pleased to have executed a new quantum computing agreement with IBM, and Archer is looking forward to working with IBM on the advancement of quantum computing. We are making crucial steps towards our goal of enabling practical quantum computing applications, and IBM is helping us get there."

"During the Quarter, we made considerable progress on the modelling of qubit control devices. The sophisticated modelling facilitates achieving qubit control of few and single qubits, which are key milestones in validating 12CQ chip viability. Without this, 12CQ chip operation would not be possible."

"We continue to seek collaborations with quantum computing companies and potential end-users. In addition to the IBM agreement, we continued our work with Max Kelsen on Quantum Neural Networks and signed a new agreement with Australian Missile Corporation."

"The sale of all of our mineral tenements shows our continued commitment to growing the Advanced Materials Business. Once the sale of the tenements is completed, we will apply to change our GICS code to "Semiconductors" and seek to be admitted to the S&P/ASX All Technology Index."

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Quarterly Activities to 30 June 2021

Archer is a technology company that operates within the semiconductor industry. The Company is developing and commercialising advanced semiconductor devices, including chips relevant to quantum computing and medical diagnostics. The Company is progressing the development of its ^{12}CQ quantum computing qubit processor chip ("^{12}CQ chip") and 'lab-on-a-chip' biochip technology ("biochip"), while completing the sale of its mineral exploration tenements.

