SIPEARL

Building the European high-performance low-power microprocessor for supercomputing and AI inference

It will help solve sovereign strategic scientific societal
and environmental challenges with a reduced carbon footprint

April 24

Philippe Notton

CEO & Founder of SiPearl

Our vision

Because major challenges for Europe in medical research, security, energy management or climate modelling require processing huge volumes of strategic data in a fraction of a second, SiPearl is building the high-performance low-power backdoor-free security microprocessor dedicated to supercomputing and AI inference.

We are thus contributing to the technological sovereignty of Europe in scientific, societal and environmental fields with a reduced carbon footprint.

Contents

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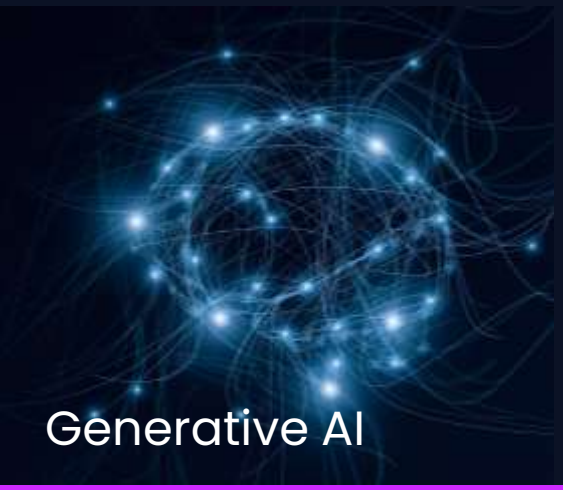
Market



Big problems need Big computers

Supercomputers are essential to ensure Europe's technological sovereignty by addressing major scientific, societal and environmental challenges.

Our business: the high-performance low-power microprocessor dedicated to HPC(1) and AI inference

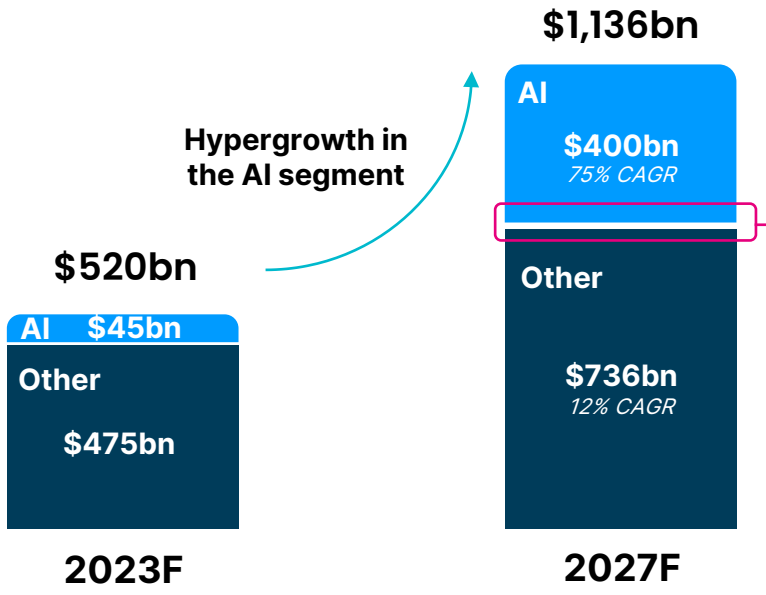
Microprocessor | Blade | Rack | Supercomputer

