



Press Release

A project undertaken by NAAREA backed by France 2030 and the Île-de-France Region under the 4th edition of the Investments in the Future programme (PIA)

4 April 2024 – Nanterre, France – NAAREA, a French company developing an innovative fourth-generation molten salt fast neutron microreactor, is undertaking the development of online analytical tools to provide real-time data on the composition of molten salts and inerting gas in its future reactor. Known as ALIS, this innovative collaborative project involving NAAREA, CNRS-IJCLab and iUMTEK was granted €1.5 million in funding by France 2030 and the Île-de-France Region.

Awarded the France 2030 label and selected as part of the inaugural cohort of the French Tech 2030 programme, NAAREA is developing a molten salt fast-spectrum microreactor capable of producing electricity and heat from spent nuclear fuel from the current fleet of conventional nuclear reactors. Capable of generating 80 megawatts thermal and 40 megawatts electric, NAAREA's XAMR® reactors offer a solution to provide power in close proximity to meet the needs of industrial consumers and local communities. After finalizing the first milestone of its digital twin in July 2023, and creating the first silicon carbide molten salt loop in October 2023, NAAREA is now embarking on a new R&D phase with the ALIS project.

The ALIS project is undertaken by NAAREA, CNRS-IJCLab and iUMTEK with the aim of developing tools for the online analysis of the composition of radioactive molten salts and inerting gases. The online analysis of these elements will notably help ensure the highest level of safety and optimized control of the future microreactor. After NAAREA, CNRS-IJCLab and iUMTEK submitted the project to the PIA4 I-Démo Régionalisé call for projects, and thanks to the audit provided and distinction awarded by the Systematic Paris-Region cluster, phase 1 of the ALIS project was selected to receive support from France 2030 and the Île-de-France Region.

The ALIS project stands out for its use of a laser-based optical analysis technology, LiBS (Laser-induced Breakdown Spectroscopy). This technological choice will require designing and validating interfaces under real conditions, such as a circulation loop, to obtain analytical results true to reality. The first phase of the ALIS project will take place over three years, and aims to develop and qualify a demonstrator LiBS instrument in two environments presenting increasing complexity. Upon the completion of this phase, the next step will be to deploy the instrumentation on a prototype nuclear reactor.

Jean-Luc Alexandre, Founder and CEO of NAAREA: *“At NAAREA, we are proud of the recognition our ALIS project has received from the Île-de-France Region and BPI France, which are contributing crucial support to carry out this ambitious project that will set us apart on a global scale. The strength of this project is that it not only contributes to the development of nuclear microreactors like our XAMR, but also to the many other possible industrial applications of molten salts such as solar energy, metallurgy and high-temperature heat treatment.”*

Valérie Péresse, President of the Île-de-France Region: *“Although there are no nuclear power plants in the Île-de-France region, we want to contribute to launching a next-generation French nuclear industry, which is necessary to rise to the challenges of the energy transition. Our support for the ALIS project led by NAAREA, alongside the CNRS-IJCLab and the company iUMTEK, aligns with these goals and is a testament to Île-de-France excellence and our ambition in this area.”*

About NAAREA:

NAAREA (Nuclear Abundant Affordable Resourceful Energy for All) was founded in 2020 by Jean-Luc Alexandre and Ivan Gavriloff to help meet the objectives of energy sovereignty, decarbonization and improving the energy mix. NAAREA is developing a groundbreaking energy solution that will



completely close the fuel cycle: the XAMR® (eXtrasmall Advanced Modular Reactor), a molten salt fast neutron microreactor capable of producing electricity (40 megawatts electric) and heat (80 megawatts thermal) that will burn plutonium and the most highly radiotoxic waste (with a lifetime of over 100,000 years) produced by nuclear power plants. The XAMR® is designed to be industrially mass-produced and installed in close proximity to consumers, namely in the mobility sector, electro-intensive industries and remote areas. NAAREA benefits from the support of the French Alternative Energies and Atomic Energy Commission (CEA) and French National Centre for Scientific Research (CNRS), as well as industry players such as Assystem, Dassault Systèmes and Orano. A carbon-free and non-intermittent energy source planned to be on the market by 2030, the NAAREA XAMR® is opening the way for sustainable and innovative nuclear energy that supports energy independence, increased resilience and the circular economy. NAAREA is a winner of the “Innovative Nuclear Reactors” call for proposals under the France 2030 investment plan and a beneficiary of the French Tech 2030 support programme.

