



Advanced Materials and Manufacturing Technology: Industry Engagements

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May 18, 2022

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Name/Org: Thomas Butcher / NEFCD Date: 6/28/2021
Guidance (if applicable): N/A

Technology Transfer of Printed SiC for Nuclear



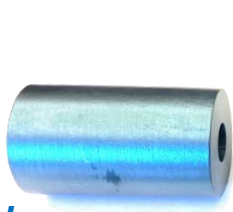
ULTRA SAFE NUCLEAR

“This technology is ideal for manufacturing structure and core components for USNC’s advanced reactor designs.” - Kurt Terrani, USNC executive vice president (formerly of ORNL)

**UN
TRISO**



YH slugs



**Conceptual
TCR Fuel
Assembly**

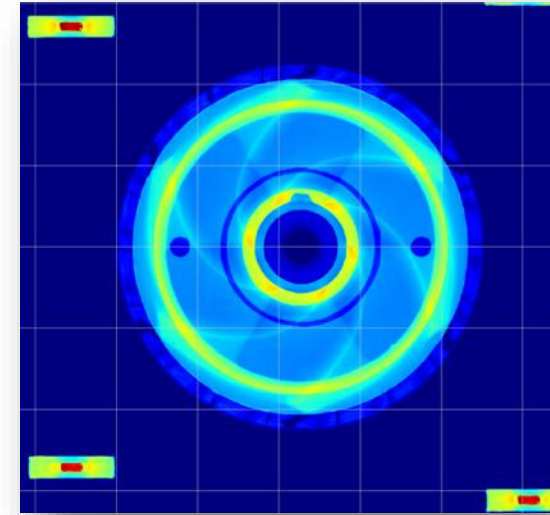
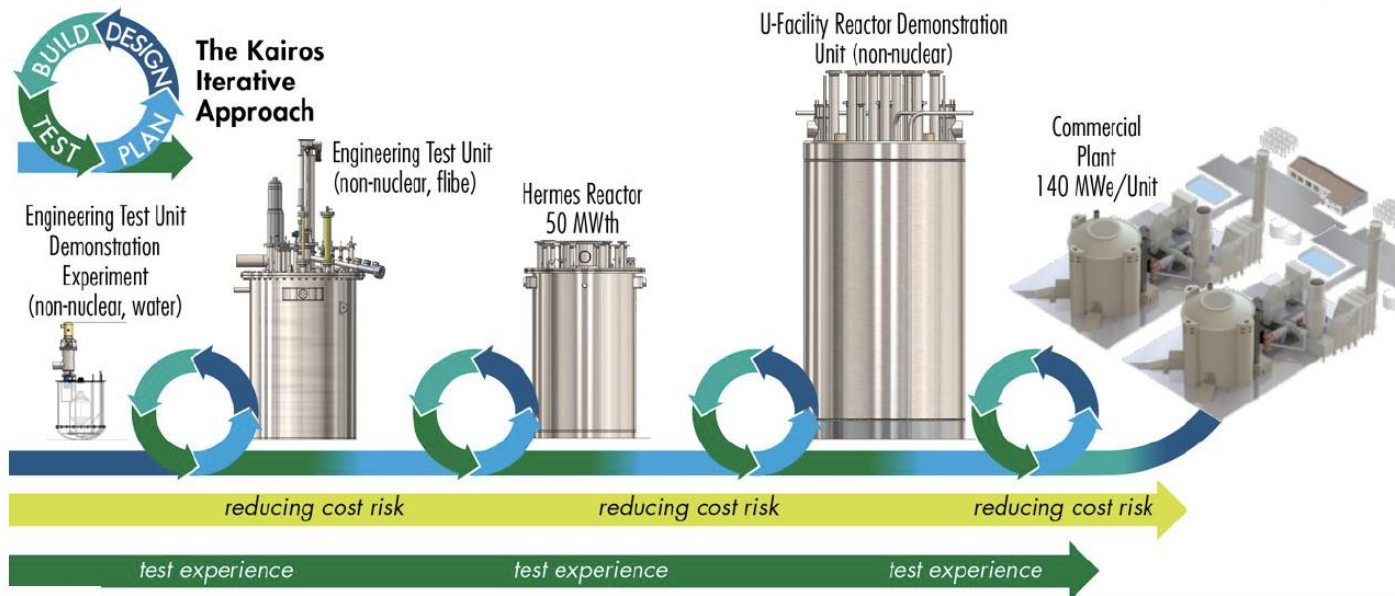


TCR program has a demonstrated track record of working with industry that will be key to its technology demonstrations

“The innovation embodied in the TCR program strategy, and the opportunity to have close physical proximity to its major AM work, were central factors in our Kairos decision to locate our Hermes reactor adjacent to ORNL in eastern Tennessee.

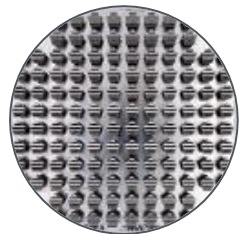
Kairos has already benefited directly from advances led by the TCR program’s development work. We will have ORNL-TCR AM hardware in our Hermes reactor.”