Tens of thousands of microprocessors in a supercomputer

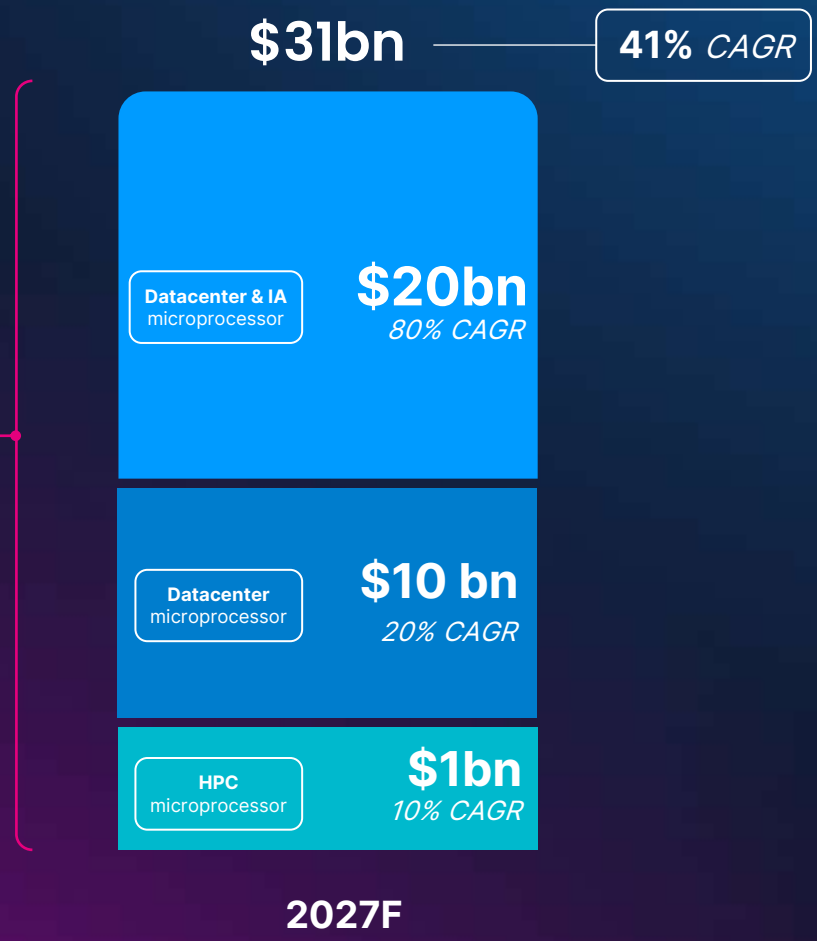
(1) High Performance Computing

SiPearl's target market: 41% CAGR to reach $31bn by 2027

Global semiconductor sales[1]



SiPearl markets



(1) Source: Semiconductor Industry Association (Dec-23), AMD (Dec-23), NewStreet Research (Jan-24), Statista (Jan-24), Silverpeak (Jan-24)

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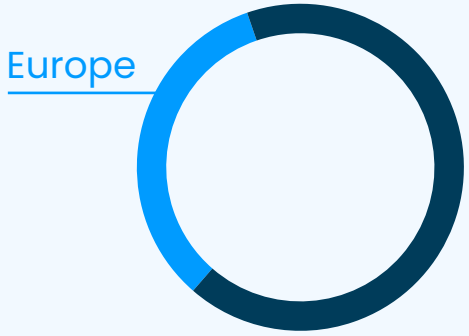
Focus: European Union

European Union behind the curve

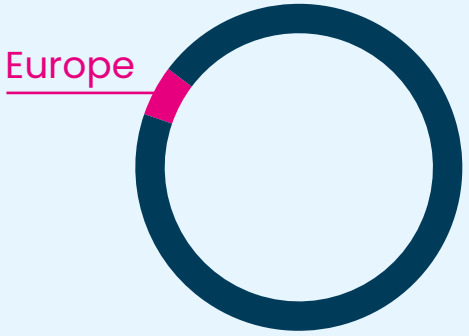
1/3

of global supercomputing ressources are consumed by Europe(1).



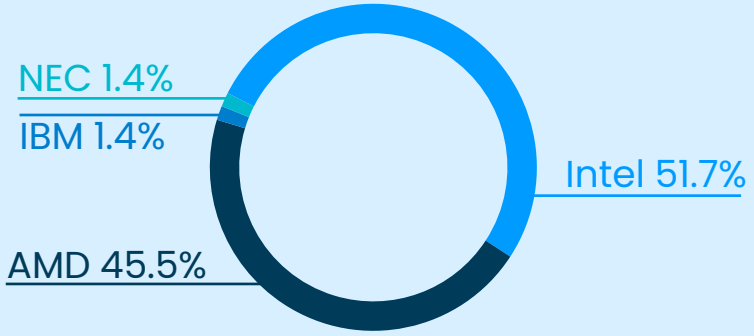
1/20

of global supercomputing equipment are supplied by Europe(1).



