



CEA
Startup
PORTFOLIO

Support the creation and development of Deeptech start-ups

The CEA, a France-based research organization that is among the most innovative in the world, is known for its active startup policy. By supporting the creation and growth of companies to develop and commercialize its technologies, the CEA nurtures disruptive innovations, helps industrial companies become more competitive, and—by helping new ventures gain a foothold in key industrial value chains—drives job growth.

The first CEA startup was founded in 1972; its first employee startup program launched in the late 1980s. Today, the CEA continues to pioneer new approaches in this field so they can **make a positive impact on the economy and society**. Services include help from CEA technology experts, the use of its state-of-the-art R&D facilities, access to its proven experience in innovation, and introductions to the CEA's network of financiers. Finally, the CEA offers the startups it supports a gateway to some of France's flagship industries through its regional technology transfer offices.

The startups that develop and commercialize CEA technologies mainly address markets like low-carbon energy, health, and digital systems, licensing the CEA's patents and playing a pivotal role in getting CEA technologies to the market.

The CEA has its own venture capital fund, CEA Investissement, and created deep tech fund Supernova Invest with Amundi. With over a hundred investments and more than 70 portfolio companies, Supernova Invest is today the leader in deep tech investment in France, with over 800 million euros under management.

You will find a selection of the CEA's startups in this booklet.

The numbers

LEADING RESEARCH ORGANIZATION IN FRANCE AND EUROPE IN TERMS OF **PATENT FILINGS**, WITH OVER

650

PATENTS FILED EACH YEAR

Strong entrepreneurial momentum, with more than

+260 STARTUPS

CREATED SINCE 1972 WITH 10 TO 15 STARTUPS CREATED EACH YEAR.

Over

1 billion

EUROS raised by CEA startups in the LAST 15 YEARS

THE MOST INNOVATIVE RESEARCH ORGANIZATION IN THE WORLD

EXCELLENT SUPPORT FOR DEEPTech STARTUP PROJECTS TO ENSURE THEIR LONG-TERM SUCCESS:

10-YEAR SURVIVAL RATE ≈ 80%

8

INITIAL PUBLIC OFFERINGS

+6,000 JOBS

CURRENTLY EXISTS IN CEA STARTUPS

Sources: INPI rankings, OEB et Clarivate 2024.

SUPERNOVA
INVEST
VENTURE CAPITAL

cea | investissement
AMORÇAGE TECHNOLOGIQUE

Sovereign industrial capacities in key sectors also paramount

Startups are not the only kinds of companies born at the CEA. Joint ventures and corporate subsidiaries are also vehicles for bringing CEA innovations in the organization's key research areas into France's sovereign enterprises. Cogema (now Orano) was created to develop the CEA's uranium production activities in 1976, for example. Genvia (hydrogen) and STMicroelectronics (semiconductors) have similar histories. These CEA spinoffs have what it takes to support a sovereign industrial economy in France that can create jobs and drive growth domestically while competing economically in Europe and beyond.

Genvia



In September 2020, the French government unveiled a green hydrogen plan that underscored the necessity to invest in hydrogen to help accelerate the energy transition and establish a sovereign domestic hydrogen industry. The purpose of the plan was to ensure France didn't miss out on the opportunities, both at home and across Europe, presented by the nascent hydrogen market.

Genvia was created on March 1, 2021 in response to this major challenge with the CEA, via its venture capital arm, CEA Investissement; Schlumberger (now SLB); VINCI Construction; Vicat; and the Occitanie regional government's investment vehicle, Agence Régionale Energie Climat Occitanie, as its founding investors. The company will ratchet up R&D on a CEA-developed SOEC (solid oxide electrolyzer cell) technology. SOECs are currently deemed to be the most efficient way to produce green hydrogen at a cost that will allow

the technology to be scaled up and successfully commercialized.

Genvia is not a startup, but rather a joint venture with SLB, whose know-how will be critical to bringing the technology to the market. The investors are committed to Genvia remaining in France.

Whether it is in Europe or globally, green hydrogen technologies like Genvia's are top of mind. Genvia is one of France's main beneficiaries of the EU's Important Project of Common European Interest (IPCEI) on hydrogen, an offensive strategy to boost green hydrogen market ramp-up. This latest-generation SOEC could play a major role in decarbonizing key industrial sectors. Genvia is planning to release its solution in 2030 with the ambition of becoming Europe's market leader.



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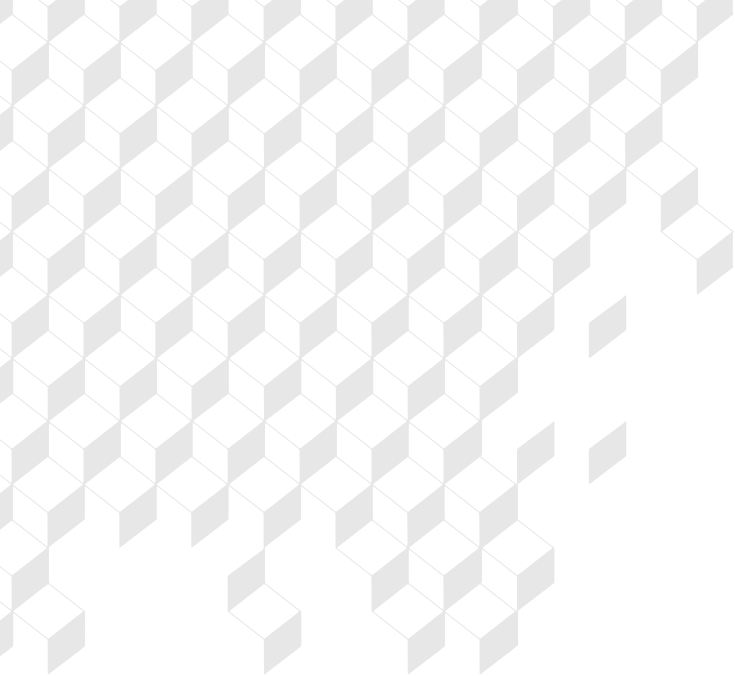
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DIGITAL 

THE THREE VALLEYS OF MICROELECTRONICS

Since 1972, CEA technologies have enabled the creation of nearly 80 start-ups in the microelectronics sector through the CEA-Leti institute.

An impressive 60 of these ventures are still in operation or have achieved successful exits or IPOs (2024 figures). CEA-Leti startups are technology providers to innovation-intensive industries in virtually all sectors of the economy. The entrepreneurial momentum generated by these companies has snowballed into a strong “three valley” semiconductor ecosystem in and around the city of Grenoble, in the French Alps.

Soitec, founded in 1992 by four CEA-Leti employees, is located in the valley that runs east from Grenoble to Geneva. The company's SmartCut™ technology has propelled it to the top of the global semiconductor materials market. In 2023, Soitec cut the ribbon on a new plant to manufacture its SmartSiC™ wafers.

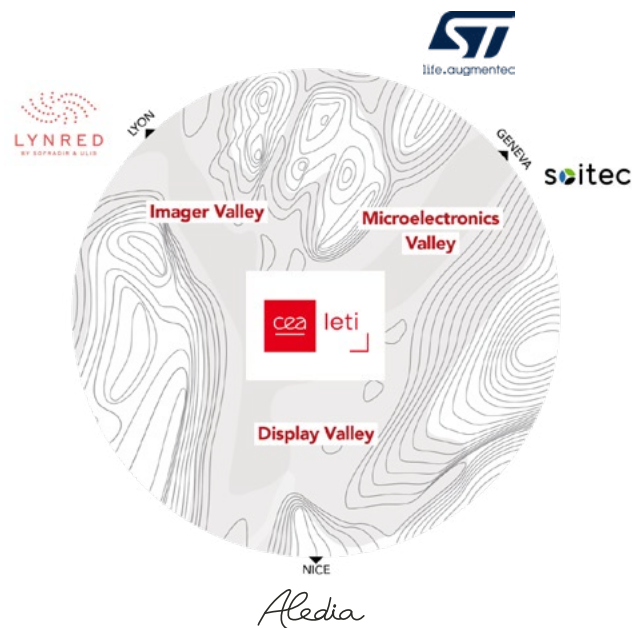
Chip industry heavyweight STMicroelectronics is located right up the road from Soitec. The company was created in 1972 as Efcis, then a CEA-Leti subsidiary and the first-ever CEA spinoff. In 2023, Soitec and STMicroelectronics employed more than 9,000 people in the Grenoble area.

The valley that runs to the north from Grenoble to Lyon is home to LYNRED, a CEA-Leti spinoff formed from the merger between infrared detector manufacturers Sofradir and Ulis. LYNRED currently employs around 1,000 people.

Aledia, which was founded in 2012, chose the valley that runs south from Grenoble towards Nice as

its home. The company's R&D center employs 230 people, and a new plant of over 15,000 m² is in activity since 2024.

These CEA-Leti spinoffs have created more than 10,000 direct jobs in the Grenoble area. The presence of these companies has also attracted manufacturers like Applied Materials and Thales (with its 2,000 employees) to the area.



Source : *Se réinventer au XXI^e siècle*, by Benoît Playoust for Le Dauphiné
Libéré in partnership with CEA Grenoble



AIHERD

Smart livestock monitoring

■ AI to automatically detect pathologies and behaviors of interest in dairy cows and suckler cattle

With AiHerd, intensive and semi-intensive dairy and cattle farms can now automatically detect pathologies like mastitis or lameness and behaviors of interest such as heat or imminent calving. This unique technology, the only one of its kind worldwide, improves animal welfare, is practical and convenient for farmers, and can increase productivity by up to several hundred euros per head per year, depending on the size and type of farm.

AiHerd is powered by an AI-enabled computer vision technology that keeps a constant watch over individual and herd activity, tracking things like feeding and resting, distances covered, and movements characteristic of certain states. The AI automatically picks up the unique signatures of important events like heat, imminent calving, or the onset of disease. AiHerd's correct identification rate is superior to that of competing solutions.

This automated decision-assistance solution lightens the farmer's workload, supports animal welfare, and boosts productivity. AiHerd is fully configurable for each farm's unique layout and organization. Users can block off restricted areas, create groups of cattle, and configure rules

and alerts, all via a very simple interface.

AiHerd was founded by a veterinarian specializing in herd health. He turned to the CEA and Thales to help develop the high-performance, AI-enabled video surveillance technology that makes AiHerd possible. The company currently has an R&D contract with the CEA.



aiherd.io

30%

ANNUAL PERD HEAD PRODUCTIVITY INCREASE

Year founded

2020

Key markets

- Dairy farms
- Suckler farms

Technology

- Artificial-intelligence-enabled computer vision
- Data analytics



ALEDIA

MicroLEDs built on 3D nanowires and silicon for next-generation displays

- *Brighter, lower-power displays that cost less to manufacture*

Aledia's energy-efficient, high-performance 3D microLEDs mark the beginning of a new era in displays of all shapes and sizes, from smart glasses to video walls.

Deeptech startup Aledia is developing a microLED technology based on 3D nanowires and silicon. Spun off of the CEA in 2011, the company launched Grenoble's Display Valley. With some 300 patent families in its portfolio, Aledia is France's number-one startup by patents filed.

The company's bright, low-power microLEDs enable displays with exceptional image quality. And, due to reduced manufacturing costs, Aledia's microLEDs offer superior performance at a lower price point than OLED and LCD technologies.

The secret to Aledia's affordability lies in its silicon process technology: Manufacturing on large wafers opens the door to economical volume manufacturing. Aledia received the Best MicroLED Technology award at SID Display

Week 2023 in San Jose, California, confirming the startup's position as a global leader at the crossroads of technological innovation and sustainable manufacturing.

Aledia's new plant near Grenoble will give Europe new microLED production capabilities. The company continues to work with the CEA through a joint lab focusing on advanced technologies.

aledia.com

ALEDIA'S NEW

15 000 sq.m

IS HOME TO **ADVANCED PROCESSES AND TECHNOLOGIES**

Year founded
2011

Key markets

- Smartphones
- Video walls
- Smart glasses (AR/VR)
- Televisions
- Commercial monitors
- Ordinateurs portables
- Ecrans automobiles

Technology

- 3D gallium nitride (GaN) nanowires
- Epitaxial growth on 200 mm or 300 mm silicon wafers



ATOM XR

Extended Reality for Nuclear Environments

- *Improve technician memory, engagement and efficiency in the field for better-prepared nuclear reactor operations*

Intervening in nuclear environments requires long and meticulous preparation. Atom XR accelerates and enhances this process with extended reality tools that immerse operators in interactive environments blending the virtual and real worlds. This unique expertise applies to all production and research reactors, as well as any nuclear installations.

Ensuring that access to equipment is feasible, verifying that an assembly can be carried out, defining the intervention scenario that minimizes technicians' exposure—these are just some of the challenges nuclear facility operators must address while meeting technical constraints, cost control requirements, and strict safety standards.

With its expertise in nuclear sciences, mechanics, robotics, and extended reality, Atom XR creates virtual replicas of nuclear facilities. Clients can test different options, validate task feasibility, and train operators while optimizing the time-to-efficiency ratio. Additionally, the startup will soon introduce a virtual representation of the radiological environment to raise operators'

awareness of radiation protection challenges.

This breakthrough solution offers features far superior to those of physical mock-ups and existing extended reality tools on the market. Atom XR leverages a CEA technology and plans to enhance it within a joint research lab. The company's founder, who comes from the CEA, benefited from the Magellan incubation program, the CEA's entrepreneurship support program.



atomxr.fr

SHUTTING DOWN A REACTOR TO PERFORM WORK ON THE CORE COSTS AT LEAST

€ 50k/hour

ATOM XR REDUCES INTERVENTION TIME, DELIVERING AN IMMEDIATE **RETURN ON INVESTMENT.**

Year founded
2024

Key markets

- Learning and training of nuclear operators
- Interventions in nuclear environments: preparation, supervision, and operational assistance

Technology

- Extended reality (including virtual and augmented reality)
- Creation of virtual replicas of nuclear facilities
- Realistic and interactive simulations
- Perception of radiological environments



ARCURE

Smart on-vehicle pedestrian detection system

■ *Life-saving AI-powered pedestrian detection system for safer, less accident-prone industrial vehicles*

Arcure's Blaxtair® systems prevent collisions between moving vehicles and pedestrians in industrial environments and on construction sites. Two-thirds of the company's business comes from export sales.

Contact between moving industrial and construction vehicles and pedestrians causes 10,000 serious accidents per year in Europe. Blaxtair® intelligent vision systems prevent these collisions and save lives. They detect all pedestrians, whether they're standing, squatting, or partially hidden by an obstruction—even in extreme temperatures, dust, low lighting, and other challenging conditions.

Blaxtair® is built on a particularly robust and reliable detection technology that avoids false alarms and nuisance alerts so that operators can work safely and confidently. Because they know the system will alert them to dangerous situations and automatically stop the vehicle in the event of an emergency, operators can concentrate on the task at hand. Plus, the data collected feeds hazard maps, which can be used for

targeted preventive measures.

Arcure is present in virtually all industries, including recycling and construction. It is based in Paris and opened a Chicago subsidiary in 2019.

Its technology is protected by eight patents. Together with the CEA, it has created a joint laboratory where it develops new image processing algorithms.

ARCURE
BLAXTAIR®

blaxtair.com

A BLAXTAIR®
SYSTEM TAKES

200 milliseconds

**TO DETECT A PEDESTRIAN
IN THE VICINITY OF A
MOVING VEHICLE**

Year founded
2009

Frequently-equipped vehicles

- Forklifts
- Loaders
- Excavators
- Bulldozers

Technology

- 3D vision and image processing algorithms
- Deep learning on the Edge



ARYBALLE

Artificial nose
with a digital
sense of smell

- *Simple odor analysis system
with high reproducibility
and reliable measurement
for industrial use cases*

Aryballe's artificial nose detects odors and compares them with references in an odor library, helping manufacturers develop new products and carry out quality controls.

Founded in 2014, the startup Aryballe offers its NeOse Advance odor sensor worldwide. It has a portfolio of 40 patents (including five CEA patents) and an exceptional database of 250,000 olfactory signatures.

Identifying odors is difficult—factors like humidity, the number of odorous molecules, and variations in concentrations can skew the data. Measuring less than a cubic centimeter, Aryballe's bio-inspired electronic nose meets industry standards of reliability and reproducibility and can discern hundreds of odors. The startup also offers services like remote analysis dashboards, odor studies, and more.

Based in Grenoble, Aryballe has subsidiaries in New York and Seoul and invests heavily in R&D. The company's joint laboratory with the CEA is working on more compact and efficient silicon sensors, as well as on selecting new biosensors.

THE ARYBALLE
DATABASE HAS
250,000

DIFFERENT
OLFACTORY SIGNATURES

Year founded
2014

- Key markets**
- Cosmetics and perfumes
 - Automotive
 - Agriculture & food systems
 - Household appliances
 - Healthcare

- Technology**
- Silicon photonic sensors compatible with biosensor grafting
 - Olfactory database and machine learning tools





ASTERIOS TECHNOLOGIES

Automated integration of
critical embedded applications

■ *Faster, more affordable integration
of safe-by-construction applications*

Asterios Technologies automates and secures the integration of critical embedded applications on single and multicore architectures. The company's software has been validated and certified for aeronautics, one of the most demanding industries in terms of safety.

The Asterios® software suite is the result of fifteen years of R&D at the CEA. The multi-patented software tools were initially scaled up and commercialized by startup Krono-Safe, acquired in 2023 by its first customer, Safran Electronics & Defense. Today, Asterios® software has become Safran's solution of choice for critical systems like engine regulation calculators, braking systems, and IMUs. Asterios Technologies can now market this mature suite of tools to a much wider market encompassing all critical applications.

Asterios® software makes software architects' and integrators' work dramatically simpler. Traditionally, application resource sharing is configured at a low level, and compliance with performance and safety requirements is demonstrated later. With

Asterios® software, architects and integrators simply describe the desired temporal behavior. With its formal, model-based foundations, the suite then automatically configures hardware resource sharing. Users benefit from certifiable safe-by-construction real-time execution of critical applications on single- and multicore architectures—and drastic reductions in integration times and costs.

