



NEWS RELEASE

Xanadu, Rolls-Royce, and Riverlane unlock dramatic improvements for applications to jet engine airflow simulations using quantum computing

2025-11-25

TORONTO, Nov. 25, 2025 (GLOBE NEWSWIRE) -- Xanadu, Rolls-Royce, and Riverlane have successfully completed their **collaborative project** on applications relevant to modeling jet engine airflow by utilizing quantum computing. By integrating Xanadu's **PennyLane** software and Riverlane's state-of-the-art quantum algorithms, the project enabled Rolls-Royce to achieve a reduction in simulation runtimes by orders of magnitude—shrinking calculation costs from weeks to less than an hour, unlocking new prototyping opportunities for the aerospace industry.

Simulating airflow in jet engines is a notorious bottleneck for classical supercomputers. The many unknown variables that have to be solved in a large system of linear equations result in prohibitively long simulation runtimes. However, quantum computers are well-suited for these systems and are poised to offer a significant advantage: quantum computers can potentially accelerate the simulation time exponentially, leading to much faster design processes for large systems.

Leigh Lapworth, Rolls-Royce Fellow in Computational Science, said: "This has been a hugely successful collaboration, which has significantly advanced our quantum applications capability. The single-minded focus on fault tolerant quantum algorithms has put us and our partners in a leading position as we enter the error-corrected era."

"To solve problems on a quantum computer, certain parameters of the quantum circuit need to be precomputed classically. This process was traditionally very time-consuming. However, our research, along with that of academic groups, has significantly accelerated this step, enabling the classical preprocessing to keep pace with the quantum computation itself," says Christoph Sünderhauf, Staff Quantum Scientist at Riverlane.

Christian Weedbrook, Chief Executive Officer and Founder of Xanadu said: “Our efforts here successfully reduced prototyping runtimes by up to 1000-fold in some instances, overcoming the unsustainable wait times of weeks for Rolls-Royce. To make quantum simulations, and more generally quantum computing, practical for Rolls-Royce, we targeted their specific application and used our Catalyst compiler to optimize their PennyLane programs.”

“Our work highlights a critical truth for industrial quantum adoption: bottlenecks won't be solved by isolating quantum from classical computing. We must focus on optimizing the hybrid quantum-classical structure to make these applications present a computational advantage.”

This collaboration, supported through joint funding between the governments of Canada and the United Kingdom, demonstrates a maturing partnership for building quantum computing expertise between the two nations. Each company brought their own specialized skills and capabilities: Rolls-Royce provided the core industrial use case; Riverlane contributed novel quantum algorithms; and Xanadu provided optimizations to the quantum-classical program written using PennyLane, highlighting the effectiveness of its **Catalyst** compiler. The collaboration benefited from leveraging a wide pool of expertise to effectively target the end-to-end prototyping process.

Quantum computing may offer exponential speedups to the most challenging computational simulations, potentially unlocking the next generation of jet engine designs. The collaboration between Xanadu, Rolls-Royce, and Riverlane paves the critical path towards this reality by uncovering and addressing key bottlenecks that apply to a simulation workflow. By preparing performant quantum algorithm components and software implementations today, Rolls-Royce is ensuring that they can extract meaningful insights upon the arrival of Xanadu's fault-tolerant quantum hardware.

Business Combination

Xanadu Quantum Technologies Inc. (“Xanadu”) recently announced a business combination agreement with Crane Harbor Acquisition Corp. (Nasdaq: CHAC), a publicly traded special purpose acquisition company (“Crane Harbor”). The combined company, Xanadu Quantum Technologies Limited (“NewCo”), is expected to be capitalized with approximately US\$500 million in gross proceeds, comprising approximately US\$225 million from Crane Harbor's trust account, assuming no redemptions by Crane Harbor's public stockholders, as well as US\$275 million from a group of strategic and institutional investors participating in the transaction via a common equity committed private placement investment. NewCo is expected to be listed on the Nasdaq Stock Market and on the Toronto Stock Exchange.

