

Future applications of Serpent in the Euratom project ESFR-SMART

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HZDR

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ESFR-SMART - Horizon2020-Euratom project

“European SFR – Safety Measures Assessment and Research Tools”

- Four-year project: 09.2017 – 08.2021
- Budget: 9.9M EUR (total), 5.0M EUR (EU)
- Lead: PSI, Switzerland
- 19 partners: research, industry, universities, TSOs

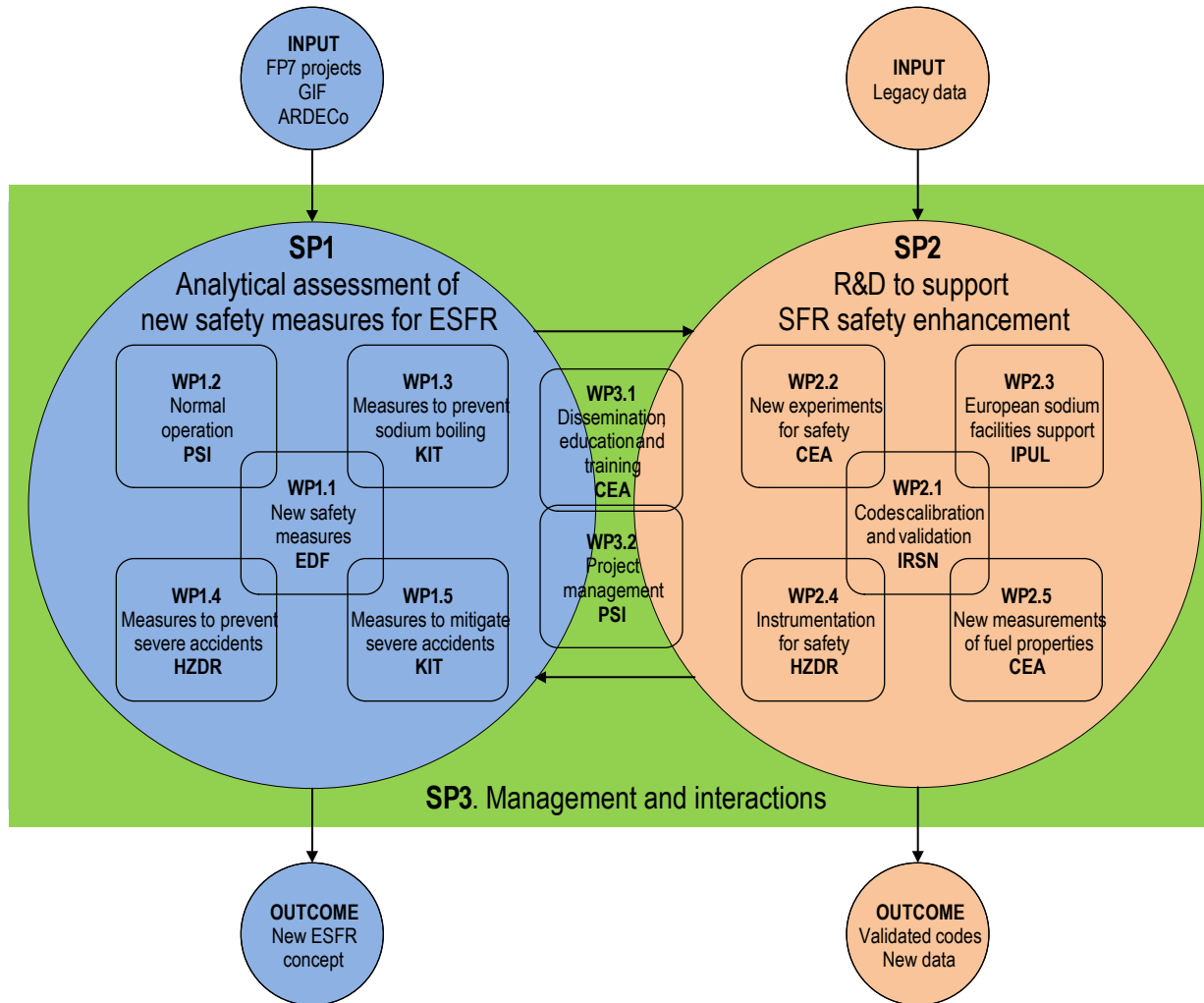


Objectives

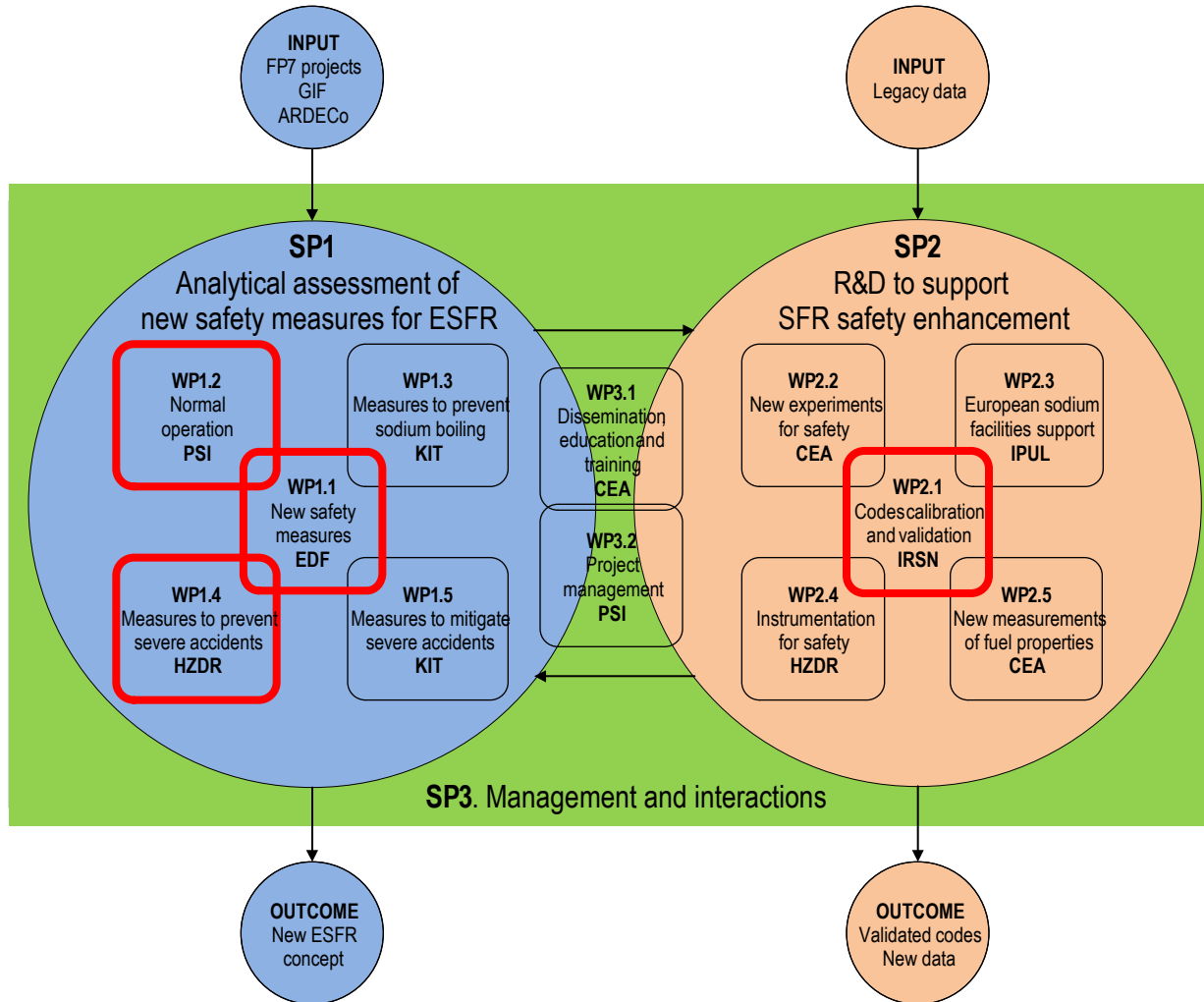
Enhancing the safety of the Gen-IV European SFR

- Selection and assessment of new safety measures
- Calibration and validation of computation tools
 - Neutronics, TH, fuel performance, severe accidents
- Generation of new experimental data for code validation