There is currently no direct equivalent to Asterios® software on the market. The suite has all the tools needed to make the switch to multicore architectures with confidence.



asterios-technologies.com

WITH ASTERIOS® SOFTWARE,
THE **TEMPORAL AND
FUNCTIONAL BEHAVIOR
OF A CRITICAL EMBEDDED
APPLICATION CAN BE**

100%

**EVEN BEFORE THE ECU IS
AVAILABLE**

Year founded
2011

Key markets

- Aeronautics
- Automotive
- Space
- Energy
- Defense

Technology

- Automated integration of critical embedded applications
- Safe by construction
- Compatible with multicore processors



ASYGN

High-performance
circuits for sensors,
telecommunications,
and AI

■ Custom circuits for very specific
use cases optimized for individual
customers' needs

ASYGN designs advanced analog circuits for sensors, radio frequency communications, and artificial intelligence.

ASYGN's microelectronics and analog circuit technologies, protected by seven patents, underpin the company's catalog of high-value-added fabless solutions for niche markets like satellite telecommunications and high-performance inertial sensors. The company can also develop ASICs and have them volume manufactured, in the millions of units. ASYGN circuits offer advantages like very low power consumption, precision measurement, and very low noise.

Integrators seeking ASICs more specific than what is available on the broader market turn to ASYGN. For example, the company has combined sensors with RFID to enable self-powering on-demand remote measurement, and designed energy-efficient neural networks for real-time image processing for its customers.

ASYGN was founded in 2008 by a team of four from the CEA and STMicroelectronics—two of whom are still managing the company. Funding its own growth at every stage, ASYGN has blossomed into a company with 45 employees with subsidiaries in the United States and Denmark.

ASYGN generates 50% of its revenue from international sales and is a partner of choice for startups seeking ASICs and custom circuit designs.

ASYGN
asygn.com

0 Joule

ASYGN SENSORS ARE
SELF-POWERING: THEY RUN
SOLELY ON THE ENERGY SENT
BY THE REMOTE RFID READER

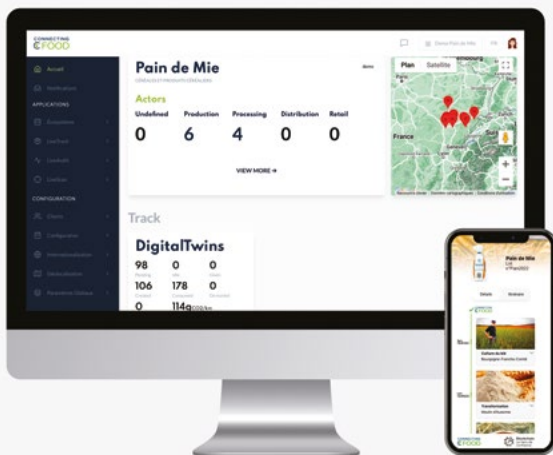
Year founded
2008

Key markets

- Industrial metrology
- Telecommunications satellites
- Artificial intelligence
- Autonomous vehicles & navigation systems

Technology

- Ultra-low-power analog circuits
- Radio frequency circuits for electronic scanning antennas
- RFID-enabled passive sensor circuits
- Interface circuits for high-performance inertial MEMS



CONNECTING FOOD

Blockchain-based platform managing food supply chains and transparency

■ A solution that enables food players to manage and authenticate product data from farm to fork

Connecting Food is a SaaS supply chain management solution that food industry stakeholders can use to manage, verify, and visualize in real-time all product-related data from end to end of the supply chain.

With Connecting Food, manufacturers can turn their data into actionable information about product traceability, quality, and sustainability—everything they need to reduce risk and effectively respond to any crises that occur. Manufacturers will be able to prove they are keeping their promises to consumers and gather consumer feedback.

Connecting Food's unique, product-centered approach was developed specifically for the complexities of food industry supply chains. The solution is built on three main pillars:

- Digital twins: An unlimited amount of data can be collected for each batch throughout the product's life cycle, aggregated, updated, and displayed in real time.
- Live audits: Digital audits and real-time alerts ensure the data

and underlying products are compliant.

- Blockchain: Contributors own their own data, privacy is guaranteed, and access to data is configurable.

Connecting Food has been working with the CEA since 2018 to improve the technology. The rapidly-growing company sells its solution in several European countries, the United States, and in Asia.



connecting-food.com

6 855

FOOD-INDUSTRY
STAKEHOLDERS
REGULARLY **ENTER DATA**
**INTO THE CONNECTING
FOOD PLATFORM**

Year founded
2016

Key markets

- Food manufacturing
- Retail
- Industries sourcing from agriculture (food, textile, cosmetics, leather goods, nutraceuticals)

Technology

- Blockchain
- Digital twin
- Graph theory
- Machine learning



DIAMSENS

*In situ water
quality monitoring*

■ *More reliable testing
and lower operating costs
thanks to the unique
properties of diamonds*

Diamond-quality water monitoring is what Grenoble-based startup Diamsens has created, with an innovative new range of electrochemical sensors that leverage the unique properties of diamonds. The high performance, durable, and low maintenance solution is manufactured using standard semiconductor processes, so it is also affordable. Synthetic diamonds offer a range of benefits for both industrial users and consumers.

The Diamsens continuous water quality monitoring solution will satisfy the needs of both BtoC and BtoB markets. In the swimming pool market, individuals will soon be able to simply and accurately measure the chlorine content of their pool in real time, a luxury only municipal swimming pools could previously afford. On a larger scale, the Diamsens solution will appeal to manufacturers who want to reduce sensor maintenance costs—the diamond sensor surfaces can clean themselves using a patented electrical technique.

To develop its innovative testing system, Diamsens built on the expertise of CEA laboratories

to synthesize its diamonds and develop a proof-of-concept prototype. The partners intend to pursue their collaboration for the long haul, giving the startup access to the CEA's unrivalled fabrication and characterization resources.



diamsens.com

MAINTENANCE
COSTS
DIVIDED BY

5

COMPARED TO
CONVENTIONAL
SENSORS

Year founded
2022

Key markets

- Swimming pools
- Drinking water and sewage treatment
- Agriculture: fertilizer concentration control, water reuse
- Environment: monitoring of natural environments
- Industry: effluent control, water reuse

Technology

- Synthetic diamond
- Electrochemical sensors



ELICHENS

Greenhouse
gas detection
and monitoring

■ *Lower carbon emissions,
better occupational safety,
and fewer costly gas leaks*

eLichens miniaturized, connected, ultra-low-power, high-performance sensors continuously measure the levels of carbon dioxide (CO₂) and methane (CH₄) in the air.

Startup eLichens has developed particularly innovative gas sensors in partnership with the CEA. Dedicated to the detection of carbon dioxide and methane, two of the main greenhouse gases, these sensors are six times smaller than their direct competitors, consume ten times less energy, and remain drift-free over their entire fifteen-years lifespan.

The infrared sensors are coupled with data fusion and analysis tools to detect the presence of gases, measure their concentrations, and issue alerts if necessary. The objective is threefold: to guarantee health and safety at work and at home, to reduce the cost of leaks (e.g. on distribution networks), and to limit environmental impacts.

With a portfolio of 59 patents (including 19 CEA patents), eLichens

generates 90% of its revenue from exports. It is developing even more sensitive gas micro-leak sensors in a joint laboratory with the CEA. For methane alone, these leaks represent losses of several thousand tons per year.


elichens.com

**ELICHENS GAS
SENSORS CONSUME**

**10^x
less**

THAN COMPETING
PRODUCTS FOR
**EXCEPTIONALLY LONG
BATTERY LIFE**

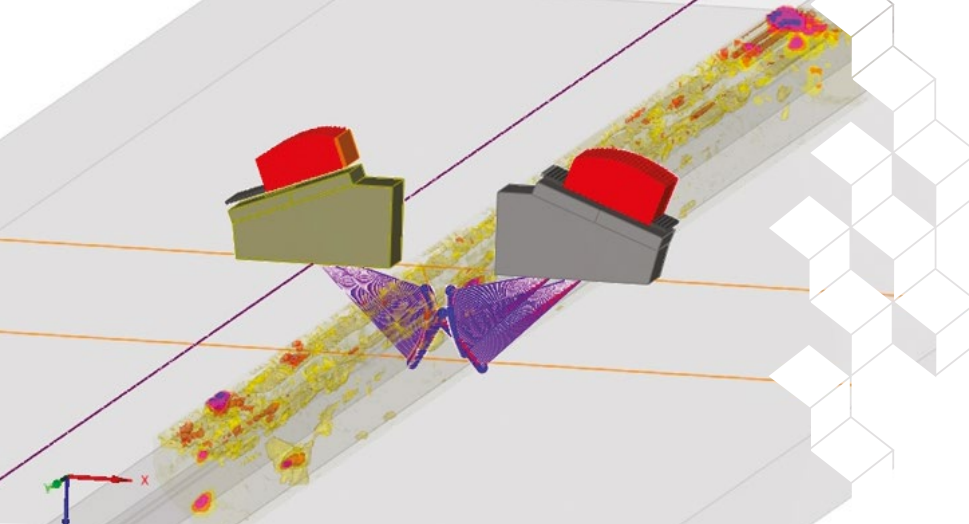
Year founded
2014

Key markets

- Industrial safety
- Natural gas supply and distribution
- Indoor air quality monitoring

Technology

- Very low power NDIR (Non-Dispersive Infrared Detection) gas sensors
- Data fusion and analysis software
- IoT devices



EXTENDE

CIVA
non-destructive
testing software
training

■ *Helping industrial companies harness the full potential of the world's most widely used NDT simulator*

Extende trains users on CIVA non-destructive testing (NDT) software and offers custom engineering and R&D services.

The CEA has been developing CIVA since the 1990s. Today, the software covers the most commonly used non-destructive testing and structural health monitoring (SHM) techniques, including ultrasound, eddy current, radiography, guided wave testing, and thermography. The CIVA suite also has Script and Data Science modules to further improve the user experience. Today, some 350 companies in 41 countries representing the energy, aeronautics, transportation, petrochemical, and other industries use CIVA to simulate and optimize their future inspections. CIVA helps these companies improve defect detection and analysis while keeping inspection costs down.

Extende, the exclusive distributor of CIVA software, trains around a hundred engineers every year on CIVA and NDT reliability. The company is also the creator of TraiNDE, the world's first-ever simulator for field training on ultrasound and radiography testing.

Finally, Extende brings its customers support and engineering services and can also help them draw up NDT specifications, demonstrate the performance of NDT protocols, prepare for NDT qualification, and determine probability of detection (PoD). The company's R&D activities, designed to constantly improve the available NDT tools, span both in-house projects and projects with and for external partners. Feature requests can be sent to Extende, which submits them to the CEA's 30-strong team of CIVA developers and engineers. Extende is located in the Greater Paris area, and has a subsidiary in the United States and distributors in China, Japan, India, and South Korea.

EXTENDE SERVES

350
USER
COMPANIES
IN **41 COUNTRIES**
WORLDWIDE

Year founded
2010

Key markets

- Nuclear
- Oil & Gas
- Rail
- Aeronautics
- Aerospace

Technology

- CIVA software

EXTENDE
CIVA

extende.com



FINRIP

Fingers and multi-finger grippers for industrial robots and cobots

■ Versatile products with a wide range of payload capacities for the industrial gripper market

Industrial robots and cobots currently use purpose-built grippers, designed for volume manufacturing environments, to lift and move items. Finrip's modular, versatile grippers can handle a wide variety of loads, making them ideal for smaller production runs and adaptable to a broad range of parts.

With a simple, modular design protected by ten CEA patents, Finrip's fingers and multi-finger grippers represent a departure from current solutions. Gripping-force sensors—a source of failures—have been eliminated from Finrip's grippers. The products are also robust and easy for operators to program and use. In addition, the same multi-finger gripper can handle parts from 0 kg to 50 kg—one of the widest payload ranges on the market.

This innovative concept, which enables high dexterity for both power and precision movements, was made possible by decades of robotics research at the CEA.

Finrip, founded by a team of three, has a joint laboratory with the

CEA to continue to improve the technology. The company's first commercial products, which it plans to manufacture at a 1,500 sq. m plant, will be released in 2026.

FINRIP'S MULTI-FINGER GRIPPERS CAN PICK UP, HANDLE, AND MOVE PAYLOADS OF **UP TO**

50 kg

Year founded
2022

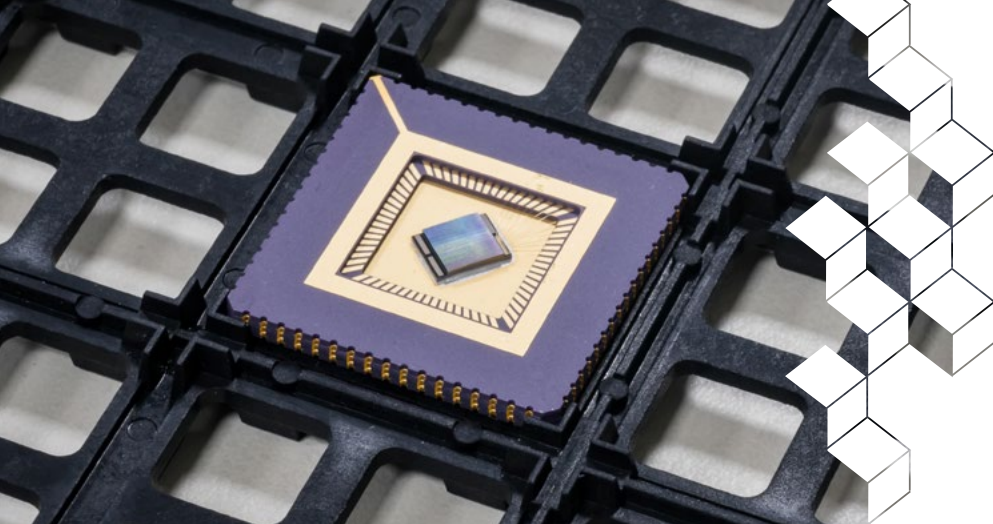
Key markets

- Automotive
- Aeronautics
- Shipbuilding
- Logistics
- Farming and food manufacturing

Technology

- Robotics*
- Under-actuated mechanical architecture•
- Electrical control
- Mechatronics





INGAGE

Accurate MEMS
inertial measurement
units for autonomous
mobility

■ *Industrial, automotive, and
personal geolocation systems that
are more compact, less expensive,
and higher-precision*

iNGage intends to revolutionize geolocation and navigation—even in areas not covered by GNSS— with MEMS IMUs using a new detection concept leveraging the CEA's M&NEMS technology.

When it comes to geolocating vehicles and robots inside buildings, tunnels, urban canyons, and areas where GNSS interference is an issue, the only inertial measurement units (IMUs) that can precisely take over are bulky and expensive. iNGage's IMUs (Inertial Measurement Unit) will not only be more compact and affordable than FOG or high performance MEMS IMU modules, and also more accurate than capacitive MEMS IMUs components. After one minute without a GNSS signal, the startup's IMUs will be accurate to within 25 centimeters—10 times better than today's integrated MEMS devices.

All iNGage sensors leverage the same breakthrough principle: M&NEMS components with piezoresistive nanogauges, which are 10 times more sensitive than

capacitive sensors. The technology was developed over fifteen years of R&D by the CEA and an Italian partner and is protected by 30 patents.

iNGage's first IMUs will be released in 2029. One of the startup's three founders is a CEA employee. A joint lab with the CEA has been created to continue to improve the products.



ingage-mems.com

**INGAGE'S ULTRA-SENSITIVE
SENSORS ARE**

10x

**MORE SENSITIVE THAN
CURRENT SOLUTIONS**

Year founded
2025

Key markets

- Autonomous robotics
- Unmanned Ground Vehicles and Unmanned Aerial Vehicles
- ADAS and Autonomous Driving
- Indoor navigation

Technology

- MEMS gyroscopes, accelerometers, IMUs and pressure sensors
- Piezoresistive nanogauge detection
- ADAS and Autonomous Driving
- 200 mm silicon wafers



iUMTEK

Real-time
in situ industrial
chemical analyzers

■ *Real-time industrial process quality and safety monitoring for better, faster, cleaner, and cheaper production*

iUMTEK analyzers identify the chemicals present in a liquid, solid, or gas 10 to 30 times faster than laboratory analysis and with results that are more representative of the medium being tested.

The startup iUMTEK employs an analytical technique that NASA uses for its Mars rovers: LIBS, or laser-induced breakdown spectroscopy. Based on more than 25 years of R&D by the CEA and Orano, iUMTEK is helping industrial customers test liquids, solids, and gases.

No sampling or sample preparation is necessary to do a test, and the results are more representative of the medium being tested than laboratory analysis. The analyzer works at distances of up to several meters and in a range of configurations: above a molten bath, through a window, or even inside a vessel. Each chemical present is identified and quantified, so that the exact composition of the medium can be known.

iUMTEK has sold several devices to research centers for diagnostic use.

At the same time, it is developing a solution for in-line industrial process monitoring. One potential use would be for companies that use recycled raw materials in their manufacturing processes to check the composition of the materials upline from the process.

iUMTEK is developing this technology for new use cases as part of an R&D agreement with the CEA. It also holds licenses to five CEA LIBS patents.

iumtek
iumtek.com

THE IUMTEK ANALYZER IS
THE ONLY ONE CAPABLE OF
IDENTIFYING THE

118

ELEMENTS OF THE
MENDELEEV PERIODIC TABLE
USING THE SAME INSTRUMENT,
REGARDLESS OF THE PHASE OF
THE MATERIAL ANALYZED

Year founded
2017

Key markets

- Government and private-sector research centers
- Small Modular Reactors (SMR/MSR)
- Metallurgy
- Recycling

Technology

- Laser ablation of liquid, solid, or gaseous material
- Emission spectroscopy analysis
- Artificial intelligence



KALRAY

Hardware and software solutions for intensive, high-performance data-centric computing, from Cloud to Edge

- *For smarter, better performing, and more energy efficient data-intensive applications and infrastructures*

Decades-old processors can't always cope efficiently with today's huge data volumes. Kalray is responding to this new landscape with processors, accelerator cards and software designed to deliver exceptional performance.

It's a CEA spin-off that's already proven itself a pioneer in intelligent processors, with its MPPA® DPU processor—currently Europe's only high-performance, lowpower DPU processor dedicated to intensive data processing and one that offers one of the most competitive performance per dollar/watt ratios around. Protected by 30 patent families, it is an 80-core processor that can manage several applications simultaneously with guaranteed processing times and performance.

This DPU processor only consumes a few dozen watts. It is programmable with standard languages, offers high-speed interfaces, and delivers real-time, on-the-fly data processing. It is integrated onto Kalray's K200- LP™ accelerator card.

Kalray also offers softwaredefined solutions for data storage and management.

The French company has operations in France, Germany, the United Kingdom, the United States and Japan.