About Xanadu

Xanadu is a Canadian quantum computing company with the mission to build quantum computers that are useful

and available to people everywhere. Founded in 2016, Xanadu has become one of the world's leading quantum hardware and software companies. The company also leads the development of PennyLane, an open-source software library for quantum computing and application development. Visit **xanadu.ai** or follow us on X **@XanaduAI**.

About Crane Harbor Acquisition Corp.

Crane Harbor Acquisition Corp is a blank check company formed for the purpose of effecting a merger, share exchange, asset acquisition, share purchase, reorganization or similar business combination with one or more businesses.

About Rolls-Royce Holdings plc

Rolls-Royce is a force for progress; powering, protecting and connecting people everywhere. Our products and service packages help our customers meet the growing need for power across multiple industries; enable governments to equip their armed forces with the power required to protect their citizens; and connect people, societies, cultures and economies together.

Rolls-Royce has a local presence in 48 countries and customers in over a hundred more, including airlines and aircraft leasing companies, armed forces and navies, and marine and industrial customers.

Through our multi-year transformation programme, we are building a high-performing, competitive, resilient and growing Rolls-Royce. We are building the financial capacity and agility to allow us to successfully develop and deliver the products that will support our customers through the energy transition.

Annual underlying revenue was £17.8 billion in 2024, and underlying operating profit was £2.46 billion.

Rolls-Royce Holdings plc is a publicly traded company (LSE: RR., ADR: RYCEY, LEI: 213800EC7997ZBLZJH69).
www.rolls-royce.com

About Riverlane

Riverlane is the world leader in Quantum Error Correction (QEC), the technology that unlocks quantum computing's promise of a new age of human progress.

We partner with over 60% of the world's quantum computer companies and leading high-performance computing (HPC) centres, to solve the error problem blocking their path to 'utility-scale' systems that can transform multiple industries.

Deltaflow, our real-time QEC stack, is interoperable with quantum computers using any qubit modality. It utilises proprietary QEC chips, decoders, and compilers. Deltakit, our software platform, helps quantum developers learn, develop and adopt QEC.

Founded in 2016 as a spin-out from Cambridge University, Riverlane is headquartered in Cambridge and has offices in Boston in the US. The company has over \$120 million in private funding, including an \$85 million Series C round in 2024.

Additional Information About the Proposed Transaction and Where to Find It

The proposed business combination transaction will be submitted to shareholders of Crane Harbor and Xanadu for their consideration. NewCo and Crane Harbor have jointly confidentially submitted a draft registration statement on Form F-4 (the "Registration Statement") to the U.S. Securities and Exchange Commission (the "SEC"). The Registration Statement includes a proxy statement/prospectus to be distributed to Crane Harbor's shareholders in connection with Crane Harbor's solicitation of proxies for the vote by Crane Harbor's shareholders in connection with the proposed transaction and other matters to be described in the Registration Statement, as well as the prospectus relating to the offer of the securities to be issued to Xanadu's shareholders in connection with the completion of the proposed transaction. After the Registration Statement has been publicly filed and declared effective by the SEC, a definitive proxy statement/prospectus and other relevant documents will be mailed to Crane Harbor shareholders as of the record date established for voting on the proposed transaction. Before making any voting or investment decision, Crane Harbor's shareholders and other interested persons are advised to read, once available, the preliminary proxy statement/prospectus and any amendments thereto and, once available, the definitive proxy statement/prospectus, as well as other documents filed with the SEC by NewCo and/or Crane Harbor in connection with the proposed transaction, as these documents will contain important information about NewCo, Crane Harbor, Xanadu and the proposed transaction. Shareholders may obtain a copy of the preliminary or definitive proxy statement/prospectus, once available, as well as other documents filed by NewCo and/or Crane Harbor with the SEC, without charge, at the SEC's website located at www.sec.gov, Crane Harbor's website at www.craneharboracquisition.com or by emailing investors@xanadu.ai.

