

Oklo, Inc.
partnered with
Argonne National Laboratory and Idaho National Laboratory

RFA-18-15829, Accelerate Development of Industry-Relevant Features in Modern Simulation Tools

YEAR AWARDED: 2018

TOTAL PROJECT VALUE: \$569K (DOE funding, \$455K; awardee cost share, \$114K)

STATUS: Completed

PRINCIPAL LAB INVESTIGATORS: Paul Romano (promano@anl.gov) and Rich Martineau (INL retired)

DESCRIPTION: Under this Gateway for Accelerated Innovation in Nuclear voucher, Oklo Inc. (Oklo) partnered with Argonne National Laboratory to accelerate the development of open-source and modern simulation tools. The project has an industry-wide impact since it advances the state-of-art simulation to design and build advanced reactor systems. The project involves further development of OpenMC, a community-developed Monte Carlo neutron and photon transport simulation code, adding capabilities of particular relevance to the advanced reactor industry. The industry needs usable, modern simulation tools to develop their technologies and bring new reactors to market. Although many of the legacy tools available to reactor developers today provide valuable capabilities, they were not built to the today's standards. New simulation tools currently under development are substantially improving this situation, but important gaps remain. This project commits additional resources to the code and provides resources to create more powerful visualization capabilities. Under the voucher, Oklo also partnered with Idaho National Laboratory to further develop thermal-hydraulic tools built upon the Multiphysics Object-Oriented Simulation Environment framework that readily couple with BISON. This project is accelerating industry-relevant features in these tools and accelerating the technology development timeline for Oklo and other reactor developers.

BENEFIT: Advanced simulation tools are now more approachable and attainable, so companies can easily acquire these tools and train employees to use them. These tools provide capabilities to accelerate engineering design work, resulting in improvements in performance, economics, and safety.

IMPACT: Improvements to these simulation tools allow Oklo and other reactor developers to perform analyses and iterate on designs more quickly without using laborious workflows, enabling more diverse designs created for specific markets and minimizing deployment time.

LESSONS LEARNED: Simulation tools with significant improvements in visualization and multiphysics capabilities streamline the design process and the design burden for reactor developers. Funding sources, such as the Gateway for Accelerated Innovation in Nuclear, provide a valuable industry mechanism to validate specific work by directing resources accordingly.

SIGNIFICANT CONCLUSIONS: Having usable modern simulation tools accelerates engineering design work and provides stronger technical bases during regulatory submission.

NEXT STEPS: Oklo will continue to integrate these improved simulation tools into its reactor design workflow as new capabilities are added. They will also maintain an open dialogue and provide feedback to the simulation tools developers to guide continued tool improvements based on indus