NRIC National Reactor Innovation Center

Welcome To The NRIC Program Review & Advanced Nuclear Technology Summit

NRIC National Reactor Innovation Center

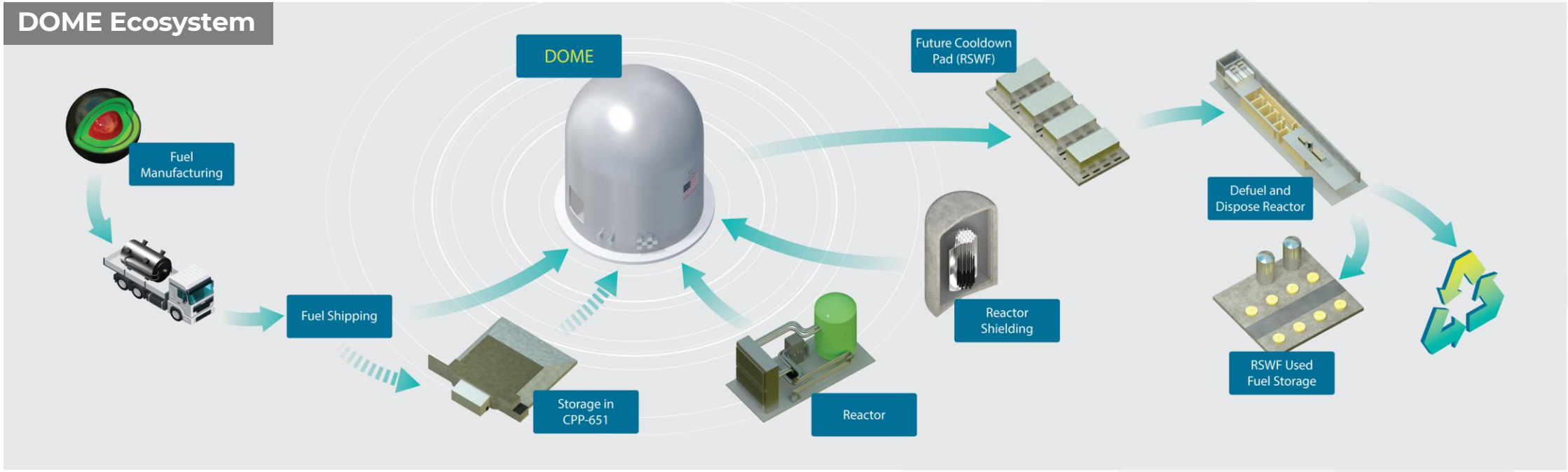
NRIC-DOME Ecosystem

Overview and Status

Curtis Nielsen

MIS-26-92035

NRIC-DOME Test Bed Ecosystem



Test bed ecosystem extends beyond DOME reactor test facility:

- Complete end-to-end support infrastructure from fresh fuel storage, supplemental shielding, testing support, and decommissioning.
- Processes and procedures to ensure consistent, repeatable testing.

Rapidly preparing for testing in NRIC-DOME:

- Supporting Radiant for DOME test in 2026 by installing shielding, reactor, and fuel.
- DOME scheduling application is open for next round of selection.

Increase NRIC-DOME testing rates:

- Applying lessons learned from the DOME ecosystem to allow faster developer turnaround.

DOME Physical Systems

DOME Polar Crane

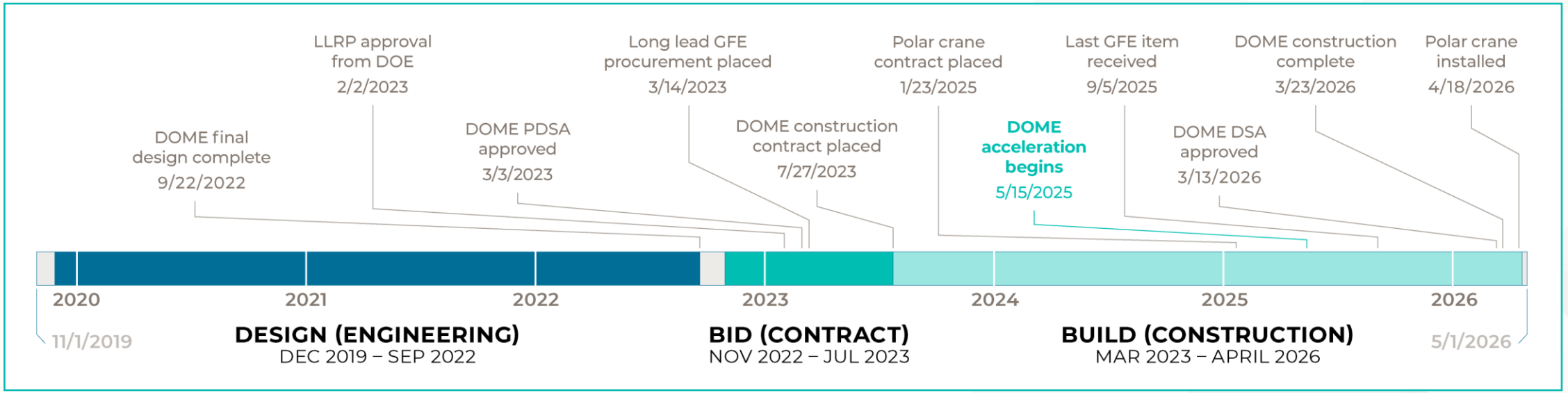
- Built for Advanced Microreactors up to 20MWth
- Accommodates up to High-Assay Low-Enriched Uranium ((HALEU) enrichment < 20%)
- Containment up to 10 psi
- Supports ISO 668 High-Cube Shipping Containers up to 40ft long
- 480V / 400Amp electrical service
- ≈ 78 ft diameter floor space with an 80ft ceiling
- 300kW of environmental cooling
- Planned Reactor cooldown pad at the Radioactive Scrap and Waste Facility (RSWF)
- 75-ton NOG-1 polar crane

Accomplishments

Since FY2025 Program Review DOME has <u>completed:</u>

- 1st round of DOME schedule selection completed *(7/1/2025)*
- DOE-ID approved the DOME Documented Safety Analysis (DSA) *(3/13/2026)*
- Construction completed *(3/23/2026)* – ***12 MONTHS EARLY!***
- Polar Crane installed *(4/21/2026)*

DOME Construction



Significant Acceleration:

- **DOME construction** - 32 mo.
  (original planned duration – 44 mo.)
- **Polar Crane Fabrication** – 14 mo.
  (original planned duration – 26 mo.)
- **DOME DSA** - accelerated 10 months

Contributing Factors:

- 4x10 to 6x20 work schedule
- Additional funds from DOE-NE and Radiant to accelerate
- Dedicated full-time INL personnel
- Leveraged defense priority allocation system
- Focused scope to support first experiment
- Good contracting partnerships

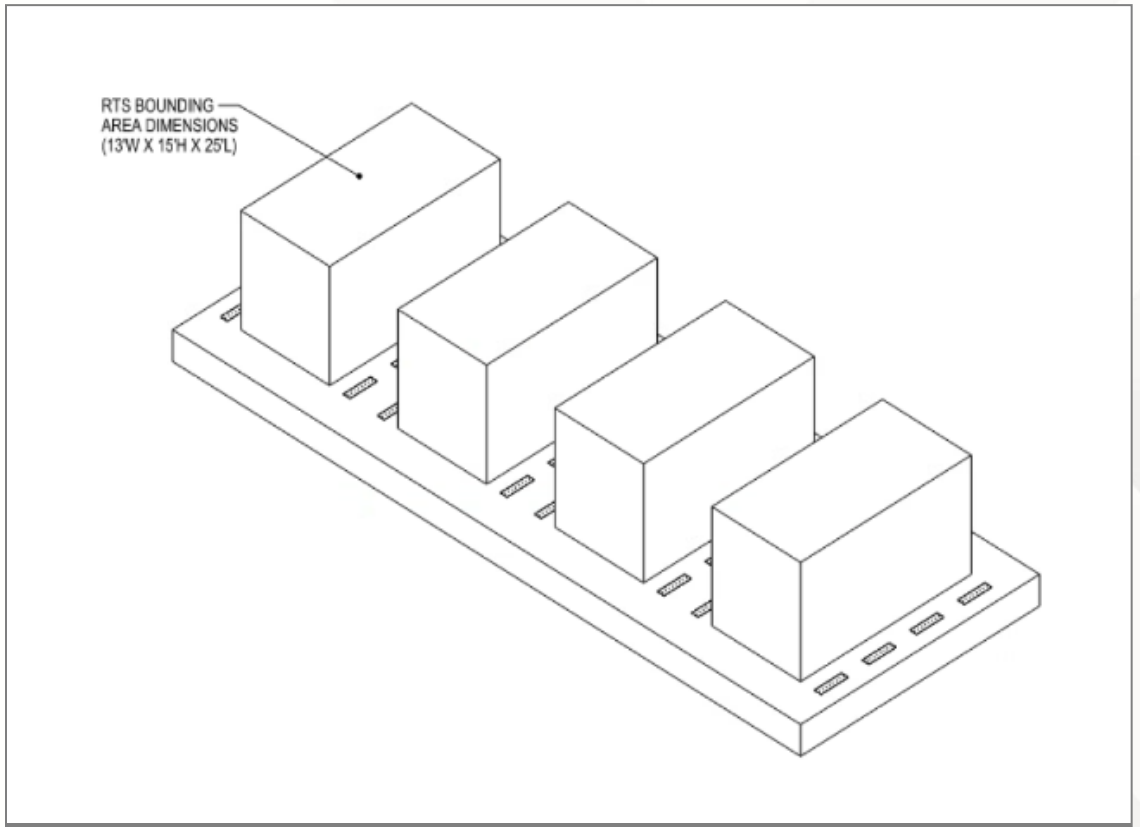
DOME Equipment and Infrastructure

RSWF Cooldown Pad:

- New permanent facility at Materials and Fuels Complex (MFC) for post-irradiation reactor management.
- Target construction completion by Q4 of FY2027
- Next steps (notional dates):
  - Final Design: 10/2025 – 7/2026
  - Contracting: 7/2026 – 8/2026
  - Construction: 9/2026 – 6/2027
- Integral to DOME ecosystem flow
- Decouples Idaho Environmental Coalition (IEC) and DOME schedules

IEC Reactor D&D Contract:

- Target placement by Q1 of FY2027
- Integral to DOME ecosystem



RSWF cooldown pad concept

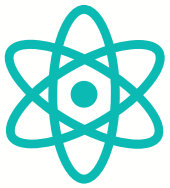
Ecosystem Path Forward

- **By July 2026**, complete design of the RSWF cooldown pad
- **By September 2026**, identify the next developer(s) going into NRIC-DOME
- **By September 2026**, begin construction of the RSWF cooldown pad
- **By October 2026**, place contract with Idaho Environmental Coalition for DOME reactor defueling and disposal

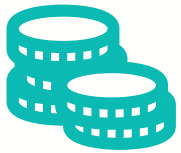
DOME equipment hatch and developer penetration

DOME v. Greenfield

DOME Offers:



Developer focus on Reactor design



Eliminates infrastructure costs

INL expertise

Developer support of Laboratory resources

Questions?

