Introduction to Salome_CFD Days @ EDF

Marc Boucker (Nuclear of the Future Initiatives Program)
Foster nuclear R&D

Two major challenges

- Started 2017 within the French Nuclear Institute
- Driving Research and Innovation toward existing fleet and new built
- Shared across the French Nuclear Industry
Nuclear of the Future Initiatives

Develop technological bricks
- Providing *global and long-term vision*, with clearly identified milestones
- Accelerating integration of external technological breakthroughs
- Identifying and tackling *technological and scientific challenges*
- Bridging *academic and industrial research*
- Featuring *flexibility*: new designs / existing fleet in operation

Showcase nuclear R&D and communicate
- Rally academic partners to tackle our scientific challenges
- Enlarge collaboration to new players (start-up, SME)
- Attract new talented people
- Digital: taking benefit of digital throughout the industrial lifecycle
- Flexibility: R&D needs beyond 2030
- Safety: continuous improvement facing environmental, regulatory, societal evolutions
- Construction & fabrication: foster the use of new modes of construction, fabrication, repair

Technological Bricks – April 2018
Technological Bricks

Where is/will be CFD?

- SG DIGITAL TWIN
- INNOVATIVE INSTRUMENTATION
- DATA ANALYTICS FOR O&M
- UNCERTAINTY QUANTIFICATION AND MACHINE LEARNING

- DIGITAL FUEL
- DIGITAL REACTOR
- HIGH FIDELITY CORE PHYSICS CODES
- HUMAN-AUTOMATION COLLABORATION FOR O&M
- DIGITAL DECOMMISSIONING

- ADVANCED PSA
- SEVERE ACCIDENTS
- SEISMIC RISK
- PASSIVE SYSTEMS
- FLEXIBLE FUEL
- Scenarios for flexibility needs beyond 2030
- DE-STANDARDIZATION
- ENVIRONEMENT
- POLYMERS

- CIVIL ENGINEERING
- INNOVATIVE MANUFACTURING
- POLYMERS

- Upscaling: correlation for porous media scale
- Simulation + probes = new solutions
- Fluid-Structure coupling
- Safety analysis: coupling with system and full 3D coupled with neutronics (MSLB, boron dilution, LOCA, …)

- 3D fire safety analysis (containment, other)
- H2 risk, EVR, IVR
- SACO, submerged exchangers
- H2 risk, EVR, IVR
Nuclear of the Future Initiatives

**Working schemes**

- Nuclear sector partners
- Academic and industry research partners
- Engineering and operation teams

**Collaborative hub**

- at EDF Lab Paris-Saclay
- co-working, labs

**Development in agile mode**

- POC approach
- Benchmark state of the art