0%

of the microprocessors powering Europe supercomputers are European(2).



This lack of homegrown technology has serious implications on Europe sovereignty, intellectual property and security.

(1) Source: Hyperion Research, HPC server and supercomputer market, November 2021
(2) Source: 62nd ranking of the global Top 500 most powerful supercomputers, November 2023

European Union response

September 2018

Launch of the EuroHPC JU backed by a €8bn budget to deploy in Europe a world class exascale(1) supercomputing infrastructure.

December 2018

Launch of a call for proposals in 2017 for developing a new generation of high-end European microprocessors

- Budget: €150m
- Target: high-performance and energy-efficiency

Coordinated by Bull (Atos Group), the European Processor Initiative (EPI) consortium won this call for proposals. It has currently 30 members:

- Scientists: research institutes, universities and supercomputing centres
- Industry: European leaders, IT, electronics and automotive specialists

June 2019

SiPearl is the private company created within the EPI to launch a strategic industry for Europe.

(1) Exascale: billion of billion calculations per second

Supercomputing EU sovereignty is on track!

Thanks to the EuroHPC program: Europe ranked 3 supercomputers in the TOP10 most powerful supercomputers(1)

No5: LUMI in Finland
379.7 million billion calculations / s

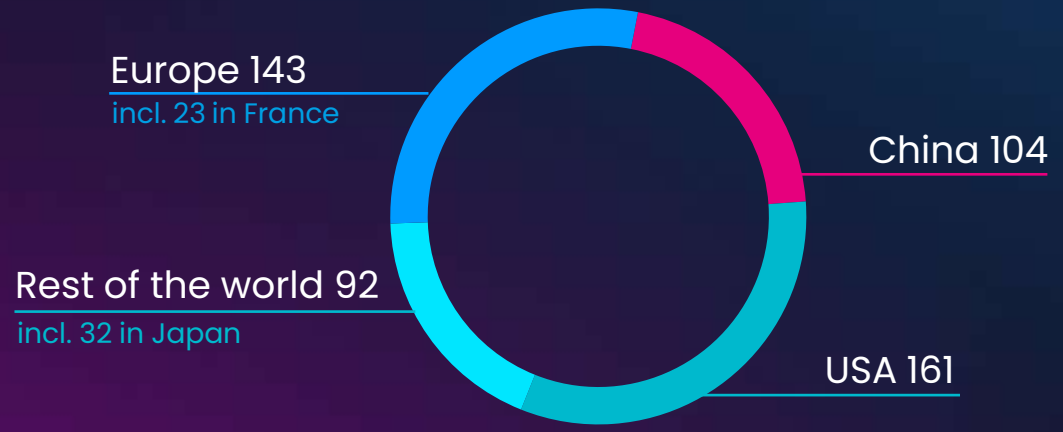
No6: Leonardo in Italy
238.7 million billion calculations / s

No8: MareNostrum5 in Spain
138.2 million billion calculations / s

And also:
Meluxina (Luxemburg, No71), Karolina (Czech Republic, No113),
Discoverer (Bulgaria, No166), Vega (Slovenia, No198).

November 2023

Europe ranks **143** supercomputers
in the Global TOP500
*vs **97**(2) before the launching of EuroHPC in 2018*



(1) Source: 62nd edition of the global Top 500 most powerful supercomputers - November 2023
(2) Source: 52nd edition of the global Top 500 most powerful supercomputers - November 2018

Soon, a "*designed in Europe*" microprocessor inside

to meet strategic scientific industrial and societal challenges for Europe sovereignty

Health

Medical research, vaccine development, clinical trials, personalized medicine.

Climate

Localized weather forecasts, prediction of storm pathways, climate change mitigation.