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www.nric.inl.gov

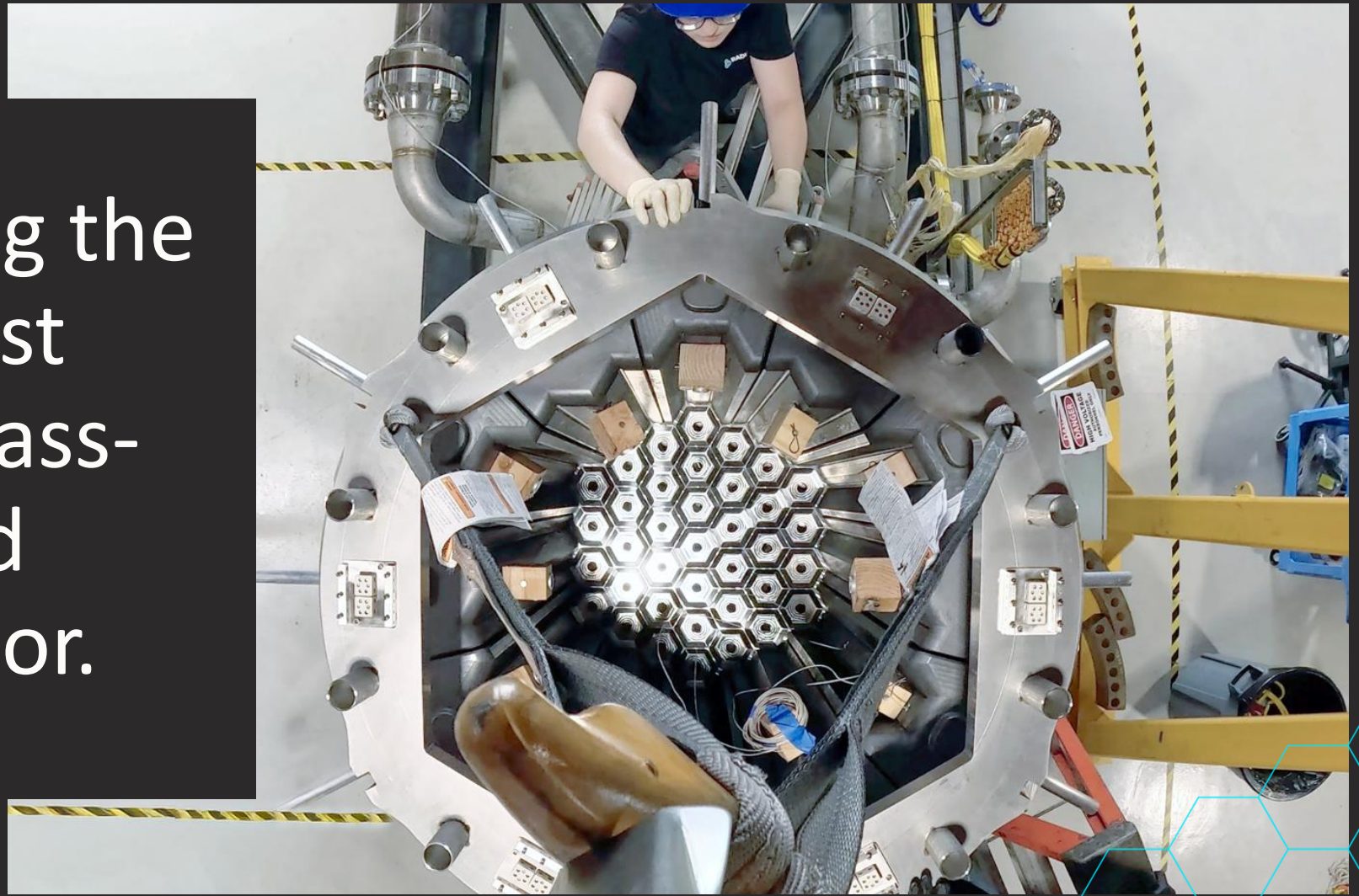
RADIANT

KALEIDOS DOME

NRIC PROGRAM MEETING

MAY 5, 2026

We’re building the world’s first portable, mass-produced microreactor.



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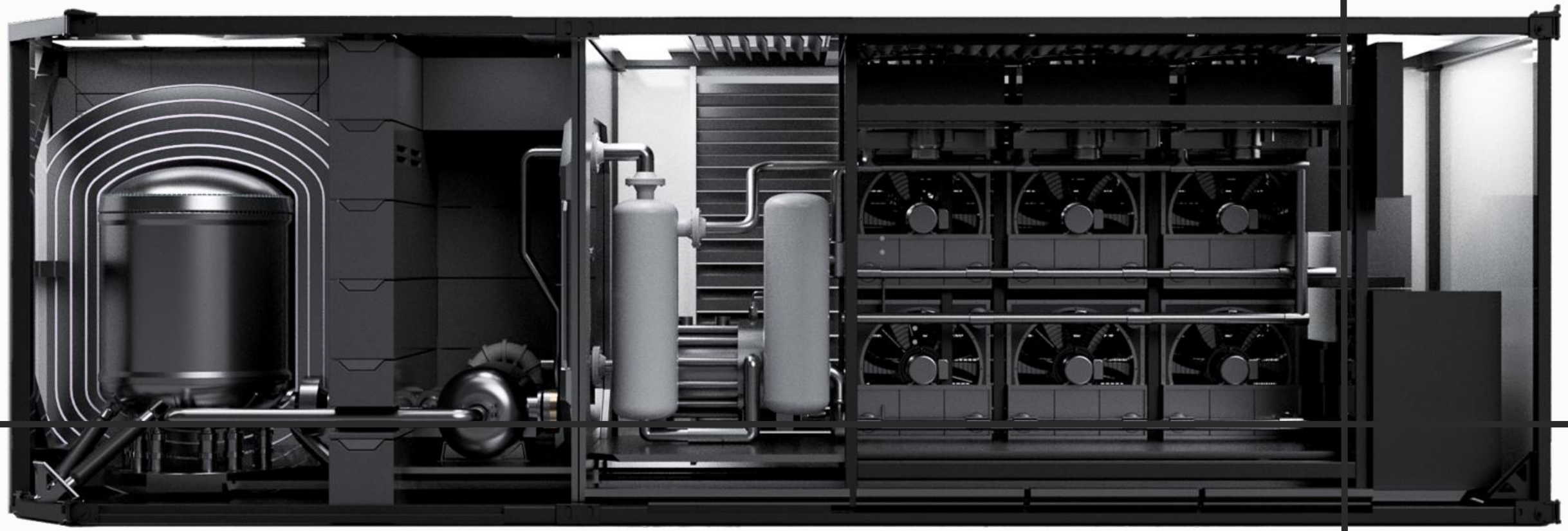
KALEIDOS



RADIANT

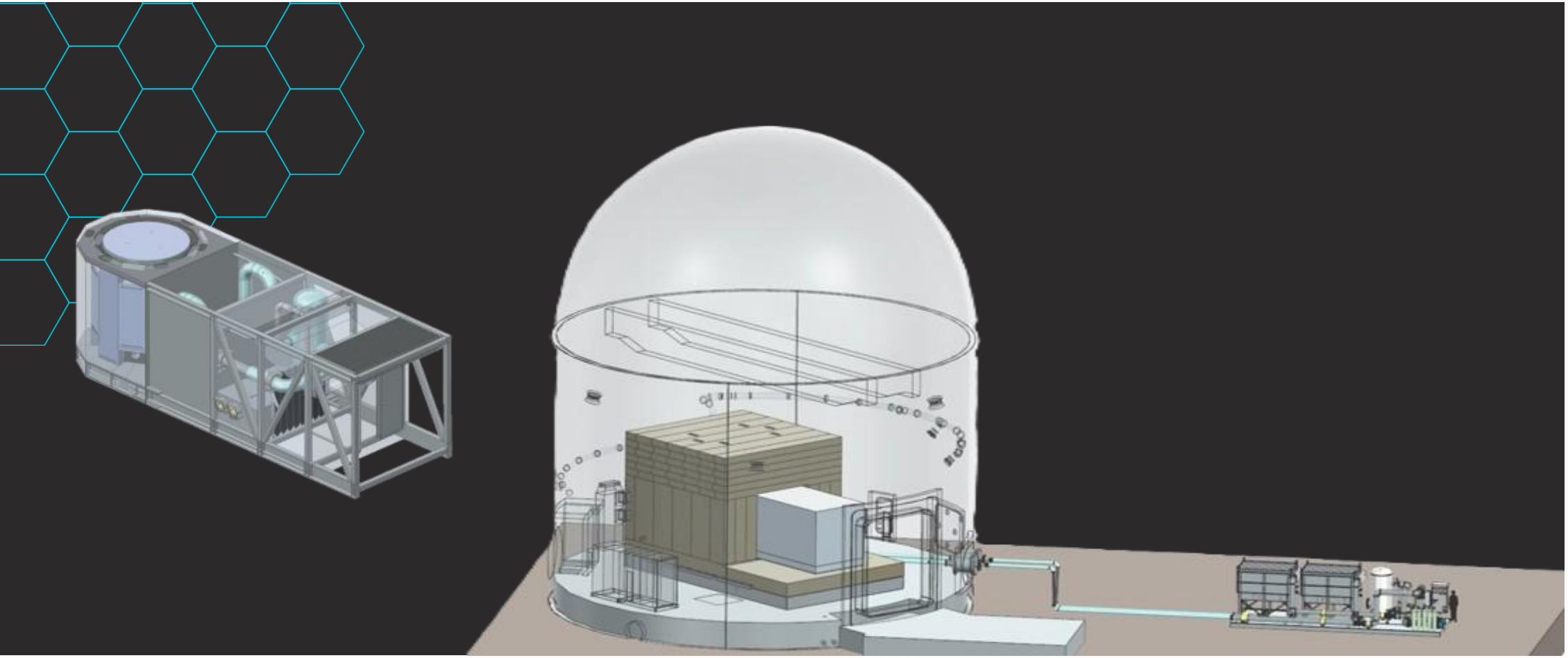
MEGAWATT IN A BOX

RADIANT

We’re the first to test in DOME.

RADIANT

DOME TEST



RADIANT

2026 Full Power Test Campaign

1	2	3	4	5
PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5
Ship, Install and Fuel KDU at DOME	Zero Power Critical	Operation above 1 MW thermal	Full Temp. and Power Operation	150 Hours Continuous Operation