Its partnership with the CEA continues through collaborative projects, particularly on ultrahigh-performance processors.



THE **KALRAY** PROCESSOR IS

5x

MORE EFFICIENT
(PERFORMANCE PER DOLLAR/
WATT) VERSUS COMPETING
SOLUTIONS IN SOME CUSTOMER
USE CASES

Year founded
2008

- Key markets**
- Data centers
 - 5G infrastructure
 - Edge computing (automotive, Industry 4.0, etc.)

- Technology**
- DPU processors, based on a massively parallel 80-core MPPA® architecture
 - High-performance programmable accelerator cards, incorporating Kalray DPU processors
 - Software-defined solutions for data storage and management



KENTYOU

Data intelligence
for smarter cities

■ *Tools to help
communities navigate
digital transformation*

Kentyou helps cities harness digital technology to build smarter, more sustainable urban environments. This Grenoble startup develops digital twins based on open-source technologies and offers IoT solutions for simple, transparent connectivity with existing systems.

Cities are sitting on mountains of data—IoT devices and open data platforms being the main sources. Kentyou's mission is twofold: firstly, to facilitate data access, unification, and processing. Secondly, to help communities obtain actionable information for decision-making. Kentyou's philosophy is open source: The technology leverages an interoperable platform (sensiNact) that supports twenty different IoT communications protocols (ZigBee, LoRa, Sigfox, etc.). Any one of these protocols can be used to remotely access unified data sources, and new data sources can be integrated in less than 10 minutes. The number of use cases is staggering, from city traffic optimization to pollution and climate data applications.

Kentyou's innovation is the result of nearly ten years of CEA research in the fields of artificial intelligence and data platforms. Partnering with the CEA allowed the startup to connect with many municipalities around the world. Today, its solution is being rolled out in fifteen cities in Europe, South Korea, and Japan.



kentyou.com

**10
minutes**
**THE AVERAGE TIME
IT TAKES
TO INTEGRATE
A NEW DATA SOURCE**

Year founded
2020

Key markets

- Transportation and mobility
- Buildings
- Government

Technology

- AI and sensiNact data platform



MICROOLED

Miniature OLED
displays
and modules

■ *Crisp, sharp images and long battery life for augmented reality and other innovative applications*

With high image quality, very low power consumption, and competitive cost, Microoled's miniature displays and modules are equipped to stand up to the global display industry's leading products. Augmented reality is their prime target market.

Thanks to an OLED technology originally developed by the CEA, startup Microoled has made waves in the market for microdisplays—tiny screens measuring less than 2 cm diagonally. High luminance, stellar image quality, and very low power consumption have earned Microoled a slot as the second-largest supplier in the world behind Sony.

The company has expanded its offering to ultra-light (7-gram) microdisplay modules for connected sports eyewear. Users can view heart rate, speed, distance, elevation gain, and other performance data collected by their smartphone or watch. The microdisplays are also ideal for augmented reality for GPS navigation and access to train

schedules or tourist information, for example. Microoled offers an open development platform to facilitate the creation of applications compatible with its products.

The startup is collaborating with the CEA on high-luminance color microdisplays and holds licenses to several CEA patents.

AT JUST
1 MILLIWATT,
MICROOLED'S
ACTIVELOOK DISPLAY
CONSUMES

30x

LESS ENERGY
THAN THE COMPETITION

Year founded
2007

Key markets

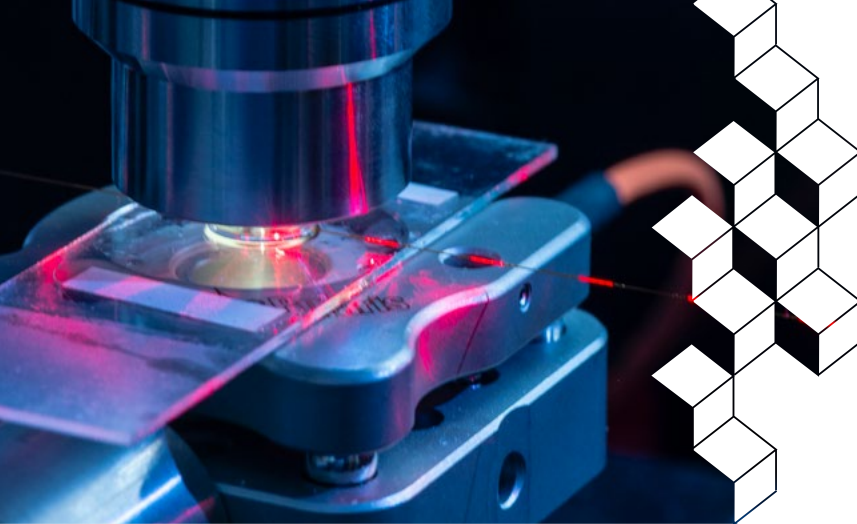
- Binoculars and scopes
- Cameras
- Connected sports eyewear for augmented reality

Technology

- High-luminance, ultra-low power OLED displays
- Microdisplay modules for augmented reality

microoled
INNOVATIVE AMOLED SOLUTIONS

microoled.net



MYRIAD4SENSING

Process instrumentation
using fiber optic
sensor networks

■ *Safer, more efficient
industrial processes in severe
environments*

Myriad4Sensing's fiber optic sensor networks enable a greater number of measurement points and can withstand harsh conditions, overcoming the limitations of traditional electronic instrumentation. This innovation helps make industrial processes safer, more efficient, and more automated.

Many industrial processes operate in extreme environments, including high or cryogenic temperatures, ionising radiation, explosive atmospheres, or intense electromagnetic fields, making them very difficult to monitor. Myriad4Sensing's innovative optical fibers feature etched temperature, pressure, and vibration sensors developed specifically for these severe environments.

The startup's optical fibers can be networked to cover an entire industrial process, increasing the number of measurement points anywhere between tenfold and a hundredfold. The higher measurement density gives users better insights and monitoring capabilities for preventive maintenance, reducing downtime

and increasing production yields and margins.

Myriad4Sensing handles all manufacturing steps in-house, including the special protective coatings made from metal, ceramic, or carbon—essential to preventing long-term damage or discoloration to the optical fibers. The company licenses seven CEA patents, already has its own pilot line, and plans to manufacture around 250,000 measurement points per year by 2026. Myriad4Sensing is currently headquartered at the CEA, and will conduct R&D through a joint CEA lab.

Myriad
Sensing

800°C

THE **OPERATING TEMPERATURE
OF MYRIAD4SENSING'S
CERAMIC-COATED BRAGG
GRATING OPTICAL FIBERS.**

COMPETING FIBER OPTIC
SENSORS ONLY WORK **UP TO
300 °C.**

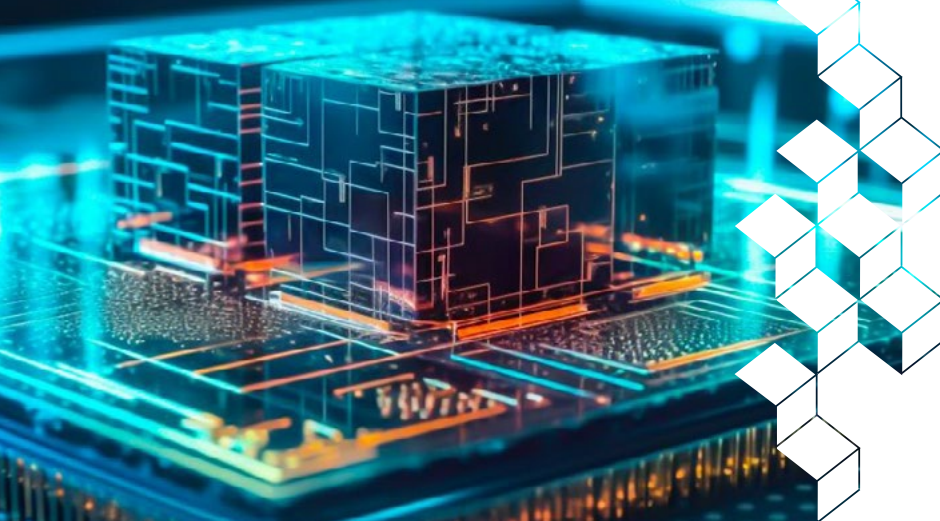
Year founded
2025

Key markets

- Oil and gas
- Nuclear
- Aeronautics
- Hydrogen tanks

Technology

- Optical fiber
- Laser-etched sensors
- Formulation and application of special protective coatings



NELLOW

Ultralow power
components for logic
and AI

■ *Solving the problem of the energy consumption of chips to offer new levels of performance and energy efficiency.*

Traditional CMOS processors, with their high power consumption and tendency to overheat, have hit a performance plateau. Nellow is developing a new generation of chips based on ferroelectric and spintronics materials, opening the door to more powerful, energy-efficient for applications like AI and computing.

Despite CAPEX and R&D investments of hundreds of billion €, and while CPU performance increased a hundredfold in the 1990's, it increased only by a factor of 3 in the last decade.

Nellow develop a new generation of chips that take advantage of the unique properties of ferroelectric and spintronics materials to merge compute and memory, eliminate leakage current, and achieve operating voltages lower than those of CMOS chips. Power consumption could be reduced 100-fold or even more. The technology, covered by nine patents, was developed over fifteen years of research at laboratories Spintec (CEA, Univ. Grenoble Alpes, CNRS) and Albert Fert (CNRS, Thales, Univ. Paris-Saclay).

Nellow is located at the CEA. The startup's founders participated in the Magellan incubation program and plan to continue to develop the technology in conjunction with the Spintec laboratory.

**NELLOW PLANS TO SLASH
CHIP POWER CONSUMPTION
BY A FACTOR OF**

100

EVEN UP TO 1000

Year founded
2024

Key markets

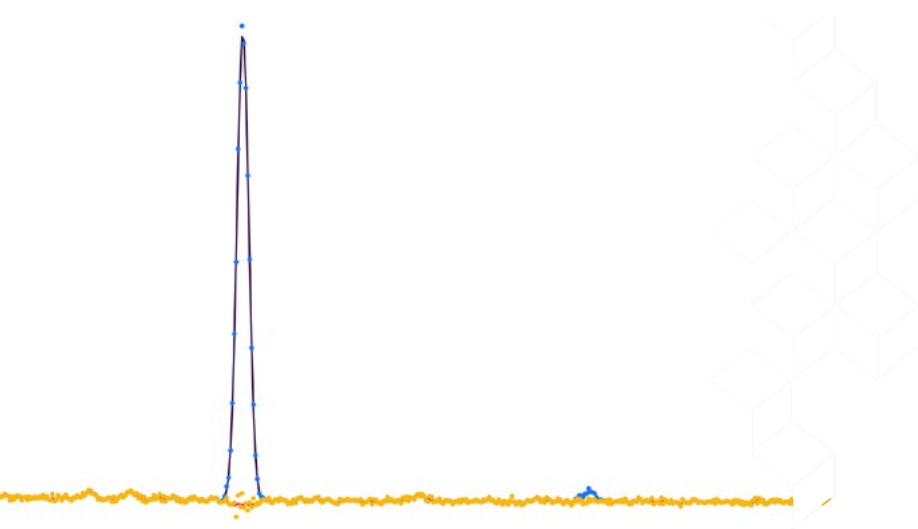
- Any kind of computing that requires high performance-to-power ratio, including AI

Technology

- Non-volatile logic based on ferroelectric/spintronics transistors.



nellow.eu



PERCEVOIR

Artificial perception for the interpretation of spectrometric data

■ *More effective nuclear waste sorting through more efficient, accurate, and robust identification and analysis of radioactive substances*

Emulate raw data measurement operator's reasoning to develop an automated solution which speed up, increase reliability, and enhance the quality of the extraction of valuable information hidden in the data: it's the main proposition of Percevoir, a young venture which conquered its first clients even before its official creation.

To sort nuclear waste, handlers need to know exactly how much of what substances the waste contains, as well as the level of radioactivity. Today, handlers use standard software to manually process spectrometric data and, crucially, their own human expertise, to make decisions. Percevoir's instrument of perception automates the interpretation of spectroscopic data while mirroring human operators' reasoning process.

The software is built on physics- and mathematics-based explainable signal processing algorithms that are more accurate, robust, and faster than conventional methods: Useful information can be extracted in minutes or hours instead of days. The human operator always retains control over the choice of the waste disposal route.

The startup was founded by two CEA doctor-engineers who participated in the Magellan incubation program. Percevoir holds exclusive licenses to three CEA patents and will continue to work with CEA labs through the joint supervision of PhD candidates.



+100%

PERCEVOIR'S FIRST CUSTOMER DOUBLED THE NUMBER OF MEASUREMENTS PER MONTH OVER ITS PREVIOUS SOLUTION.

Year founded
2025

Key markets

- Analysis of nuclear waste to determine the appropriate disposal route
- Medicine, recycling, in-line metrology for the semiconductor industry, mining prospection and operation (all longer-term markets)

Technology

- Signal processing algorithms developed for spectrometric data
- Automated extraction of relevant information



PRIMO1D

RFID tags
in textile threads

■ *Digital identification
for inventory management
and the circular economy*

Primo1D replaces rigid RFID tags measuring several square centimeters with miniaturized devices that can be integrated into textile threads and that are resistant to washing, chemicals, and high temperatures.

Primo1D miniaturizes the RFID tag almost to the point of invisibility—the startup's chip can be integrated into textile fibers, car tires, wires and cables, and more. Its read performance is close to 100%, for example during on-the-fly scanning of clothing stored in boxes. In addition, it can withstand the common mechanical, chemical, and thermal stresses it may be subjected to during its useful life.

The startup has a production capacity of several million units per year. Its top market is apparel, where it helps manage inventories and support the development of the circular economy—by facilitating the sale of second-hand clothing, clothing rental, and end-of-life recycling.

Also targeted are the car tire and wire and cable markets, where it could provide product traceability and help manage maintenance and repairs.

Primo1D has a portfolio of 30 patents, including eight CEA patents under exclusive license. The company continues to work with CEA laboratories to characterize new RFID tags as needed.

Primo1D

primoid.com

PRIMO 1D RFID
TAGS CAN WITHSTAND

100
MACHINE
WASHINGS

Year founded
2013

Key markets

- Apparel
- Automotive tires
- Electrical wire and cable

Technology

- E-Thread™ technology with miniaturized, thread-integrated RFID tags



QUOBLY

Silicon Qubit-based Quantum Computer

■ *The transformational potential of quantum*

With the capacity to solve problems that are currently intractable—even by the world’s most powerful supercomputers—the quantum computer could bring unprecedented benefits to all industries.

Quobly was founded to commercialize the first million-qubit quantum computer. The startup’s strategy is to use proven semiconductor technologies to bring this operable quantum computer to the market.

The technology leverages the physical properties of semiconductors to fabricate quantum dots—the basis for top quality quantum bits (qubits). But Quobly brings an additional asset to the mix: deep expertise in proven semiconductor industry processes that have already been used to manufacture chips with billions of transistors. The startup’s technology plus this clear path to manufacturability will lead to quantum accelerators that deliver truly revolutionary performance. Quobly’s disruptive innovation expected to make a huge impact, including on France’s technological

sovereignty. And all industries will be concerned. Among the early adopters will be industrial companies with strong demand for high-performance computing—especially in the pharmaceutical, energy, and transportation industries.

Created in 2022, Quobly is built on joint research between the CEA and the CNRS and has already generated a portfolio of about 40 patent families. Its three co-founders, from the CEA and CNRS, bring complementary skills essential to the creation of a quantum computer.



1 MILLION QUBITS

POTENTIAL FOR INTEGRATION ON A SINGLE CHIP

Year founded
2022

Key markets
• All industries, including health, energy, and transportation

Technology
• FD-SOI semiconductor technology



SAFEN AI

A SaaS platform for industrial IA lifecycle governance

■ *Quality, trustworthy AIs for industrial process management, guaranteed*

AI can improve industrial process monitoring and supervision—at least on paper. In more practical terms, the lack of safety guarantees has kept most industrial AI projects at the proof-of-concept stage. SafenAI provides the safety checks needed to effectively move AI into real-world production settings with confidence.

SafenAI's Klarity SaaS platform was developed over several years of research at the CEA and SystemX. The software suite continuously verifies that AI tools deployed in production are functioning as intended, looking inside the proverbial black box to monitor parameters like performance, robustness, explainability, data quality, uncertainty, potential biases, and more.

The insights generated by Klarity empower users to put AI's full potential to work to automate certain controls, optimize processes, enable predictive maintenance, and more. Klarity can also be deployed early on, when AI specifications are being drawn up and during development, for example, making future AI deployment even safer.

Of the company's three founders, one is a CEA employee who participated in the Magellan startup incubator. SafenAI has a joint laboratory with the CEA to continue to improve the software and will initially focus on the French and other European markets.



SAFEN AI

safenai.eu

ONLY

15%

OF INDUSTRIAL AI PROJECTS MAKE IT TO THE IMPLEMENTATION PHASE DUE TO A LACK OF PROOF OF **SAFETY AND RELIABILITY.** **SAFENAI'S AMBITION FOR ITS KLARITY SOFTWARE IS TO INCREASE THAT NUMBER SIGNIFICANTLY.**

Year founded
2025

Key markets
• Manufacturing
• Industry 4.0

Technology
• Optimized integration of AI



SCINTIL PHOTONICS

Integrated
silicon photonic laser
sources

■ *Volume-manufacturable
integrated photonic circuits
with optimal optical connectivity*

Based in Grenoble and Toronto, Scintil Photonics designs and supplies advanced silicon photonic circuits with integrated lasers and optical amplifiers. A breakthrough technology developed by Scintil Photonics paves the way for ultra-fast, compact and energy efficient optical connectivity. This is pivotal step in replacing the electrical interconnection between AI processors to meet the exponential computing and data transmission needs of an increasingly connected world.

With its laser-augmented silicon photonic integrated circuits, the startup intends to significantly improve connectivity in high-performance systems and processors.

Scintil Photonics develops integrated single-chip solutions that integrate active and passive components manufactured using standard semiconductor industry CMOS silicon photonics processes volume production. This unique, heterogeneous integration of semiconductor materials, including lasers and optical amplifiers, enables extremely compact ultra-high-speed communications, from 800 Gbit/s to 3,200 Gbit/s. Scintil Photonics' technology, which

leverages more than fifteen years of CEA laser and silicon photonics research and development, is ideal for data centers and high-performance computing (HPC).