Energy

Optimization of renewable energy parks, power grid management.

Gen. AI

Generative AI inference, Large Language Model

Engineering

Design of new land and air vehicles, crash test simulation, creation of greener materials.

Security

Cybersecurity, armies, nuclear deterrent force.

Academic

Fundamental and applied research

Geology

Optimization of oil and gas prospecting and acquisition, early detection of earthquakes.

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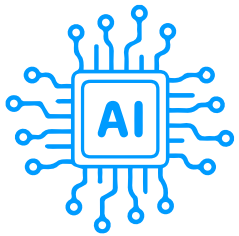
Company

At the nexus of the semiconductor industry's most powerful disruptive forces

1. Pervasive AI

Advanced compute
is everywhere



Opportunity for SiPearl

Semiconductor market for AI[(1)]

- +80% CAGR to $400bn by 2027
- incl. $20bn for SiPearl's segment

2. Sustainability

Energy efficiency
is a must

Opportunity for SiPearl

Arm architecture used by SiPearl

- Energy efficiency x 2
  for the same computing power

3. Sovereignty

Europe requires
technology independence

Opportunity for SiPearl

Strong EU & governmental support

- Captive market
- Access to capital

(1) Source: NewStreet Research (Janvier 2024)

SiPearl in a nutshell

Building the European high-performance low-power microprocessor

Incorporated
In June 2019

Financing
Series-A (to date): €113m

Funded
By the European Union

Key partnerships
Joint-offering with

Arm architecture
Energy-efficiency quick time to market, proven ecosystem

Identified customers
Server manufacturers based on user specifications: First, EuroHPC ecosystem before going global.

+190

Employees
from

6 locations
Maisons-Laffitte (HQ), Barcelona, Duisburg, Grenoble, Massy, Sophia Antipolis