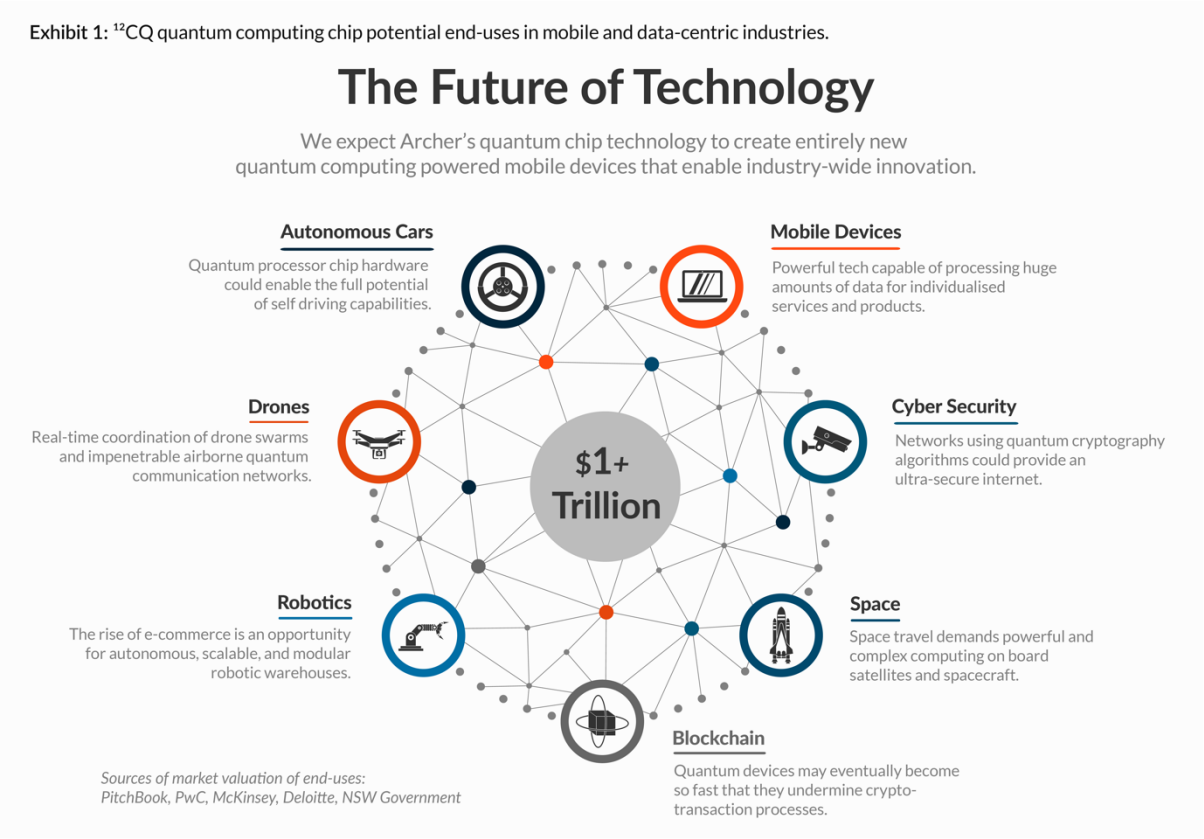
Advanced Materials

Quantum Technology

Archer's ^{12}CQ is a world-first qubit processor technology that would allow for mobile quantum computing powered devices (Exhibit 1). During the Quarter, Archer signed a new quantum computing agreement with International Business Machines Corporation ("IBM", "NYSE: **IBM**"). Archer and IBM will continue to work together on the advancement of quantum computing (ASX ann. 5 May 2021).

As part of the new agreement between Archer and IBM, Archer retains membership to the global IBM Quantum Network and the associated IBM Quantum Startup Program. The new agreement also gives Archer the opportunity to progress the work initiated under the previous agreement (ASX ann. 5 May 2020). Archer is one of the first Australian companies developing quantum computing technology to have joined the invitation-only, IBM Quantum Network.

Exhibit 1: ^{12}CQ quantum computing chip potential end-uses in mobile and data-centric industries.



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Archer is making significant progress with Max Kelsen in the development of Quantum Neural Networks (ASX ann. 26 May 2021). The collaboration involves adapting a unique class of quantum algorithms, called Quantum Approximation Optimisation Algorithm, to be used in the training of Quantum Neural Networks and more generally Variational Quantum Eigensolvers. These quantum algorithms could potentially allow quantum computing devices to outperform modern computers in solving complex problems with broad applications.

During the Quarter, Archer signed a non-binding letter of intent ("LOI") with the Australian Missile Corporation Pty Ltd. By signing the LOI the Company confirmed its interest in cooperating with NIOA's Australian Missile Corporation to help fulfil the Australian Government's long-term vision of developing sovereign Australian defence industrial capabilities, in particular, for The Sovereign Guided Missile Enterprise[†].

Archer also continued to make technical development progress on its ^{12}CQ chip. The Company announced that it was developing qubit control devices based on various semiconductor technologies that integrate control electronics with ^{12}CQ chip qubits (ASX ann. 10 May 2021). The qubit control devices that Archer is building are state-of-the-art.

Controlling qubits in Archer's ^{12}CQ chip requires the design of new and highly complex quantum information control electronics to integrate with ^{12}CQ chip qubits. The Company is now at a stage of development where these advanced designs can be (and are being) developed from first principles, modelled using specialised software, built and tested, all in an end-to-end process.

Archer's ^{12}CQ chip development has progressed to utilising *Electromagnetic Finite Element Modelling* to build qubit control devices (Image 1). The sophisticated modelling facilitates achieving qubit control of few and single qubits, which are key milestones in validating ^{12}CQ chip viability. Without this, ^{12}CQ chip operation would not be possible.

