

# Orano Projets and its subsidiaries



Bruno DUMONT  
September 2023



# Orano Group

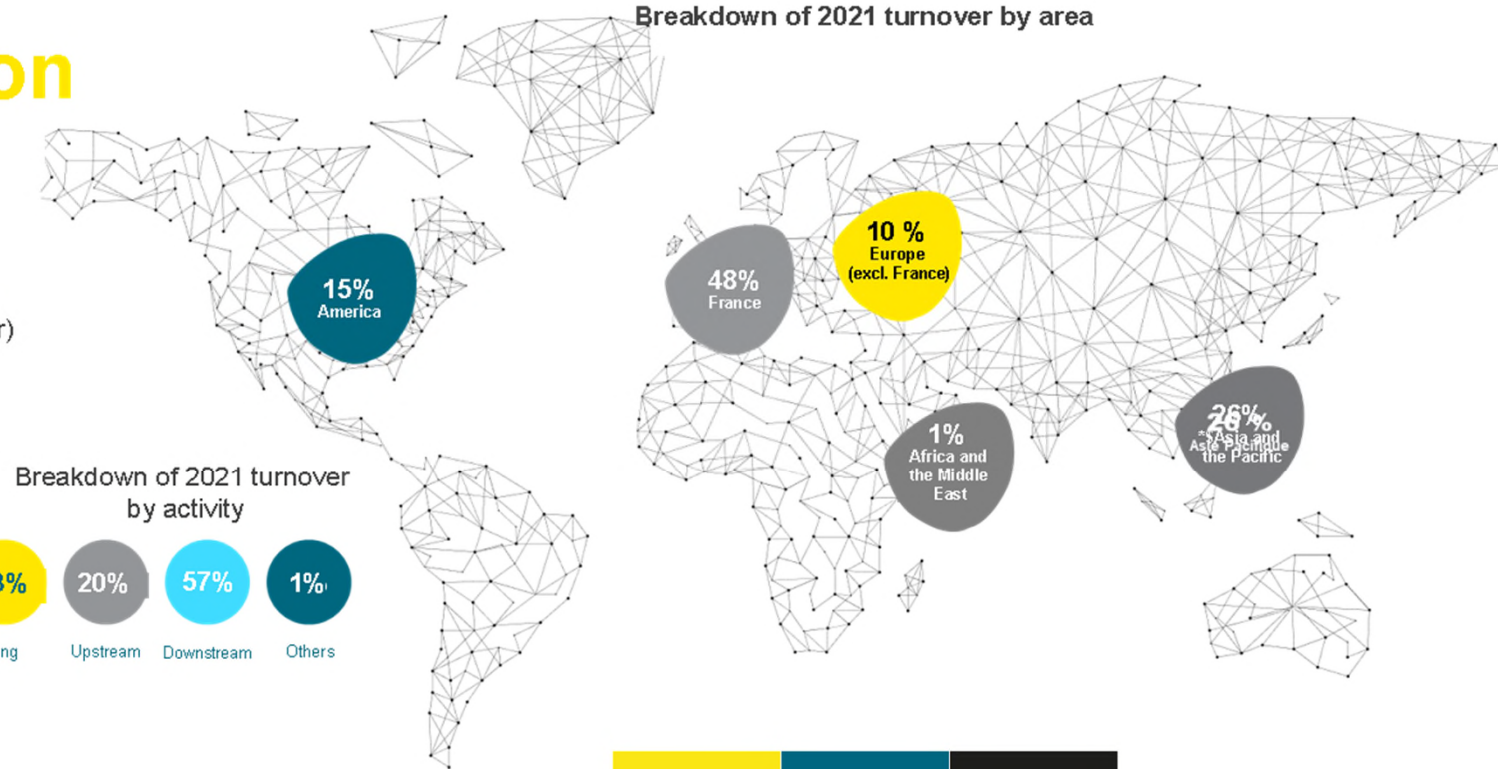
— An international group

**€4.7 billion**  
turnover

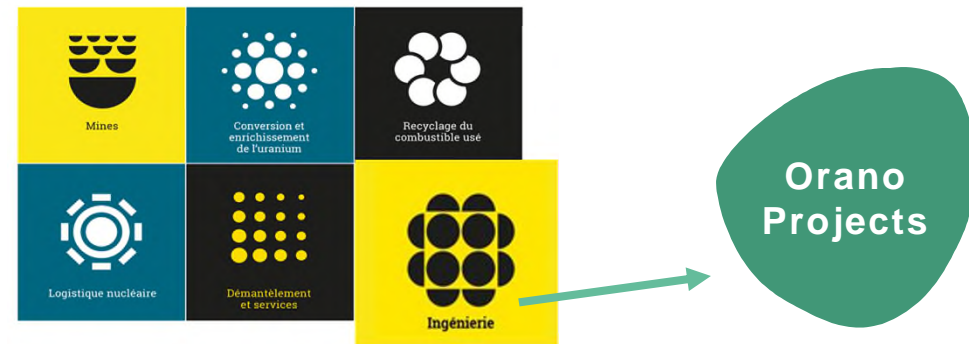
**€25.7 billion**  
in orders  
(almost 5.5 years of turnover)