3,2 TÉRABIT/S
OF DATA TRANSMIS-
SION SPEED WITH A
TARGET OF **LESS THAN 5**
PICOJOULE PER BIT

Year founded
2018

Key markets

- Data Centers
- Cluster of processors for AI/ML (Artificial Intelligence/Machine Learning)

Technology

- Integrated silicon photonic laser sources

SCINTIL
PHOTONICS

scintil-photonics.com

become invisible.



If hackers can't see you, they can't hack you! Snowpack's virtual and invisible private network makes servers, web services, IoT sensors, and other digital assets safe from the prying eyes of even the most experienced attackers.

Snowpack's strategy for dealing with cyberattacks is an original one: invisibility. The company's solutions, backed by four CEA patents, are designed to protect users, infrastructures, and services. Snowpack renders digital assets—servers, web services, IoT sensors—exposed on the internet invisible.

The company's virtual and invisible private network (VIPN) technology is built on a dark-net-inspired architecture and leverages proprietary protocols. The packets that contain information that could reveal the source and destination of the data are broken up into "snowflakes" (anonymous random noise) routed over pathways that are created via a self-discovery mechanism that protects the packets' anonymity.

This renders both the data and

the metadata invisible. Users no longer need to be able to trust the network infrastructure. Snowpack makes passive observation and active attacks—even on political organizations and government institutions—on data flows impossible. Servers no longer have a listening port, also making scanning, DoS attacks, and vulnerability exploitation impossible.

Snowpack's tools are also available as libraries for integration into third-party software and systems. The company is working to further enhance its technology, including through a joint lab with the CEA.

snowpack

snowpack.eu

SNOWPACK

Online invisibility
for sensitive digital
assets

■ *A patented technology to
fend off cyberattacks*

4

**EXCLUSIVE
CYBERSECURITY
PATENTS**

Year founded
2021

Key markets

- Cybersecurity software companies
- Organizations that gather on-line information, in particular law enforcement agencies and cyberthreat intelligence companies
- Businesses and organizations, especially critical infrastructure and service operators

Technology

- A virtual and invisible private network (VIPN) that turns packets into "snowflakes" (anonymous random noise) routed over the internet via anonymous pathways



SPORT QUANTUM

Connected
interactive electronic
shooting targets

■ A fun, interactive solution offering high-quality measurement for training and competitions—a revolution in shooting sports

Sport Quantum's exclusive technology measures the shock waves generated by a projectile to display the score of each shot live on a screen, effectively replacing paper targets. To date, the company's products are sold in 42 countries, including Germany, where it has a subsidiary.

Sport Quantum's technology, protected by four CEA patents, is based on four piezoelectric sensors that can locate the exact point of impact of each shot to within 100 micrometers (0.1 mm) over the entire surface of the target. The solution has been approved by a number of official organizations, including the International Shooting Sport Federation (ISSF).

The screen, which can either display a conventional target or fun practice activities, can be adapted to different shooting distances and connected to a tablet so that results can be shared and scores analyzed. Amateur practitioners enjoy the additional motivation, while competitive athletes appreciate the system's performance monitoring capabilities.

Sport Quantum products are made in France and sold in 42 countries. Sport shooting is the fourth most widely practiced individual athletic activity in the world, making the market a potentially huge one. The solution also helps reduce the environmental impacts of sport shooting by eliminating paper targets altogether. The projectiles can be collected in a special container for recycling.



sportquantum.com

0,1 mm

THE DEGREE OF ACCURACY
OF SPORT QUANTUM'S
TECHNOLOGY, MEETING THE
REQUIREMENTS OF OFFICIAL
COMPETITIONS

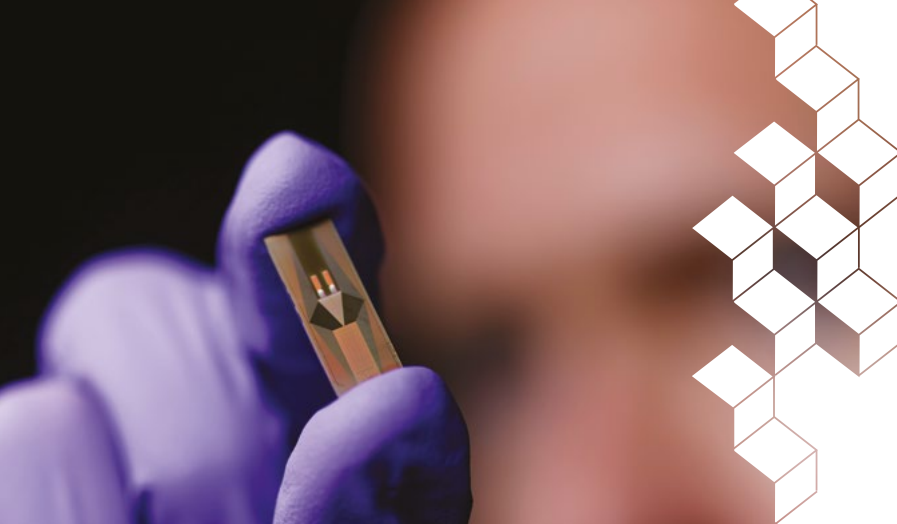
Year founded
2017

Key markets

- Sport shooting clubs and training centers
- Official competitions

Technology

- High-brightness display protected by an ultra-resistant polycarbonate plate
- Location of impacts by piezoelectric sensors
- Collection, processing, and sharing of shooting score data via interactive software



STEERLIGHT

A new generation
of LiDAR sensors

■ *Reliable, three-dimensional optical sensors to protect people and goods in motion*

SteerLight is a deep tech startup founded in 2022. It has developed a new generation of LiDAR: laser-based optical systems that can perceive the environment in 3D with unparalleled precision and resolution. The quality of these systems translates into decisive advantages in a range of use cases, including guaranteeing that autonomous vehicles and robots can move around safely.

The SteerLight solution is based on a disruptive coherent infrared LiDAR architecture. The LiDAR is fully integrated onto silicon photonic chips using standard microelectronics processes and does not have any moving mechanical parts. SteerLight LiDAR-on-chip is compact, robust, and—because it is volume-manufacturable—affordable.

Its innovative and coherent detection architecture ensures improved performance for distance and real-time velocity measurements

It is the result of fifteen years of research in CEA laboratories in the fields of silicon photonics, electronics, and embedded computing.

Its extremely miniaturized sensor will secure the mobility of goods and people and contribute to making cities smarter, a market with prospects of over \$2 billion by 2030.

INTEGRATED
SENSOR VOLUME

<20cm³

Year founded
2022

Key markets

- Logistics and manufacturing: mobile autonomous robots
- Urban transportation: people and goods
- Urban security: securing dangerous areas

Technology

- Silicon photonic FMCW architecture



SteerLight
steerlight.com



TRUSTINSOFT

Quality and security
for C & C++ software

■ Dramatically faster,
cheaper verification
for guaranteed software
reliability and robustness
to cyberattacks

TrustInSoft helps software developers achieve source code reliability and immunity to known types of cyberattacks, a unique offering available worldwide.

Using the Frama-C source code analyzer developed by CEA and Inria, TrustInSoft has developed a full suite of C & C++ software analysis tools and services. They provide mathematical evidence of their reliability (zero bugs) and immunity from known types of cyberattacks.

These tools make software validation much, much simpler. Usually, software is validated by performing an array of test attacks, with no way to guarantee that all possible scenarios have been covered. TrustInSoft runs a single analysis and provides guarantees to its customers. In aeronautics industry use cases, software validation time and cost have been reduced by 75%.

The startup holds a license to a CEA patent. Initially focused on critical applications (nuclear, aeronautics), it now focuses on the automotive and consumer electronics industries. It generates 70% of its revenue from exports, 50% from sales to customers in the United States.

TRUSTINSOFT
TOOLS
CURRENTLY
SECURE **57**
million

ELECTRONIC DEVICES,
IN ENERGY, GAMING AND
TELECOMS

Year founded
2013

Key markets

- Critical industrial systems
- Automotive
- Consumer electronics

Technology

- Comprehensive analysis of C and C++ source code
- Mathematical proof of code security and reliability

TRUST **IN** SOFT

trust-in-soft.com



WIN MS

Real-time
cable monitoring and
diagnostics

■ *Expert cable network monitoring for high-uptime production, transportation, and building management equipment*

Expert cable network monitoring for high-uptime production, transportation, and building management equipment

The startup WiN MS has built a reputation both in France and internationally on the performance of its fault detection and location solutions for cable networks. The company's technology works with all types of cables: electrical, data, radio, and fiber optic. Its electric arc detection solution, with its extremely low false alarm rate, is, along with several other WiN MS solutions, unique on the market.

These user-friendly solutions are designed for non-experts in the aeronautics, automotive, air transportation, and defense industries. In aeronautical maintenance, for example, they cut troubleshooting time by 80%.

WiN MS solutions can be used for the entire equipment lifecycle, including during service life, making systems and infrastructures more reliable. Arc detection and power

distribution network monitoring provide increased safety. As electric mobility and microgrids gain traction, the opportunities for WiN MS will continue to grow.

The startup has a portfolio of nine patents, including five exclusive CEA patent licenses. WiN MS is present in 20 countries, with subsidiaries in the United States and Singapore.



WIN MS
GENERATES **75%**
OF ITS REVENUE FROM
EXPORTS

Year founded
2012

Key markets

- Aeronautics manufacturing and airlines
- Automotive
- Renewable energy, microgrids

Technology

- Detection and localization of faults via reflectometry
- Arc detection



WISE INTEGRATION

Innovative
power electronics

■ A technology for simpler-to-use, more efficient chargers

Wise Integration, founded in 2020, offers a breakthrough technology that enables its customers to manufacture more compact and energy-efficient chargers. The innovation leverages a gallium nitride (GaN) technology developed at the CEA.

Wise Integration is headquartered in France, but the startup has already opened offices in Taiwan, Hong Kong, and South Korea, as well as a design center in Canada.

The company addresses a wide range of markets, including some—mobile phones, laptop computers, electric mobility—whose end-users are consumers. However, Wise Integration's solutions are also used by equipment manufacturers and data centers, dramatically reducing their overall power consumption. Today, Wise Integration, with a portfolio of more than 20 patents, is known as an innovator in power electronics.

The company's current product portfolio centers around WiseGan® and WiseWare®. WiseGan® is a technology developed in CEA laboratories and protected by

four CEA patents. At the core of the technology is a power GaN IC specially designed to maximize the benefits of the material. WiseWare® is a 32-bit digital microcontroller optimized for GaN power supply architectures.

After an initial prototype, Wise Integration began scaling up its technology and released its first commercial product in 2022.



wise-integration.com

CHARGERS

3x
more **COMPACT**
& more **EFFICIENT**

Year founded

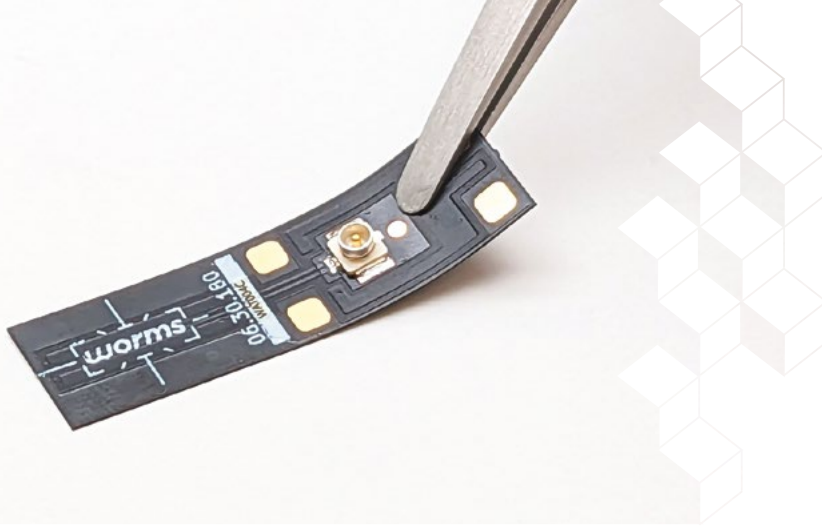
2020

Key markets

- Cell phones
- Laptop computers
- Electric mobility (e-bikes, electric scooters, etc.)
- Equipment manufacturers and data centers

Technology

- WiseGan™ power GaN technology
- WiseWare™ digital controller



WORMSENSING

A new sensor for a revolution in vibration measurement

■ A new level of vibration measurement precision on all types of assets with potential use cases in all industries

Wormsensing has made the first major advance in vibration measurement in over 70 years with piezoceramic sensors that are as sensitive as they are easy to integrate and use.

Today's vibration sensors generally use strain gauges or accelerometers. Wormsensing sensors are 1,000 times more accurate than strain gauges and 10,000 times smaller than accelerometers. The patch-like sensors are as thin as a human hair, making them quick and easy to apply to virtually any surface in any environment.

At the heart of this innovation lies Dragonfly®, Wormsensing's flagship product family. Built on a hybrid flexible electronics platform, Dragonfly® offers unparalleled sensitivity and adaptability for Industry 4.0 applications. Whether testing satellites and turbines or monitoring robots, CNC machines, and wind turbines, Dragonfly® is revolutionizing the testing, production, operation,

and maintenance of machine parks and infrastructures. Now, equipment manufacturers are considering integrating these sensors natively into their machines, creating a custom cloud of measurement points to predictively monitor and protect their assets.

With 40 patents and key partnerships with leading players such as EDF and Airbus, Wormsensing operates a pilot line capable of manufacturing up to two million units per year. A collaborative R&D laboratory with the CEA ensures continuous innovation and leadership in Industry 4.0 technologies.

worms

wormsensing.com

THE WORMSENSING VIBRATION SENSOR, **AS THIN AS A HAIR** AND

1000x

MORE SENSITIVE, IS DEPLOYABLE EVERYWHERE

Year founded

2020

Key markets

- Monitoring, Structural Health Monitoring (SHM), Condition Based Maintenance (CBM)
- Event detection
- Vibration analysis
- Quality and process control
- Dynamic weighing and force measurement
- Human-machine interfaces

Technology

- Piezoelectric technology: lead-free thin-film piezoceramic <10µm
- Hybrid flexible electronics





HEALTH 



SUCCESS STORY

ALCHIMEDICS

Better arterial healing and a lower risk of thrombosis after percutaneous neurological and coronary interventions.



Created in 2007, AlchiMedics has developed a coating technology named “Electro-grafting”, delivering covalently bonded nanometric polymer brushes,

that promote artery healing and reduce thrombosis. AlchiMedics’ electro-grafted polymer coating accelerates the desired migration of endothelial cells from areas adjacent to the stent zone, while inhibiting the undesired proliferation of smooth muscle cells likely to cause occlusion: it accelerates the healing of arteries inevitably wounded after a percutaneous intervention. This, thanks to a biodegradable polymer for the controlled release of the active ingredient. The polymer is electro-grafted onto the surface of the medical device in a very thin layer (just 150 nanometers thick).

The risks of acute and late stent thrombosis are virtually eliminated once the endothelium is formed, and Dual Anti-Platelet Therapy (DAPT) can be safely interrupted as early as 1 month (as per the outcomes of the Pioneer IV trial in Europe). Today, more than 2.2 million patients located in 34 countries have already benefited from this technology, both for cardiovascular and neurovascular stents.

AlchiMedics’ technology is protected by 225 patents, 150 of which belong to the CEA. The company has been commercializing its solution on the Chinese

market since 2011 (and has earned CFDA approval), in Europe since 2019 (with the CE marking for its HT Supreme stent), targeting approval in the United States in 2025 (with FDA premarket approval for the RAVE HT stent). AlchiMedics is continuing to improve its coating technologies to bring patients even greater levels of safety and, ultimately, eliminate the need for anti-platelet therapies.

The HT Supreme stent, which embarks AlchiMedics’ technology, obtained – in 2024 – the status of reimbursable device by the Haute Autorité de Santé in France, for all types of coronary pathologies: only 6 out of 30 stents have this status in France.

alchimedics.com



ADEQUABIO

Photosynthetic
bacteria to treat
agricultural effluents

■ A simple, effective, robust, and maintenance-free solution for the treatment of agricultural effluents containing pesticides

Adequabio uses evaporation and biodegradation in a liquid medium to remove pollution from agricultural effluents. The solution works on its own—no energy-hungry machines or human intervention required.

Adequabio's solution encapsulates more than 25 years of research on photosynthetic bacteria and their capacity to degrade pollutants. Phytobarre, the company's process for treating effluents containing pesticides, is easy to use.

Unlike ozone treatment, light is the only source of energy the bacteria used in Phytobarre need. Plus, the bacteria can be used on any volume of effluent, in any climate, and for any kind of crop. The "set it and forget it" treatment stations do not involve manual operation or maintenance of any kind other than the addition of a fresh batch of bacteria once a year.

The concept has been proven on pesticides, but, given the ability of photosynthetic bacteria to degrade a wide range of organic pollutants, there is potential for other use

cases, especially in the chemical industry. Adequabio is partnering with the CEA, with its advanced bioinformatics and other resources, on research to identify new bacteria candidates.

The company has commissioned around 30 agricultural effluent treatment stations, each serving one or more farms, since 2018. After focusing on the French market in its early years, Adequabio is now gearing up to commercialize its solution across Europe.



adequabio.fr

ADEQUABIO REMOVES
MORE THAN

95%

OF POLLUTION
FROM EFFLUENTS

Year founded
2018

Key markets

- Treatment of agricultural effluents containing pesticides
- Treatment of chemical industry effluents

Technology

- Selection and culture of non-genetically modified photosynthetic bacteria
- Design and installation of treatment plants



ADMIR

High-speed
spectroscopic
imaging

■ *Faster, simpler,
more secure
medical diagnostics*

ADMIR designs, develops, and manufactures a particularly innovative ultra-fast spectroscopic infrared imaging system that makes bioanalysis more reliable and, above all, 100 times faster. The technology is revolutionizing public health.

ADMIR's instruments, designed for pathologists, biologists, and biochemists, are breaking new ground in cancer, infectious disease, and microplastics screening.

The technology developed by the startup turns results around in just one hour vs. the several days needed by current bioanalysis technologies. In addition, it does not require reagents, dyes, biomarkers, or other chemicals, and is more reliable than conventional testing.

Today, ADMIR leverages the CEA's know-how in infrared technology through a portfolio of twelve patents.

Its software suite combining instrumentation and artificial intelligence is on track to address new markets other than health.