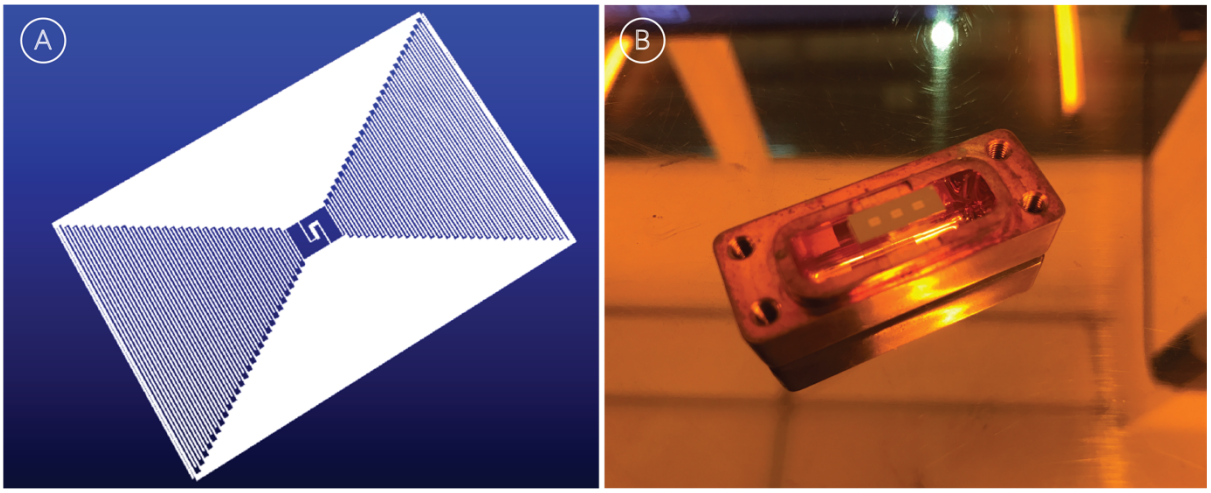

Image 1. Use of specialised software to model qubit control circuitry and devices. A Example of model qubit control circuitry prepared for illustrative purposes. Actual designs remain commercial-in-confidence and intellectual property of Archer. **B** Example of a qubit control device fabricated by the Archer team with integrated model circuitry on the mounting chip (three rectangles in the centre of the block) measuring 11 mm x 4 mm. The control circuitry in **B** is not visible to the eye at the image magnification.

[†] https://www.pm.gov.au/media/sovereign-guided-weapons-manufacturing

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Human Health

Archer's biochip is a unique graphene-based biotechnology that the Company is building to enable the complex detection of some of the world's most deadly communicable diseases. The largest technological barriers to commercialising such devices involve nanofabrication. This is the current focus of Archer in its biochip development (ASX ann. 22 Mar 2021).

During the Quarter, Archer continued to strategically secure access to local institutional deep-tech infrastructure (ASX ann. 26 Apr 2021 and 11 Jun 2021) to grow its capability in semiconductor production operations that are essential to the development and commercialisation of the Company's biochip technology.

These new capabilities provide the high-quality and reliable technical specifications necessary for Archer's future patent applications. The establishment of semiconductor chip testing allows Archer to reach a number of biochip development milestones, including the fabrication of graphene transistors and their operation at the limits of what can be achieved technologically.

Importantly, the progress highlights the complementary nature of Archer's technologies; the Company is developing advanced chips in the same semiconductor fabrication environment and the chip testing workstations can also be configured to test chip devices relevant to the Company's ^{12}CQ chip.

The successful development of Archer's biochip requires the analysis and testing of semiconductor device materials components and the establishment of quality control processes at the nanoscale (Image 2). This is because Archer's biochip technology integrates materials like graphene, which is one-atom 'thick' in size (*i.e.* a fraction of a nanometre), and device features that are nanometres in size (ASX ann. 8 Apr 2021).

