Eviden, ColibrITD and ONERA join forces to build the first hybrid quantum combustion platform

Paris, France – May 16, 2023 – Eviden, an Atos business, ColibrITD and ONERA today announce the launch of VulQain, a research project, funded by the French Defense Innovation Agency, to build the first end-to-end hybrid platform to address the phenomenon of combustion and its challenges, including its complexity and non-linearity. By integrating Eviden's quantum computer emulator and ColibrITD's quantum software on ONERA's classical simulation platform, the project team aims to reduce carbon emissions, lower the energy footprint of high-performance computing (HPC) centers and help develop safer engines and turbines in the future.

Most HPC customers are confronted with decarbonization challenges in their particular industry and a reduced product development time. In the meantime, classical simulation is facing limitations: certain complex phenomena like combustion cannot be fully simulated in a reasonable amount of time, and more computations would require more energy, defeating the initial purpose of reducing the environmental impact. A hybrid approach between classical and quantum computing would bring together faster computing capacities with improved computation precision and energy efficiency.

This innovative project will give birth to the first end-to-end quantum computing combustion platform that aims to work on existing noisy and quantum computers. The project team, supported by ColibrITD's expertise in quantum software, will develop a noise-resistant hybrid algorithm to solve differential equations using the simple use case of a flame structure in 1D. This algorithm will be integrated on Eviden's quantum computer emulator and, thanks to Atos' deep expertise in hybrid computing, on Onera's classical simulation platform to be able to compare both approaches and results.

> **Cédric Bourrasset, Global Head of HPC-AI and Quantum Computing, Eviden, Atos Group** said "*This project has come to life thanks to Atos' innovation strategy. Atos and ColibrITD started their collaboration through Scaler, the Group's start-up accelerator, and decided to solve the computational challenge of combustion through quantum technologies with the support of ONERA. This project is not only about algorithm research, but also to provide those industries that require combustion with a hybrid computational platform, enabling better simulation capacity and precision while improving their energy efficiency.*"

> **Laurent Guiraud, Co-Founder and Quantum Computing R&D Lead, ColibrITD** declared "*Being part of the VulQain project with our partners is helping accelerate the 2nd quantum revolution adoption in key industrial sectors says Dr.*

Laurent Guiraud. "This project will help increase the quantum momentum for real use cases that will benefit the aerospace & defense industry and other sectors."

Alain Refloch in charge of quantum computing at ONERA QTECH laboratory highlighted "Today, a lot of effort is being put into developing various qubit technologies. For ONERA, the interest of this project lies in its algorithmic orientation and the fact that the developments on this platform will be hardware-agnostic. This platform can be used for quantum education purposes and in training programs and will serve the air, space and defence technologies."

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About Eviden[1]

Eviden designs the scope composed of Atos' digital, cloud, big data and security business lines. It will be a global leader in data-driven, trusted and sustainable digital transformation. As a next generation digital business with worldwide leading positions in digital, cloud, data, advanced computing and security, it brings deep expertise for all industries in more than 53 countries. By uniting unique high-end technologies across the full digital continuum with 57,000 world-class talents, Eviden expands the possibilities of technologies for enterprises and public authorities, helping them to build their digital future. Eviden is an Atos Group business with an annual revenue of c. € 5 billion.

About Atos

Atos is a global leader in digital transformation with 111,000 employees and annual revenue of c. € 11 billion. European number one in cybersecurity, cloud and high-performance computing, the Group provides tailored end-to-end solutions for all industries in 69 countries. A pioneer in decarbonization services and products, Atos is committed to a secure and decarbonized digital for its clients. Atos is a SE (Societas Europaea), and listed on Euronext Paris.

The purpose of Atos is to help design the future of the information space. Its expertise and services support the development of knowledge, education and research in a multicultural approach and contribute to the development of scientific and technological excellence. Across the world, the Group enables its customers and employees, and members of societies at large to live, work and develop sustainably, in a safe and secure information space.

About ColibrITD

ColibrITD is a quantum computing software startup developing an innovative platform to help transform and optimize classical problems through a hybrid HPC-Quantum approach. Our mission is to help all companies take advantage of the second quantum revolution and not be left behind by this new industrial revolution in the next few years. The future is now.

About ONERA, the French Aerospace Lab

ONERA is a central player in aeronautical and space research and employs over 2,000 people. Operating under the authority of the French Ministry of Armed Forces, its 2023 budget amounts to €289 million, over half of which comes from study, research and testing contracts. As the government expert in aerospace technologies, ONERA strives to prepare tomorrow's defenses, address the aerospace challenges of the future, and boost the competitiveness of the aerospace industry. It boasts skills in all disciplines and technologies used in aerospace applications. All the major civil and military aerospace programmes in France and Europe are rooted in ONERA's DNA, including Ariane, Airbus, Falcon, Rafale, missiles, helicopters, engines, radars, etc. Its world-renowned, prize-winning research scientists mentor many doctoral students.

ONERA QTech: w3.onera.fr/qtech

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[1]*Eviden business is operated through the following brands: Alia Consulting, AppCentrica, ATHEA, Atos Syntel, Bull, Cloudamize, Cloudreach, Cryptovision, DataSentics, digital security, Eagle Creek, EcoAct, Edifixio, Energy4U, Engage ESM, Forensik, IDEAL GRP, IDnomic, In Fidem, Ipsotek, Maven Wave, Miner & Kasch, Motiv, Nimbix, Processia, Profit4SF, science+computing, SEC Consult, Visual BI, Worldgrid, X-Perion, zData*
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