

OVERVIEW OF NE FOCUS AREAS IN DOE'S GENESIS AI INITIATIVE



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May 19, 2026
GAIN Workshop
Argonne National Laboratory

OVERVIEW OF GENESIS MISSION



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REQUEST FOR APPLICATION (RFA – March 2026)

- Advance the use of frontier AI to accelerate high-impact national missions.
- Build deployable AI platforms and workflows, not just stand-alone technical demos.
- Connect DOE, research institutions, and industry to move capabilities into real-world use.
- Generate measurable improvements in speed, scale, and efficiency for mission-relevant work.

CHALLENGE AREAS

- The RFA is structured around challenge areas, each covering a broad mission problem and its related focus areas.
- The challenge areas define the major national problem spaces the RFA wants to address with AI.
- They are intended to focus projects on practical, mission-driven applications rather than general AI research.
- Together, they show the RFA's goal of using deployable AI to improve speed, efficiency, and impact in high-value domains.

AmSC and ModCon

- **American Science Cloud (AmSC)** - Provides shared compute, storage, and data infrastructure for AI projects.
- **Model Consortium (ModCon)** - Provides access to AI models and supports their development and integration.
- Together, they form the core infrastructure and model foundation for the RFA.

OVERVIEW OF NE CHALLENGE AREA



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Objectives

- Use AI to accelerate the nuclear energy lifecycle, especially design, licensing, construction, and operations.
- Address key industry bottlenecks such as slow workflows, disconnected information, manufacturing limitations, and labor-intensive processes.
- Enable faster, safer, and more cost-effective deployment of nuclear energy at scale in the United States.

Focus Areas (1/3)

- **Focus Area 4A** — Accelerated Nuclear Power Plant Design and Licensing
 - Speed up reactor and plant design and produce licensing-ready analyses faster.
 - Identify safety, licensing, and constructability issues earlier to avoid delays.
- **Focus Area 4B** — Autonomous Operations
 - Use AI to automate monitoring, diagnostics, control, and decision support.
 - Reduce staffing needs while preserving safety and human oversight.

Focus Areas (2/3)

- **Focus Area 4C** — AI-Assisted Manufacturing and Construction
 - Accelerate fabrication planning, quality assurance, and construction verification.
 - Strengthen domestic supply chains and reduce manufacturing time.
- **Focus Area 4E** — Fuel Cycle Facility Design and Licensing
 - Apply AI to speed design, safety analysis, and licensing for fuel cycle facilities.
 - Reduce engineering and regulatory bottlenecks that slow deployment.

Focus Areas (3/3)

- **Focus Area 4H** — Legacy Document Curation
 - Turn legacy nuclear documents and data into machine-usable knowledge.
 - Improve access to past knowledge while maintaining review and traceability.

Seed Projects

- Seed projects are early, smaller-scale efforts meant to test concepts, prove feasibility, and lay the groundwork for larger projects under the RFA.

PROJECT PROMETHEUS



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Objectives

- Build a production-ready AI platform for nuclear energy with governed orchestration, a persistent digital thread, and a machine-usable knowledge base.
- Accelerate nuclear plant and fuel cycle facility design and licensing through AI-enabled workflows.
- Improve nuclear manufacturing, construction, and operations by reducing time, labor, and staffing needs through AI.
- Turn legacy and partner nuclear data into a reusable knowledge resource that strengthens all project workflows.

Seed Project (Nov 25 – present)

- Demonstrated an end-to-end plant workflow that reduced a two-week manual process to about 24 hours.
- Showed an agentic component design and meshing workflow that let a non-expert perform at roughly expert speed.
- Proved AI-accelerated manufacturing potential through faster additive manufacturing data processing and much faster surrogate model training.
- Established that the prototype Prometheus platform could support multiple workflow types with shared orchestration and provenance tracking.

Phase II Proposal submitted (FY27-29)

- Prometheus is a 3-year, \$60M proposal to use AI to make nuclear energy faster, safer, and cheaper.
- It brings together national labs, universities, and industry to build a shared AI platform for nuclear deployment.
- It focuses on key bottlenecks such as slow workflows, disconnected data, manufacturing gaps, and labor-intensive operations.
- It aims to deliver measurable gains in speed, cost, staffing, and access to nuclear knowledge.

Integration across Focus Areas

- The proposal is built as one shared platform spanning design, licensing, manufacturing, construction, operations, and data curation rather than separate efforts by focus area.
- A persistent digital thread is meant to carry information across phases, so design changes automatically inform downstream analyses, licensing claims, construction needs, and operations.
- Shared agents, data infrastructure, and knowledge resources are intended to let progress in one focus area strengthen the others.
- This cross-focus integration is presented as a main source of speed, traceability, and cumulative AI advantage.



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