RADIANT

DOME TO DOME

Click Here to Watch

RADIANT

DOME CRANE SYSTEM

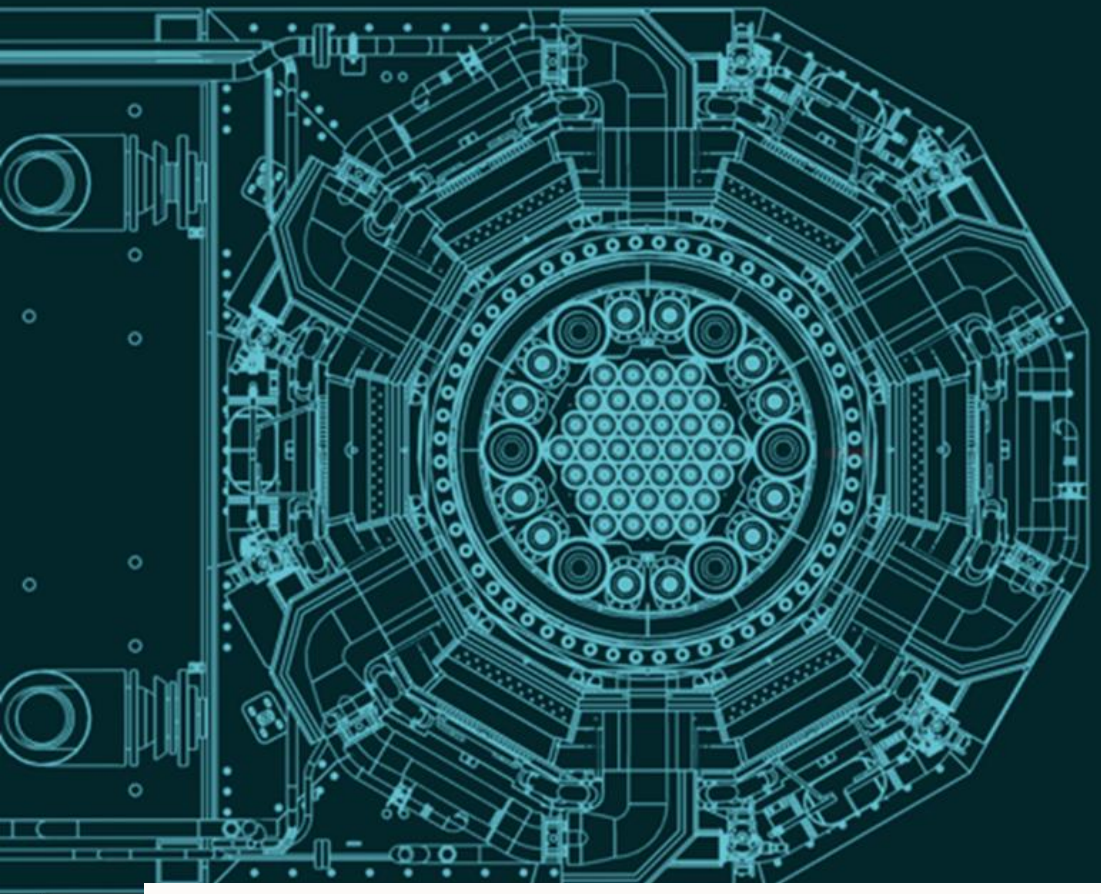
RADIANT

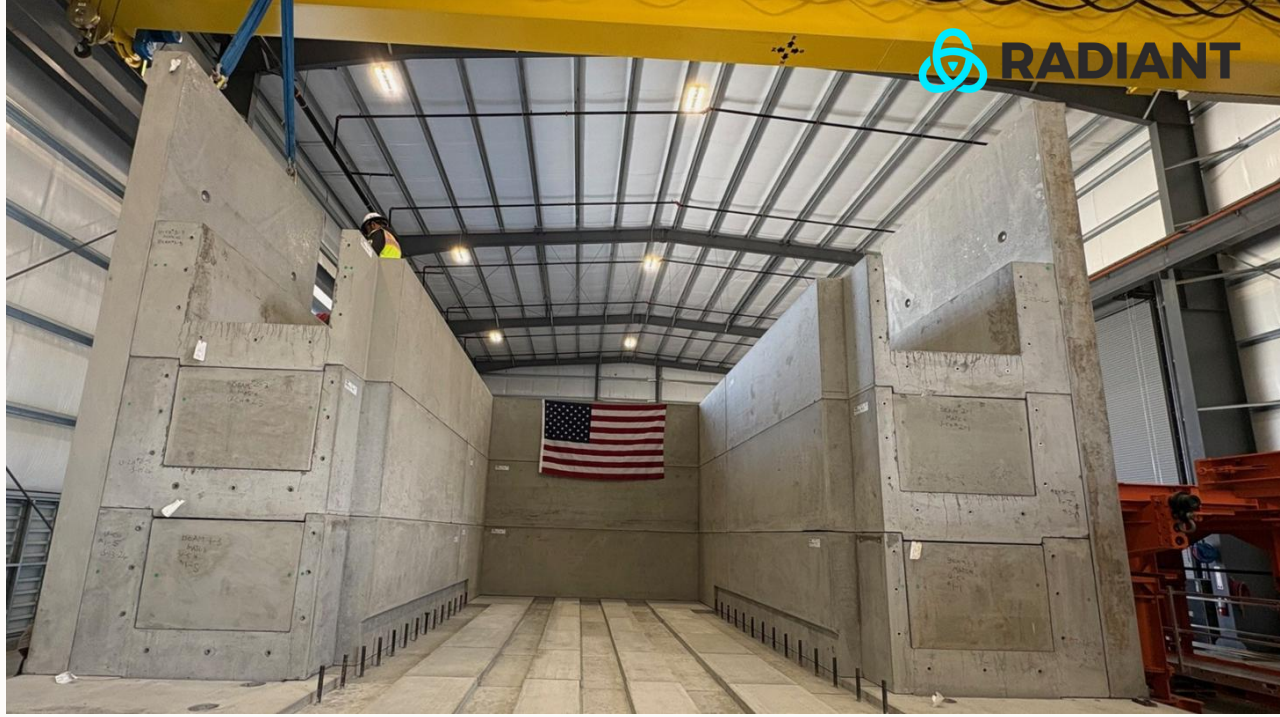
CRANE TESTING

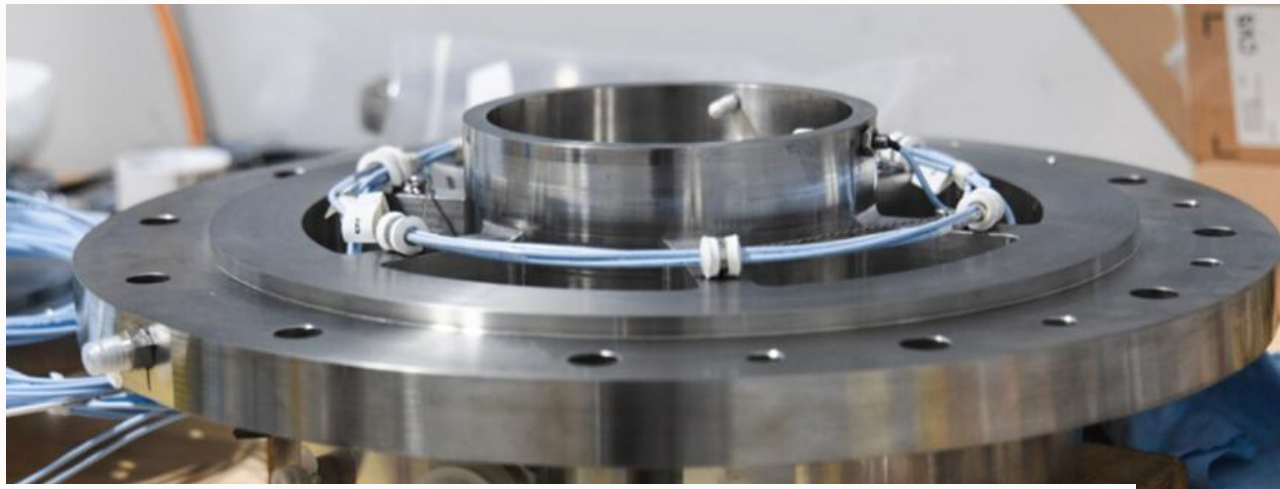
RADIANT

DARK - DOE Authorization Request for Kaleidos

Documented Safety Analysis – Section 7 Core Physics







Department of Energy review required before public release.

Further dissemination authorized to DOE and DOE contractors only; other requests shall be approved by the

KDU UPDATES & SUCCESSES

INL-RADIANT PARTNERSHIP

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CIRCULATOR TESTING

Click Here to Watch

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REACTOR OPERATIONS

Click Here to Watch

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National Reactor Innovation Center

Partnering with industry to deploy advanced nuclear at the speed of a startup

May 5, 2026

Brad Tomer

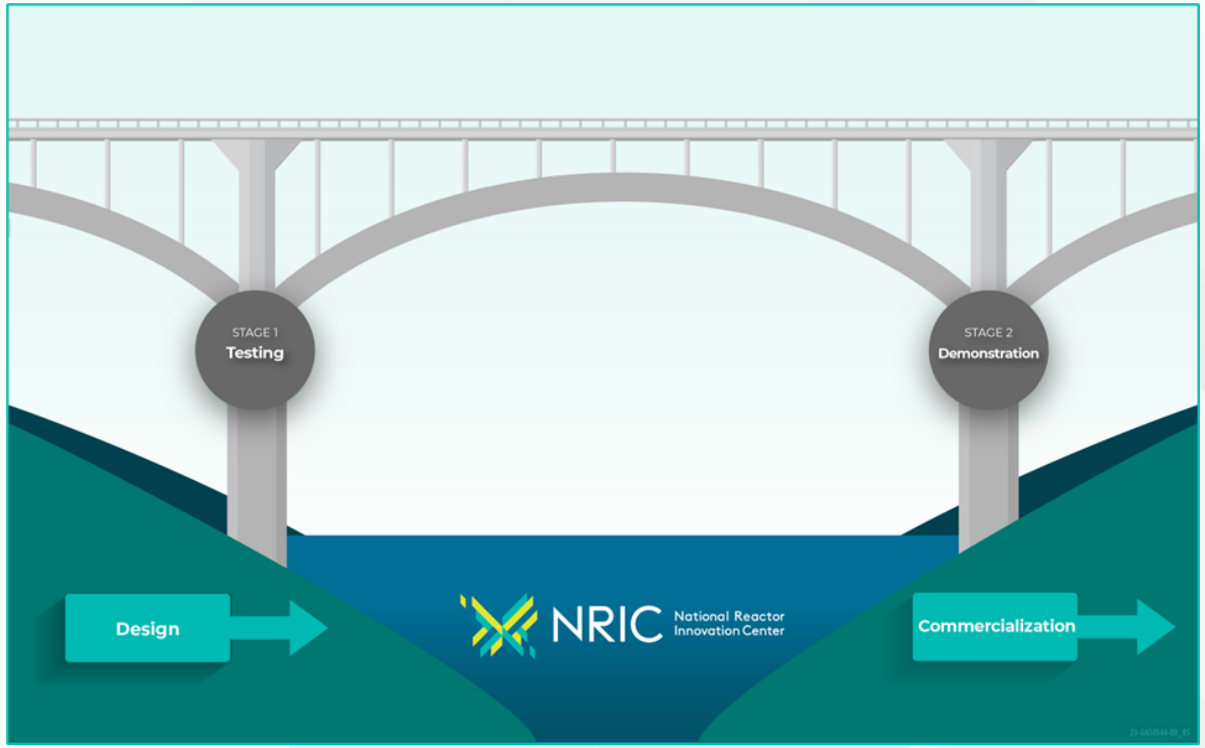
Director
National Reactor Innovation Center
Idaho National Laboratory
Brad.Tomer@inl.gov

MIS-25-85413

The National Reactor Innovation Center (NRIC) is a DOE program launched in October 2019

NRIC Enables Nuclear Reactor Tests & Demonstrations

- Authorized by the Nuclear Energy Innovation Capabilities Act (NEICA)
  - Department of Energy (DOE)-Office of Nuclear Energy
  - Headquartered at Idaho National Laboratory (INL) and part of Nuclear Science & Technology Directorate
- Partner with industry to bridge the gap between research and commercial deployment
- Leverage national lab expertise and infrastructure

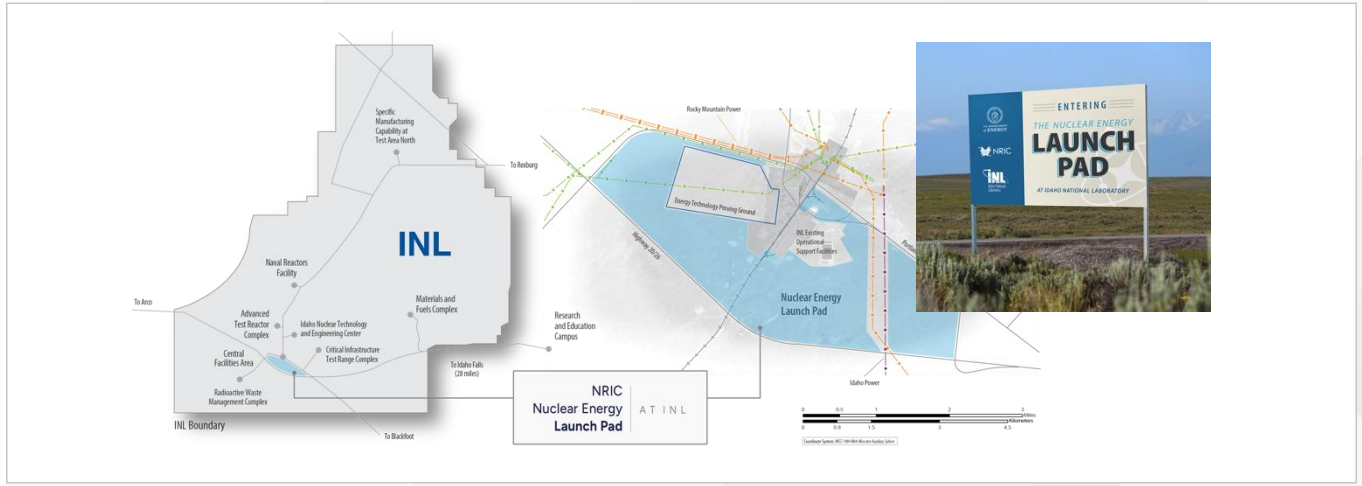


NRIC National Reactor Innovation Center

Portfolio Empowering Developers

NRIC's portfolio of facilities, capabilities and expertise is bridging the gaps identified by industry.