100x

FASTER
BIOANALYSIS

Year founded
2022

Key markets

- Health: Oncology, microbiology, and analysis of microplastics in the body

Technology

- Spectroscopic infrared imaging
- Machine learning


ADMIR
[admir-analysis.com](https://www.admir-analysis.com)



AVALUN

A connected,
portable biological
testing lab

■ Anytime, anywhere
biological testing
from a single drop of blood

Avalun is the startup behind the LabPad® Evolution, a pocket-sized lab that can perform multiple biological analyses from just a finger prick of blood.

A miniature, automated microscope built from two CMOS sensors is what allows the LabPad® to perform multiple lab-quality measurements. The reagents required for the tests take the form of consumable micro-cartridges. Blood tests can be done anywhere from a single finger prick, and the results are sent via Bluetooth to a smartphone or tablet.

Avalun's device, widely distributed in France and other European countries, facilitates point-of-care testing in hospitals, and is also of interest to biology laboratories, general practitioners, nurses, nursing homes, and other healthcare stakeholders.

It can measure blood clotting time in patients on anticoagulants, C-reactive protein to detect viral or bacterial infections, and D-dimer if cardiac embolism is suspected.

Founded by two CEA engineers, Avalun's IP portfolio includes nine CEA patents. In 2021, the startup was acquired by Biosynex.

AVALUN OFFERS THE
LIGHTEST BIOLOGICAL
ANALYSIS DEVICE ON
THE MARKET AT ONLY

300grams

COMPARED TO **1.5 KILOGRAMS**
FOR ITS CLOSEST CONTENDER

Year founded
2013

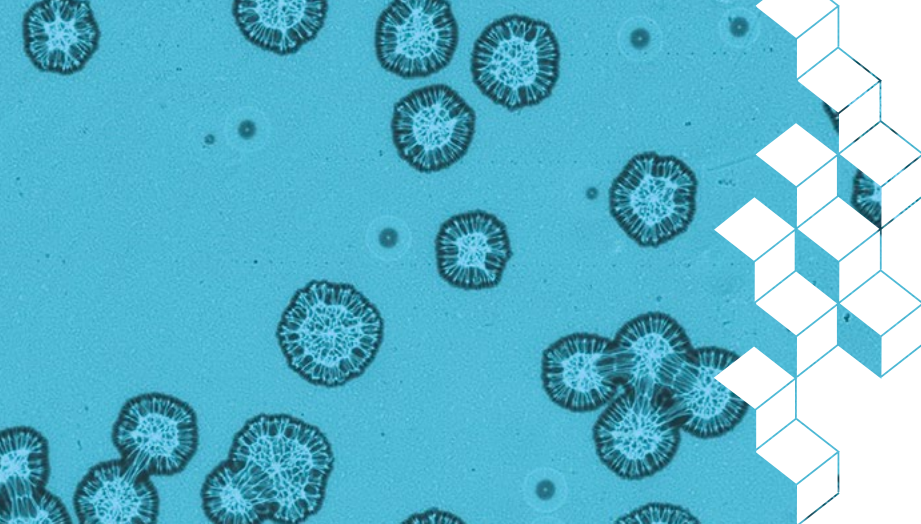
Key markets

- Hospitals
- Outpatient medicine
- Medical offices
- Home care

Technology

- Lensless microscopy
- Microfluidics
- Rapid reading of fluorescent optical measurements
- Transmission of results via Bluetooth





BAIO-DX

Rapid bacteria
identification
using holographic
imaging and AI

■ Antibiotic sensitivity
screening results in
a quarter of the usual time

BAIO-DX is developing a new medical diagnostic tool that leverages artificial intelligence and lensless holographic imaging. The company's augmented microbiological analyses can identify the bacteria responsible for infection, and then rapidly and automatically indicate the best antibiotic.

To determine which antibiotics will be effective against an infection, biological samples are cultured, and then the bacteria present are identified using MALDI-ToF mass spectrometry. The BAIO-DX lensless holographic imaging device, coupled with artificial intelligence algorithms, accelerates this step. It continuously observes the Petri dish, detects bacteria as soon as they appear, and identifies them without sampling. It then performs an antibiotic sensitivity test.

With this technology, which can be integrated into existing lab processes, healthcare professionals are improving patient care by prescribing better-targeted antibiotics more quickly and slowing the onset of antibiotic resistance. Process automation increases the

productivity of analysis laboratories, as well as the traceability and reliability of their operations.

BAIO-DX, created in January 2022, conducts tests on patient samples with a prototype in use at the Grenoble Alpes University Medical Center as part of a partnership. The startup, founded by one CEA researcher and one CNRS researcher, holds licenses to four CEA patents.

baio-dx

baio-dx.com

ACCORDING TO THE
WHO, **ANTIMICROBIAL
RESISTANCE** COULD
CAUSE AROUND

**10
million**

**DEATHS WORLDWIDE
BY 2050**

Year founded
2022

Key markets
• Hospitals
• Private analysis labs

Technology
• Lensless holographic imaging
• Artificial intelligence algorithms



CELL&SOFT

In vitro soft culture plates for molecule safety, toxicity and efficacy testing

■ *Faster, cheaper, more successful drug development*

Cell&Soft develops soft, textured culture plates that mimic human tissues for more relevant *in vitro* trials and faster drug development.

In vitro cell cultures are plagued by a lack of predictability: 98% of promising results obtained *in vitro* turn out to be clinical failures. The low success rate is due in part to the plastic culture plates used in labs. A million times stiffer than human tissues and organs, the plates subject cells to a very different environment than that of their original organs, skewing the results.

Cell&Soft's hydrogel culture plates mimic the physiological rigidity of the lungs, heart, brain, and other organs and tissues. Several academic research laboratories have confirmed that the cellular models developed on these plates are more realistic, providing *in vivo* conditions for safety, toxicity and efficacy testing of new molecules.

The startup has developed an initial line of eleven products and co-develops custom plates with biotech companies. The CEA saw the potential of these technologies at an early stage and financed the first market studies.

Cell&Soft
Let's reinvent cell culture!

cellandsoft.com

TODAY, ONLY

1 to 2%

OF DRUG CANDIDATES TESTED
IN VITRO ARE **EFFECTIVE IN
CLINICAL TRIALS**

Year founded
2018

Key markets

- Oncology
- Cell-based assays
- Cell culture
- Dermocosmetics

Technology

- Synthetic hydrogels designed using microelectronic techniques
- Photopolymerization through lithography masks enables local rigidity representative of a given organ



CERES BRAIN THERAPEUTICS

A drug candidate for neurometabolic diseases

■ Treatment for previously untreatable diseases to improve quality of life for patients, caregivers, and families

Ceres Brain Therapeutics is developing a drug candidate for a neurological diseases like Charcot disease or Creatine Transporter Deficiency, that cause severe intellectual disabilities, autistic behaviors, and seizures. The drug could be made available by 2028.

X-linked creatine transporter deficiency is an inherited disease linked to a genetic mutation on the X chromosome that prevents creatine (an amino acid that provides energy to cells) from reaching neurons. With an initial clinical trial scheduled for 2024, Ceres Brain Therapeutics is currently the company in the world closest to developing a drug for this disease.

The drug, CBT101, is a pro-creatine that, thanks to a chemical vector graft, can cross the blood-brain barrier, supplying neurons with creatine. Animal tests have shown very significant improvement in cognitive behavior. However, this innovation can also be applied to other neurological diseases.

Ceres Brain Therapeutics has a portfolio of six patents, including three CEA patents. As part of an R&D agreement with the CEA, the startup is deepening its understanding of the mechanism of its drug candidate and developing new candidates targeted at other rare neurological diseases.



ceres-brain.com

16,000

ESTIMATED NUMBER OF
CHILDREN WORLDWIDE
AFFECTED BY **CONGENITAL**
CREATINE TRANSPORTER
DEFICIENCY

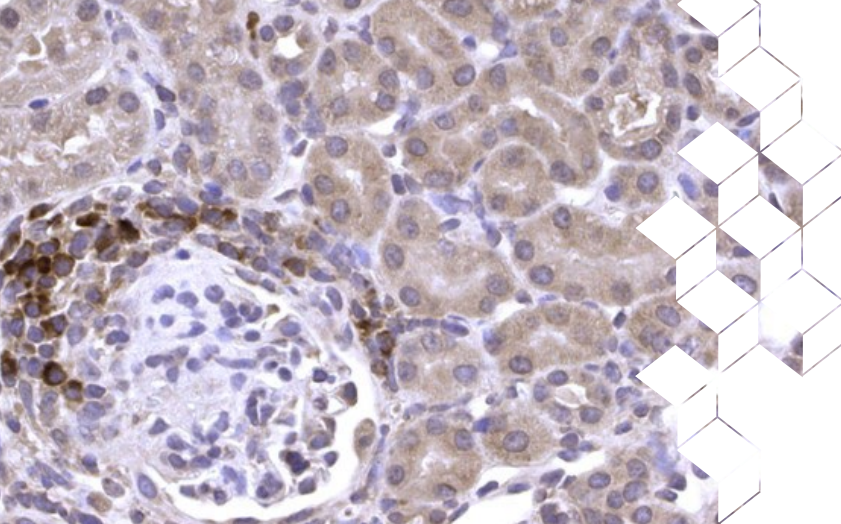
Year founded
2019

Indications

- Congenital Creatine Deficiency Syndrome and Charcot Disease

Technology

- Active ingredient administered via the nasal route to cross the blood-brain barrier via the olfactory and trigeminal nerves and neuronal membrane



DETERA THERAPEUTICS

Disruptive therapies for
rare kidney diseases

■ *Toward fewer deaths, transplants,
and dialysis treatments for patients
with rare kidney diseases*

DETERA Therapeutics is developing the first-ever treatment for kidney damage caused by certain rare diseases. The startup's solution, protected by two patents, was developed over a decade of research by the CEA and Inserm.

Crescentic glomerulonephritis, a complication of autoimmune diseases that affects 20 out of every million people, will be the first commercial target of DETERA Therapeutics' future treatment. DTR8, which will be administered alongside the traditional immunosuppressants given to reduce inflammation, is intended to prevent the disease's rapid kidney failure—which currently results in dialysis for the rest of the patient's life, a transplant, or death.

DTR8's active ingredient is derived from a naturally-occurring protein that inhibits a growth factor, which, in patients with the disease, is abnormally expressed in the kidney. Encouraging results, published and presented at international conferences, have been obtained both in vitro and on animal models. The startup, which is also

developing a companion test, plans to license the product to industrials before the Phase 3 clinical trials and is aiming for a market release date from 2034.

One of the three founders is a CEA employee who benefits from the CEA's Magellan startup incubation after following the SATT Paris Saclay maturation program. A R&D contract with the CEA is also planned. The goal is to develop DTR8 and other disruptive treatments for several other rare kidney diseases.



DETERA THERAPEUTICS' OBJECTIVE IS FOR ITS DTR8 TREATMENT TO IMPROVE RENAL FILTRATION CAPACITY BY

30%

**SIX MONTHS AFTER
A CRESCENTIC
GLOMERULONEPHRITIS
DIAGNOSIS.**

Year founded
2024

Indications

- Crescentic glomerulonephritis
- Other rare kidney diseases in adults and children

Technology

- Active ingredient derived from the diphtheria toxin
- Improvement of solubility and target affinity, and reduction of immunogenicity and antigenicity



DIABELOOP

Interoperable
self-learning
diabetes
management
solutions

■ *Better blood sugar regulation,
a lighter mental load,
and improved quality of life
for people living with diabetes*

Diabeloop's first-of-its-kind solution for automated type 1 diabetes treatment calculates the insulin doses patients need throughout the day and administers them in an automated and personalized manner. The solution is already in use in seven European countries.

People living with type 1 diabetes are constantly at risk of either hypoglycemia or hyperglycemia. To manage the disease, they must perform countless insulin dose calculations every day. And, depending on metabolism, physical activity, and diet, the doses can vary by a factor of three. Diabeloop's DBLG1 System lightens this mental load by continuously monitoring the patient's glucose level, calculating the right insulin dose, and automatically administering it.

Fifteen clinical studies have validated the effectiveness of this device, which improves the regulation of blood sugar levels and patients' quality of life. It obtained CE certification in 2018 and France's national health insurance provider approved the device for reimbursement in 2021.

Diabeloop's product is already available in seven European countries, and the company is now accelerating its international development.

The technology is protected by a portfolio of 21 patents, including ten CEA patents. And, as part of a joint laboratory with the CEA, Diabeloop is continuing to improve its AI algorithm to further refine insulin dose calculation based on each patient's specific needs.



diabeloop.com

ONE YEAR AFTER LAUNCH,
MORE THAN

10,000
people in Europe

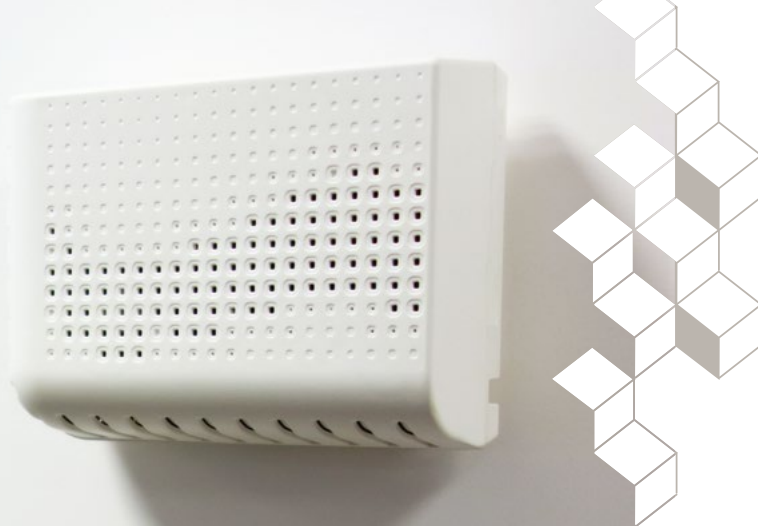
HAVE BEEN EQUIPPED
WITH THE **DIABELOOP**
DBLG1 SYSTEM

Year founded
2015

Main application
• Treatment of type 1 diabetes

Technology

- Dexcom glucose monitor
- Diabeloop technology compatible with multiple insulin pumps
- Artificial intelligence algorithm for glycemic management: prevention of hypoglycemia, adaptation to carbohydrate and fat intake from meals, physical activity, correction bolus in case of hyperglycemia



ETHERA

Air quality monitoring sensors

■ *Solutions for controlling both indoor air quality and building energy use*

Ethera's compact, accurate, and easy-to-maintain sensors continuously monitor indoor air pollutant concentrations so that building operators can take action.

Building occupants are chronically subjected to air pollutants like formaldehyde, fine particles, nitrogen dioxide, ozone, carbon monoxide, and volatile organic compounds, to name a few. Ethera has developed sensors and measuring stations to detect them, quantify them, and report any readings that exceed regulatory thresholds.

These miniaturized, energy-efficient devices achieve the same level of sensitivity (one microgram/m³) as laboratory measurements—and they do it in real time, on-site, and at a much lower cost.

Ethera combines these solutions with services for collecting, managing, displaying, sharing, and post-processing data.

In particular, these services help optimize building ventilation strategies to guarantee air quality without letting more heat out of the building than necessary.

The startup, a SEB company, holds exclusive licenses to two CEA patents.



ethera-labs.com

ETHERA SENSORS DETECT

formaldehyde, the primary indoor air pollutant, at a

record sensitivity of 2 ppb

Year founded
2010

Key markets

- Commercial buildings
- Smart buildings
- Schools
- Ambient air

Technology

- Porous materials functionalized to react to pollutants
- Data collection, processing, and provision
- Post-processing of data to control air purifiers, ventilation systems, etc.



FLUOPTICS

Fluorescence
imaging for surgery

■ *Image-guided surgery
for improved patient care
and fewer complications*

Fluoptics imaging systems highlight features like the exact locations of the parathyroid glands or tissue vascularization during procedures, making it a valuable tool for surgeons.

Surgeons conventionally rely on diagnostic imaging done in advance to prepare for their procedures. Fluoptics provides them with additional real-time information invisible to the naked eye: its cameras detect contrast media circulating in the vascular or lymphatic systems or accumulating in a lymph node or vessel.

This allows surgeons to operate with even greater precision, for far more effective procedures and a vastly reduced risk of damage to healthy tissues. Fluoptics technologies were developed and validated by clinicians across the globe and are currently sold in more than 20 countries.

Fluoptics is the result of more than 10 years of research in CEA laboratories. Today the startup

is a world leader in fluorescence imaging for thyroid surgery. It is also active in breast reconstruction surgery. Acquired in 2022 by the Swedish company Getinge, Fluoptics possesses a portfolio of 20 patents, including ten CEA patents for which it has exclusive licenses.

SINCE ITS INCEPTION
IN 2009, **FLUOPTICS** HAS
COMMISSIONED
MORE THAN

500
IMAGING SYSTEMS

Year founded
2009

Key markets

- Thyroid surgery
- Reconstructive surgery
- Lymphatic surgery

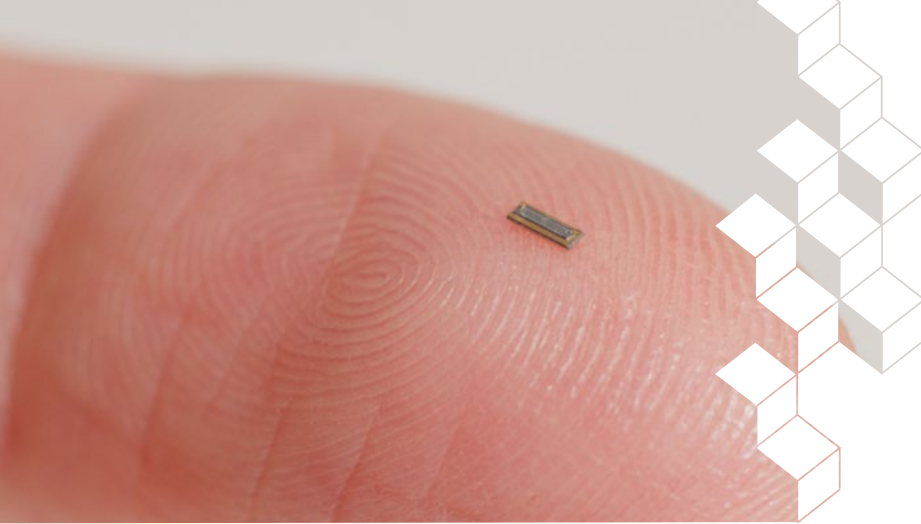
Technology

- Fluorescence imaging
- Detection of contrast media through biological tissues
- Images as accurate as X-ray

FLUOPTICS®

Part of Getinge

fluoptics.com



INJECTPOWER

A new generation
of microbatteries
for implantable
medical devices

■ *Non-invasive continuous intraocular,
intracranial, and blood pressure monitoring*

Today, one of the major challenges for implantable medical devices is battery size. Injectpower is addressing this challenge with a new generation of rechargeable microbatteries for longer-lasting, less invasive medical devices.