Leadership

Executive Committee

Philippe Notton
CEO-founder

Laure Perfetti
Head of Human Resources

Ying-Chih Yang
CTO

Frédéric Hannoyer
COO

Vincent Casillas
SVP Software R&D

Vivian Blanchard
VP Hardware R&D

Craig Prunty
VP Marketing & Business Development

Jean-Yves Quentel
Group CFO & Investor Relations

Management Committee

Anna Riverola
Head of Research Programs

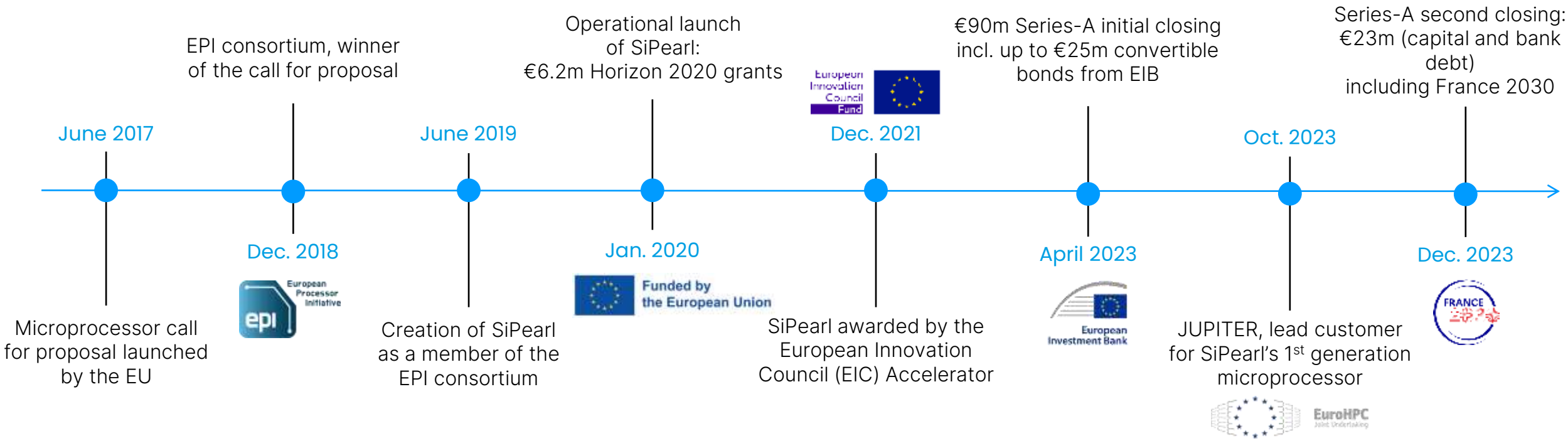
Pierre Marchal
CFO

Cornelia Emmerlich
Group General Counsel

Dominique Bordereaux
CIO

From a European Union concern to SiPearl's ramp-up

Our common goal: fostering the return of high-performance, low-power microprocessor technologies in Europe.



Our EPI partners, a powerful ecosystem

Close collaboration with our partners of the EPI consortium

Scientists: research institutes, universities and supercomputing centres.

Industry: European leaders, IT, electronics and automotive specialists.

A joint project involving 200 engineers since December 2018

- Development of elementary hardware and software technological bricks.

Stakeholders

- Privileged access to IP of European leaders and innovative startups.

End-users

- Supercomputing centres.

Technology partnerships

with leading providers

Partnership with Arm:
SiPearl, the only European licensee to use Neoverse V1 platform

The global semiconductor IP provider

A robust software ecosystem

Accelerated design of a very high-end offering in terms of both computing power and energy efficiency

Other partnerships

EDA software

Hardware emulation with Veloce Strato emulation platform

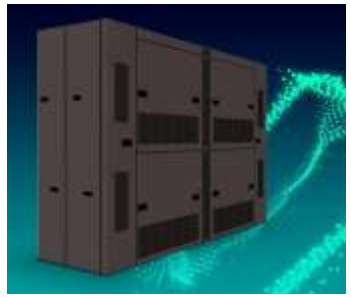
Validation of semiconductor power integrity, minimization of power consumption

Focus **Veloce Strato**

128 new generation cards

Simulation speed: **x1000**

Unique in Europe



Manufacturing initially entrusted to the Taiwanese TSMC

1st independant semiconductor foundry

Etching: 6nm or better for next generations

SiPearl sovereign design and data centre

196
Servers
108 in Eppes
88 in Reims
8,000 cores
150 TB RAM

41
networks (DC)
Switch / firewall

22
Storage
12 storage
10 synology
1 PB

5
Backup server
Cohesity & Veritas technologies
Eppes & Reims




Investment to date: €15m
x2 in 2024

World leading industrial partnerships

Our ecosystem to accelerate Europe's adoption of exascale supercomputers

Leading manufacturers

EVIDEN

Europe No1

Hewlett Packard Enterprise

Global leader

Developing joint solutions for HPC applications

Acceleration specialists

AMD

Instinct™ accelerators
with ROCm™ open software

GRAPHCORE

Intelligence Processing Unit (IPU), designed
to support artifical intelligence workloads

intel.

GPU Ponte Vecchio
with the open unified software stack oneAPI

NVIDIA.

Portfolio of world-leading accelerated
computing and networking solutions

JUPITER, lead customer

JUPITER, 1st European exascale supercomputer owned by EuroHPC, operated by Jülich (Germany)

Built by a European consortium

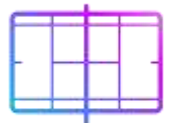
- Eviden: the Atos Group business leading in advanced computing
- ParTec: the German modular supercomputing company

General-purpose Cluster Module of JUPITER to be based on Rhea1

- Very high memory bandwidth
- Extraordinary compute performance and efficiency

JUPITER Key Figures

€273m
expected budget



4 tennis courts
equivalent surface

10 million desktop computers
equivalent power

260km
high-performance cabling

This contract signs the return of high-performance, low-power microprocessor technologies in Europe.