DOME ecosystem



Accelerating Nuclear Testing

- Advanced reactor test beds
- National Lab/Developer Partnerships
- Nuclear Energy Launch Pad
- Experimental infrastructure

Addressing Costs & Markets

- Advanced Construction Technology Initiative
- Digital Engineering for Nuclear
- Virtual Test Bed
- Maritime applications

NRIC-DOME is Open for Business

Demonstration of Microreactor Experiments *(DOME)*

- Built around repurposed EBR-II dome
- Designed for advanced microreactors up to 20 MWth
- Designed for reactors using <20% enriched fuels
  - High-assay low-enriched uranium (HALEU)
  - Low enriched uranium (LEU)

Progress since last year's program review

- Received Defense Priority Allocation System rating of DO – March 2025
- Directed by DOE to accelerate construction schedule – April 2025
- Completed construction and crane install – April 2026
  nearly a year ahead of schedule!
- Began Readiness Review April 27, 2026
- Issued scheduling RFA and selected first two tests in DOME
- Issued 2nd scheduling RFA for testing in DOME – **April 29, 2026**

Looking ahead

- Radiant's Kaleidos Demonstration Unit installation and testing
- Selection and scheduling of DOME's next reactor test
- Design & begin construction of reactor cooldown pad
- Establish defueling capability in partnership with IEC

DOME heat rejection piping

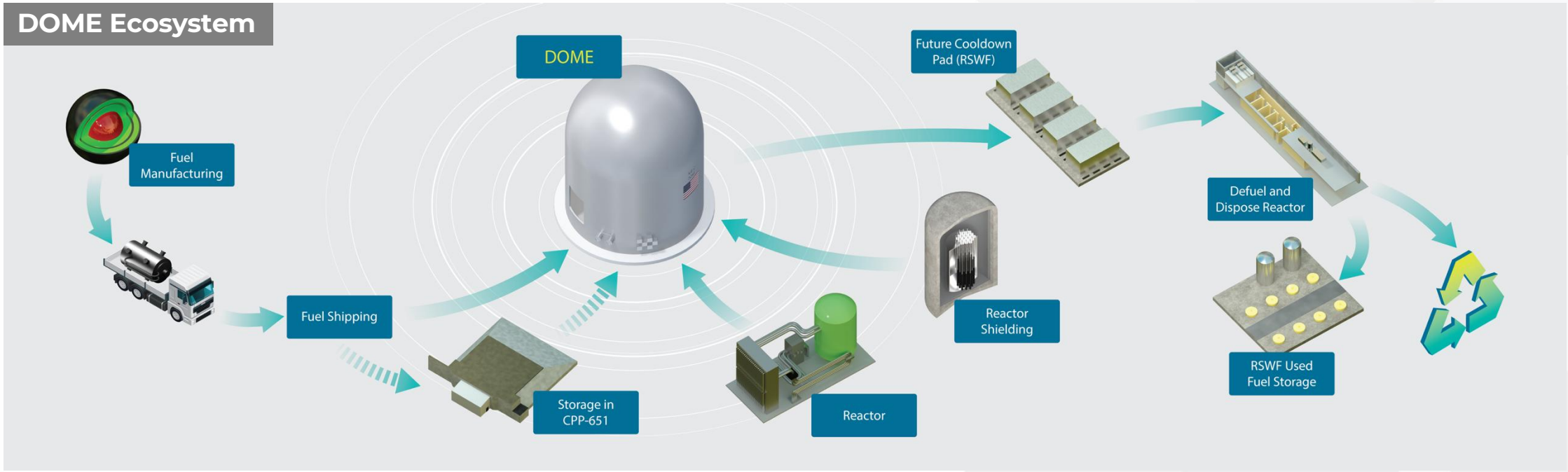
DOME polar crane

DOME testbed

NRIC National Reactor Innovation Center

DOME Ecosystem

Performing reactor experiments takes more than just the DOME facility. It requires integration of additional infrastructure, partners, procedures, and processes.



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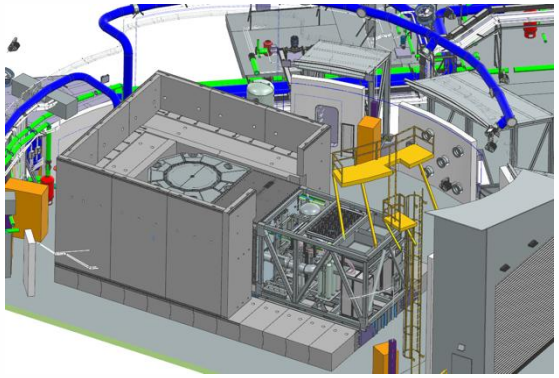
Radiant Kaleidos Demonstration Unit (KDU)

Kaleidos Demonstration Unit Arriving at the NRIC DOME



KDU Installation at DOME

KDU Shield block delivery at MFC 4/16/2026

General Information

Power:	**3.5 MW(th)**
License Authority:	**DOE Authorization**
Location:	**NRIC-DOME**
Target Operation Date:	**June 2026**

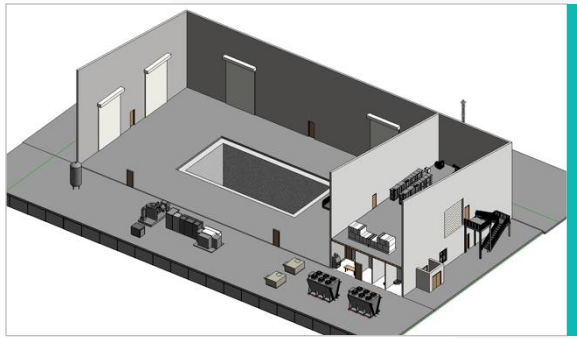
Critical Activities

NSDA submission to DOE-ID - 11/15/2025
PDSA submission to DOE-ID - 11/17/2025
DSA submission to DOE-ID
KDU arrives at INL
KDU Fueling
KDU Criticality

NRIC-LOTUS Test Bed

Laboratory for Operations & Testing in the United States (LOTUS)

Pivot driven by cost, constructability, and mission flexibility



Lower cost, greater flexibility, and a test bed aligned with future reactor innovation needs

LOTUS – ZPPR Facility Concept

LOTUS – Standalone LOTUS Facility

Key Constraints

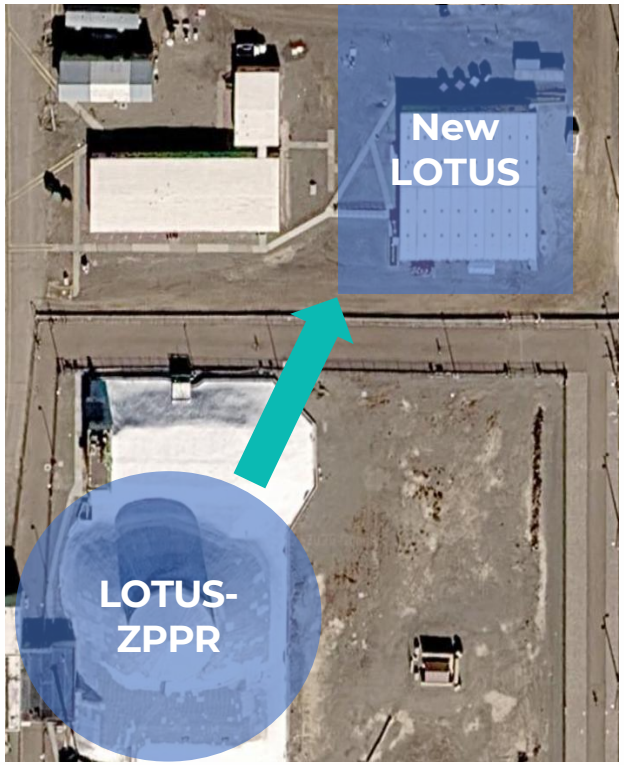
- Fixed size of ZPPR cell limited experiment scale and configuration
- Escalating costs as design matured and project became bid-informed
- Experiment bottleneck: 13’ x 13’ tunnel resulted in extensive in-cell fabrication
- Compliance-based safety posture limited operational flexibility and increased costs

Key Advantages

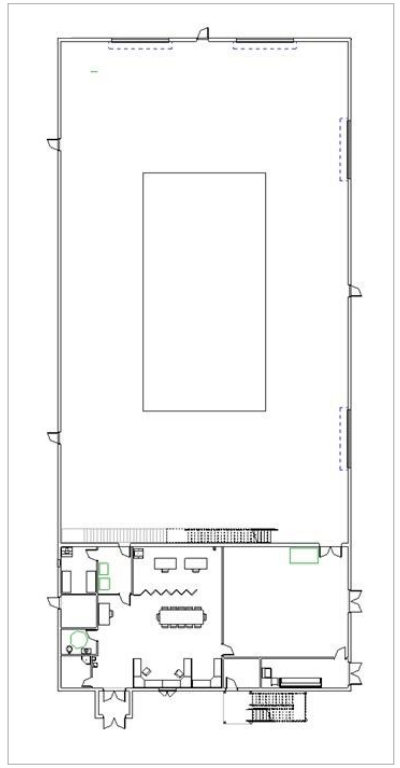
- Reduced construction cost (no legacy facility constraints)
- Expanded design flexibility for developers and test configurations
- Increased usable floor space and scalability using high bay concept with design-build option to incorporate a pit
- Performance-based safeguards and security posture aligned with new NE orders to reduce costs on developers

NRIC-LOTUS Test Bed

February 2026	April 2026	March 2027	Mid-Late 2028	
Developed Requirements and Specifications →	**Submitted Nuclear Safety Design Agreement** →	**Groundbreaking for Test Bed** →	**Open for Operations** →	**20 Year Operations Life**



Relocation of LOTUS



New LOTUS Base Floor Plan

Features

- Designed for >20% enriched high security fuels
- Hazard Category 2 Nuclear Facility
- Experiment Area Heat Removal System
- Ventilation system with radiological monitoring
- Instrument air and Argon gas systems available
- Available uninterruptable power supply, standby power – diesel generator

DOE Pilot Programs

Aalo · Terrestrial Energy · Oklo · Radiant · Antares · Natura Resources · Last Energy · Valar Atomics · Deep Fission · Atomic Alchemy

DOE Reactor Pilot Program

- At least 3 critical by July 4, 2026
- Request for Application – June ’25
- 11 Projects Selected – August ‘25

TRISO · Oklo · Terrestrial Energy · Standard Nuclear · Valar Atomics

DOE Fuel Line Pilot Program

- Support Reactor Program
- Establish domestic fuel supply chain
- Request for Application – July ’25
- 5 Projects Selected – September ‘25

Nuclear Energy Executive Orders (May 25)

- Reinvigorate the Nuclear Industrial Base
- Reform Nuclear Reactor Testing at DOE
- Deploy Advanced Nuclear Reactor Technologies for National Security
- Reform the Nuclear Regulatory Commission

Rapid Response Team

Established cross-functional team in December 2025.