Injectpower is revolutionizing the microbattery market by offering ultra-miniaturized, high-energy-density batteries that are easier to integrate than ever before. The rechargeable microbatteries have a lifetime of more than ten years, opening the door to new medical applications that require continuous measurement. Implantable eye-pressure monitors could finally make the effective treatment of glaucoma a reality. Innovations in continuous post-stroke monitoring and blood pressure monitoring could dramatically improve the management of neurological and cardiovascular disease.

The startup Injectpower is the result of more than eighteen years of microbattery R&D at the CEA—a long scientific adventure that has generated more than 40 patent families. The company holds an exclusive license to a CEA patent for the medical field.

10x THINNER
ENERGY
DENSITY
10-YEAR LIFESPAN

Year founded
2020

Key markets

- Ophthalmology
- Neurology
- Cardiology

Technology

- Microbatteries, solid thin-film technology

injectpower 
injectpwr.com



MAG4HEALTH

More affordable
magnetoencephalography

■ A powerful, competitive
new neuroimaging technology
to improve the treatment
of brain conditions

Magnetoencephalography is a powerful brain imaging technique, but it is not helping as many patients as it could due to its high cost. Mag4Health is democratizing MEG scans with a device that is more versatile and just as powerful as conventional machines but at one-third the cost.

Mag4Health utilizes a magnetometry technology developed over two decades of CEA space research. The startup is bringing this twelve-times-patented innovation to healthcare, where it is reshaping magnetoencephalography.

Mag4health's quantum sensors operate at ambient temperature, replacing conventional sensors that need to be cooled to -269°C with a cryostat. The magnetic shielding required is ten times lighter, which means that the sensors can be placed on a helmet, in contact with the patient's skull, for better brain signal reception. The simplicity of the device opens the door to many use cases, including image acquisition on moving patients or children.

The total purchase and maintenance cost of these machines is one third that of conventional machines for the same level of performance. Mag4Health has now eliminated the main obstacle to the development of the only imaging technology that can record and locate all brain activity. Currently there are only around 150 MEG scanners in the world, and just five in France. The startup plans to ship its first products at the end of 2023.



mag4health.com

MAG4HEALTH'S MEG
SCANNER HAS A ONE-TON
MAGNETIC SHIELD; THAT'S

10x
LIGHTER
THAN CURRENT SYSTEMS

Year founded
2021

Key markets

- Preparation for epilepsy surgeries
- Preparation for brain tumor surgeries
- Diagnosis of concussions
- Early diagnosis of Alzheimer's disease

Technology

- Helium-4 quantum sensors operating at room temperature
- Headset acquisition system incorporating 48 sensors



NAWU DIAGNOSTICS

Rapid diagnostics
of respiratory-tract infections

■ *Rapid respiratory infection screening device for animals to prevent epidemics, limit the impact of reduced growth rates, and lower the associated financial costs*

With nawu diagnostics, livestock can be tested for respiratory diseases within 30 minutes instead of the usual 48 hours with lab PCR tests. This innovative diagnostic testing solution is backed by eight CEA patents. The solution will be released in late 2027.

The European cattle industry loses an estimated €500 million each year to respiratory diseases. Results of a lab PCR test can take between two and five days. From the time the sample is collected to when the results are available, animals continue to spread the disease to others and sometimes die, leading to lower growth and delayed reproduction.

The portable, battery-powered device developed by nawu diagnostics produces reliable results in just 30 minutes so that a treatment decision can be made rapidly. This non-invasive, easy-to-use system is a game-changer. The device simply collects and tests the air exhaled by animals with a suspected infection or preventively. It has already proven effective on bronchiolitis and coronaviruses and will soon be extended to six other diseases.

nawu diagnostics plans to target other livestock species—swine and poultry—and, ultimately, humans. The startup's two cofounders plan to raise funds within a year to fund the development of its first product.

 **nawu** diagnostics

nawudx.com

20%

OF THE WORLD'S LIVESTOCK PRODUCTION IS LOST DUE TO DISEASES—ESPECIALLY RESPIRATORY-TRACT INFECTIONS.

Year founded

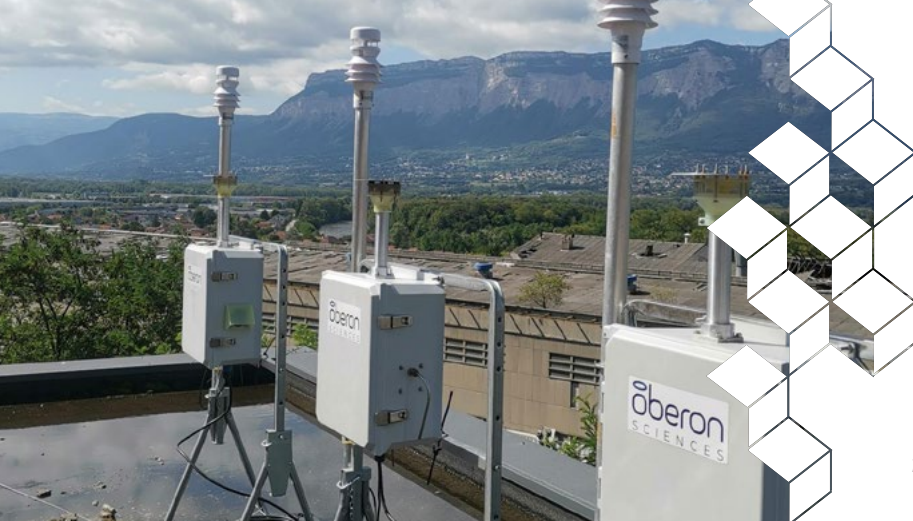
2025

Key markets

- Cattle, swine, and poultry farming
- Human health

Technology

- Electrostatic aerosol collector for sampling
- Capillary microfluidic circuit for sample preparation
- Loop-mediated isothermal amplification (LAMP) molecular analysis for detection



ÖBERON

Real-time airborne particle measurement and analysis

■ *Tracking of a key environmental transition indicator to help municipalities, industrial facilities, and farms make informed decisions*

Today's air quality monitoring systems only provide an indeterminate total particle count. Öberon Sciences' solution goes further with real-time measurement and identification of particle sources, giving public- and private-sector stakeholders actionable information.

Öberon Sciences' Aerōtape leverages a patented technology to provide precision real-time data not only on the number of particles, but on the exact kind of particles in the air. The suspended particles in the air are captured and pictured under different lightings. The resulting data is processed by AI algorithms to determine the types of particles and particle counts.

Monitoring data on traffic-related pollution, pollen, mold and other particles can then be used by urban planners and other stakeholders. Factories that emit dust plumes can take more targeted corrective action sooner, preventing unnecessary pollution, for example. This data can also help air quality monitoring bodies determine why pollution thresholds have been exceeded and respond more effectively.

The company's digital business model is built around services like supervision interfaces that display the data produced by the instruments.

So far Öberon Sciences has bootstrapped its development through sales revenue and research grants. The company plans to raise equity and ramp up its partnerships with academic research labs to accelerate sales and R&D.

öberon
SCIENCES

oberon.one

UNLIKE CURRENT SOLUTIONS BASED ON ASYNCHRONOUS CHEMICAL ANALYSIS,

ÖBERON SCIENCES PROVIDES INFORMATION ON WHICH POLLUTANTS ARE PRESENT EVERY

5 minutes

Year founded
2021

Key markets

- Urban development: construction sites and road monitoring, monitoring of invasive plant species
- Industry: emissions monitoring, dust plume mitigation, crisis management
- Air monitoring: pollution monitoring by source

Technology

- Microscope imaging
- Machine learning



REMEDEE LABS

Endorphin
stimulation for
chronic pain relief

■ A customizable, drug-free
long-term pain treatment
solution for better quality of life

Remedee Labs has developed the first millimeter-wave-emitting bracelet that stimulates the production of endorphins, the body's natural analgesics. It also offers an online service platform to bring patients multidisciplinary pain management backed by personalized support.

Millimeter-wave treatment was used successfully on millions of pain patients in the 1970s. Over time, however, the treatment, which could only be administered in hospitals due to the large equipment used, has been replaced by pain medication. Remedee Labs is putting millimeter-wave technology at everyone's fingertips with a simple bracelet equipped with a microelectronic chip that stimulates natural endorphin production.

Two clinical studies have confirmed the effectiveness of this solution with patients suffering from fibromyalgia and osteoarthritis, at Grenoble University Medical Center. In 2024, Remedee became the first medical device authorized in Europe to relieve the symptoms of fibromyalgia. The commercialization of this medical

solution is planned for early 2025. In the meantime, the startup is offering an initial non-medical bracelet, Remedee Well, to improve users' day-to-day well being. The package includes the bracelet plus access to the online platform.

Remedee Labs is collaborating with the CEA on imaging-based brain evaluation of the physiological effects of its technology.



remedeelabs.com

12 MILLION PEOPLE IN
FRANCE SUFFER FROM
CHRONIC PAIN,
AND

70%

OF THEM **DO NOT**
RECEIVE APPROPRIATE
TREATMENT

Year founded
2016

Possible uses
(clinical trials in progress)

- Fibromyalgia
- Osteoarthritis
- Chronic migraines

Technology

- 2 cm² miniaturized electronic module integrated into a bracelet
- 60 GHz millimeter-wave-emitting silicon chip



SUBLIMED

Relieving osteoarthritis
knee pain via
neurostimulation

■ Pain relief for a rapid return
to normal activities
and better quality of life

Sublimed relieves chronic pain associated with osteoarthritis of the knee using a discreet and flexible transcutaneous neurostimulation patch. It is available in France and several European countries.

Transcutaneous electrical neurostimulation has been used for 30 years to fight chronic pain. It inhibits pain signals and triggers the secretion of endorphins, the body's natural analgesics. However, conventional equipment is cumbersome and impractical; 40% of patients give up using it for practicality reasons.

The startup Sublimed, born from the meeting between a CEA engineer and a pain center doctor, now offers a lightweight, miniaturized, and discreet device controlled via smartphone. A clinical study carried out on 110 patients confirmed its effectiveness for osteoarthritis of the knee, a result that led France's national health insurance provider to approve the device for reimbursement. Thanks to a web platform, the patient can find their

neurostimulation data and track quality of life indicators like sleep and resumption of walking and other daily activities.

Sublimed is based on a portfolio of six patents, including five CEA patents under license. It is collaborating with university medical centers to improve its technology and has been FDA-approved for the US market since 2021. The startup was acquired by Expanscience laboratories in 2023.



SUBLIMED

subli-med.fr

MORE THAN

35,000

PATIENTS

IN FRANCE HAVE ALREADY
USED THE **ACTITENS**
SOLUTION DEVELOPED BY
SUBLIMED

Year founded
2015

Prescribed for
• Osteoarthritis of the knee

Technology
• Slim, conformable pulse generator patch
• Miniaturized, wireless skin electrodes
• Remote electronic control



THERANEXUS

Treatment for
rare neurological
diseases

■ *Innovative drug candidates
for devastating and
currently-untreatable
neurological diseases*

Theranexus is an innovative biopharmaceutical company born from the CEA. It is developing what is currently the most advanced drug candidate in the world to slow the progression of Juvenile Batten disease, a neurodegenerative disorder that affects children starting at the age of four. The drug could be made available in 2026.

Batten disease is a genetic disorder that affects children as young as four. It results in loss of vision, motor and cognitive impairment, and seizures. There is no treatment available, and the disease is fatal after 20–25 years on average.

Batten-1, the drug candidate developed by Theranexus in partnership with the US-based Beyond Batten Disease Foundation, addresses this condition by targeting both neurons and astrocytes, non-neuronal brain cells. It acts on the process that recycles toxic molecules from cells, which the disease disrupts. Theranexus will begin a pivotal clinical trial in 2023, with the hope of getting the drug onto the market in 2026.

Beyond this flagship project, Theranexus, a startup created by

two CEA researchers, is working collaboratively with the CEA to discover other innovative therapy drugs. Possible future avenues include targeting one or more of the 40 rare neurological conditions close to Batten disease.

RARE NEUROLOGICAL
DISEASES FOR WHICH
NO TREATMENT EXISTS
AFFECT

350 MILLION
PEOPLE WORLDWIDE

Year founded

2013

Prescribed for

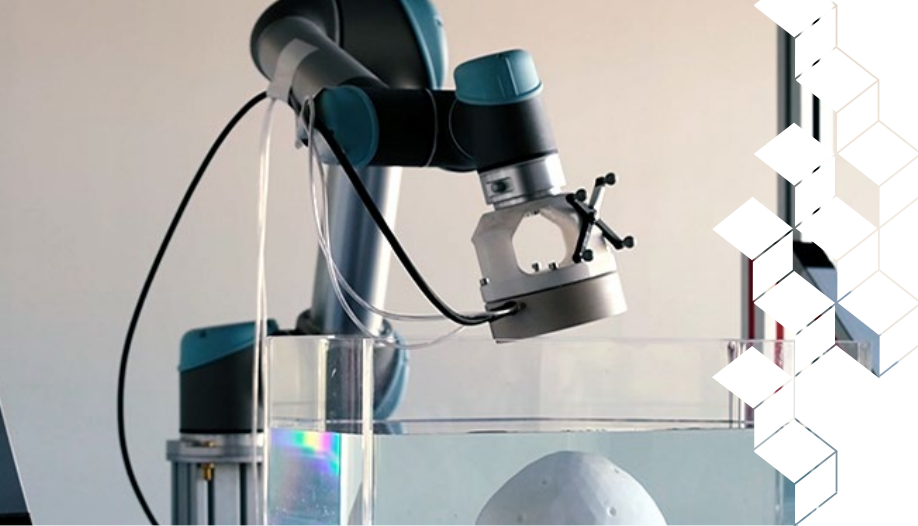
• Treatment of Batten disease

Technology

- Proprietary pharmaceutical specialty
- Action mechanism: prevents brain cell death by blocking glycosphingolipid accumulation and neuroinflammation
- Method of administration: oral solution



theranexus.com



THERASONIC

Non-invasive
intracerebral drug
administration

■ *More effective treatment of
serious brain diseases without
compromising patient safety*

The blood-brain barrier (BBB) protects our brains. But it also keeps therapeutic drugs from reaching areas of the brain affected by diseases. TheraSonic's transcranial focused ultrasound technology makes the BBB permeable long enough to improve drug delivery to the brain. This will create new treatment options for serious brain diseases, starting with cancer.

TheraSonic's technology was developed over fifteen years of research at the CEA and CNRS. It is protected by two CEA patents and one co-owned patent (also with the CEA). The principle behind the solution leverages the clever combination of focused ultrasound beams and gas microbubbles to make the layer of endothelial cells where the BBB is located permeable long enough to administer drugs.

Because the ultrasound dose is monitored and adjusted in real time, this non-invasive technique is safe and efficient, as it has been demonstrated in animal models. Drug delivery can be precision-targeted, and several areas of the brain can be treated in just a few minutes—ideal for outpatient treatment.

The startup will initially commercialize the solution for brain cancers, including metastatic brain cancer, which has a median life expectancy of just over a year. TheraSonic raised €1 million in 2024 and plans to release its first product, which will be sold to cancer centers and hospitals, in 2031. One of the two founders is a CEA employee, and the venture was supported by the CEA's Magellan startup incubator. Continued R&D will take place in a joint lab with the CEA.



TheraSonic

therasonic.fr

**THERASONIC TECHNOLOGY
IMPROVED THE ADMINIS-
TRATION OF MONOCLONAL
ANTIBODIES TO THE BRAIN FOR
CANCER TREATMENT**

FIVEFOLD

IN ANIMAL MODELS

Year founded
2023

Target market

- Neurological oncology
- Parkinson's disease
- Rare genetic diseases

Technology

- Transcranial focused ultrasound
- Acoustic cavitation for personalized real-time ultrasound dose monitoring
- Neuronavigation to guide the ultrasound beam
- Cobotic assistance for targeted drug administration



V4CURE

Treatment of
cardio-renal
pathologies with
animal toxins

■ *Develop a new class of drugs for millions of patients suffering from cardio-renal diseases without a therapeutic solution*

V4Cure is based on CEA research into the use of animal toxins as therapeutic molecules. The start-up is focusing its efforts on one of them, V4C-232, which could be used for two cardio-renal diseases.

V4C-232 is derived from a toxin contained in the venom of the mamba, a sub-Saharan African snake whose bite is fatal to humans. The CEA has established and validated through preclinical studies the efficacy of this molecule on two pathologies, hyponatremia and polycystic kidney disease.

V4Cure is primarily developing the indication of hyponatremia, which is manifested by a low level of sodium in the blood. The neurological symptoms of this condition can lead to seizures, coma and even death. V4C-232 can provide a safe and effective response to control the concentration of sodium in the blood (natraemia).

The start-up is conducting pharmacological development studies and will then launch phase 1 and 2 clinical studies. At the same time, it is pursuing R&D work with the CEA on the use of V4C-232 in the treatment of polycystic kidney disease, a chronic genetic disorder currently considered incurable; it affects one person in 1,000.

V4Cure was created by three founders, including one from the CEA. Two patents have been filed by the CEA to date.

10

MILLIONS

NUMBER OF **PATIENTS**
IN WESTERN COUNTRIES
FOR WHOM THE DRUG
CANDIDATE WOULD PROVIDE
A **THERAPEUTIC RESPONSE**

Year founded
2023

Indications

- Hyponatremia resistant to current treatments
- Polycystic kidney disease

Technology

- Active ingredient: peptide V4C-232 is derived from a toxin extracted from mamba venom
- Dosage form: injection


v4cure.com





ENERGY 

SUCCESS STORY

SYMBIO

European hydrogen fuel cells industrial leader, Symbio accelerates the development of zero-emission mobility.



Symbio paves the way for large-scale zero-emission hydrogen mobility. The Group combines industrial maturity and technological leadership to create mass-produced fuel cell systems, enabling its customers, pioneers in clean mobility, to bring high-performance, competitive hydrogen vehicles to the market promptly.