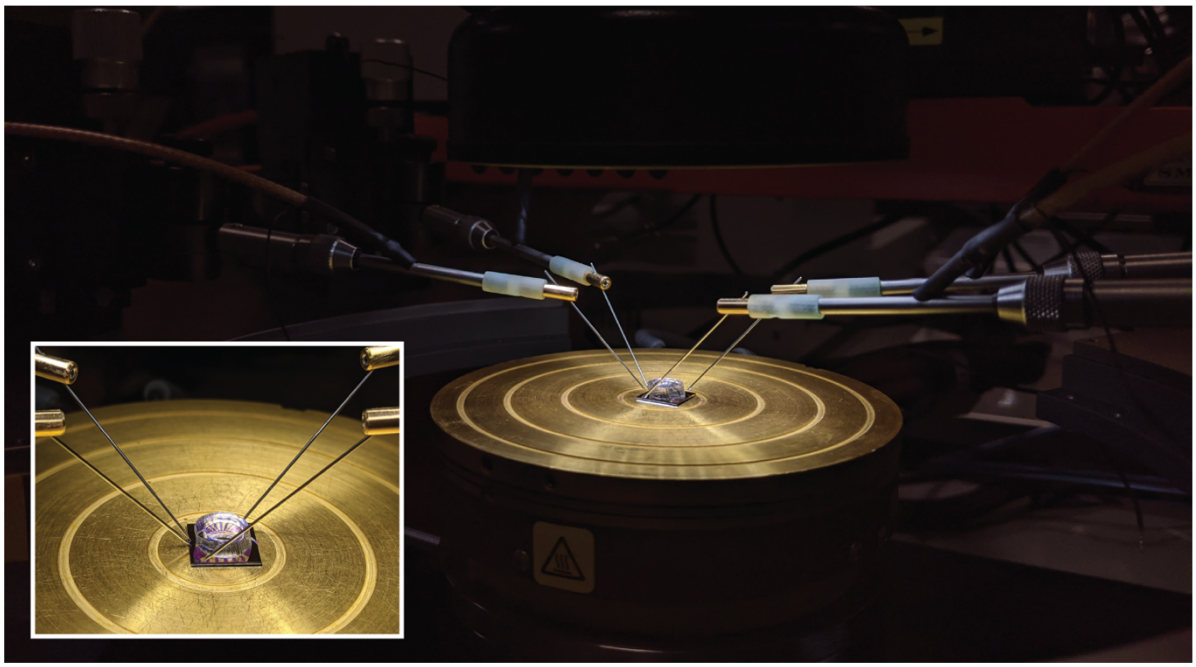

Image 2. Part of the semiconductor chip probe workstation. Inset: Testing of a chip relevant to biochip development. The US and German manufactured state-of-art semiconductor chip prober and analysers are operated by Archer staff and housed in a specialised cleanroom inside a world-class $150 million semiconductor research and prototype foundry.

Mineral Exploration

Completion of Sale of Two Eyre Peninsula Tenements

The Company is selling its mineral tenements, which allows Archer to be technology focussed. During the Quarter, the Company completed the sale of two Eyre Peninsula Tenements to ChemX Materials Ltd (formerly Baudin Minerals and NextGen Materials) with Archer receiving 9.25 million ChemX Materials Ltd ("ChemX") shares at an issue price of $0.20 per share for a value of $1.85 million (ASX ann. 18 Jun 2021).

The total payment to Archer for the sale was $2.0 million which includes a $150,000 cash payment. The terms of the sale ChemX sale agreement were detailed in previous ASX announcements (ASX ann. 22 Dec 2020, 15 Mar 2021, and 21 May 2021).

Shareholders will retain exposure to any exploration success on the ChemX tenements through Archer's ChemX shareholding and the 2% net smelter return royalty granted to Archer. ChemX intends to list on the ASX in the coming months and Archer is entitled to receive an additional bonus payment equal to 5% of the enterprise value of ChemX at the time of ASX listing.

Sale of all remaining Mineral Tenements

As previously announced, Archer has agreed to sell the Graphite Rights and all of the Company's remaining mineral tenements (excluding the ChemX tenements) to iTech Minerals Ltd (together the "iTech Assets"). The iTech transaction was described in previous ASX announcements (ASX ann. 12 Apr 2021, 21 May 2021, and 18 Jun 2021) and under *Subsequent Activities* section in Archer's Third Quarter Activities Report (ASX ann. 19 Apr 2021).

At the completion of the sale and purchase of the iTech Assets, Archer will receive 50 million ordinary shares in the capital of iTech. iTech intends to undertake an initial public offering at $0.20 per new iTech share and list on ASX. The Company intends to distribute all 50 million iTech shares to Archer shareholders on a pro-rata basis.

Upon completion of the sale of the three wholly-owned subsidiary companies to iTech, Archer will no longer hold any mineral exploration licences, mining leases or any other type of mineral tenement. The sale of the iTech Assets will be subject to Archer shareholder approval at a general meeting ("Meeting"). At this stage, the Company intends to hold the Meeting in late August 2021.

Other Projects

No work was undertaken during the Quarter at Archer's other project areas not mentioned in this report.

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Corporate

Cash Balance

The Company's cash balance at the end of the Quarter was $6,239,000.

Exercise of Unlisted Options

During the Quarter, the Company received $283,563 from the exercise of unlisted options.

Relocation of Head Office

During the Quarter Archer relocated its head office to Lot Fourteen's innovation precinct, Adelaide (ASX ann. 24 May 2021). The Company relocated to Lot Fourteen as part of the Company's strategy to align with quantum computing end users.

The Company's new address details are:

New office address	New postal address
Lot Fourteen Frome Road, Adelaide SA 5000	PO Box 190 Belair SA 5052

Shareholder Events and Outreach

Archer CEO, Dr Mohammad Choucair, was an invited panellist at the high-profile American Chamber of Commerce 'Innovation and Collaboration Luncheon', alongside leaders of General Electric, University of Sydney, and the NSW Government.