**3rd**  
worldwide  
in its key activities

**16,000**  
employees



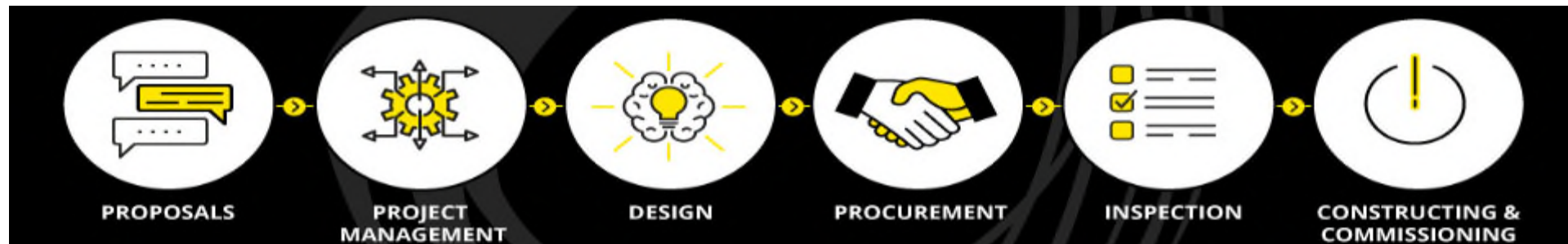
**6 business Units**



# Orano Projets value proposition

## An engineering subsidiary of the Orano Group, Orano Projets...

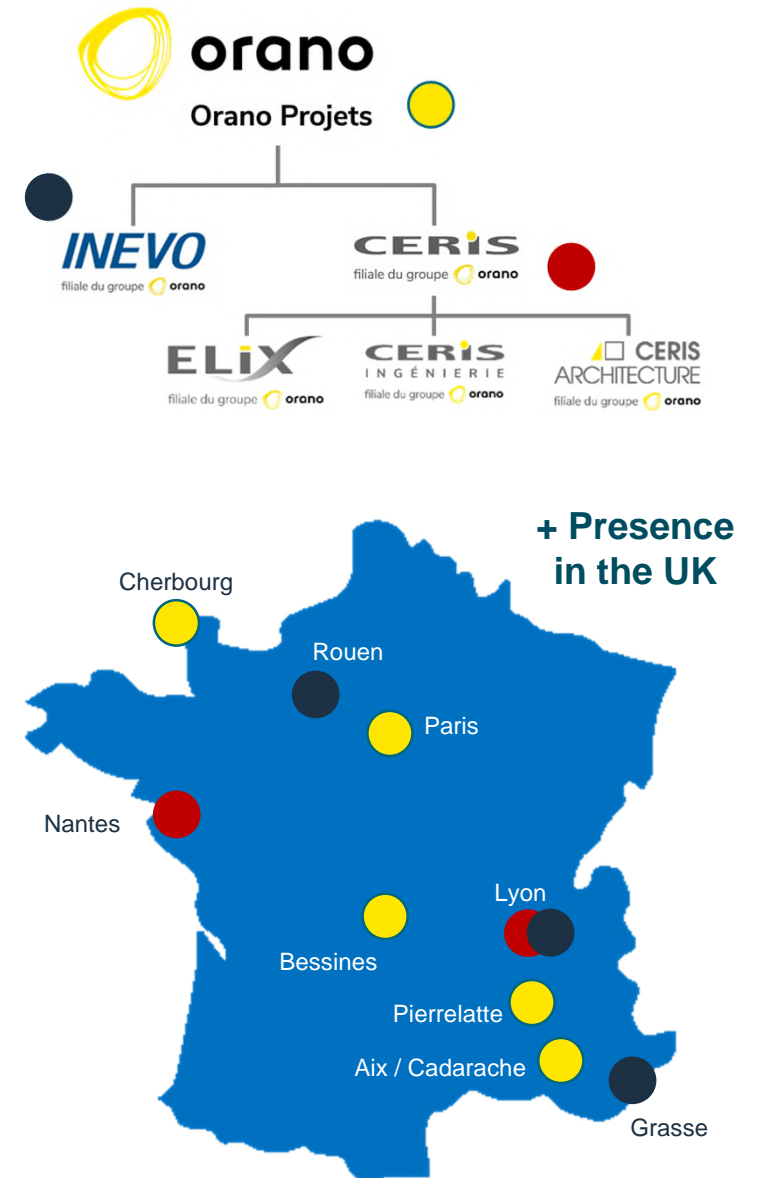
- ✓ ...offers its customers more than 40 years of experience in engineering nuclear projects and providing support for BNI operators
- ✓ ...has a wide range of expertise (43 disciplines), notably in terms of safety and processes (mechanical and radiochemical)
- ✓ ...can be involved in all steps in the project lifecycle, from upstream phases (feasibility, pilots, etc.) through to commissioning and operating support
- ✓ ...works in an agile and responsible way, offering services and EPC according to customer needs



## • Des atouts uniques

### Expertise in managing complex nuclear projects (>1 billion euros)

- ✓ Teams matching the size of your projects
- ✓ Subsidiaries that complement each other, making it possible to propose global solutions (Process/Facilities/Architectures/Works)
- ✓ Flexibility in our types of service ranging from:
  - Consulting / Expertise / Training
  - Technical assistance
  - Assistance for project owners and prime contractors
  - Project owner
  - Prime contractor / Turnkey
- ✓ A subsidiary-based organisation with a global approach to meet customer needs:
  - R&D Development and Process
  - Organisation of production and R&D facilities
  - Process fluids and utilities
  - Infrastructure
  - Buildings and architectures



# Orano Projets en un clin d'oeil

## Processes

- Development of physical-chemical, mechanical, and thermal processes...

## Design studies

- Organisational and human factors
- Optimisation of project cost
- Artificial intelligence
- Regulations
- Safety
- Waste management

## Design Production

- DCE preparation
- Studies, calculations, and facility construction for Orano plants
- Tests and industrial commissioning
- ...

### Feasibility

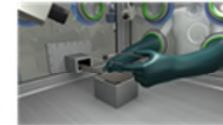
- Interacting with the future operator as soon as design begins
- Support for developing and industrialising processes developed by our customers
- Optimizing needs, costs, and deadlines

### Support for operators

- Through-life support for facilities
- Assisting operations with changes in functioning facilities
- Performing audits customised for handling customer challenges

### Production

- Creating/Modifying/Optimising industrial facilities
- Complying with initial schedule/costs
- Guaranteeing an availability rate following commissioning



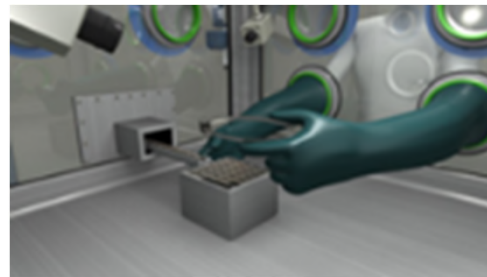
**Une expertise**  
à toutes les étapes du projet



