

Project SAFARI

Secure Automation for Advanced Reactor Innovation

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SAFARI Overview

GOAL

Reduce NPP O&M costs by delivering a capability which will enable smart functionalities in advanced reactor systems including:

- Autonomous, flexible operations
- Predictive maintenance
- Agile Design
- System and sensors optimization

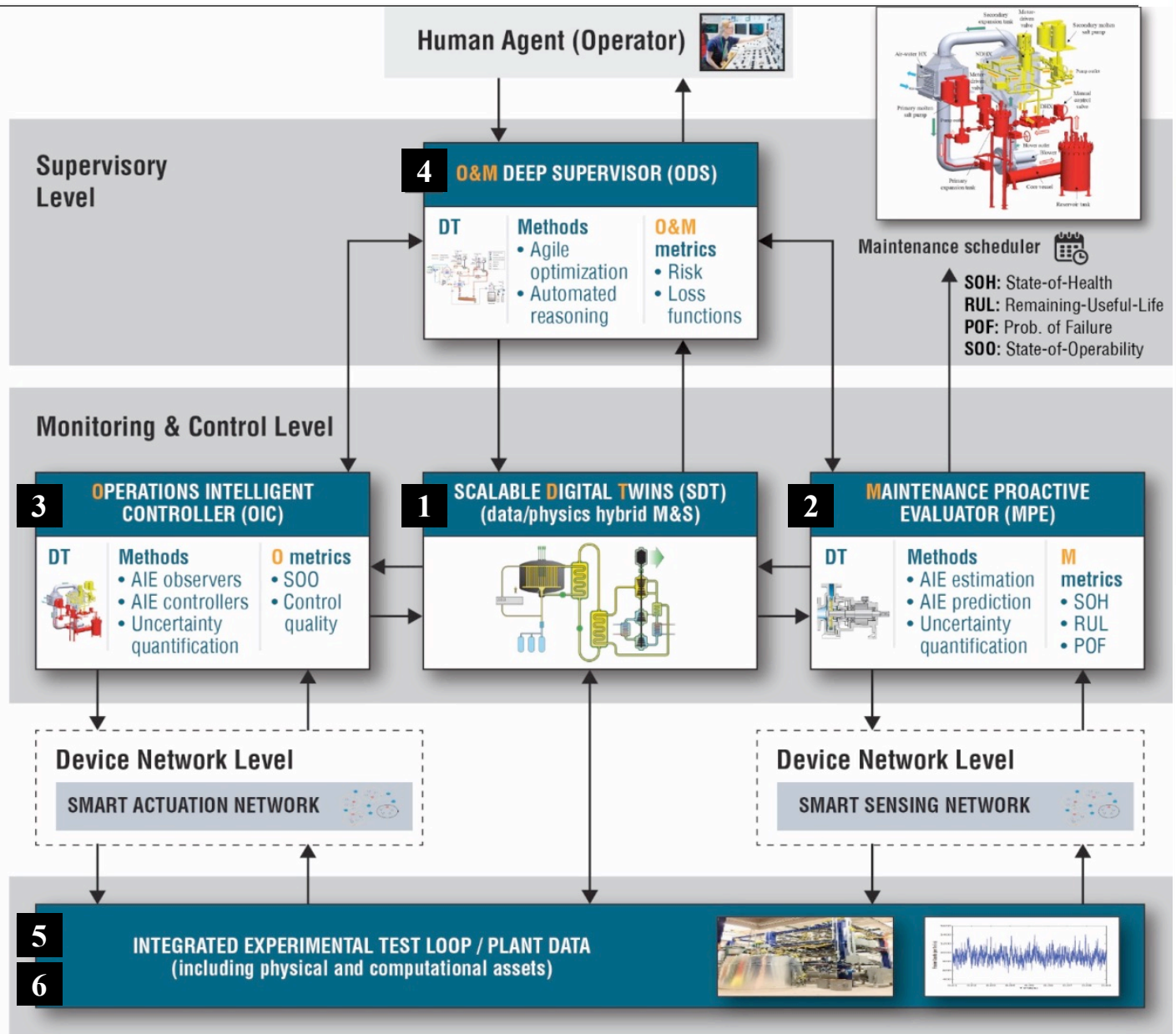
DEMO Kairos FHR

END PRODUCT

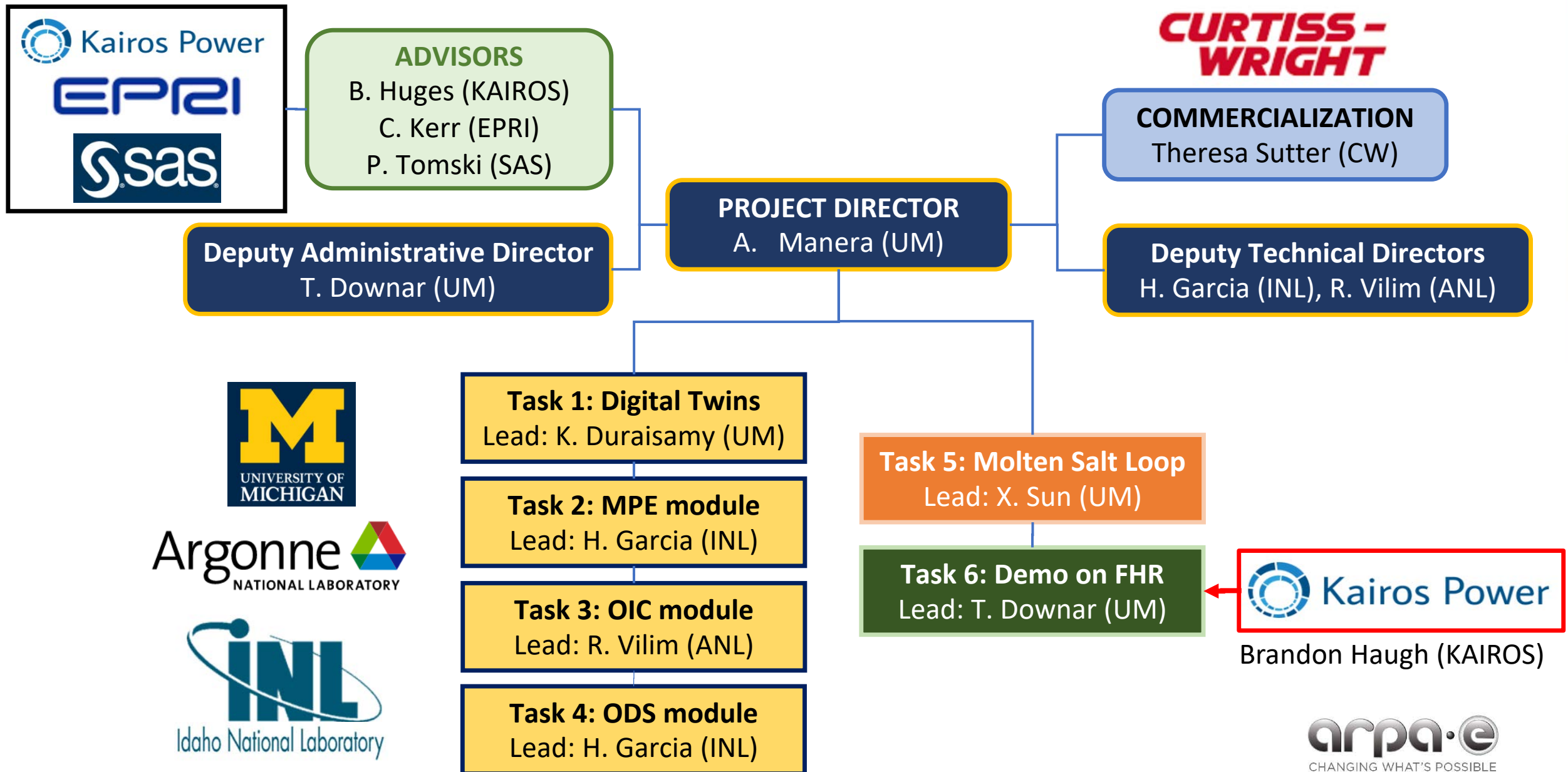
Physics-based, data-enabled, modular and scalable capability that can be extended and applied to any reactor technology