Purpose:

1. **Rapid action** on existing DOE pilot program requests
2. **Framework of tools** for rapid response to new requests

- Standard agreement templates
- Interface plan template
- Standard T&C's with applicability matrix
- Siting and regulatory scoping checklists
- Menu of services
- Subject matter expert list

Project Scope

	ID #	Required Information	Reference
☐	A.1.1	An accurate and properly written scope of work (*see CLOA Overview & Instructions*)	

Site & Environmental Context

	ID #	Required Information	Reference
☐	A.2.1	Any known environmental constraints or concerns identified by the partner (for example: proximity to wetlands, past contamination, known sensitive areas)	
☐	A.2.2	Any previous studies, surveys, or environmental documents related to the project site that the partner can provide	

Special Materials & Hazards

	ID #	Required Information	Reference
☐	A.3.1	Use of any particularly hazardous chemicals (for example: strong oxidizers, highly toxic gases)	
☐	A.3.2	Use of large batteries, hydrogen systems, or other significant energy storage systems	
☐	A.3.3	Any explosives, energetic materials, or similar items proposed	
☐	A.3.4	Any unique safety or hazard features important to understanding the project	

Radiological Information

	ID #	Required Information	Reference
☐	A.4.1	Description of any radiological sources, materials, or fuel to be used	
☐	A.4.2	Approximate quantities or activity levels, if known	

Partial scoping checklist

Example Rapid Response Accomplishments

The team's senior-level decision-makers quickly resolved multiple emergent issues. Here is a sampling:

- Established Criticality Safety Program in **six weeks**
- PDSA authored and submitted to DOE in **39 days**
- **Approved contract in 18 days** from final partner comment
- Added more than **2,000 documents** to the NRIC Reference Library and made available to industry partners:
  - BEA processes (crit safety, MC&A, FHA)
  - MARVEL
  - MFC
  - TREAT
  - EBR-II
  - FCF
  - FFTF
  - FMF
  - VTR

Partner site preparation

Additional Test Beds

RACE and NRAD NRS – Developer Funded

RACE Test Bed
Reactor And Critical Experiments (RACE) Facility

Overview

- Originally housed ML-1 reactor in 1960s
- Currently supports MFC sodium waste management activities

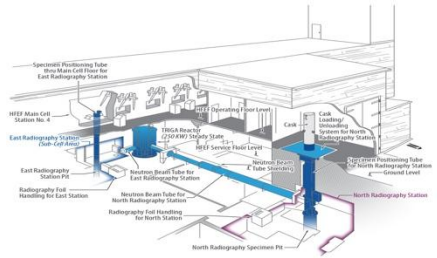
Features

- 32’ tall × 20’ wide rollup door
- 30-ton crane; 32 ft hook height
- 10’ wide x 15’ long x 20’ deep pit

Status

- Upgraded to Hazard Cat 2 nuclear facility
- Initial construction completion mid 2026
- Final construction completion in 2027

NRAD NRS (3N) Test Bed
Neutron Radiography (NRAD) Reactor North Radiography (NRS) Station Test Bed



Overview

- Located below MFC’s Hot Fuel Examination Facility (HFEF)

Features

- Personnel entry to NRS via 11.5-ton shield door
- 18’ tall × 14’ wide rollup door
- 30” diameter “pit” that extends below the shielded cell 34’
- HAZCAT 2 CAT B Reactor Facility
- Radiation shielding, 6’ thick concrete walls
- 5-ton bridge crane
- Configuration funded by Deployable

Nuclear Energy Launch Pad Established March 5, 2026

Replaces/Expands Pilot Program

- Fast-track the testing of advanced nuclear technologies
- Strengthen domestic nuclear infrastructure

TWO PATHS

1. Launch Pad – INL

- Land set aside for testing with coordinated site characterization, shared utilities and infrastructure
- Open to DOE-Authorization

2. Launch Pad – USA

- Location proposed by Applicant
- Open to DOE Authorization

Requests for Application (RFA)

- Issued: April 29
- Industry Day: May 19
- Due: July 8
- Includes both pathways
- Process similar enough to pilot program that current pilot program applicants can easily apply

Establish contracts with participants for siting

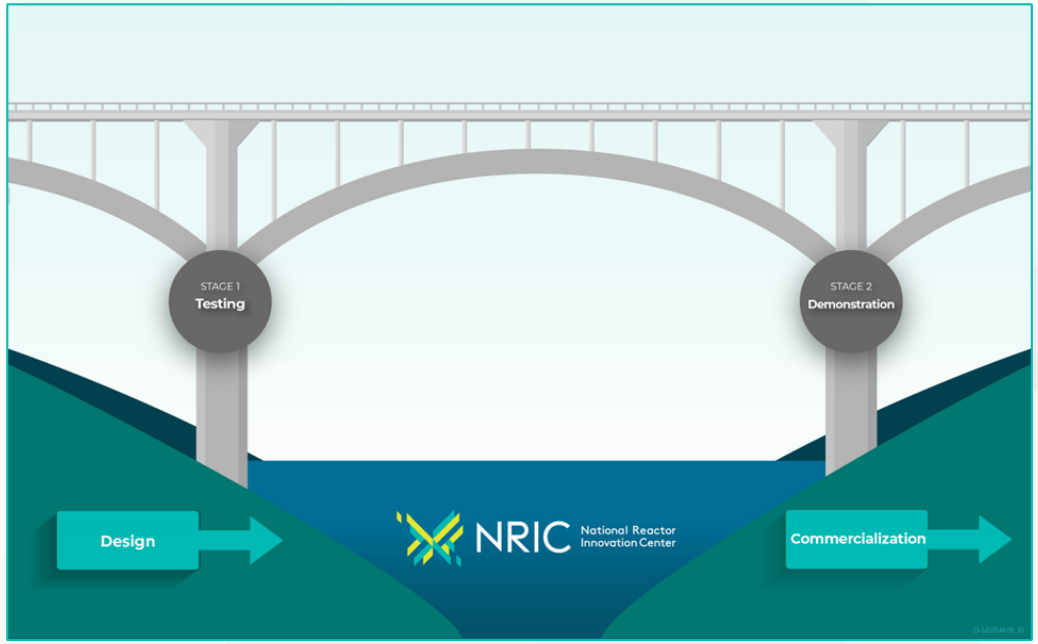
- OTAs with DOE
- SPPs with INL or other National Labs as appropriate

Provides a solution to backlog of pilot program applicants

- *4 selectees transferred*
- *3 applications transferred*

National Lab Resources, Delivered Through Industry Partnerships

- 29 Active contracts (SPPs and CRADAs)
- 19 Developers
- Broad range of scope
  - Design, siting, construction, commissioning, operation, and decommissioning
  - Support developer in obtaining DOE Authorization
  - Fuel Storage
  - Modeling & Simulation
  - Irradiation & PIE
  - Fuel design & fabrication
- >$500M value



- NRIC Technical Program Manager – each developer
- Access to NRIC deployed digital engineering and project management tools
- Access to other labs for resources

NRIC Experimental Infrastructure

Purpose:

- Experimental facilities de-risk the path to a fully fueled reactor test
- Component and system validation in a relevant environment reduces technical uncertainty before partners build full system

Operational Facilities:

- **METL** – *Argonne National Laboratory*
  - Supports liquid metal fast reactor design
  - Test small/intermediate-scale components using purified R-grade sodium
- **Helium Component Test Facility** – *Idaho National Laboratory MAGNET Facility*
  - Supports High Temperature Gas Reactor design
  - Test components in non-irradiated environment at typical reactor operating pressure and temperature

Recent milestones:

- Creep Frames opened in September 2025
- Molten Salt Thermophysical opened in February 2026

Mechanisms Engineering Test Lab (METL) [Operating since 2018]

Helium Component Test Facility [2022]

MSTEC: First-of-a-kind facility

The **Molten Salt Thermophysical Examination Capability (MSTEC)** – a state-of-the-art, shielded argon glovebox designed for examining both irradiated and nonirradiated nuclear fuel materials – **is open for business.**

Request for application coming soon!

MSTEC Unveiling on Feb. 19, 2026

MSTEC contains unique equipment

MSTEC Benefits

- Supports fuel cycle R&D, advanced fuel characterization, and nuclear safeguards.
- Safety systems in place and a wide range of capabilities to handle a wide range of materials: chlorides and fluorides (salts), actinides (materials use in reactor fuels, including uranium), and reactive gases.
- Enables fuel salt synthesis and purification for exploring novel fuel compositions.
- Allows researchers to work with real materials at scale for rapid experimentation and technology validation to accelerate innovation.

NRIC Hot Cell Creep Frames

- **Purpose built** to accelerate qualification of advanced reactor materials for long-term, high-temperature operation
- **Strategically installed** in a shielded enclosure to enable mechanical creep testing of irradiated materials – an INL-unique capability
- **Designed** to test in high temperature environments (600+ °C)

Ribbon cutting ceremony at MFC's Structural Properties Laboratory on September 9th, 2025.

Partnership-ready and operational; SAM.gov application coming soon.

NRIC Creep Frames installed in a shielded enclosure at MFC's Structural Properties Laboratory

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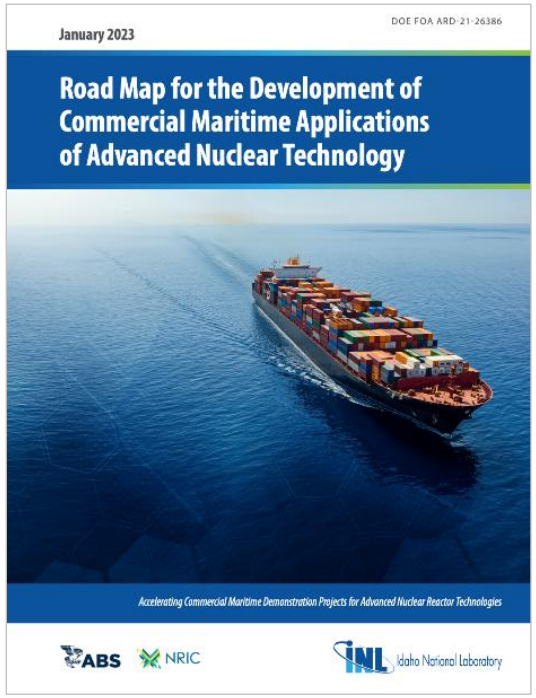
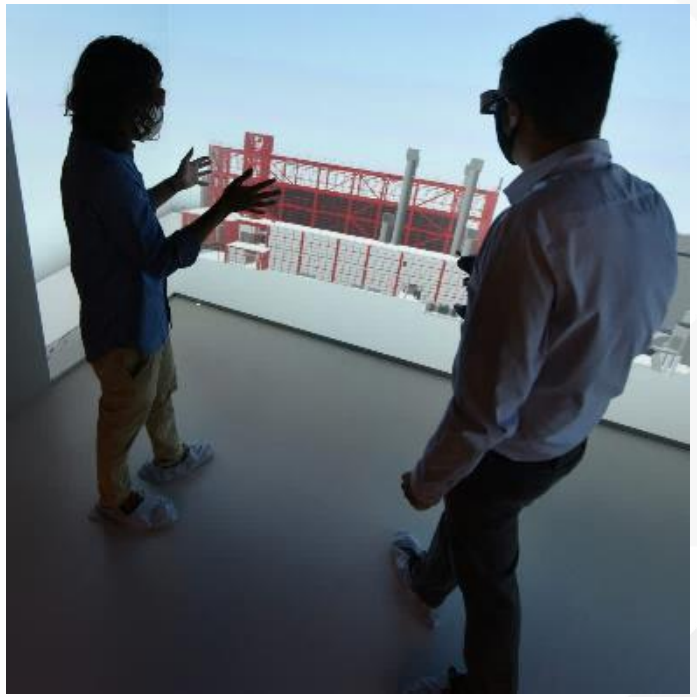
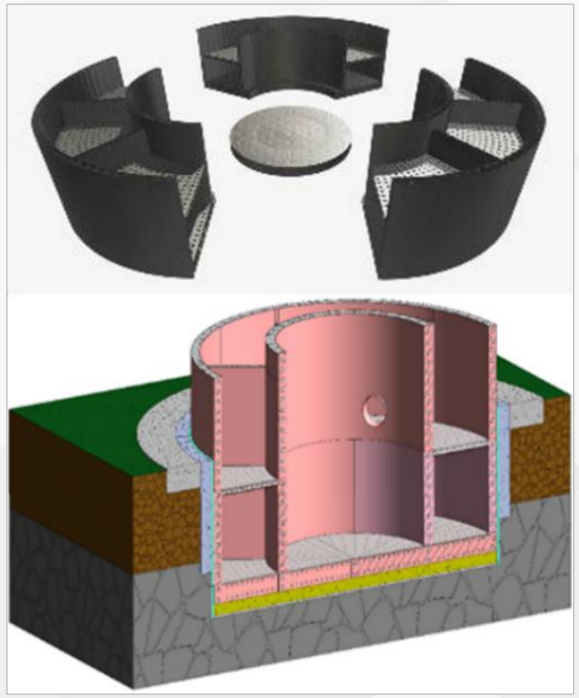
Addressing Cost and Markets

- Advanced Construction Technology Initiative
- Digital Engineering & Knowledge Sharing/Lessons Learned
- Demonstration/Deployment Opportunities (Maritime)







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NRIC Digital Engineering (DE)

What? An integrated digital approach using authoritative sources of truth for data and models across disciplines to support project lifecycle from concept through disposal.