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Offer

Rhea1, our 1st generation microprocessor

With its high-performance energy-efficient Arm Neoverse V1 platform,
Rhea1 will meet the needs of all supercomputing and inference generative AI workloads

Pre-integration with proven accelerator (AMD, Intel, Graphcore, Nvidia)

- More to come with quantum computing

High performance per watt: Arm, global leader in the smartphone business

- Arm ISA power efficiency

Very high memory bandwidth

Unique memory architecture

- High Byte/Flop
- 2 first patents

Built-in HBM

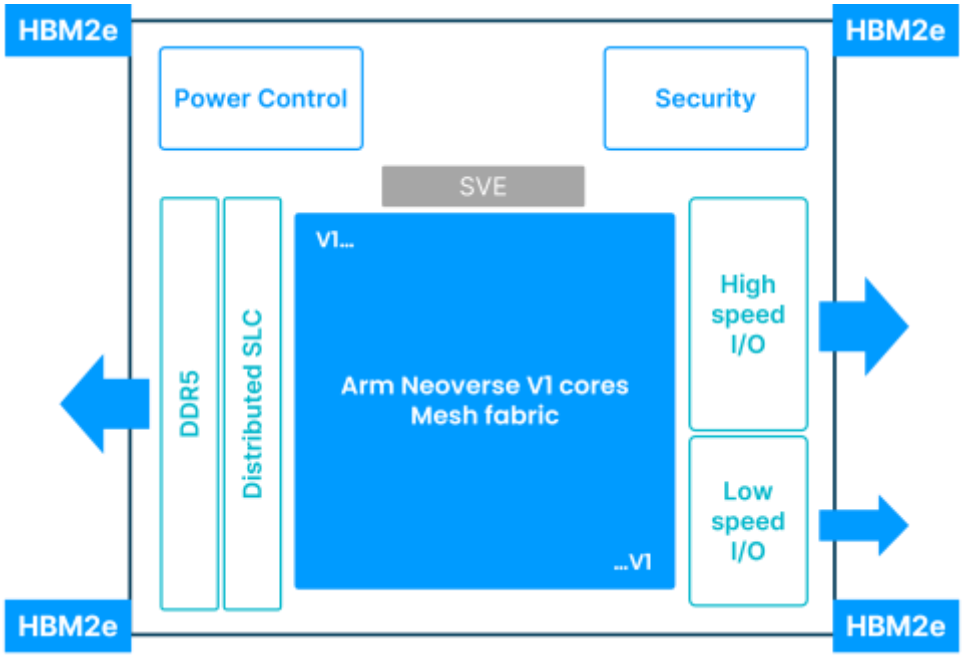
- Ideal performances for Generative AI inference

Openess

- Arm ecosystem from IoT/edge to HPC and cloud
- Common platform – chiplet-based ecosystem

Fully auditable – backdoor-free

Block diagram



Rhea1 will deliver extraordinary compute performance
and efficiency with an unmatched Byte/Flop ratio.

Rhea1 in a nutshell

The European high-performance low-power microprocessor dedicated to HPC and AI inference.

Sovereignty

To further Europe's technological leadership and independence.

High Performance

To surpass the performance of 10,000,000 desktop computers.

Energy-efficiency

To halve power consumption for equivalent computing power.

Flexibility

Designed to work with any third-party accelerator (GPU, artificial intelligence, quantum).

Backdoor-free security

To protect data with secure end-to-end network transmission.

Rhea1 sampling: 2024

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Outlook

SiPearl involved in core European projects to ensure sovereignty

Cloud

Developing an open-source software ecosystem needed to optimize the efficiency of EPI hardware and facilitate the integration of SiPearl's microprocessors in the cloud.

Developing the 1st all-European RISC-V cloud server infrastructure, significantly enhancing Europe's open strategic autonomy.

Developing a custom cloud installation with the guarantee that an entirely European solution can be deployed reproducibly.

Centres of Excellence

Making some of the most used HPC application suites in engineering and manufacturing work on exascale EuroHPC supercomputers based on SiPearl's microprocessors.

Developing materials modelling, simulations and discovery technologies, and making them accessible to a vast community of researchers.

