

NUCOBAM

NUclear COmponents Based on Additive Manufacturing

OBJECTIVES

NUCOBAM will develop the qualification process and provide the evaluation of the in-service behaviour allowing the use of additively manufactured (AM) components in a nuclear installation. Once qualified, the use of AM will allow nuclear industry to (1) tackle component obsolescence challenges and (2) manufacture and operate new components with optimised design in order to increase reactor efficiency and safety. In order to make this ambition a success, NUCOBAM has set itself five technical objectives and one dissemination related objective, which are strongly correlated to the project methodology and the structure of the project:

- Establish a qualification methodology for AM nuclear components to be proposed for standardisation and to be communicated to nuclear design code committees
- Develop a laser powder bed fusion manufacturing plan that ensures and demonstrates process stability, repeatability and reproducibility that meet nuclear quality standards.
- Demonstrate that laser powder bed fused material performance meets qualification requirements.
- Demonstrate that laser powder bed fused in-core use case meets its safety-related function and operational requirements.
- Assess the operational performance of ex-core AM components regarding safety-related function and operational requirements.
- Disseminate and prepare the exploitation of results with nuclear industries and regulatory bodies in support to codification and industrialisation of AM.

EXPECTED IMPACTS

Developments proposed in NUCOBAM will be used for 3 main applications in 3 different time frames. In a short term (by the end of the project), NUCOBAM results will be used in existing nuclear power plants in order to continue safe operation and optimise maintenance. For midterm, NUCOBAM achievements will all provide high value for nuclear fuel with new possibilities for fuel components design with improved performances and safety. Finally, for long term, NUCOBAM results will allow to optimise design of future reactor components (large reactors or small modular reactors). NUCOBAM will bring major advances which will benefit to:

- Nuclear industry profitability, both for new NPP design and for existing NPP operation;
- Improve nuclear safety with optimised component design for higher performances;
- Development, qualification and standardisation of an innovative AM technology;
- Creation of new manufacturing industry in Europe.

HIGHLIGHTS

In order to be able to use AM in nuclear industry, NUCOBAM has 3 main ambitions:

- Validate metal additive manufacturing as a safe and competitive solution for component obsolescence in nuclear industry;
- Qualification of AM process to optimize design cycle for enhanced performance of critical nuclear components;
- Demonstrate compatibility of AM stainless steel 316L in irradiated environment.

PARTNERS

CEA / EDF / ENGIE LABORELEC / ENGIE TRACTEBEL / NAVAL GROUP / FRAMATOME / CIEMAT / UFSD / VTT / SCK•CEN / JRC / RAMEN VALVES / IRSN

DURATION & BUDGET

October 2020 – September 2024 – 4 years
Total Project Cost: 4,067,916 €
Requested grant: 2,999,324 €

CONTACTS

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EVENTS

Kick-Off meeting – October 12 and 13, 2020