Forward-Looking Statements

This communication includes "forward-looking statements" within the meaning of the U.S. federal securities laws and "forward-looking information" within the meaning of applicable Canadian securities laws (collectively, "forward-looking statements"). Forward-looking statements may be identified by the use of words such as "estimate," "plan," "project," "forecast," "intend," "will," "expect," "anticipate," "believe," "seek," "target," "continue," "could," "may," "might," "possible," "potential," "predict" or similar expressions that predict or indicate future events or trends or

that are not statements of historical matters. We have based these forward-looking statements on current expectations and projections about future events. These statements include: the stock exchanges on which the shares of the combined company are expected to trade; proceeds from the business combination and related PIPE; funds received by the combined company from Crane Harbor's trust account and redemptions by Crane Harbor's public shareholders; quantum computers ability to accelerate simulation time and improve design processes for large systems, the ability to optimize the hybrid quantum-classical structure to achieve a computational advantage, quantum computing's ability to offer exponential speedups to the most challenging computational simulations related to the next generation of jet engine designs, and the ability to extract meaningful insights following the completion of Xanadu's fault-tolerant quantum hardware.

These forward-looking statements are provided for illustrative purposes only and are not intended to serve as, and must not be relied on as, a guarantee, an assurance, a prediction or a definitive statement of fact or probability. Actual events and circumstances are difficult or impossible to predict and will differ from assumptions, many of which are beyond the control of Xanadu and Crane Harbor. These forward-looking statements are subject to known and unknown risks, uncertainties and assumptions that may cause the actual results of the combined company following the proposed transaction, levels of activity, performance or achievements to be materially different from any future results, levels of activity, performance or achievements expressed or implied by such statements. Such risks and uncertainties include: that Xanadu is pursuing an emerging technology, faces significant technical challenges and may not achieve commercialization or market acceptance; Xanadu's historical net losses and limited operating history; that there is substantial doubt about Xanadu's ability to continue as a going concern; Xanadu's expectations regarding future financial performance, capital requirements and unit economics; Xanadu's use and reporting of business and operational metrics; Xanadu's competitive landscape; Xanadu's dependence on members of its senior management and its ability to attract and retain qualified personnel; the potential need for additional future financing; Xanadu's ability to manage growth and expand its operations; potential future acquisitions or investments in companies, products, services or technologies; Xanadu's reliance on strategic partners and other third parties; Xanadu's concentration of revenue in contracts with government or state-funded entities; Xanadu's ability to maintain, protect and defend its intellectual property rights; risks associated with privacy, data protection or cybersecurity incidents and related regulations; the use, rate of adoption, and regulation of artificial intelligence and machine learning; uncertainty or changes with respect to laws and regulations; uncertainty or changes with respect to taxes, trade conditions and the macroeconomic environment; material weaknesses in Xanadu's internal control over financial reporting and the combined company's ability to maintain internal control over financial reporting and operate as a public company; the possibility that required shareholder and regulatory approvals for the proposed transaction are delayed or are not obtained, which could adversely affect the combined company or the expected benefits of the proposed transaction; the risk that shareholders of Crane Harbor could elect to have their shares redeemed, leaving the combined company with insufficient cash to execute its business plans; the occurrence of any event, change or other circumstance that could give rise to the termination of the business