- Testing and qualification of new instrumentations

ESFR-SMART structure

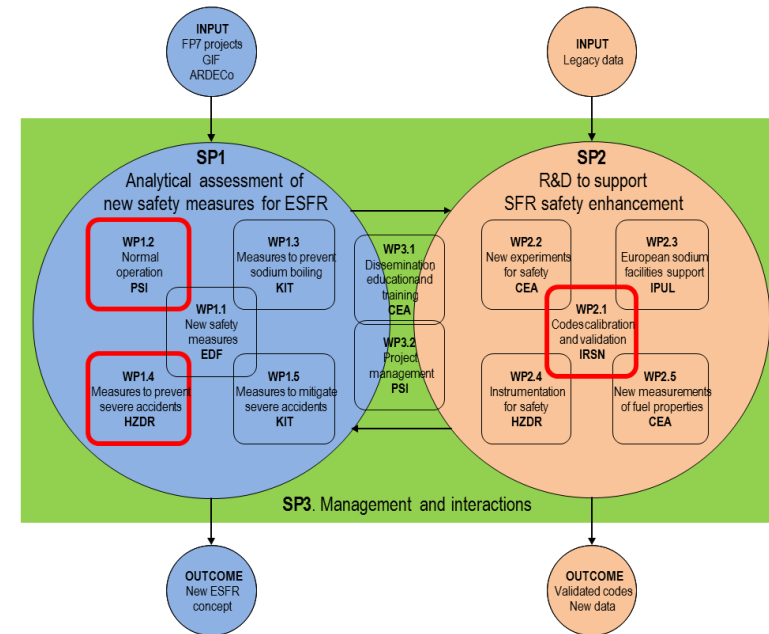


ESFR-SMART structure + Serpent related WPs



Use of Serpent in ESFR-SMART

- Replaces MCNP as a main MC code
- Extended features and superior performance
- Application for a wide range of tasks



Use of Serpent in ESFR-SMART

- Massive design and production calculations
 - Initial design assessment
 - Fuel cycle performance including burnup calculations
 - Decay heat calculations
 - Evaluation of safety parameters
 - Evaluation of uncertainties related to nuclear data
 - Generation of few-group XS for 3D core simulators
 - Generation of reactivity coefficients for PK-based solvers
- Reference MC solution
 - Superphénix start-up experiments

