# Center for Advanced Engineering and Research (CAER) Forest, VA

BWXT and CAER, with the help of University, U.S. National Laboratories, and Industry partners are exploring avenues to transition two state-of-the-art research and development facilities to open research platforms. These two facilities are the Integrated System Test (IST) facility and Integrated Control Room and Operation Performance Laboratory (INCONTROL)

These facilities are housed in the Center for Advanced Engineering and Research (CAER) in Forest, Virginia.

CAER is a Region 2000 initiative to develop an industry-focused regional research and development center that drives the development of innovative products and processes by providing local access to university and federal research and inventions.

- A 501(c)(3) non-profit established for R&D and education
- Region 2000 initiative to develop an industry-focused regional research and development center
- Drives innovation using Technology-Based Economic Development (TBED) best practices
- In addition to INCONTROL and IST the CAER houses research and laboratory space available focused on progressing technology readiness and business incubation

For more information, contact:
Bob Bailey, Executive Director – CAER: (434)477-5060, bbailey@caer.us
Joe Miller, Manager - IST: (434) 316-7649, jkmiller@bwxt.com

www.caer-ist.org

# INTEGRATED CONTROL ROOM AND OPERATOR PERFORMANCE LABORATORY (INCONTROL)

Modular Reconfigurable Full-Scope Nuclear Power Plant Control Room Simulator

- Provides hardware and software focused on human-machine interaction (interface and visualization design) and verification and validation using state of the art simulation environments
- Educate the next generation of students in nuclear reactor operation and control, and the design, analysis, operation, and maintenance of instrumentation and control systems
- Serve the nuclear industry by providing research, technology transfer, and educational activities that support workforce training and development, as well as new technology creation and commercialization
- Conduct applied and basic research to create new and improved instrumentation and control technologies to ensure the safety and security of nuclear power plants

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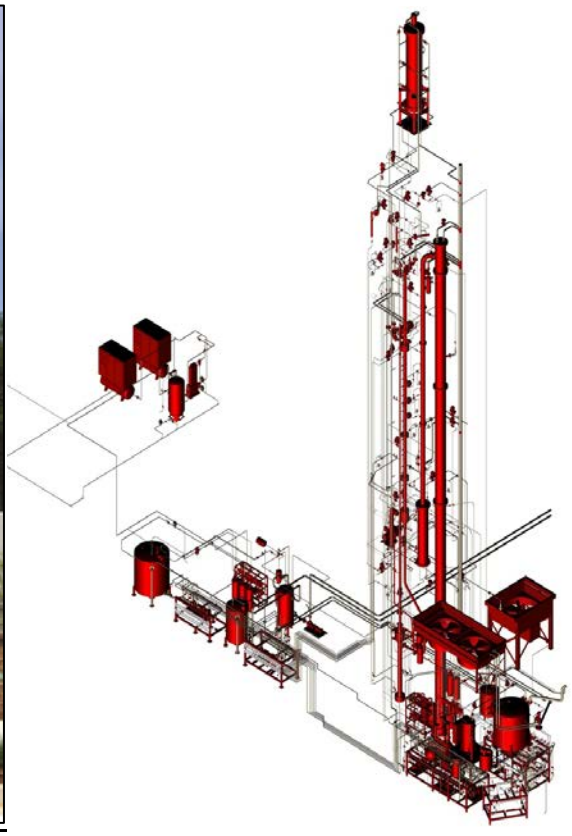
## Integrated System Test Facility (IST)

The Integrated System Test (IST) facility is an electrically heated pilot-scaled steam cycle nuclear power plant prototype facility housed in a ten-story 120 ft. tower. The IST is outfitted with fluid systems, instrumentation and controls dedicated to gathering high quality, high fidelity test data. This one-of-a-kind test facility contains unique testing capabilities possible at operating pressures and temperatures characteristic of conventional and advanced designs.

Some of the key technologies that this facility can support include:

- R&D for both fundamental and separate effects thermal hydraulic research in operational and accident conditions (modeling and validation)
- Fully functional pilot plant for demonstrating operational performance of maturing technology for commercialization
- Rulemaking and licensing support for digital I&C systems applying 10CFR50 Appendix B QA program
- Flexible control system and plant configurability with multiple test fixture locations for novel applications
- Cybersecurity and cyber-physical systems testing utilizing existing or “plug and play” configurations
- Operator training



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## Current Activities to Date (2015)

- Three events held at CAER: March 6th, March 26th, June 4-5th 2015. Events brought researchers from universities, laboratories, industry, and regulators to propose potential future use of IST and INCONTROL
- RFI response to DE-SOL-0008318 University, National Laboratory, Industry and International Input on Potential Office of Nuclear Energy Infrastructure Investments (NSUF focused response)
- Teaming with Virginia Commonwealth University, Virginia Tech, and University of Pittsburgh for IRP response to IRP-FC-1 Benchmark Experiments to Validate Multi-physics Simulations for Nuclear Energy Systems
- Working with potential industry partners to setup testing when facilities are available

## Future Use of INCONTROL and IST

- Strengthen the R&D through open access with universities, national laboratories, and industry potential
- Fulfill national research development & demonstration roadmaps
- Spurring innovation and advancing technology readiness of existing and emerging energy technologies.
- Addressing regulatory challenges to improve existing deployment obstacles
- Include IST and INCONTROL into national scientific user facility partnership network

## Potential Partners

- Department of Energy and DOE National Labs
- Commonwealth of Virginia
- University network
- Industry partners (engineering companies, utilities, and technology start-ups)
- Virginia Nuclear Energy Consortium

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