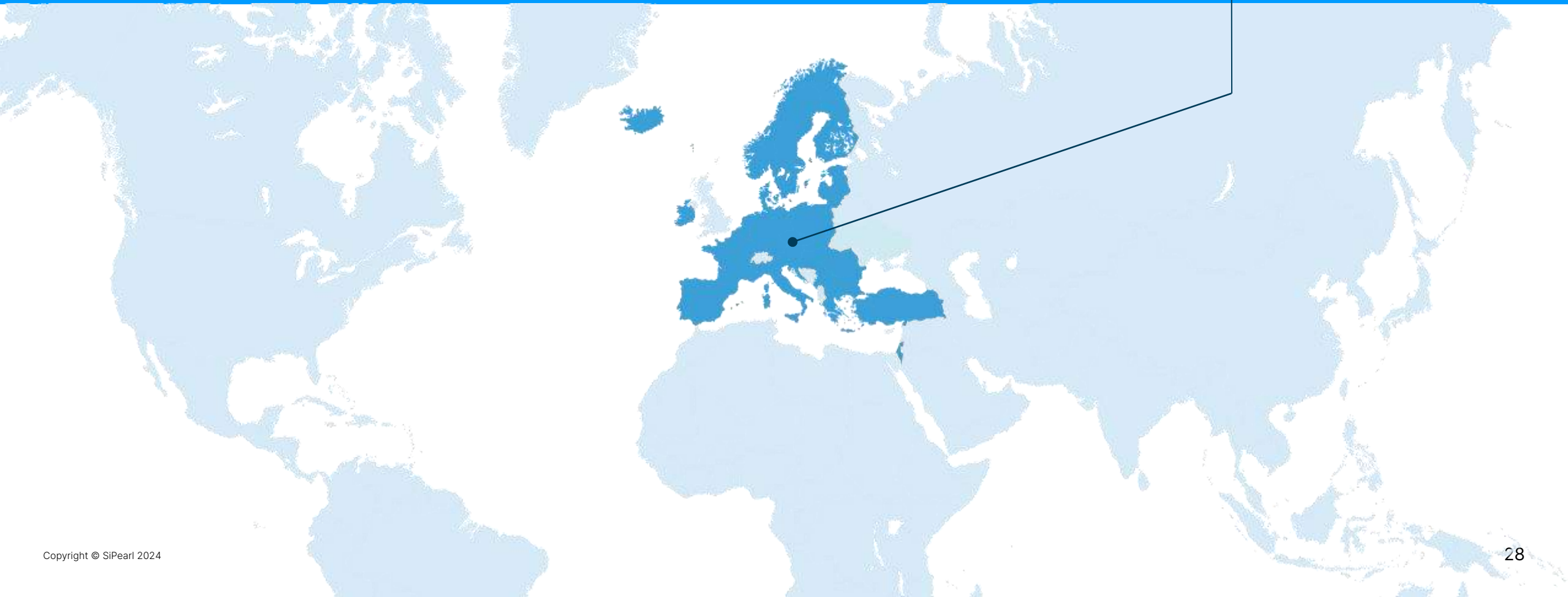
Promoting scientific and technological progress in key areas such as magnetic confinement fusion, industrial plasmas, medical applications...

And also regional projects:
Emopass (France), FlexFMM (Germany)

Our strategy for Rhea

Deployment on the EuroHPC market, then worldwide

EuroHPC
Joint Undertaking



SiPearl corporate vision and strategy

A range of HPC & AI inference microprocessors with a reduced environmental footprint to conquer the European market and beyond