Why? Large nuclear projects often experience cost overruns and schedule delays. Digitalization improves predictability, reduces rework, and enhances overall deployment viability

Thrust Areas

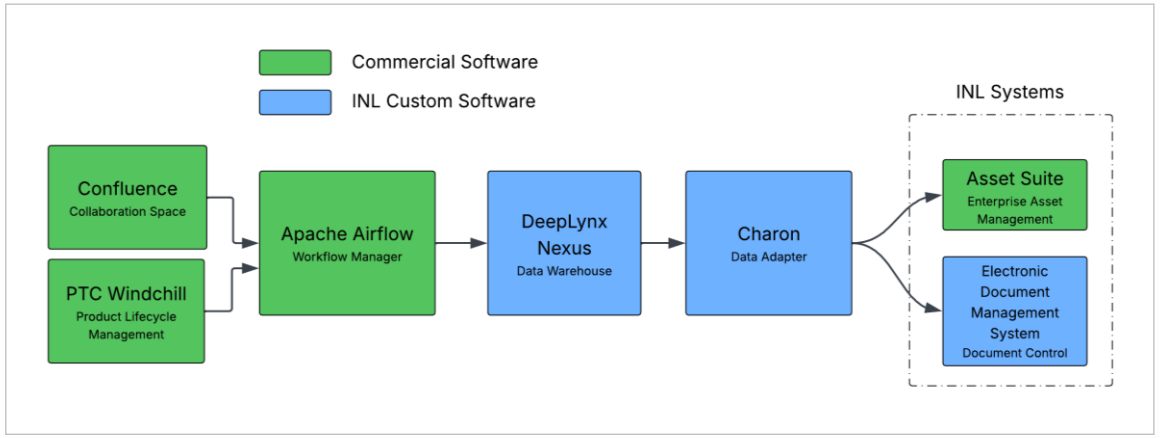
- Demonstrate and deploy facility-scale digital twins
- Modernize core engineering and operational practices
- Augment the nuclear engineering Process using AI

FY26 Highlights

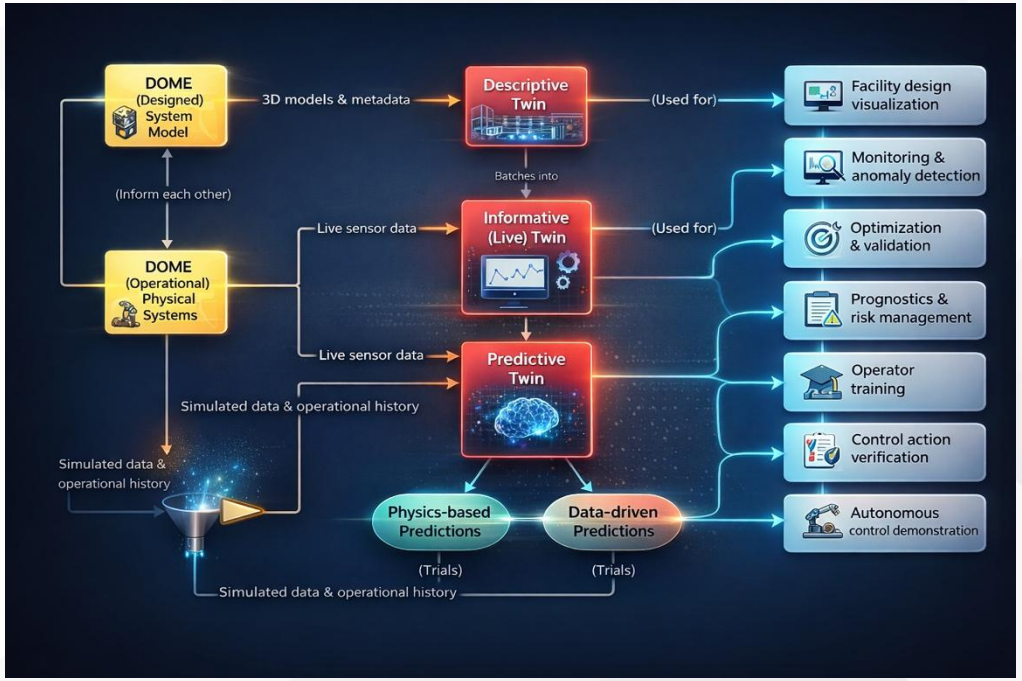
→ Completed predictive model development for the DOME Digital Twin

→ Converted DOME operating procedures for the digital procedure system

→ Launched NRIC-GPT



NRIC digital engineering workflow for synchronizing Windchill to Asset Suite and EDMS



NRIC-DOME digital twin workflow enabling real-time monitoring and predicting future DOME states and control response. This image includes AI-generated content.

NRIC National Reactor Innovation Center

Integrating AI to the Nuclear Safety Documentation Development Process

Connecting NRIC's Digital Engineering to AI

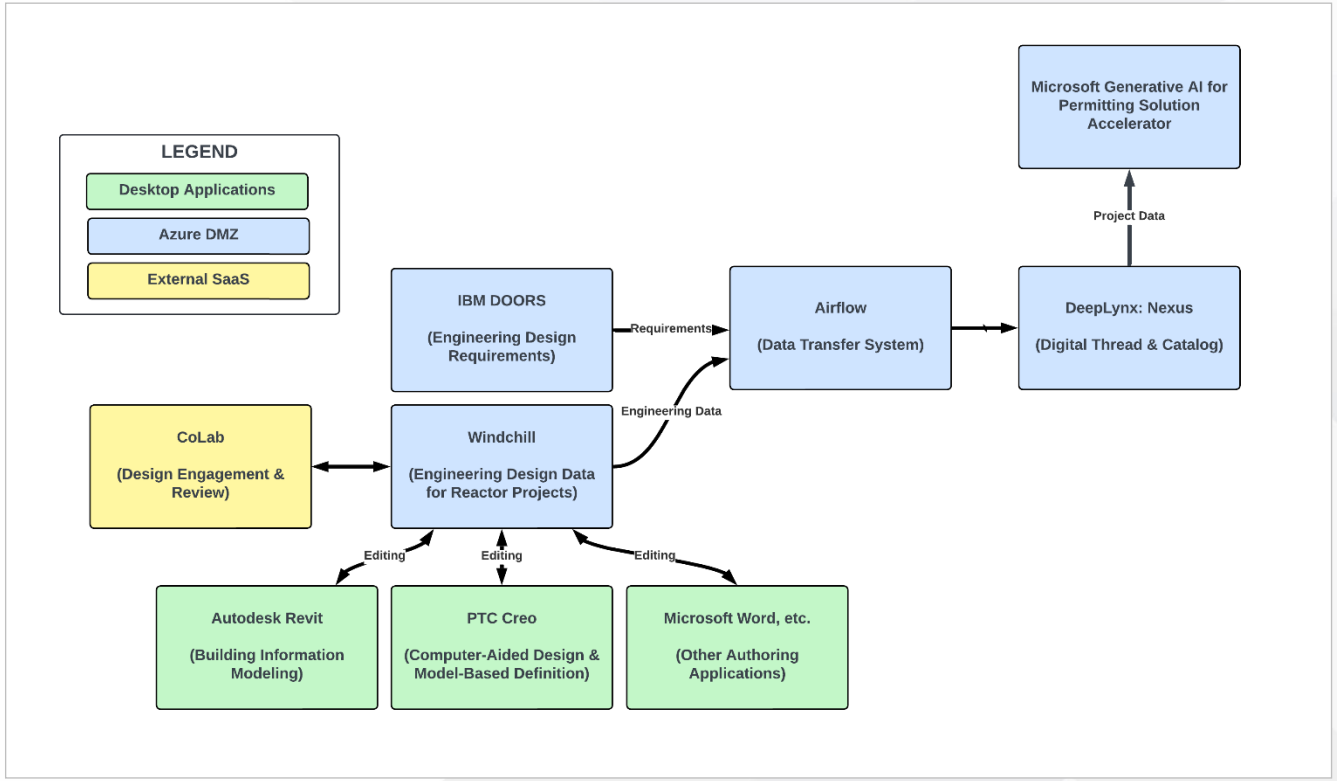
What NRIC Delivered (2024–2026):

- Developed Digital DSA Framework integrating:
  - AI (LLMs) + Digital Engineering Tools (DOORS, DeepLynx, Windchill)
  - Single Authoritative Digital Thread
- Created Pilot Analyses: HTGR @ DOME
- Generated Technically Reviewable DSA Chapter

Results:

- INL SME evaluation shows **~50% reduction** in effort to produce product
- Maintained technical credibility + regulatory structure
- Accelerated draft generation → review-ready documents

~50% Reduction in Effort for Safety Basis Document Development



Flow of Information to AI LLM from NRIC Digital Twin

Transforming Nuclear Processes

AI + Digital Thread = Next Generation Authorization & Engineering

OBSERVED LIMITATIONS

- Constraints of FedRAMP Large Language Model (LLM) (GPT-4.o)
- Limitations on context retention
- Limited extraction of tables and graphs from existing documents
- Inability to create or reuse figures

NEXT

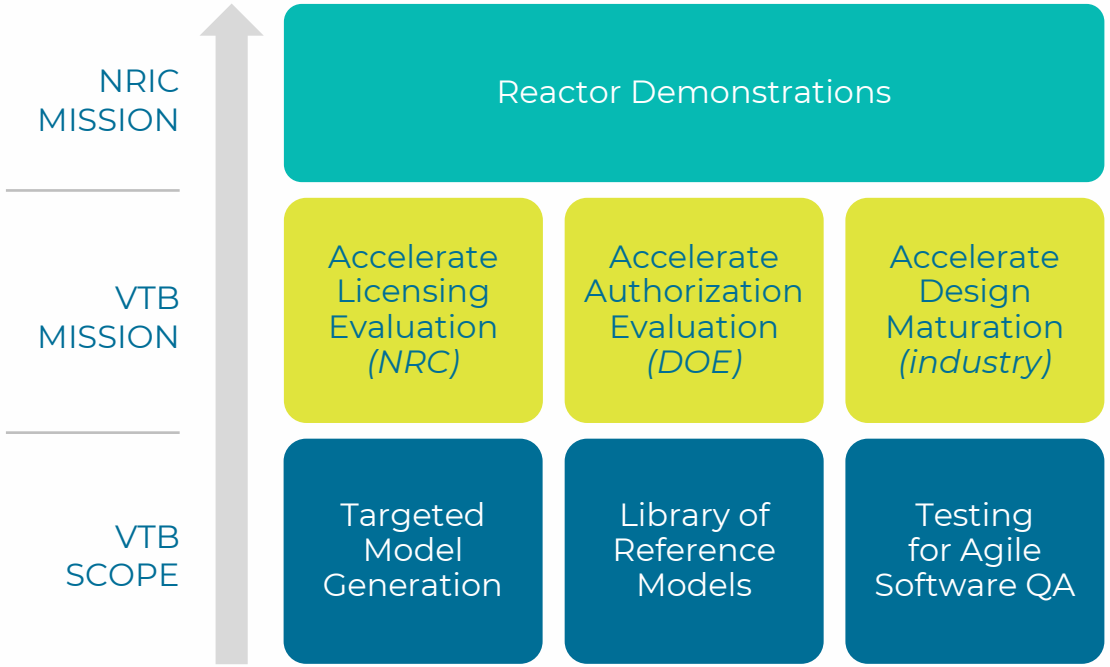
- Expand framework to:
  - Full DSA
  - TSRs, hazard analyses, supporting engineering docs
- Enable:
  - Faster review cycles with traceable data
  - Augment the nuclear engineering process using AI
- Overcome current constraints:
  - Access to new AI model on Government Cloud

