



Abstract of the DigiDECOM<sup>23</sup> October 24-26, 2023

Helsinki, Finland

## **PLEIADES: MAIN OUTCOMES, EVALUATION AND STEPS FORWARD**

Author 1\*: Marie-Bénédicte JACQUES

Affiliation: Université Paris-Saclay, CEA, LIST, F-91120, Palaiseau

Country: France

Email: [marie-benedicte.jacques@cea.fr](mailto:marie-benedicte.jacques@cea.fr)

Author 2: Dusan DANISKA

Affiliation: WAI

Country: Slovakia

Email: [dusan.daniska@wai.sk](mailto:dusan.daniska@wai.sk)

Author 3: Joseph A. RIDAO CABRERIZO

Affiliation: Institute of Technology and Management in Construction, Karlsruhe Institute of Technology, 76131, Karlsruhe.

Country: Germany

Email: [j.ridao@kit.edu](mailto:j.ridao@kit.edu)

Author 4: Sascha GENTES

Affiliation: Institute of Technology and Management in Construction, Karlsruhe Institute of Technology, 76131, Karlsruhe.

Country: Germany

Email: [Sascha.gentes@kit.edu](mailto:Sascha.gentes@kit.edu)

Author 5: Nicolas DELANNAY

Affiliation: Tractebel ENGIE

Country: Belgium

Email: [nicolas.delannay2@tractebel.engie.com](mailto:nicolas.delannay2@tractebel.engie.com)

### **Abstract**

In 2023, the average age of the Nuclear Power Reactor (NPR) fleet in the world is over 30 years old. More than 200 NPRs were already put out of service, and more than 200 of those operating will also be shut down for good before 2050. Taking into account the decommissioning strategy adopted by most countries, especially in Europe, the demand in the Decommissioning & Dismantling (D&D) market will continue to grow for safer, more efficient and cost-effective processes with high safety and reliability levels.

As nuclear D&D tasks were not foreseen at the time the reactors were built, these activities are very challenging. But they can be planned and optimized with digital-twin support: advances in digitalization tools, 3D modelling and scanning technologies provide unprecedented opportunities to build a "digital-twin" of nuclear installations for simulating complex dismantling tasks, optimizing planning of projects, and better assess costs and risks. Inspired by the BIM (Building Information Modelling) concept, PLEIADES (PLatform Based on Emerging and Interoperable Applications for enhanced Decommissioning processES) is an EU-funded project that aims to demonstrate an innovative approach in selected cases across Europe. The demonstration is performed by introducing a CDE (Common Data Environment) platform with a flexible API that integrates 3D models and multi-disciplinary software tools. The platform enables the digital collaboration among all disciplines participating in the decommissioning planning. The use cases also rely on the development of new 3D modelling techniques, supported by newly



**Abstract of the DigiDECOM<sup>23</sup> October 24-26, 2023**

**Helsinki, Finland**

developed specific software features. PLEIADES also participates in the standardization of D&D management and adds a stone to the building of D&D processes that improve safety and minimise radiation exposure while optimising costs and schedules.

PLEIADES, has:

- Developed a common ontology for nuclear decommissioning, aligned with results from international organisations, ensuring a basic compatibility to international knowledge resources such as the combined IAEA, EU and OECD taxonomy for decommissioning,
- Developed a common data environment platform with flexible API, including a set of innovative modules based on simulation technologies, and implementing the digital-twin data structure relying on the ontology,
- Demonstrated the concept through 6 user stories on 3 existing facilities under D&D in different countries (France, Norway and Spain) by carrying simulations of different scenarios.

Evaluations and performances estimations are going-on and allow the consortium to identify next challenges and consolidate next steps in this area of research.

Please select 1 topic, please mark with X on the relevant check box for allocation to the program sessions:

- AI, Data and Robotics (role of digitalisation)
- New initiatives and Emerging technologies
- Sustainability and circular economy
- Risks, safety and security management