Symbio develops, industrializes and markets a wide range of pre-validated, pre-integrated fuel cell systems, called StackPack™, which meet all the power, durability and range requirements of on- and off-road mobility. Vehicles equipped with Symbio solutions have already covered more than 10 million kilometers, confirming the relevance and robustness of the Group's technology.

Founded in 2010 in France with the ambition of decarbonizing mobility with a breakthrough fuel cell technology, Symbio now operates in 4 countries: France, with Europe's largest integrated gigafactory for fuel cell production based in Saint-Fons in the Lyon region, also certified to IATF 16949 standard; the United States, with the Temecula pilot plant in California; Switzerland, with the Givisiez innovation center; and Germany, in Russelsheim, close to our customers.

The Group brings together 600 employees with rare skills, meeting all the challenges of developing and industrializing cutting-edge technology.

Owned equally by Forvia, Michelin and Stellantis, the group aims to produce 200,000 StackPack™ per year by the decade 2030 to accelerate the deployment of clean mobility that respects the environment and health.

In 2024, Symbio and CEA were awarded 3rd prize in the "Impact Achieved" category of the EARTO - European Association of Research and Technology Organisations- Innovation Award 2024, a ceremony that recognizes the year's best innovations, for the technology behind StackPack™ 75, a compact, high-performance zero-emission hydrogen fuel cell system for urban and interurban buses, and medium-duty commercial vehicles

symbio.one



AJELIS

High-performance
industrial
pollution filters

■ *New-generation filters
for air and water depollution
and strategic metal recycling*

Startup Ajelis is the fruit of a partnership between the CEA and Paris-Saclay University. Its new-generation polymer fiber filters are designed for the depollution of liquid and gaseous industrial effluents. The company also offers specialized fibers for the recovery and recycling of metals. This breakthrough innovation is built on a selectively sorbent fiber technology developed at the CEA.

This new generation of filter medium, capable of filtering both pollutants and metals, outperforms conventional activated carbon or resin filter media. First, it can absorb lower metal concentrations, giving users a head start on increasingly stringent environmental standards. Second, fiber selectivity can be adapted to different target metals. Finally, treatment speed is at least ten times faster than that of conventional materials, at one-tenth the treatment cost. And, because the fibers are easy to regenerate, they are more sustainable.

The startup's solutions found success with many industrial customers in France and other European countries practically on day one. This efficient, economically-viable, and more environmentally-friendly technology from Ajelis helps customers create their Factories of the Future.



ajelis.com

200

**WATER TREATMENT
AND METAL
RECYCLING PROJECTS
SUCCESSFULLY
COMPLETED WITH
FRENCH AND
EUROPEAN CUSTOMERS**

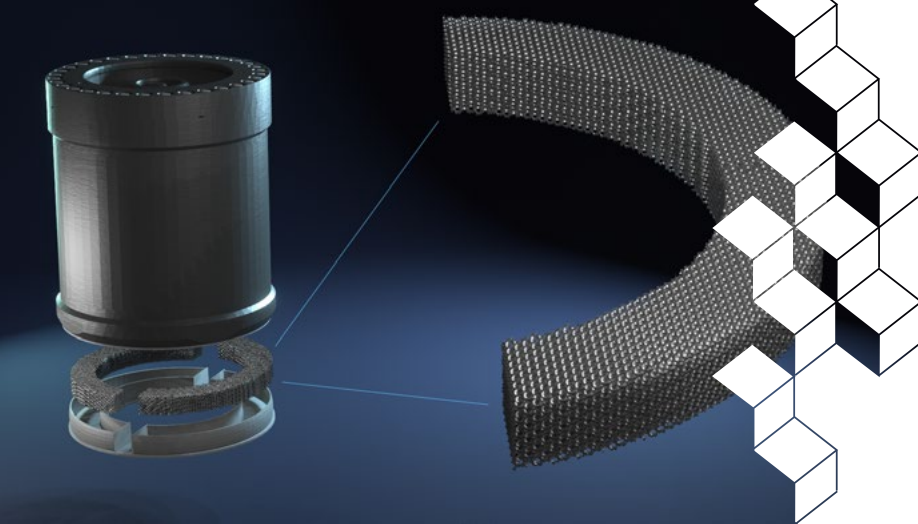
Year founded
2014

Key markets

- Depollution of liquid industrial effluents
- Air purification
- Decontamination of nuclear effluents
- Recycling of critical metals
- Mobile treatment units

Technology

- Selectively sorbent polymer nanofibers for toxic and strategic metals



AM3L

High-performance 3D architected metamaterials

■ Custom designed and
manufactured shock-absorbing
materials and new-generation
molds with unique properties

AM3L designs, dimensions, and 3D prints lightweight, space-saving structures and parts with precision porosity. The startup's metal metamaterials offer far superior performance than any other solution on the market.

AM3L was founded to commercialize metallic metamaterials, an innovation protected by twelve CEA patents. With fully-customizable and perfectly-controlled geometries and mechanical characteristics, including void ratios of up to 95%, AM3L's solutions offer unparalleled performance.

The startup custom designs the material's architecture and the final part to meet the needs of each customer. Metal powders and 3D printing processes are also tailored to each project's unique performance requirements. All project development work is done on industrial machines for reliable process scalability and a smooth transition to mass production.

The high-performance shock absorbers manufactured by AM3L

are priced similarly to competing solutions and have already been approved for nuclear waste container protection. Another AM3L innovation—porous molds for bio-based food packaging manufacturing—helps keep costs competitive with plastic packaging.

AM3L was founded by two CEA employees who participated in the CEA's Magellan startup incubator. Further improvements to the solutions will be made through a partnership with the CEA. The startup is hosted by the CEA and has also had its own manufacturing facility on the Saclay plateau since 2025.



A 6-kg

SHOCK ABSORBER BY AM3L

**CAN ABSORB THE KINETIC
ENERGY OF AN 800-KG
PARCEL FALLING FROM A
HEIGHT OF 15 METERS.**

Year founded
2023

Key markets

- High-performance shock absorbers
- Tools for bio-based food packaging

Technology

- Design engineering
- Custom metamaterial design with perfectly controlled porosity, void ratios, etc.
- Production on 3D metal printers



APIX ANALYTICS

*In situ analysis of
industrial gases
and liquids*

■ *Real time, in-process measurement for
higher yields and better product quality*

Apix Analytics is bringing industrial gas and liquid analysis to a wide market with its miniaturized gas chromatography modules. They are half the price and ten times the resolution of laboratory equipment.

Apix Analytics leverages advanced silicon technologies developed by the CEA and Caltech and protected by 25 patents to produce miniaturized gas chromatography modules of less than a liter. With the company's continuous on-site analysis solution, users no longer need to send samples to a lab and wait for the results to come back—they can optimize their processes in real time.

The startup's analyzers are simple enough to be used by anyone. They detect all gases and liquids, from hydrogen to heavy oils—a versatility unmatched on the market.

These compact and competitive analyzers can carry out quality controls, verify the correct level of odorization of natural gas, or calculate caloric value for pricing purposes.

Apix Analytics is developing new generations of multi-gas detectors with the CEA. Its customers include major energy companies such as Air Liquide, Engie, and TotalEnergies.

APIX ANALYTICS
HAS ALREADY DEPLOYED

500
SYSTEMS
TO INDUSTRIAL SITES
WORLDWIDE

Year founded
2014

Key markets

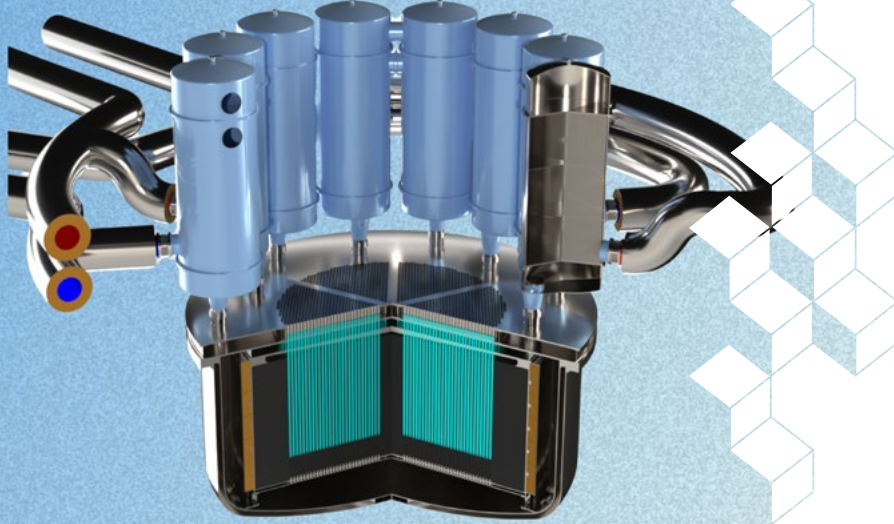
- Renewable natural gas (RNG) production
- Natural gas production
- Hydrogen energy industry

Technology

- Nano electromechanical systems (NEMS)
- Miniaturization and integration of the gas chromatography chain into a 0.7-liter module

APIX
ANALYTICS

apixanalytics.com



BLUE CAPSULE

High-temperature nuclear reactor for industrial heat production

■ *Cost-competitive, zero-carbon heat that could replace up to 75% of fossil-fuel-based industrial heat production*

Blue Capsule is developing a safe, powerful, and durable small modular reactor (SMR) to provide industrial process heat up to 750 °C, steam, or electricity. The high-temperature reactor (HTR) technology is similar to the one Google is banking on for its data centers.

Industrial process heat, 75% of which is produced by burning natural gas, coal, or oil, is responsible for 10% of global GHG emissions. Blue Capsule is leveraging a CEA patent to develop a high-temperature, sodium-cooled nuclear reactor capable of delivering up to 150 MW of heat at 750°C, a temperature out of reach of most nuclear reactor technologies. The expected service life of the reactor, which can also generate steam at 650 °C or 50 MW of electricity, is at least 40 years.

The startup is directly addressing the energy challenges of hard-to-abate industries. Blue Capsule reactors use ambient air for cooling and can therefore be installed in arid climates. They run on TRISO (tri-structural isotopic) fuel, known for its high level of safety. Several reactors can be combined to meet specific customer requirements.

Two of the three founders were CEA employees, and joint R&D will continue under contract with the CEA. The first Blue Capsule reactor will be commissioned by 2035.

A **BLUE CAPSULE** REACTOR CAN PRODUCE **INDUSTRIAL PROCESS HEAT AT UP TO**

750°C

COMPARED **WITH 400 °C** FOR MOST COMPETING SOLUTIONS.

Year founded
2022

Key markets

- Cement plants
- Low-carbon hydrogen production
- Alumina-type production
- Chemical production: soda ash, ammonia, , etc.
- Ports, large construction sites, and industrial parks

Technology

- High-temperature reactor
- Sodium coolant
- Flexible production of heat, steam, and power

BLUE CAPSULE
TECHNOLOGY

bluecapsule-technology.com



DISTRICTLAB

Optimized thermal
grid design and
operation

■ *Software to detect and eliminate 100% of avoidable energy losses on thermal grids for lower costs and reduced environmental impacts!*

DistrictLab is developing and commercializing a novel thermal grid design and optimization software application. The software, initially developed at the CEA, can be used on all district thermal grids, regardless of size, generation of technology, or renewable energy penetration rate.

District thermal grids are becoming more and more complex and the penetration of “non-manageable” sources is increasing. Unfortunately, the available management software has not kept up with these trends. DistrictLab is filling the gap with its design and optimization software. Many French thermal networks (e.g., Grenoble, Metz, Chambéry, Montpellier, Paris Airport, etc.) as well as Swiss networks (e.g., Lausanne, Geneva, Neuchâtel, etc.) and engineering firms in the field are already putting the software to use.

DistrictLab’s solution allows users to rapidly deploy a digital twin of the grid during design or operation. Known or possible operating conditions are reproduced in the simulation so that the software can calculate the best configurations for financial profitability and energy-efficiency.

Thermal grid operators can reduce thermal input power, forecast peak

demand, curtail the use of additional generators, integrate more renewable energy, prepare for new customer hookups, simulate extreme temperatures, and more. In terms of financial savings, operators can lower costs by as much as 15% at the design stage, and between 2% and 6% during operation when the software is deployed on existing grids.

One of DistrictLab’s two founders is from CEA. The company is now commercializing its Districtlab-H solution and is developing new features through an R&D contract with CEA and a corporate partner. Initially, DistrictLab will target Europe and, in particular France, where 1,300 district thermal grids are expected to be commissioned or their capacity increased by 2035.

DistrictLab Digital twin for energy grids

districtlab.eu

DISTRICTLAB CAN **REDUCE THE COST OF BUILDING A THERMAL GRID BY UP TO**

15 %

Year founded
2023

Key markets

- Independent thermal grids
- Large thermal grid operators
- Engineering firms

Technology

- Physics simulation software
- Extensive scenario and analytics features



EXTRACTHIVE

A recycled carbon fiber that's easy on the environment

■ *An eco-friendly, competitively-priced, high performance product for a more secure carbon fiber supply chain*

Extracthive recovers carbon fiber from used composite parts and gives it a second life in new parts. An initial industrial demonstrator will launch in 2027.

An eco-friendly, competitively priced, high-performance product for a more secure carbon fiber supply chain.

Extracthive recovers carbon fiber from used composite parts and gives it a second life in new parts. An initial industrial demonstrator will launch in 2027.

Carbon-fiber composites are booming, with an expected 14% CAGR over the next decade. However, producing new carbon fibers generates 40 tons of carbon dioxide (CO₂) per ton produced. Extracthive is developing a process for recycling carbon-fiber-containing composite materials. Called solvolysis, the process, which reduces CO₂ emissions by 90%, separates the matrix from the fiber with a heated solvent. The recovered fiber does not cost any more than new fiber and achieves 98% of its fracture toughness and tensile strength.

It is compatible with multiple polymer matrices.

Some PoCs have been made with sporting goods, boat, and aeronautics manufacturers to validate its performance under representative conditions.

Extracthive is based on more than ten years of CEA R&D and continues to collaborate with CEA researchers on lifecycle analysis (LCA), fiber characterization, and degraded polymer resin recycling. In 2027, it will launch an initial industrial demonstrator in France, where its customers are. At the same time, it is developing new recycling processes for lithium batteries and silicon carbide, used in chemistry and metallurgy.



EXTRACTHIVE
Creating value from waste

extracthive-industry.com

THROUGHOUT ITS USEFUL LIFE, EXTRACTHIVE'S RECYCLED CARBON FIBER PRODUCES

90%
LESS GREENHOUSE GASES THAN VIRGIN FIBER

Year founded
2015

Key markets

- Boating
- Sports and recreation
- Electric vehicles

Technology

- Solvolysis of end-of-life and post-production composite parts
- Matrix depolymerization, carbon fiber recovery
- Solvent regeneration and reuse



FLUIDD

Industrial process fluid monitoring

■ A solution that minimizes costly downtime and makes processes more energy efficient

Fluididd detects anything that can disrupt industrial process fluid flows—from air bubbles to foreign bodies, agglomerates, fouling, and clogging—at a fraction of the cost of X-ray tomography.

An early-career scientist at the CEA founded Fluididd to make industrial process fluid monitoring available to the masses. The company's high-performance detection solution—electrodes integrated into the pipework, an electronic circuit, and an embedded artificial intelligence—is easy to deploy.

The solution reconstructs images of the cross-section of the pipe and fluid flow, and then flags anything abnormal. Operators can use the information to make informed decisions like whether an emergency shutdown is needed, or, if the problem has been located, schedule a shutdown later.

The solution can detect air bubbles indicative of leaks, as well as foreign bodies, agglomerates (clumps of solid materials), build-up of material on pipe walls, clogging, and plugging. It also takes density measurements in

multi-phase flows. In the future, Fluididd will also help make processes more energy efficient, alerting operators to clogs that cause pressure drops and abnormally high electricity consumption.

The solution, built on electrode and signal processing technologies protected by five CEA patents, can be used in all kinds of industrial facilities, even in extreme conditions. It has been tested at 600 °C and 250 bar and reconstructs images at fluid flow rates greater than 1,000 kph. Fluididd is pursuing R&D to further improve the solution through a joint lab with the CEA.



fluididd.com

THE FLUIDD PROCESS SCANNER ACHIEVES AN IMPRESSIVE ACCURACY OF

97%

WHILE MEASURING MULTIPHASE FLUIDS FLOWING AT 300 METERS PER SECOND.

Year founded
2023

Key markets

- Farming and food manufacturing
- Pharmaceuticals and cosmetics
- Water treatment and distribution
- Process industries in general

Technology

- Low-current industrial scanner
- Innovative electrodes integrated into the pipe wall
- Artificial intelligence



HELIUP

Lightweight roof-mounted photovoltaic panels

■ Rooftops that generate
revenue and secure
electricity rates for 20 years

HELIUP is a startup specialized in the development and production of lightweight photovoltaic panels for large roofs on existing buildings.

The roofs of many industrial and commercial buildings are not compatible with conventional solar photovoltaic, weigh 15 kg/m². A Heliup innovation reduces PV panel weight by more than 60% without sacrificing profitability. The electricity generated can be used by the building or fed back into the grid for income.

The reduced weight is made possible by ultra-thin glass that provides both mechanical and physicochemical protection for the PV cells. This innovation is protected by two CEA patents for which Heliup holds exclusive licenses. This innovative technology has obtained the various levels of certification essential for its application.

The startup has invested in a 100 MWp/year production line, and already brings to market the product which is installed with success on several commercial, logistic and industrial buildings with low bearing capacity. The company has signed a collaboration agreement with the CEA to further improve the panel's performance.

Heliup

heliup-solar.com

HELIUP ROOF-MOUNTED
PHOTOVOLTAIC
PANELS WEIGH

5 **KG/M²,**
COMPARED TO
15 KG/M² FOR
CONVENTIONAL PANELS

Year founded
2022

Key markets

- Industrial and commercial buildings
- Warehouses
- Retail
- Public buildings

Technology

- Lightweight, high-strength glass capable of protecting photovoltaic cells
- Innovative roofing systems for flat roofs



HEXANA

Modular sodium-cooled fast-neutron reactor

■ *Decarbonized heat and power for the most energy-intensive industries, even those with fluctuating demand*

Fossil fuels are currently the only way to meet the substantial heat and power needs of large industrial facilities. HEXANA's goal is to replace fossil fuels with a cost-competitive low-carbon energy source that uses spent nuclear fuel readily available in France and Europe.