VISION

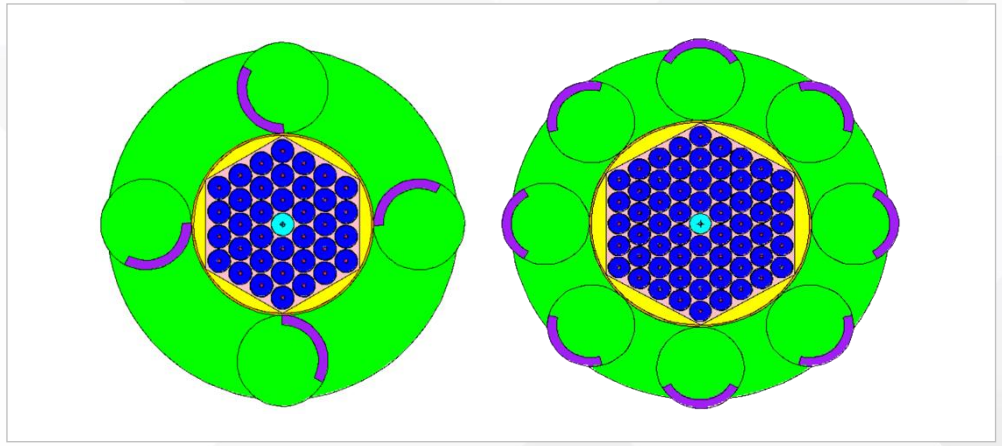
- Fully integrated Digital Ecosystem + AI
- Capabilities:
  - Rapid generation of complete authorization packages
  - Updates via live digital thread
- Outcome:
  - Reduced engineering timelines
  - Accelerated nuclear deployments

NRIC Virtual Test Bed (VTB)

- **Mission:** accelerate the deployment of advanced reactors using advanced modeling and simulation (M&S) tools for design, evaluation, and licensing.
- The VTB is a central location for stakeholders to access a wide variety of reactor models including liquid metal-cooled, gas-cooled, molten salt and microreactors.
- Active users increased by 78% to an average of 200/week



STARTR core design (left) and University of Michigan design (right)



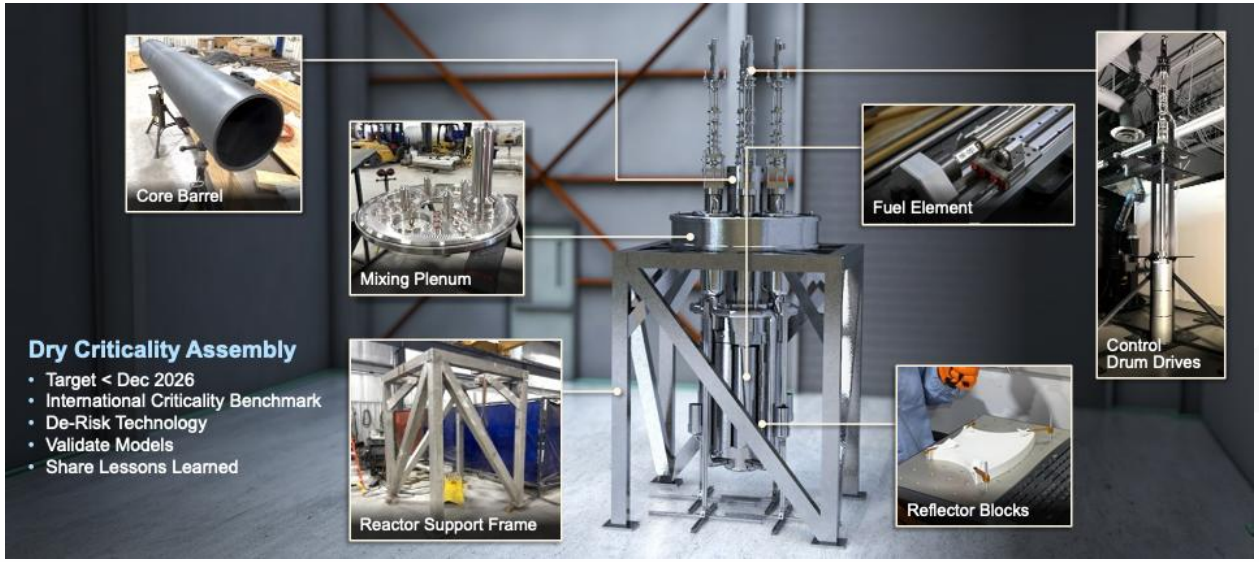
Sodium-cooled Thermal-spectrum Advanced Research Test Reactor

FY25-26 Case Study

- **FY25:** Developed and released an open-source MARVEL "STARTR" model in partnership with DOE's Microreactor Program
- **FY26:** Mentored a University of Michigan senior design team that adapted the STARTR design for defense applications

MARVEL Data & Documents Developer Accessible

- DOE Signed 'Intent to Share' letter enabling the program to remove export control designation from MARVEL data as appropriate (subject to caveats)
- MARVEL information can be used to inform designs of commercial vendors, train university students, enable more realistic R&D, support AI training, etc.



MARVEL Status

MARVEL data hosted on NRIC Confluence.
Request open access at:
https://confluence.de.inl.gov/

Documents Hosted on Confluence:

Document Type	No. of Documents
Calculations	57
CGIs	31
FORs/TFRs	7
Licensing	3
Other	4
PCAT Testing	2
Plan	9
Reports	5
Specifications	17
Drawings	56 (+ 225 coming soon)

Nuclear Quality Assurance (QA) Improvement Initiatives

- **Follow-on from FY25 NQA Feasibility Study:** Organized a workshop that was well attended by all industry stakeholders and identified pathways to address cost and schedule challenges.
- **In FY26, NRIC is focused on civil structures:** Funding industry-led projects that result in:
  - Topical reports:
    - (1) risk-informed performance-based safety classification of certain civil structures, and
    - (2) mapping QA best practices in non-nuclear but safety-related (e.g., earthquake-safe hospitals in California) projects to nuclear
      - Industry workshop on right-sizing civil structures QA (May 19th in Menlo Park, CA)
  - White paper on optimizing QA requirements in reinforced-concrete (RC) construction through improvements in design code (ACI 349)
- Projects **execute the pathways** identified and provide **regulatory assurance** for designers looking to use improved QA strategies.

NRIC

NEI NUCLEAR ENERGY INSTITUTE

EPRI ELECTRIC POWER RESEARCH INSTITUTE

NRIC National Reactor Innovation Center

Enabling Maritime Applications

Maritime Nuclear Application Group:

- Partnership with American Bureau of Shipping (ABS) and Morgan & Lewis Law Firm
- 209 members representing 110 companies

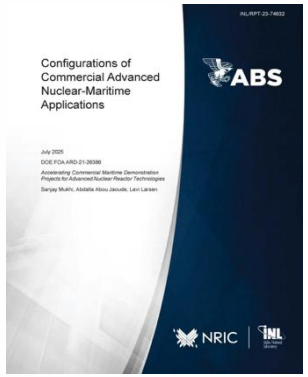
Interagency Working Group:

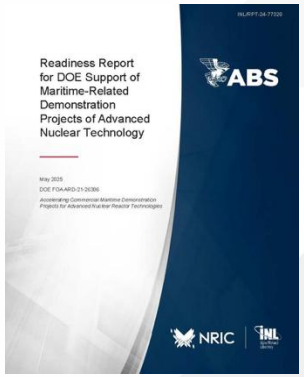
- Department of Energy (NE; NNSA); Department of Homeland Security, (USCG); State Department; Department of Transportation (MARAD); Department of Interior (BOEM)

Year in Review: Published 4 studies in partnership with ABS

Ongoing efforts:

- Oil and gas (O&G) concept of operations – stage gate of floating nuclear power plants (FNPP) and O&G platform projects.
- Reactor technology suitability and modeling under maritime conditions/ motion
- Port siting study – feasibility study of small nuclear reactors for maritime ports





*MNAG is a **research hub** and **resource center** that brings together experts from the maritime and nuclear energy sectors to facilitate the demonstration of advanced nuclear technologies for a range of marine applications.*

NRIC National Reactor Innovation Center

NRIC Accomplishments: A Landmark Year

- DOME open for business
  - Selected first participants
  - Initiated second scheduling application process
- MSTEC open for business
- Creep Frames deployed in SPL
- LOTUS pivot from ZPPR to new build
- Nuclear Energy Launch Pad established
  - Selected first participants
  - Issued request for applications
- Completed predictive model development for the DOME Digital Twin
- Converted DOME operating procedures for the digital procedure system
- Numerous accomplishments with Developers

Multi-Program NRIC/Industry Partnerships

NS&T
MFC
ATR
CFA
& Other
National Labs

26-50349

Select DOE Pilot Programs

Aalo | ANTARES | ATOMIC ALCHEMY | OKLO | RADIANT

LAST ENERGY | TERRESTRIAL ENERGY | VALAR ATOMICS | STANDARD NUCLEAR

Launch Pad

RADIANT | General Matter | DEPLOYABLE.energy | NuCube Energy | Idaho State University

Other Early Engagement

arc CLEAN TECHNOLOGY | EXODYS ENERGY | BLYKALLA | ZettaJoule | Nuclea | CLEAN CORE THORIUM ENERGY | FISSIONAIRE

Advanced Reactor Demonstration Program

- **Natrium Reactor** Sodium-cooled reactor + molten salt energy storage system (TERRAPOWER)
- **XE-100** High-temperature gas reactor (X-ENERGY)
- **BWXT Advanced Nuclear Reactor (BANR)** High-temperature gas-cooled microreactor (BWX TECHNOLOGIES)

NRIC serves as a hub, bringing the best of the National Laboratories to bear for successful deployment of private industry-developed advanced nuclear technology.

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NRIC Digital Engineering

NRIC-DOME Digital Twin

Thomas Folk – National Reactor Innovation Center
Luis Nunez - Autonomous Engineering
Jack Cavaluzzi – Autonomous Engineering

5/13/2026

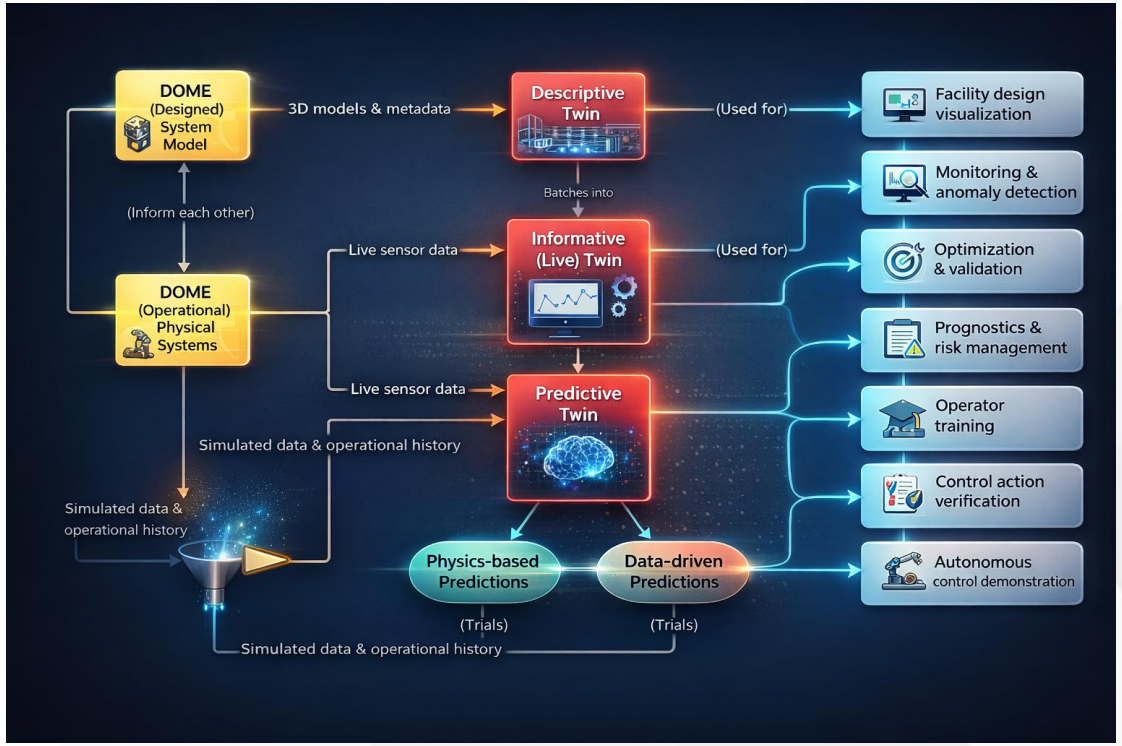
NRIC Digital Engineering (DE)

What? An integrated digital approach using authoritative sources of truth for data and models across disciplines to support project lifecycle from concept through disposal.