combination agreement; the outcome of any legal proceedings or government investigations that may be commenced against Xanadu or Crane Harbor; failure to realize the anticipated benefits of the proposed transaction; the ability of Crane Harbor or the combined company to issue equity or equity-linked securities in connection with the proposed transaction or in the future; and other factors described in Crane Harbor's filings with the SEC. These forward-looking statements are based on certain assumptions, including that none of the risks identified above materialize; that there are no unforeseen changes to economic and market conditions, and that no significant events occur outside the ordinary course of business. Additional information concerning these and other factors that may impact such forward-looking statements can be found in filings and potential filings by Xanadu, Crane Harbor or the combined company resulting from the proposed transaction with the SEC, including under the heading "Risk Factors." If any of these risks materialize or assumptions prove incorrect, actual results could differ materially from the results implied by these forward-looking statements. In addition, these statements reflect the expectations, plans and forecasts of Xanadu's and Crane Harbor's management as of the date of this communication; subsequent events and developments may cause their assessments to change. While Xanadu and Crane Harbor may elect to update these forward-looking statements at some point in the future, they specifically disclaim any obligation to do so, unless required by applicable securities laws. Accordingly, undue reliance should not be placed upon these statements.

In addition, statements that "we believe" and similar statements reflect our beliefs and opinions on the relevant subject. These statements are based upon information available to us as of the date of this presentation, and while we believe such information forms a reasonable basis for such statements, such information may be limited or incomplete, and our statements should not be read to indicate that we have conducted an exhaustive inquiry into, or review of, all potentially available relevant information. These statements are inherently uncertain and investors are cautioned not to unduly rely upon these statements.

An investment in Crane Harbor is not an investment in any of Crane Harbor's founders' or sponsors' past investments, companies or affiliated funds. The historical results of those investments are not indicative of future performance of Crane Harbor, which may differ materially from the performance of Crane Harbor's founders' or sponsors' past investments.

No Offer or Solicitation

This communication does not constitute an offer to sell or the solicitation of an offer to buy any securities, or a solicitation of any vote or approval, nor shall there be any sale of securities in any jurisdiction in which such offer, solicitation or sale would be unlawful prior to registration or qualification under the securities laws of any such jurisdiction. This communication is not, and under no circumstances is to be construed as, a prospectus, an advertisement or a public offering of the securities described herein in the United States or any other jurisdiction.

No offer of securities shall be made except by means of a prospectus meeting the requirements of Section 10 of the Securities Act of 1933, as amended, or exemptions therefrom. INVESTMENT IN ANY SECURITIES DESCRIBED HEREIN HAS NOT BEEN APPROVED BY THE SEC OR ANY OTHER REGULATORY AUTHORITY NOR HAS ANY AUTHORITY PASSED UPON OR ENDORSED THE MERITS OF THE OFFERING OR THE ACCURACY OR ADEQUACY OF THE INFORMATION CONTAINED HEREIN. ANY REPRESENTATION TO THE CONTRARY IS A CRIMINAL OFFENSE. This press release is not, and under no circumstances is to be construed as, a prospectus, an advertisement or a public offering in any province or territory of Canada. In addition, no securities commission or similar regulatory authority in Canada has reviewed or in any way passed upon this press release or the merits of any of the securities described herein and any representation to the contrary is an offense.

Participants in the Solicitation

NewCo, Crane Harbor, Xanadu and certain of their respective directors, executive officers and other members of management and employees may, under SEC rules, be deemed to be participants in the solicitation of proxies from Crane Harbor's shareholders in connection with the proposed transaction. Information regarding the persons who may, under SEC rules, be deemed participants in the solicitation of Crane Harbor's shareholders in connection with the proposed transaction will be set forth in proxy statement/prospectus when it is filed by NewCo with the SEC. You can find more information about Crane Harbor's directors and executive officers in Crane Harbor's final prospectus related to its initial public offering filed with the SEC on April 25, 2025 and in the subsequent Quarterly Reports on Form 10-Q filed by Crane Harbor with the SEC. Additional information regarding the participants in the proxy solicitation and a description of their direct and indirect interests will be included in the proxy statement/prospectus when it becomes available. Shareholders, potential investors and other interested persons should read the proxy statement/prospectus carefully when it becomes available before making any voting or investment decisions. You may obtain free copies of these documents from the sources described above.

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Source: Crane Harbor Acquisition Corp.