HEXANA's integrated energy platform, the result of CEA small modular reactor (SMR) research dating back to 2019, cleverly combines two sodium-cooled fast-neutron reactors, which produce energy continuously, with a thermal energy storage unit. The buffer capacity provided by this storage unit based on a molten salt is what allows HEXANA's solution to respond to fluctuating energy demand of up to 800 MW of heat at 500 °C or 300 MW of power.

It is ideal for industries with high energy consumption and high GHG emissions looking to reduce their reliance on fossil fuels. HEXANA is committed to making this source of energy cost-competitive by leveraging France's proven and mature nuclear industry. Factory-built reactors assembled on-site and reactors deployed in pairs to reduce

construction time and the equipment required for certain functions, will also help keep costs down.

The startup's three founders worked for the CEA. The company, which received a €10 million grant under the national France 2030 innovation plan and raised €15 million in equity, has also signed a partnership agreement with the CEA for ongoing R&D. HEXANA offers the necessary flexibility to compensate for fluctuating, intermittent renewable energy. The first industrial-scale reactor will be commissioned by 2035.



hexana.fr

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HEXANA IS THE ONLY COMPANY THAT CAN RESPOND TO DEMAND FOR HIGH HEAT AND POWER DEMAND, EVEN FLUCTUATING, WITHOUT FOSSIL FUELS.

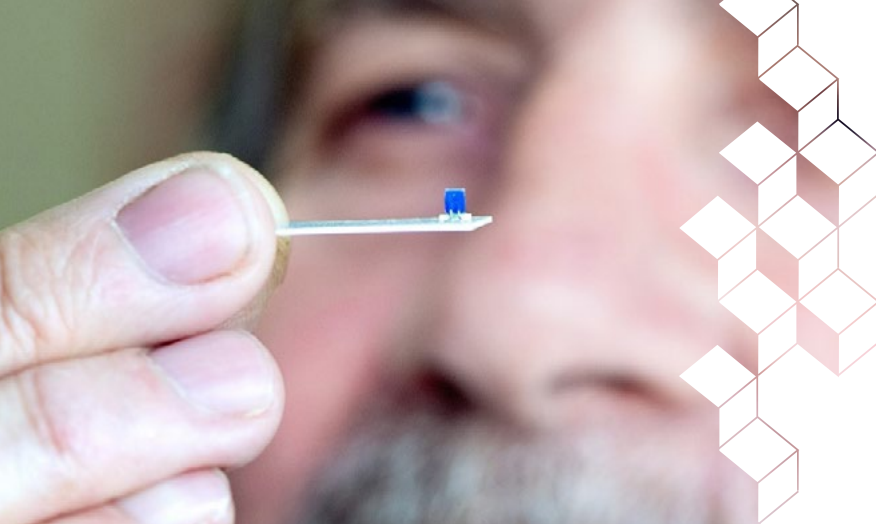
Year founded
2023

Key markets

- Steel making
- Chemical and petrochemical plants
- Synthetic fuel / e-fuels / e-SAF manufacturing
- Hydrogen and CO2 capture applications

Technology

- Modular sodium-cooled fast-neutron reactor
- Runs off spent fuel from Europe's conventional nuclear plants
- Molten-salt heat storage



IMPROVEHEAT

Precision temperature measurement for industrial process equipment

■ *Safer, more energy-efficient industrial equipment that breaks down less and lasts longer*

improveHeat develops compact precision temperature sensors for industrial equipment that uses heat. The sensors generate real-time data on the heat transfer mechanisms at work inside the equipment. This data is then transformed into actionable information to reduce energy consumption and improve production.

A surprising 70% of the primary heat used in industrial processes is turned into...more heat! And 40% of this heat is irretrievably lost to dissipation. The ability to effectively measure and improve heat transfer in industrial equipment offers a clear path to improvement. improveHeat's sensors—protected by four patents—respond to this need. What makes the sensors unique is how sensitive, accurate, compact, and heat-resistant they are (up to 1,000 °C).

The startup also developed a software application to generate measurement results in real time. Users can immediately access fluid and wall temperatures, heat flow, and heat exchange coefficients directly, without the need for modeling. Having this readily-available data

opens the door to heat transfer efficiency gains, equipment lifespan predictions based on the thermal stress measured, more appropriate initial equipment configuration, clogging and fouling detection, and other improvements. The solution is ideal for heat exchangers, furnaces, turbines, and molds.

improveHeat was founded by two CEA employees who participated in the CEA's Magellan startup incubator. The company will continue to work with the CEA under an R&D contract.



improveHeat

improveheat.com

IMPROVEHEAT SENSORS ARE ACCURATE TO THE

**1,000th
OF A DEGREE**

THAT'S 10X TO 100X MORE SENSITIVE THAN COMPETING SOLUTIONS

Year founded
2025

Key markets

- Thermal equipment design optimization
- Preventive maintenance
- Thermal equipment performance measurement

Technology

- High-sensitivity sintered ceramic resistive sensor
- Custom sizing for thick or thin equipment walls
- Real-time physical-measurement calculation software



INOCEL

Compact,
very-high-power,
high-performance fuel
cells

■ A faster transition from fossil fuels to efficient and clean energy to decarbonize mobility and stationary energy storage

Inocel, with its PEMFC (proton exchange membrane fuel cell) technology, is removing hurdles to the widespread adoption of fuel cells. The company's fuel cell, which offers unrivalled power for its size, will be available in a 300 kW format in 2024.

Inocel's very-high-power PEMFC is based on two years of research and development conducted by 30 scientists and engineers. The company holds licenses to fifteen CEA patents on the technology, which has set a new state of the art in terms of power for a fuel cell this compact. At just 100 kg and 110 liters for the 300 kW version, the fuel cell is three times more powerful for its size than the solutions currently on the market.

Several modules can be combined to build systems from 300 kW to 3 MW, with the latter packaged in a standard shipping container. The fuel cell achieves efficiencies of 60% and a lifespan that puts it at the state of the art.

And it is also very responsive, ramping up to full power in just 1.5 seconds.

The startup, which has set up shop in at 2,000 m² facility in Grenoble, has 35 employees, and continues to work with the CEA on R&D, taking advantage of the organization's advanced development and testing capabilities to optimize the technology.

FOR ITS SIZE, INOCEL'S FUEL CELL IS

3x MORE POWERFUL
THAN OTHER FUEL
CELLS ON THE
MARKET

Year founded
2022

Key markets

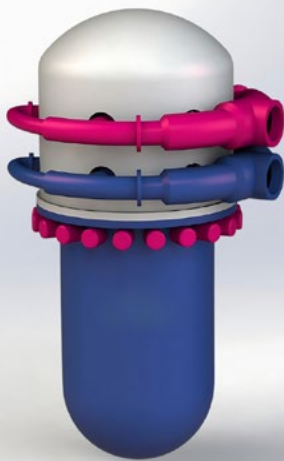
- Maritime transportation
- Heavy land vehicles: trucks, buses, construction vehicles
- Stationary applications: commercial buildings, multi-unit residential buildings

Technology

- High-power PEMFC
- Integration into all kinds of energy systems



inocel.com



OTRERA

Sodium fast-neutron reactor for combined heat and power generation

■ Accessible, more democratic energy production that meets the needs of local communities while supporting the energy transition

Otrera's innovative nuclear reactors will produce low-carbon heat and power at affordable, controlled prices—ideal in a context characterized by climate and energy crises. The startup recycles spent fuel assemblies from existing plants and plans to power local energy loops with its reactors.

Otrera is designing a sodium fast-neutron reactor (SFR)—one of France's technologies of excellence. The startup plans to commission its first industrial-scale demonstrator in 2032. In combined heat and power (CHP) mode, each Otrera reactor is expected to generate 110 MW of electricity and 180 MW of heat (between 100 °C and 180 °C) distributed via a local energy loop for use in industrial processes and urban heat networks.

Otrera recycles spent MOX fuel assemblies (currently stored in pools) and recycles its own waste. The company's reactors can also run off high-assay low-enriched uranium (HALEU) for a decade before refueling is required. The reactor is designed specifically to reduce construction and operating costs and to produce market-competitive energy.

Otrera closed out a first fundraising round of €2.5 million and signed a partnership with the CEA under France's national France 2030 plan. The company also holds five CEA patent licenses. The go-to-market strategy focuses on technology sales and operation or joint operation of reactors.



OTRERA'S FUTURE REACTORS WILL GENERATE

1g of CO₂ / kWh

THAT'S. 4 TO 6 TIMES LESS THAN TODAY'S NUCLEAR POWER PLANTS—ALREADY THE LOWEST-CARBON ENERGY SOURCE AVAILABLE.

Year founded
2023

Key markets

- Industrial facilities
- Municipalities

Technology

- Modular sodium fast-neutron reactor
- Recycling spent fuel assemblies from conventional nuclear reactors
- Combined heat and power generation
- Reinforced containment barriers



POSITHÔT

Atomic-scale defect density measurement with positrons

■ *A non-destructive testing tool from science to bring unprecedented sensitivity to industrial control*

Posithôt's industrial NDT solution leverages a non-radioactive positron source to measure the density of defects ranging in size from nanometer to micrometer. It is intended for use on critical or very-high-added-value parts during design, manufacturing, operation, and maintenance.

There is no such thing as a defect-free industrial part. The ability to monitor how defects evolve over time is the challenge—especially for parts that are critical or that are subjected to high mechanical, thermal, electrical, or photonic stresses. Posithôt's non-destructive testing (NDT) solution can measure the density of atomic-scale defects and predict, very early on, how they will evolve over time.

The ability to effectively predict the appearance of microcracks, for example, can help parts manufacturers and users optimize designs, improve manufacturing processes, and adapt maintenance strategies, extending service life with a high degree of confidence. Industries that manufacture and use critical parts (space and

defense) or that deal with high volumes (semiconductors) will benefit from the startup's solution.

Posithôt's CEO is a former CEA researcher. The startup was hosted by the CEA for its first five years. Its business model is based on defect density measurement services and the sale of equipment (the positron source) to end-users. Posithôt holds an exclusive license to the CEA patent behind the innovation.



POSITHÔT CAN MEASURE DEFECT DENSITIES AT

1 nanometer

FAR MORE SENSITIVE THAN THE 0.3-MILLIMETER CAPABILITIES OF CONVENTIONAL NDT METHODS,

Year founded
2016

Key markets

- Aerospace
- Defense
- Semiconductors
- Hydrogen industry

Technology

- Non-radioactive positron source
- Defect density measurement by positron annihilation spectroscopy



SOLREED

Solar panel diagnostics, maintenance, and repair

- *A repair solution to eliminate systematic replacement for improved solar power plant production, profitability, and environmental impacts*

Replacing defective photovoltaic panels with new ones is today the only solution for maintaining the performance of solar power plants affected by module defects. Solreed is the first European company to offer solar power plant operators a high-quality repair solution at a competitive price.

Solar panels are built to last between 20 and 30 years. However, many fail long before this, due to problems such as diode, soldering or sealing faults that were previously beyond repair. In practice, solar power plant operators schedule the replacement of defective panels with new ones, which can lead to incompatibility problems and incompressible production times for new panels. In the meantime, the faulty panels produce no electricity.

Solreed can monitor solar power plants and panels, predict and detect faults based on a digital signature, and maintain or repair panels on site in just a few minutes per panel using semi-automated proprietary protocols. The solution is backed by two CEA patents and Solreed's unique know-how. Power plant operators can look forward to an extra ten years' life

for repaired panels, and a significantly reduced carbon footprint. Solreed's solution—the only one of its kind in Europe—will support a zero-carbon second-life solar panel industry. The startup is partnering with energy utility Engie Green to bring this vision to fruition.

The startup's two founders include a CEA researcher who participated in the Magellan incubation program. Part of the company's activities are housed at the French National Solar Energy Institute, INES. R&D with the CEA is continuing through French National Research Agency (ANR) and European programs.

SolReed

solreed.com

**REPAIRING A SOLAR PANEL
INSTEAD OF REPLACING IT
AVOIDS**

1.2 tons

OF GHG EMISSIONS

Year founded
2024

Key markets

- Solar power plant operators
- Buyers of zero-carbon solar panels: government, commercial building owners/operators

Technology

- Continuous monitoring of individual panels to predict and diagnose faults
- Automated repair protocols
- Mobile on-site intervention unit



STEADYSUN

Solar and wind energy
production and
weather forecasting

■ A reliable solar forecasting service to help energy producers to reduce costs and risks associated with meteorological variability

Steadysun's software predicts solar and wind power plant production with a high degree of precision—anywhere in the world and for any type of solar photovoltaic panel technology and wind turbine. It also provides weather forecasting services.

Solar and wind energy are intermittent and difficult to predict, and therefore does not easily lend itself to production forecasts. Still, power plant operators, grid managers, and electricity traders need it to optimize their operations and maximize profits.

Steadysun provides subscription-based forecasting services adapted to customers' particular facilities and prediction needs, with time horizons ranging from a few minutes to two weeks. The software is the result of ten years of CEA R&D and delivers some of the most reliable forecasts in the world calculated from pictures of the sky, satellite images and data, weather forecasts, and site production measurements.

The company, present worldwide, is one of the global leaders in solar forecasting. As part of an R&D agreement with the CEA, it is adapting its tools to tomorrow's panel and networks technologies. Since 2022, it has diversified into weather forecasts, with a service that is 20% more reliable than that of the main players in the field.



steady-sun.com

**STEADYSUN'S SOLAR
FORECASTING
SOFTWARE TRACKS
MORE THAN**

14,000
**PHOTOVOLTAIC
PRODUCTION SITES**
WORLDWIDE IN 25 COUNTRIES

Year founded
2013

Key markets

- Grid managers
- Plant operators
- Energy traders
- Energy microgrids

Technology

- Statistical approach
- Physical approach
- Artificial intelligence



STELLARIA

An advanced molten salt reactor for combined heat and power

■ *Safe, cost-competitive, decarbonized energy for thousands of years*

Stellaria's innovative, compact, high-yield nuclear reactors are designed to support the transition to zero-carbon energy production. The company's first reactor is slated for commissioning in 2035.

Stellaria's molten-salt fast-neutron reactor (MSFR), with its fourth containment barrier, is safe by design. It also offers electrical efficiency of 50%, flexibility of 20% to 30% of rated power per minute, and a competitive cost per MWh. The reactor runs on a fuel made from the recycling of current reactors' used fuel (plutonium and minor actinides) and depleted uranium — resources that are readily available in France.

With advantages like these, the reactor will be especially beneficial for heavy industries with high and/or fluctuating demand for power. Electric utilities will also be able to leverage the solution to balance the grid as intermittent renewable energy penetration increases. The reactors will be deployed in pairs that require four hectares per production site to deliver up to 1,000

MW of heat or 500 MW of power, or any combination of heat and power up to this capacity.

The startup, whose five founders include three CEA employees, raised €2 million in capital in 2023 and secured €10 million in government funding in 2024. So far, Stellaria has established partnerships with Schneider Electric, Technip, and Orano. The technology is protected by eight patents, three of which are held jointly with the CEA. Continued R&D with the CEA will lead to Stellaria's first demonstrator reactor, expected in 2029.



stellaria.fr

IF STELLARIA REACTORS REPLACED ALL OF FRANCE'S CURRENT NUCLEAR POWER PLANTS, THE COUNTRY'S EXISTING INVENTORY OF NUCLEAR WASTE WOULD BE ENOUGH **TO GENERATE THE SAME AMOUNT OF POWER FOR**

5000 years

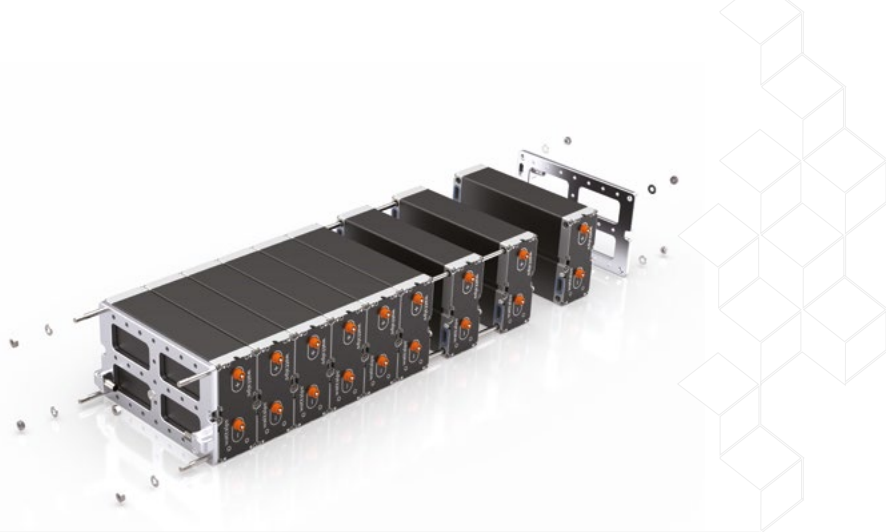
Year founded
2023

Key markets

- Industry: data centers, glass manufacturing, iron and steel, chemicals, petrochemicals, semiconductors, and more
- Electric and other energy utilities

Technology

- Molten-salt fast breeder reactor
- Heat and power generators



WATTALPS

Energy storage
solutions

■ *Safe, high-performance
batteries for industrial
vehicle electrification*

More efficient, less expensive, and safer—the innovative lithium-ion batteries developed by WattAlps are electrifying a wide range of industrial vehicles, a major technological breakthrough that boosts productivity and profitability. Cleaner, quieter work sites mean that WattAlps batteries are good for the environment and for workers, too.

WattAlps three founders have brought their diverse experiences to a company that has managed to create a breakthrough innovation in only a few years: a modular, immersion-cooled lithium-ion battery. Designed for small and medium series, it offers manufacturers the key advantages of adaptability, performance, and safety. Not to mention savings—the battery's development cost is 20 times lower than that of conventional high-performance batteries.

WattAlps batteries are reusable and recyclable, evidence of the company's commitment to the energy transition.

Two of the three founders of the startup came from the CEA, where they developed and patented the technologies exclusively reserved for today's WattAlps solution.

BATTERY FORM
FACTORS UP TO

2

MORE COMPACT

Year founded

2018

Key markets

- Industrial and construction vehicles
- Agricultural machinery
- Logistics
- Maritime
- Niche vehicles: sports cars, vintage cars, etc.

Technology

- Lithium-ion batteries with immersion cooling

wattalps®

wattalps.com

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BOOKLET DESIGN

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