HPC & AI inference

SiPearl entry business: European HPC & AI

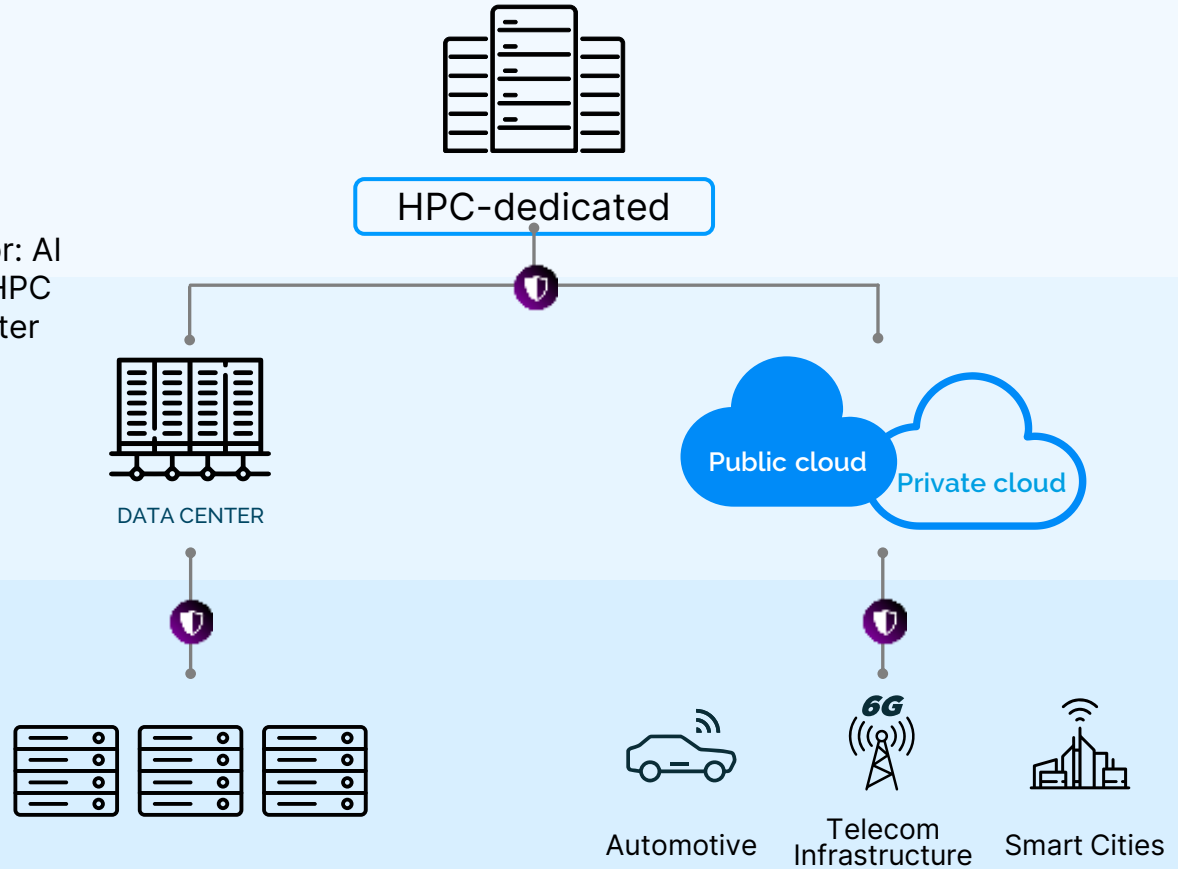
Growth vector: AI Inference in HPC and Data center

Data center-Central

Data centers, private and public cloud

Data center-Edge

Small Compute Farms
around 6G infrastructure



About... SiPearl

SiPearl is building the European high-performance low-power microprocessor dedicated to AI inference and supercomputing. This new generation of microprocessors will first target EuroHPC Joint Undertaking ecosystem, which is deploying world-class supercomputing infrastructures in Europe for solving major challenges in medical research, security, energy management and climate with a reduced environmental footprint.

SiPearl is working in close collaboration with its 30 partners from the European Processor Initiative (EPI) consortium - leading names from the scientific community, supercomputing centres and industry - which are its stakeholders, future clients and end-users.

SiPearl employs more than 190 people in France (Maisons-Laffitte, Grenoble, Massy, Sophia Antipolis), Germany (Duisburg) and Spain (Barcelona).

Media contact

Marie-Anne Garigue / Grégory Bosson
+ 33 6 09 05 87 80 / + 33 6 60 75 71 61
marie-anne.garigue@sipearl.com / gregory.bosson@sipearl.com

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European Processor Initiative
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