AI-enhanced tool enabling the autonomous reactor of the future

AI-ENHANCED (AIE) FRAMEWORK



Project Team Organization

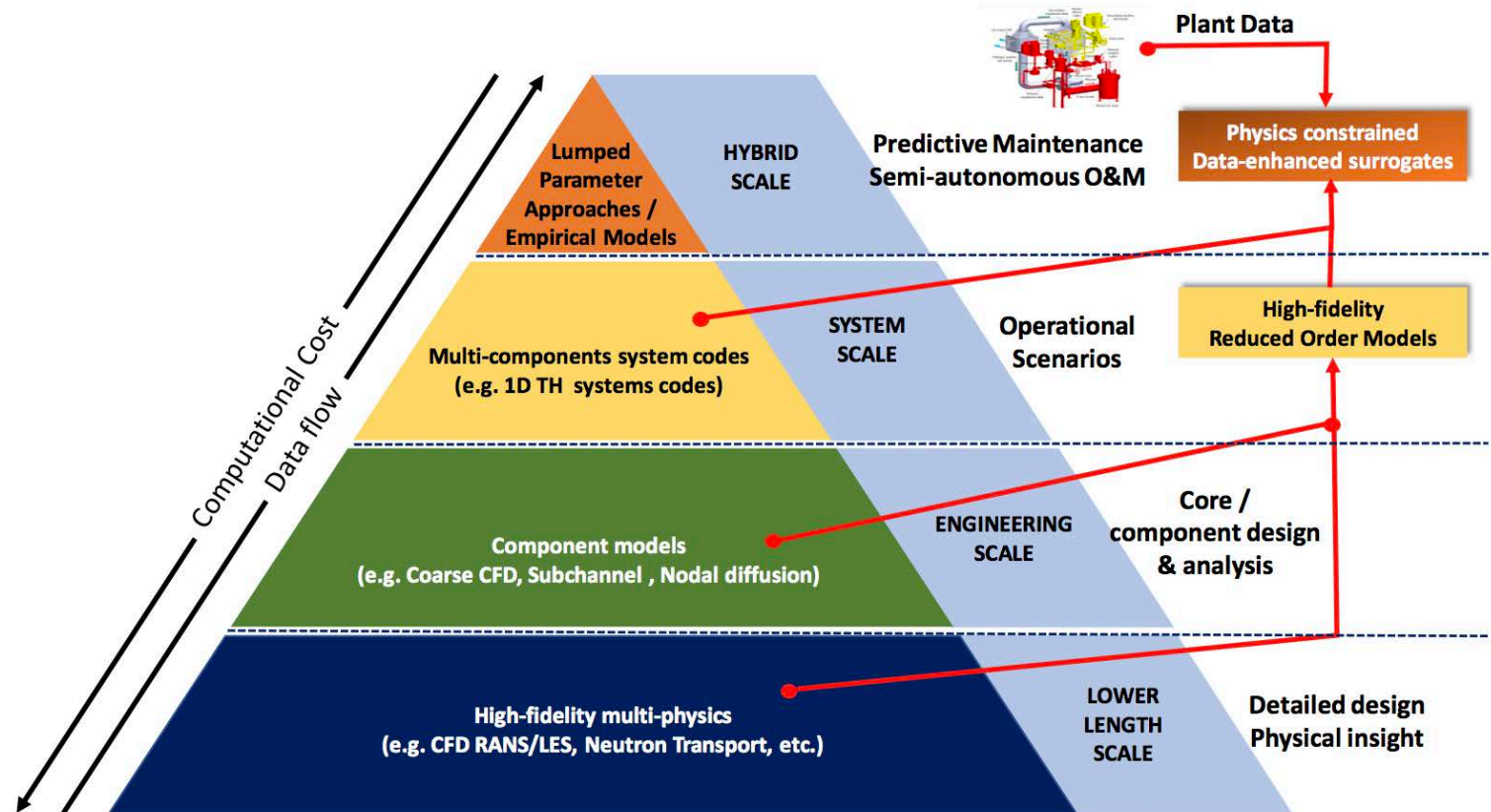


Project Plans – Digital Twin

- Central to SAFARI is a scalable digital-twin

OUTCOMES

- Accurate and reliable models that can be used in decision support systems
- Will feed into controls, health-assessment and supervision



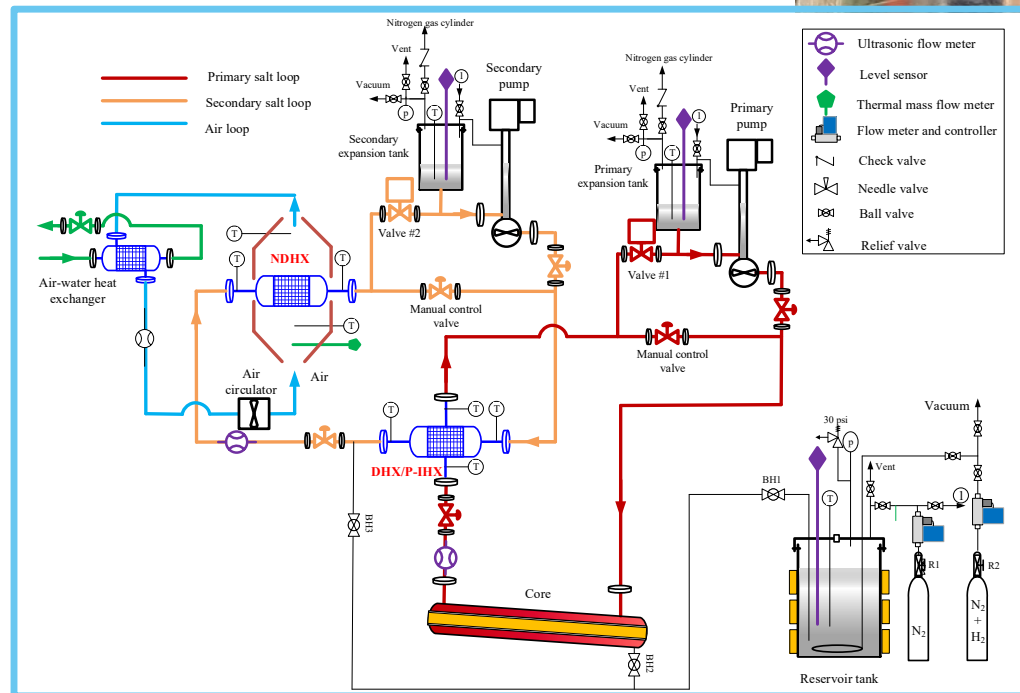
No BLACK-BOX AI Approach!