# • Nos moyens & domaines d'expertise

## Our Ressources

- 1800 employees
- Project managers
- Architects
- Materials experts
- Specialised engineers and technicians
- Experts in nuclear safety / regulations
- Works managers
- A research and development centre
- A network of experts via our partners



## Our areas of expertise

- HVAC / Fluids
- Process / Core process utilities
- Artificial intelligence
- Nuclear safety – Regulatory files
- Waste management
- Project management
- Materials
- Organisational and human factors
- Insulators / Glove boxes
- Instrumentation and control / Nuclear
- Tests / Industrial commissioning



# • Our areas of work

## Nuclear / New Nuclear

Waste sorting and treatment facility / Dismantling scenario / Analysis & safety-security files / Research and development laboratories / Analysis laboratories / Process industrialisation



## Defense

Experimental facilities / Test laboratories / Process development and industrialisation / Instrumentation and control on vital operating systems



## Pharmaceutical & Biotech industry

Production units (BPF, cGMP) / Research centres / Quality control laboratories / Process studies / Organisation studies / Confined zones (L2/L3) / Radiopharmacy



## Industries with major constraints

Metal recycling / Asbestos treatment / Manufacturing units / Process studies / organisation studies / chemical process industrialisation



# • Quelques exemples d'expertises



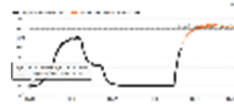
## Organisational and human factors

- Preparation of an article on human and organisational factors in the La Vague magazine – A3P
- Link to the article: [https://a3p.org/wp-content/uploads/2018/10/LAVAGUE\\_59\\_def2.pdf](https://a3p.org/wp-content/uploads/2018/10/LAVAGUE_59_def2.pdf)



## Solution 4.0

- Digitalisation and enrichment of process data to enhance optimisation
- Artificial intelligence to create digital twins:
  - ✓ For decision support
  - ✓ To anticipate any production defects
  - ✓ To optimise productivity
  - ✓ Comply with the strictly necessary in terms of product quality



## HVAC

- Air flow and thermal calculation, simulation of air flows, global and detail diagrams, modelling, and financial estimation



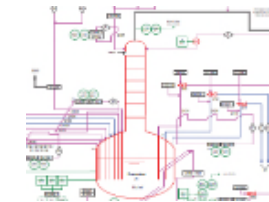
## Réglementation / Gestion déchets

- Relations with authorities
- Environmental impact studies
- Regulator safety file
- Confinement / Earthquake
- Releases to the atmosphere
- Waste studies



## Operational Safety Management & Integrated Logistics Support

- Anticipate / Analyze / Identify failures (AMDEC)
- Calculate overall equipment effectiveness (Facility availability)
- Design maintenance system
- Control availability optimizing cost



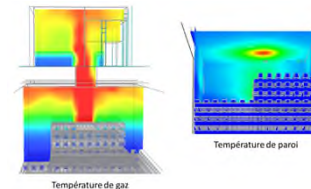
## Process industrialisation

- Implementation of innovative and/or complex processes in compliance with the exacting safety / security requirements (confinement, suitable maintenance, etc.)
- Materials expertise for specific reaction environments
- Methodology for equipment qualification and tested processes
- Availability of our R&D centre (from the laboratory to the pilot)



## Industrial master plan

- Mapping of activities
- Analysis of strategic objectives and issues
- Definition of technical and organisation solutions
- Planning and estimation of investments



## Demonstration of fire safety

- Numerous verification calculations associated with fire problems
- Several calculation tools available
- Development of an AI-based tool for automating hundreds of thousands of sensitivity calculations

# A few references



## Asbestos Neutralisation – Recycling

Study and development of a process for recycling asbestos in the form of a reusable material  
Industrialisation study of the process



## Biomass power plant – Heat and steam production



Complete prime contractor services from preliminary design studies up to industrial commissioning of the biomass power plant  
Power plant including an LLT steam boiler (48.5 MWt), a TGM turbine (15 MWe), and a steam distribution network at 3 and 13 bars (40 T/h)  
Contract including 18 work packages (Civil Engineering / Pipework / Water Treatment / HVAC / SCADA / etc.)



