

Digital Environment for Advanced Reactors Workshop

Argonne National Laboratory, Chicago, IL • June 5-6, 2018



Objective

This is an invited workshop to gather input from stakeholders related to advanced sensors, monitoring, control and human automation interaction technologies needed to support the deployment of advanced reactors.

The workshop will provide a forum for exchange of information about ongoing I&C research and development for the next generation of nuclear plants.

Information obtained from this workshop will be used to identify gaps between existing and needed capabilities by the advanced reactors community and to establish funding priorities by the U.S. Department of Energy (DOE). The DOE activities could include planned solicitations, cost shared research and development, and pilot projects through private-public partnerships.

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Tuesday June 5, 2018 (Morning)
Bldg. 241, Room D172

Introduction and Industry Experience

- 7:30 Registration
- 8:00 Welcome Hussein Khalil, ANL
- 8:10 Workshop Goals and Introduction Suibel Schuppner, DOE/Craig Primer, INL
- 8:15 DOE-NE Overview, FOA Opportunities Tom Miller, DOE
- 8:30 Vision on Future I&C Systems John Connelly, Exelon
- 9:00 Other Industry Experience Paul Tobin, Rolls Royce
- 9:30 Current Fleet I&C Research Steve Lopez, EPRI

10:00 Break

Advanced Reactor Type Overviews

Four promising advanced reactor types are featured in this workshop. An overview of these advanced reactor types will be presented by representative companies to familiarize the workshop participants with the general design and unique I&C challenges of each respective type.

- 10:15 Molten Salt Reactor Matt Lish, Flibe
- 10:45 Fast Reactor Greg Droba, General Electric
- 11:15 High Temperature Gas Reactor Farshid Shahrokhi, Framatome
- 11:45 Light Water Reactor Brian Arnholt, NuScale
- 12:15 Lunch and Poster/Demo Session** All

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Tuesday June 5, 2018 (Afternoon)
Bldg. 241, Rooms D172, D173, C201, A323

I&C Technology Requirements Input - Break-Out Sessions

Individual break-out sessions will be conducted to obtain technology requirements in four focused I&C groups. These smaller sessions will give workshop participants the opportunity to provide input on an individual basis. The sessions will be repeated in four successive rotations to give workshop participants the opportunity to attend each group.

- 1:15 Break-Out Sessions..... All
 - Session 1: Sensors and Communications Requirements Rick Vilim, ANL
 - Session 2: Protection, Control, and Monitoring RequirementsAhmad Al Rashdan, INL
 - Session 3: On-Line Monitoring and Diagnostics Vivek Agarwal, INL
 - Session 4: Concepts of Operations/Control Room Katya Le Blanc, INL
- 2:15 Break-Out Sessions Rotation All
- 3:15 Break**
- 3:30 Break-Out Sessions Rotation All
- 4:30 Break-Out Sessions Rotation All
- 5:30 Adjourn**

	Group 1	Group 2	Group 3	Group 4
1:15	Vilim - A323	Al Rashdan - C201	Agarwal - D173	Le Blanc - D172
2:15	Le Blanc - D172	Vilim - A323	Al Rashdan - C201	Agarwal - D173
3:30	Agarwal - D173	Le Blanc - D172	Vilim - A323	Al Rashdan - C201
4:30	Al Rashdan - C201	Agarwal - D173	Le Blanc - D172	Vilim - A323

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Wednesday, June 6, 2018
Bldg. 241, Room D172

Day 2 Agenda Overview

8:00 Recap and Overview of Day 2 Agenda..... Craig Primer, INL

Panel Presentations

The panel presentations will feature representatives of the advanced reactor types that will provide requirements/needs for the specific technology are based on the pre-meeting survey and reactor community input. In addition, the facilitator from each Day 1 break-out session will summarize the input collected for each session for a collective input.

8:15 Sensors and Communications..... Panel Members

9:15 Protection, Control, and Monitoring Requirements..... Panel Members

10:15 Break

10:30 On-Line Monitoring and Diagnostics..... Panel Members

11:30 Concepts of Operations/Control Room..... Panel Members

12:30 Lunch and Poster Session..... All

Summary Discussion

A facilitated group exercise will be conducted to identify and prioritize the significant technology gaps that would benefit by DOE-sponsored R&D. Research needs that are common to multiple advanced reactor types will be of particular interest.

1:30 Gap Analysis and Research Priorities Discussion All

2:45 Break

Reflection and Actions

Representatives of key nuclear organizations are asked to reflect on the findings of the workshop and provide their perspectives on how they relate to the ongoing activities and plans of their respective organizations.

3:00 Nuclear Regulatory Commission Perspective Ian Jung, NRC

3:20 Nuclear Energy Institute Perspective..... Jason Remer, NEI

3:40 DOE Research Perspective..... Ken Thomas, INL

4:00 Summary of Actions and Path Forward Suibel Schuppner, DOE/Craig Primer, INL

4:20 Closing Remarks Tom Miller, DOE

4:30 Adjourn

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Thursday, June 7, 2018
Bldg. 241, Lobby (Tour will begin and end here)

Optional ANL Facility Tours (Need to register by May 23, 2018 to participate)
Tour locations are subject to change.

8:30 Tour Rick Vilim, ANL

11:30 Adjourn

Engineering Development Laboratories, Building 308

1. Under Sodium Viewing Laboratory
Experiment facility for development of acoustic sensing arrays for visualization in opaque fluids, such as sodium, found in advanced reactors.
2. METL Test Facility
Sodium loop for testing of sensors and other components for fast reactors at prototypic operating temperatures.
3. Natural Shutdown Test Facility
Application of optical fibers for measuring temperature distributions in a large-scale natural circulation facility used for evaluating decay heat removal in advanced reactors.

Advanced Photon Source, Building 401

1. EPICS Instrumentation and Control System
Distributed real-time control system for large-scale engineering and scientific experiments.
2. X-Ray Diffraction for Materials Damage Characterization
Advanced techniques for resolving irradiation-induced damage in new materials for use in nuclear energy.

Engineering Development Laboratories, Building 315

1. Core Melt Coolability Experiments
Instrumented facility for measuring temperatures during core-melt experiments.