Why? Large nuclear projects often experience **cost overruns** and **schedule delays**. Digitalization improves predictability, reduces rework, and enhances overall deployment viability

Thrust Areas

- Demonstrate and Deploy Facility-Scale Digital Twins
- Modernize and Improve Core Engineering and Operational Practices
- Augment the Nuclear Engineering Process Using Artificial Intelligence



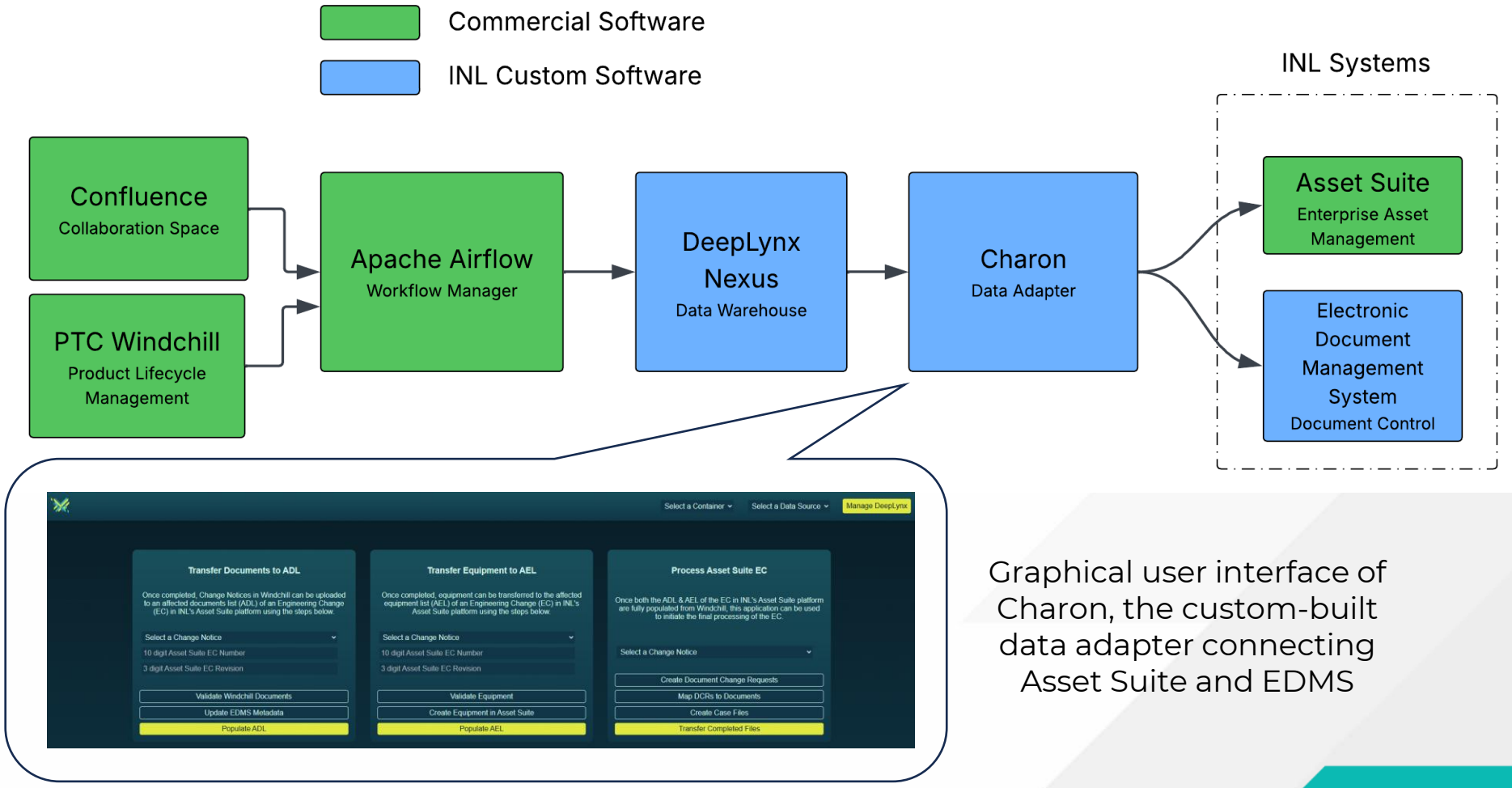
NRIC-DOME digital twin workflow enabling real-time monitoring and predicting future DOME states and control response. This image includes AI-generated content.

NRIC-DOME Digital Twin Video

Click Here to Watch

Modernize Engineering Practices

Integrate Windchill with INL Legacy Systems



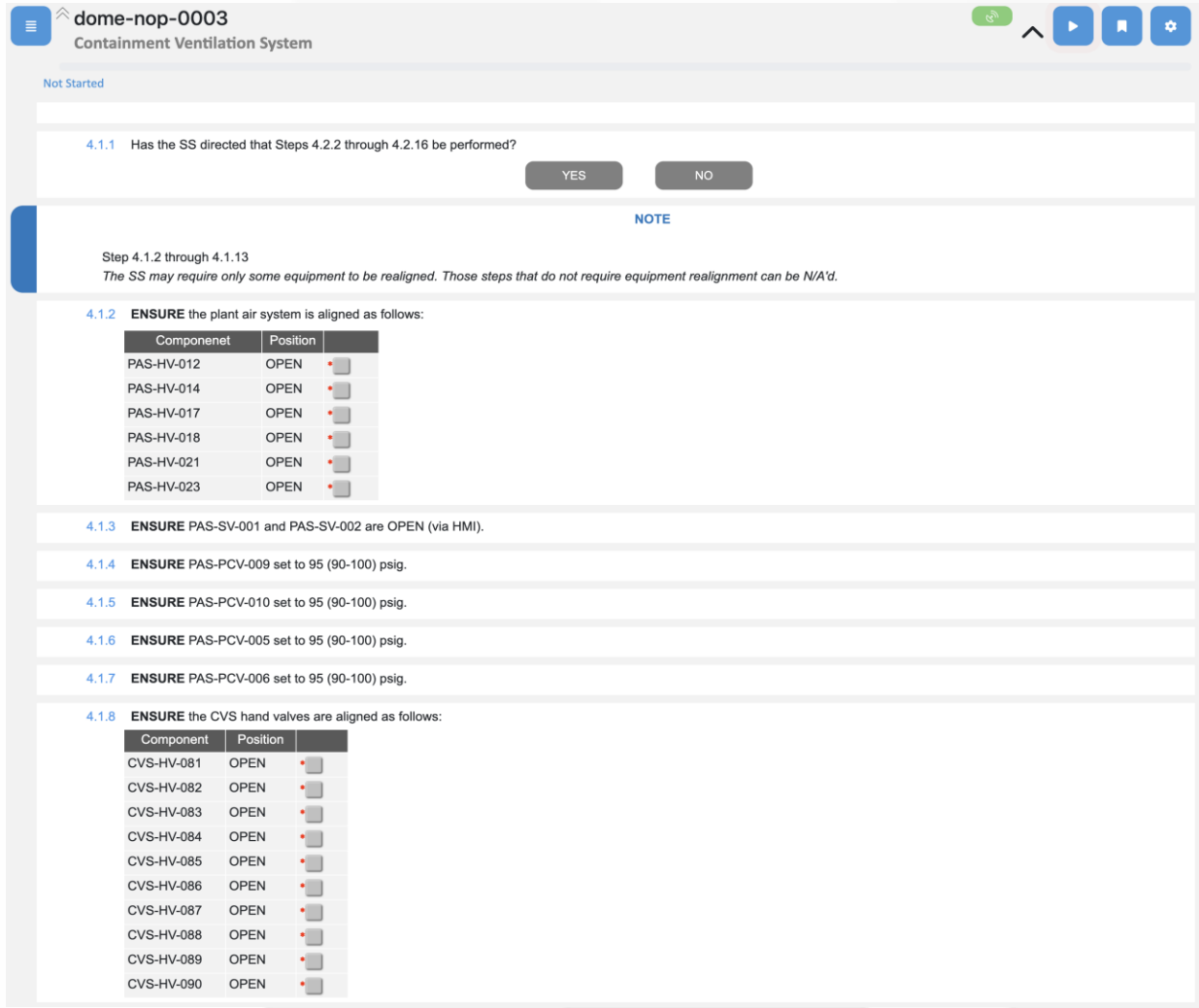
NRIC digital engineering workflow for synchronizing Windchill to Asset Suite and EDMS

Graphical user interface of Charon, the custom-built data adapter connecting Asset Suite and EDMS

Modernize Operational Practices

Deploy a digital procedure system for NRIC-DOME facility operations

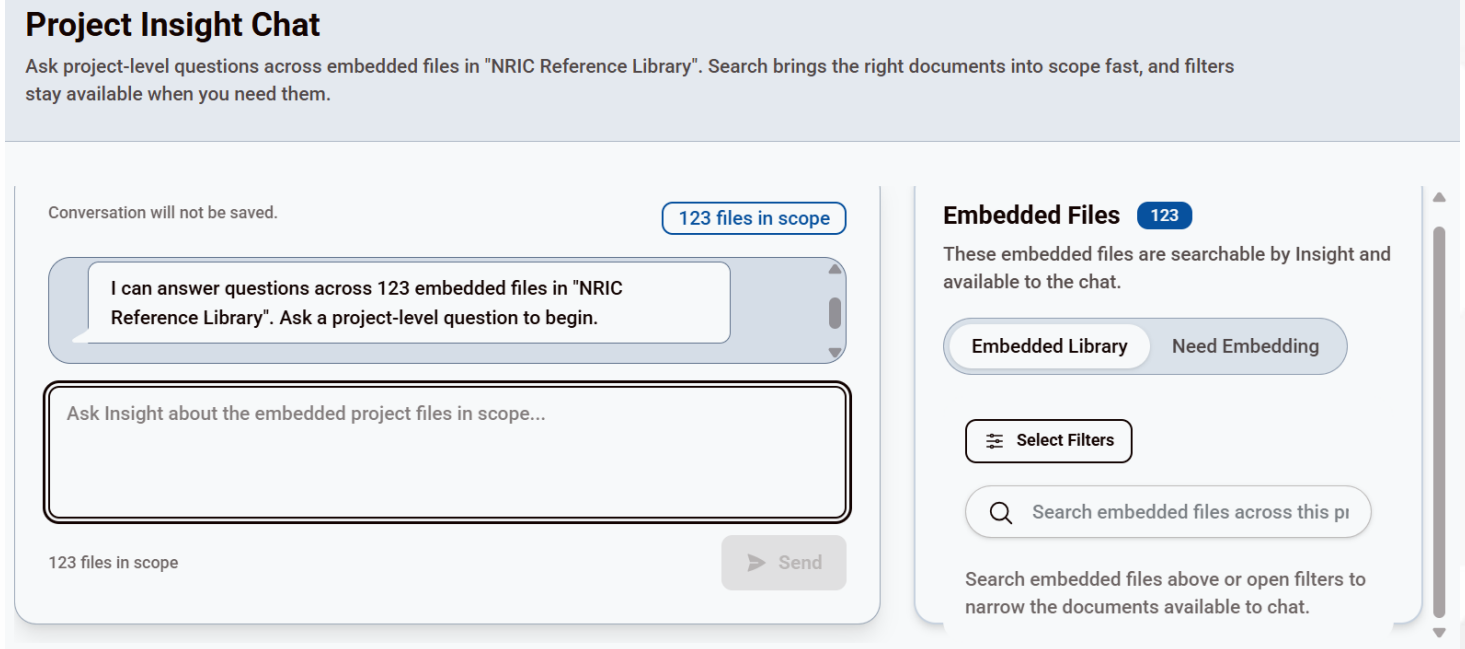
- Demonstrate advanced operations to lower O&M costs of microreactor fleet deployments
- Enables operators to focus on supervisory control and management functions



DOME-NOP-0003 procedure as viewed while performing the procedure from the Monitor Dashboard of the NextAxiom digital procedure software.

Augment the Nuclear Engineering Process Using Artificial Intelligence

Deployed NRIC-GPT, a virtual assistant for Confluence users



Graphical user interface of NRIC-GPT showing the NRIC Reference Library

Uses INL-approved large language models to provide insights to project documents

Questions?

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