## Orano – Battery recycling

Building design studies enabling battery pre-treatment up to the production of black mass  
Definition of tools / a process enabling industrialisation and production



## alphaCARBONE

Optimisation studies of a process for recycling used tyres



## AFYREN – Lab Pilot & Industrial Unit

From laboratory design to industrial production:

- Development of process and utility PFDs
- Material Balance / Utilities / Effluents
- Choice and sizing of technologies
- CAPEX estimate



## ERGOSUP – H2 industrial demonstrator

Feasibility studies for an industrial demonstrator of hydrogen production using electrolysis  
Process involving storage of energy in the form of zinc

## Autres références :



- **Your contact person**



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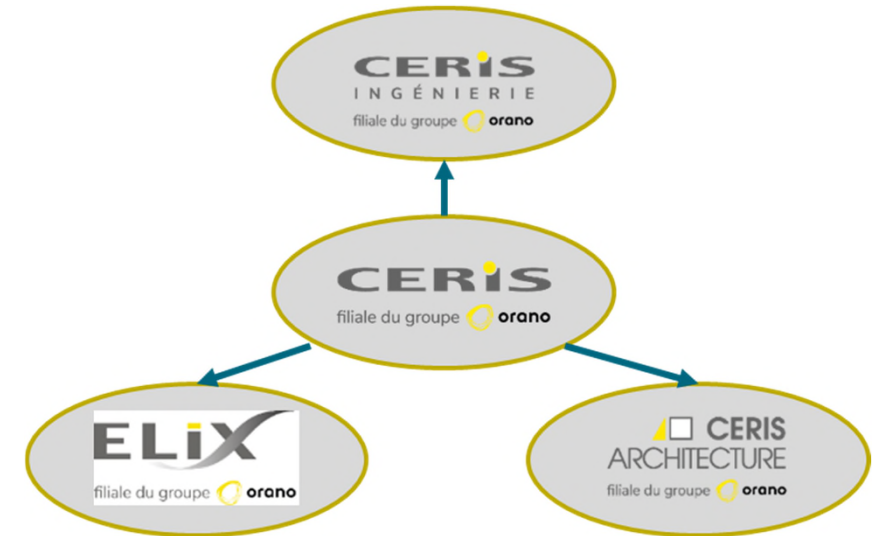
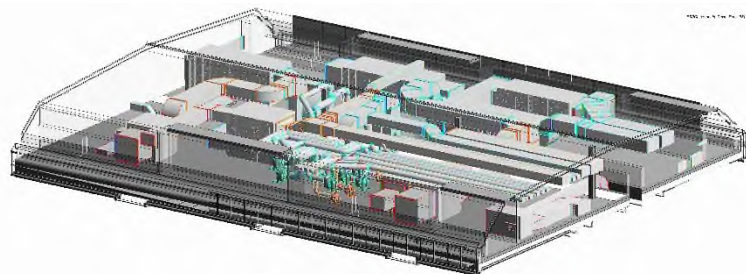
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## • CERIS in a flash

# Global approach to architecture and engineering

50 employees

- Project engineers
- Architects
- Specialised engineers (HVAC, fluids, utilities, etc.)
- BIM managers
- Technicians
- Works managers...



- Design: Site Master Plans / Organisation studies
- Design and production engineering (Prime Contractor)
- Turnkey solution (Prime Contractor)

## • INEVO in a flash

### Expertise in generating processes to meet sustainable production challenges

*Projects based on 4 pillars*



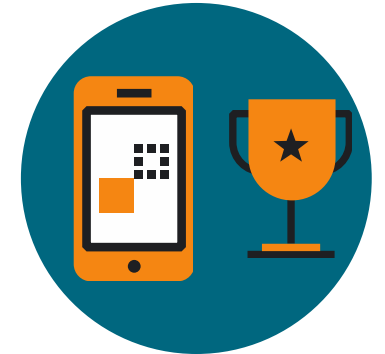
**Industrialisation of new processes and products**



**Optimisation and augmentation of capacities at existing sites**



**Safeguarding and Environment (emissions reduction, recycling, and reuse)**



**Digitalisation and enrichment of process data to enhance optimisation**

**50 employees**

- Process engineers
- Experts in process engineering