Physics-based Digital Twin to ensure robustness over the entire range of operations and data-enabled to enhance predictive capabilities

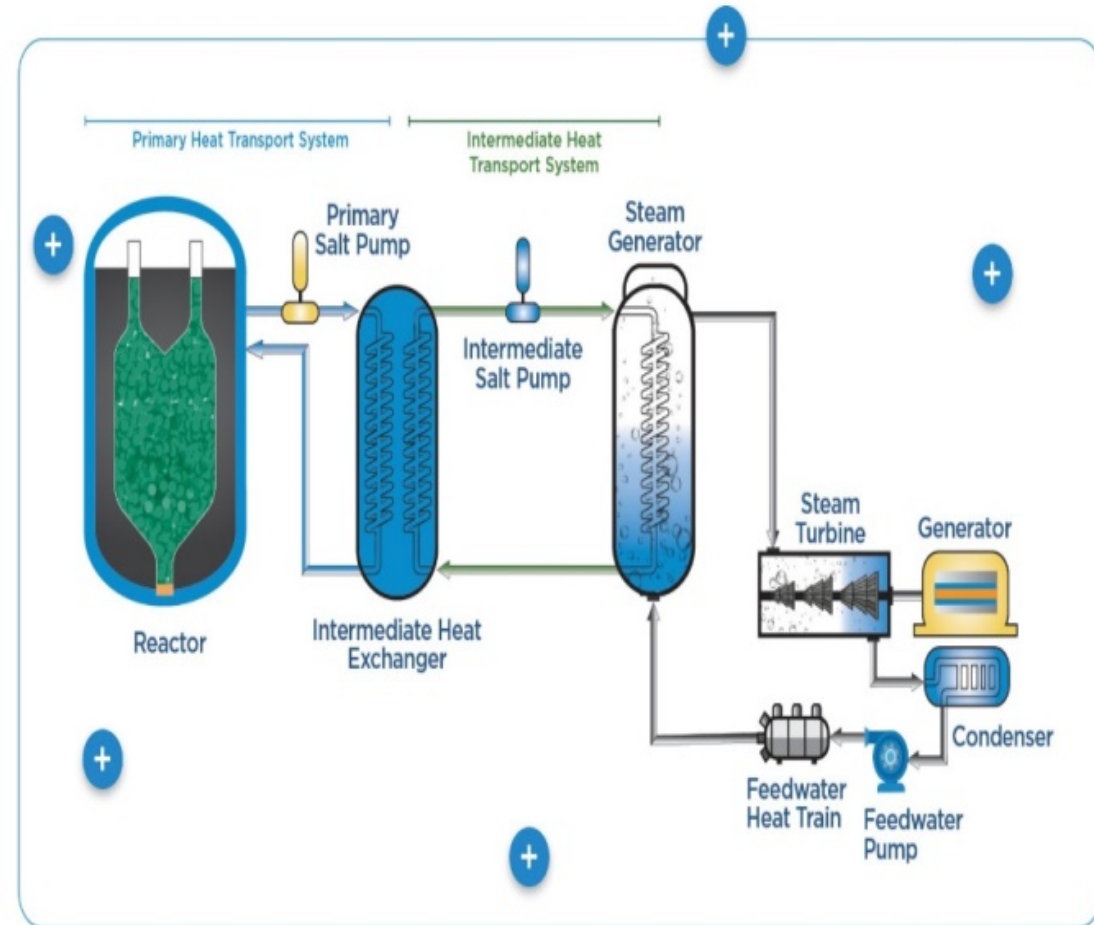
SAFARI Validation

High-Temperature Fluoride Salt Test Facility (HT-FSTF)

- Well-instrumented, controllable, and sophisticated high-temperature molten salt testbed
- Comprehensive experimental databases (with and without feedback and operator action) for model validation
- Experimental demonstration of proposed capability-enabling functionalities



- aid and optimize the plant design
- optimize sensor location
- aid selection of control strategies
- provide autonomous control, including load follow
- allows for predictive maintenance of selected high-risk components



Lead by CURTISS-WRIGHT

- Definition of system architecture (software structure) [Q2]
- Software formal test plan [Q7]
- Roll-out of technology road-map [Q12]