

Impact & Innovation

- **Reinforcing reactor safety cooperation in Europe** bringing together Research Organizations, TSOs, Utilities and Designers from different countries and connecting the fuel safety and source term research communities.
- **Pooling knowledge and means sharing the upgraded models** for best estimate reactor calculations of foreseen scenarios and harmonizing the methodology for release evaluation in various European reactors.
- **Innovating by use of Artificial Intelligence** to turn the prognosis tools into diagnosis ones and by evaluating the most promising Accident Tolerant Fuel concepts.

Education & Training

- **Two international open workshops** to disseminate the main achievements and results of the project.
- **Training sessions** to involve effectively students and young researchers in the R2CA community.
- **Summer School** for knowledge dissemination and education and training of young researchers.
- **Mobility program** for PhD students, post-docs or young researchers on the R2CA themes.

Communication & Dissemination

- **Publications** in scientific journals and international conferences.
- **Communication with international organizations, networks, associations** (e.g. IAEA, OECD/NEA, ETSON, SNETP, NUGENIA, etc.) in order to update periodically about the project status and the main achievements.
- **Set-up** of an End-Users Group.
- **Annual newsletter** with the main highlights of the project.
- **Creation** of social network accounts.
- **Public project website:**

<http://r2ca-H2020.eu>



CONTACT



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Reduction of Radiological Consequences of Design Basis and Design Extension Accidents

R2CA project targets the evaluation of more realistic safety margins through the analysis of the radiological consequences of bounding accidental scenarios and the development of innovative accident management approaches and safety devices for operating and foreseen NPPs in Europe.

Context

Review of safety analyses following Fukushima Daiichi Nuclear Plant accident.

Main Challenges

- 1 **Reduce the degree of conservatism in release evaluations of selected bounding scenarios by improving the simulation tools and the calculation methodologies.**
- 2 **Increase the safety level of Nuclear Power Plants by development of innovative devices and smart tools for early diagnosis of accidents.**

This project has received funding from the Euratom research and training programme 2014-2018 under grant agreement n° 847656

Nutshell

Resources

17 organisations (522 pm)
4.2 M€ (~3/4 funded by EU Commission)

Time Frame

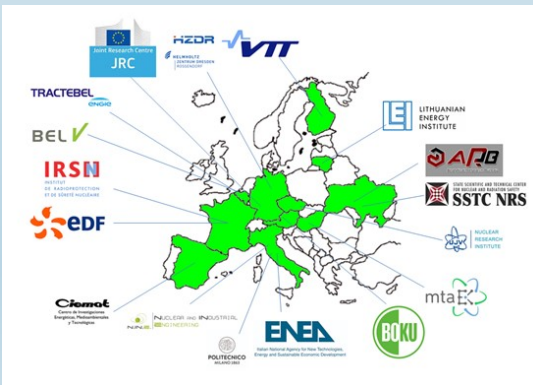
01.09.2019 – 31.08.2023

Scope

Design basis and design extension accidents.
Loss Of Coolant & Steam Generator Tube Rupture Accidents (**LOCA & SGTR**).
Existing and innovative European nuclear power plant designs : **PWRs, VVERs, EPR & BWR**.

Consortium

Gathering **fuel safety & source term** research



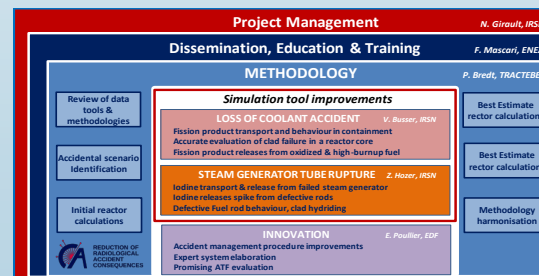
Objectives

Elaborate updated and harmonized methodologies for release evaluations applicable to operating/future reactors and for optimization of EP&R actions.

Provide analytical rationales for the development of innovative systems (accident tolerant fuels, safety devices or measures).

Supply the analytical basis and develop a prototype advanced tool based on artificial intelligence for anticipating reactor accident diagnosis.

Organisation



Overall R2CA project structure

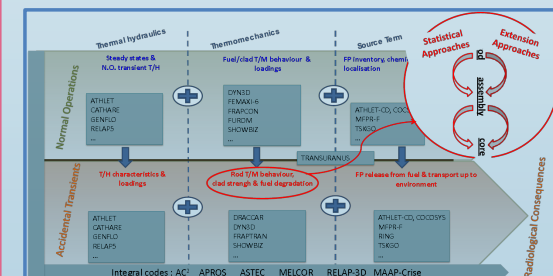
Methodology

Compare assumptions, models, in simulation codes, methodologies and review legacy experimental data used for reactor safety evaluation margins.

Identify reactor cases of interest covering all aspects (conditions, accidents, reactor designs) and simulation schemes.

Provide upgraded models & advanced simulation codes for the considered scenarios from fuel rod behaviour up to fission product releases to the environment.

Quantify the gains obtained with best estimate reactor calculations and evaluate their uncertainties.



Overall R2CA evaluation methodology, associated phenomena and supporting codes