Learn more at: www.naarea.fr

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About iUMTEK

Founded in October 2017, iUMTEK is a company positioned at the heart of current societal concerns: increasing the rate of recyclability (Li-ion batteries, etc.) and shortening supply chains, combating risks (monitoring Seveso sites, for example) and pollution (nanoparticles, controlling fumes), optimizing industrial production and mineral extraction of critical and strategic materials, and developing green chemistry and next-gen nuclear energy.

A deep tech/green tech company built on CEA/ORANO research, and backed by CEA Investissement (the venture capital subsidiary of the French Alternative Energies and Atomic Energy Commission), iUMTEK is launching a new generation of analysis instruments that detect chemical elements in solid, liquid or gaseous materials. These instruments are based on LIBS* technology, artificial intelligence and specialized sensors. This next-generation technology allows instrumentation to go beyond its current market, laboratories, to provide online, real-time measurement in industrial or even hostile environments (Industry 4.0 and New Nuclear).

* *Laser-induced Breakdown Spectroscopy*

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About the CNRS's IJCLab

IJCLab (*Laboratoire de Physique des 2 Infinis Irène Joliot-Curie*) is a joint research unit (UMR) of the CNRS (French National Centre for Scientific Research) and the Paris-Saclay and Paris Cité universities. It was born of the merger in January 2020 of five historic laboratories in Orsay that were close to each other both geographically and in terms of research focus. The scientific activities of IJCLab bring together nearly 730 people, organized around seven scientific fields: Astroparticles, Astrophysics and Cosmology; Accelerator Physics; High-Energy Physics; Nuclear Physics; Theoretical Physics; Energy and Environment; and Health Physics. The laboratory also has a large Engineering centre as well as four research and technology platforms that support high-level research, from the conceptual phase to experiments and the production of large-scale research instruments.



IJCLab, through its Energy and Environment unit, has skills in the field of molten salt reactors, combined with its experimental facilities enabling numerous projects in the fields of chemistry, the reprocessing of molten salts and nuclear waste management. The laboratory's expertise also includes the development of electrochemical and analytical methods to monitor corrosion in extreme environments and determine basic data for solutes in molten salts. It also specializes in the calculation of thermodynamic potential-acidity diagrams for molten salt media similar to Pourbaix diagrams. The laboratory's expertise also encompasses the field of experimental simulation of the effects of irradiation in solids, via the use of accelerated ion beams and related characterization techniques.

This range of expertise has led IJCLab to collaborate with major research organizations and industrial actors in the field of nuclear energy.

For more information:

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About Systematic

Systematic is a European deep tech cluster. Since its creation in 2005, it has brought together and organized a community of nearly 900 members, including nearly 550 startups, SMEs and mid-market companies, 140 major corporate groups, 160 research organizations, a group of investors and nearly 30 local governments.

Systematic thus connects players in the software, digital and deep tech industries through collaborative innovation, networking and technology sourcing, with the aim of:

- Creating and designing new products, services and uses, using an open innovation platform;
- Bringing their innovations to market;
- Accelerating companies' growth and competitiveness;
- Supporting and promoting the region's economic development.

With regard to its historical core business, supporting the development of collaborative or single-partner R&D projects at both national and European level, Systematic is positioned as France's leading cluster with 796 projects supported through to funding, representing a total of €3.6 billion in R&D costs at the end of 2022.

Systematic Paris-Region receives support from the French government, including the Directorate General for Enterprise (DGE), the Île-de-France Region and local governments within the region.

Learn more about Systematic Paris-Region: www.systematic-paris-region.org – @Pole_SYSTEMATIC | LinkedIn

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About the Île-de-France region

The Île-de-France Region (the French administrative region comprising Greater Paris) plays a strong role in driving French jobs and growth, both through its economic weight and the reach of its influence. The leading economic region in Europe and third worldwide, after Tokyo and New York, Île-de-France is a hub for innovation that is home to 40% of French R&D activity, and boasts competitive international appeal. The Île-de-France Region is active in many areas that concern the daily lives of its 12 million inhabitants, such as transport, secondary schools, economic development and the environment. In an area that covers 2% of French territory, but which accounts for 18% of the nation's population and nearly 30% of its GDP, the Region is implementing a planning policy that places the environment at the heart of its priorities and is dedicating €10 billion to this issue.