The Archer team also attended the Land Forces Expo in Brisbane, where they met with senior decision makers of Defence Prime Contractors to discuss potential opportunities for collaboration in developing Archer's technologies.

The Company electronically distributed a number of Newsletters and News Spotlights to shareholders during the Quarter, including:

+ Quantum-powered Artificial Intelligence
+ Quantum computers and the Bitcoin blockchain
+ Archer and IBM sign new quantum computing agreement
+ Quantum Computing - Between hype and revolution
+ Archer advances as a pure-play deep tech

Archer CEO, Dr Mohammad Choucair, also gave interviews with Proactive Investor:

+ Archer Materials CEO outlines partnership with Australian Missile Corporation
+ Archer Materials 'one of the front-runners' in the quantum computing economy
+ Archer Materials details advanced device modelling for its quantum chip
+ Archer Materials agrees new quantum computing deal with IBM
+ Archer Materials transitions to pure-play deep tech company with sale of mineral tenements

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Appendix 5B Disclosures

Archer's accompanying Appendix 5B (Quarterly Cashflow Report) includes amounts in item 6.1 which were executive and non-executive director fees paid as salaries and wages. During the Quarter the Company spent $11,000 on exploration activities, primarily being direct expenditure on tenure licence related fees. This amount does not include any costs associated with the Quantum Computing, Human Health and Reliable Energy projects, nor does it include other corporate salaries and other associated overheads.

Issued Capital

Date	Shares	Options	Performance Rights
Start of Quarter	226,036,546	15,988,277	Nil
New issues during Quarter	Nil	Nil	Nil
Exercised/forfeited during Quarter	1,470,000(1)	1,470,000(1)	Nil
End of Quarter	227,506,546	14,518,277	Nil
Date of this Report	227,706,546(2)	14,318,277(2)	Nil

(1) 1,470,000 unlisted options, exercisable at $0.1929 on or before 31 March 2023, were exercised into shares. The unlisted options were previously issued under an employee incentive scheme.

(2) A further 200,000 unlisted options, exercisable at $0.1929 each on or before 31 March 2023, were exercised into shares subsequent to 30 June 2021. The unlisted options were previously issued under an employee incentive scheme.

About Archer

Archer is a technology company that operates within the semiconductor industry. The Company is developing and commercialising advanced semiconductor devices, including chips relevant to quantum computing and medical diagnostics.

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

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For more information about Archer's activities, please visit our:

Website:
https://archerx.com.au/

Twitter:
https://twitter.com/archerxau

YouTube:
https://bit.ly/2UKBBmG

Sign up to our Newsletter:
http://eepurl.com/dKosXI

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List of Archer Tenements

Tenement[1]	Location	Commodity	Jurisdiction
Tenements sold to ChemX Materials Ltd[2]			
EL 5815	Waddikee	Graphite	SA
EL 5920	Carappee Hill	Graphite	SA
Tenements sold to iTech Minerals Ltd[3]			
EL 6363	North Cowell	Graphite	SA
EL 5791	Cockabidnie	Graphite	SA
EL 5804	Wildhorse Plains	Graphite	SA
EL 5870	Carpie Puntha	Graphite	SA
EL 6351	Burra North	Base Metals	SA
EL 5769	Napoleons Hat	Copper / Gold	SA
EL 5794	Blue Hills	Copper / Gold	SA
EL 5935	Whyte Yarcowie	Cobalt / Copper	SA
EL 6000	Pine Creek	Copper / Gold	SA
EL 6029	Altimeter	Copper / Gold	SA
EL 6160	Franklyn	Copper / Gold	SA
EL 6287	Peterborough	Copper / Gold	SA
EL 6354	Bendigo	Copper/Gold	SA
EL 6478	Caralue Bluff	Kaolin	SA
ML 6470	Campoona Shaft	Graphite mining	SA
MPL 150	Sugarloaf	Graphite and graphene processing	SA
MPL 151	Pindari	Process water for Sugarloaf	SA
EL 8894	Stanthorpe	Tungsten / Tin	NSW
EL 8871	Crowie Creek	Copper/Gold	NSW

Notes

(1) All tenements are 100% owned by Archer.

(2) Refer to ASX announcement 22 Dec 2020.

(3) Refer to ASX announcement 12 April 2021.