Development Strategy - Iterative Development Approach



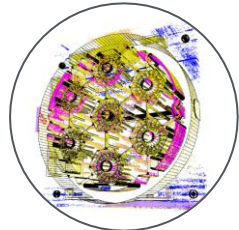
Framatome Channel Fasteners inserted into TVA's Browns Ferry Unit 2 reactor

April 26th, 2021



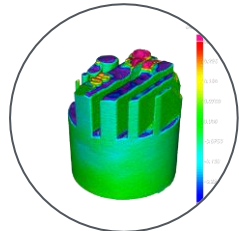
Powder Bed
Laser Printing
Expertise

MDF Process
and Process
Understanding
from



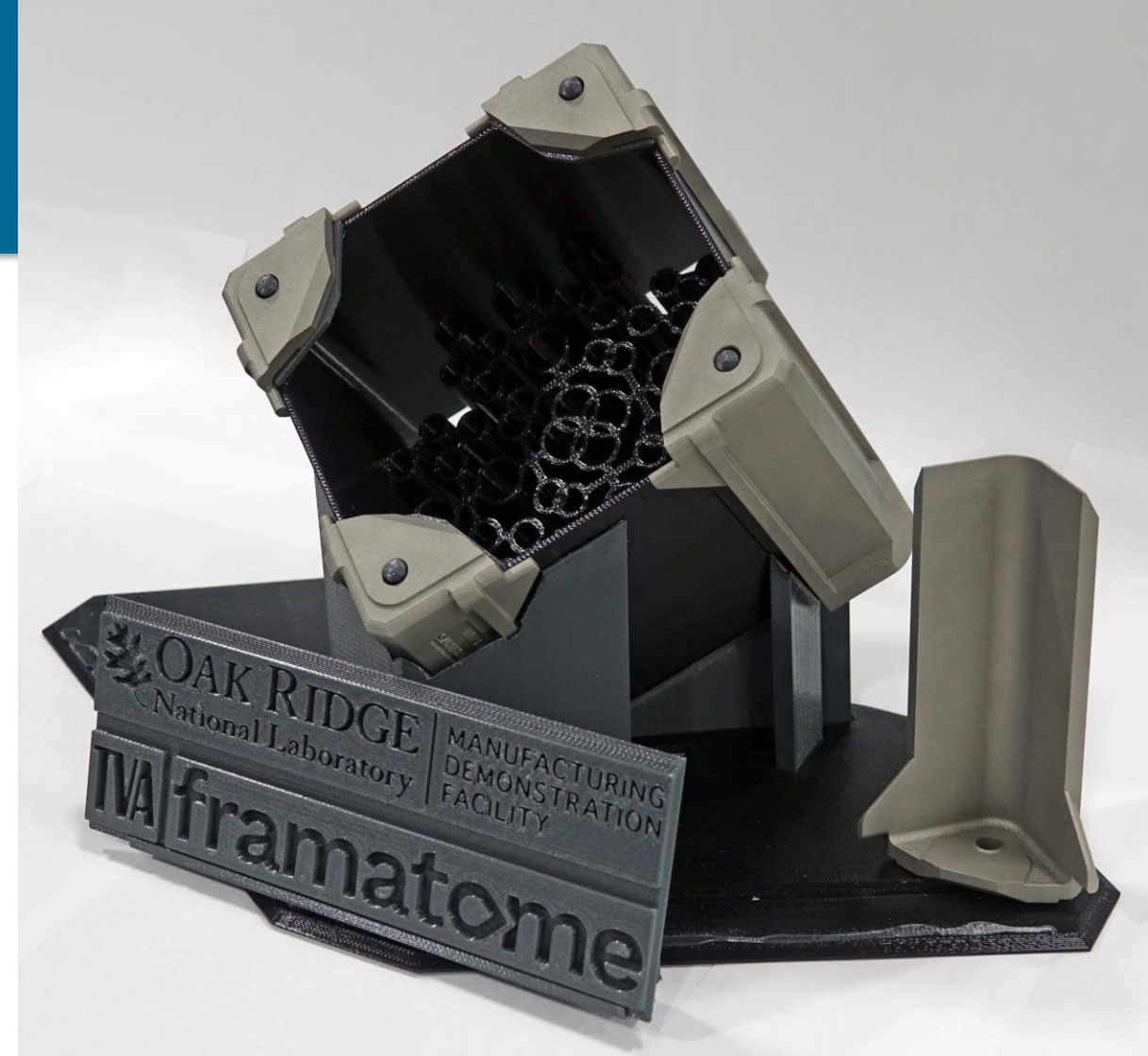
Peregrine

In-Situ Process
Monitoring of
builds to
determine defects



3D
Characterization

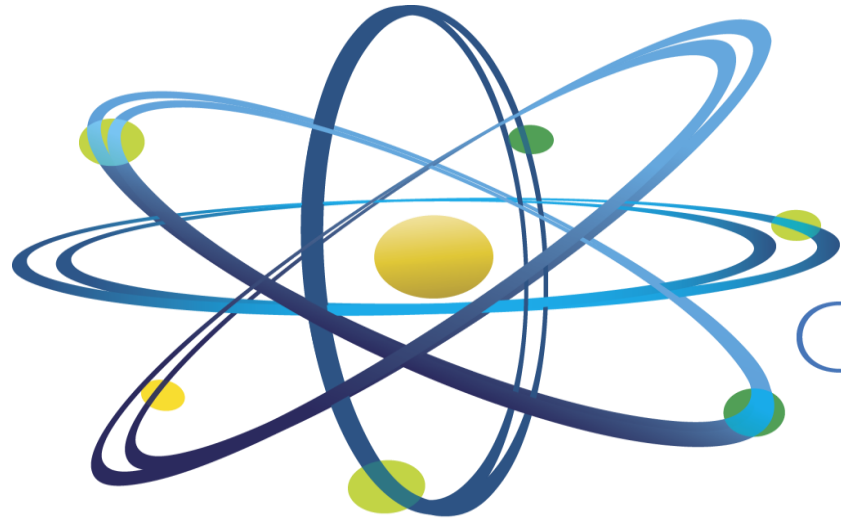
Leveraged the
Zeiss CRADA and
ORNL Equipment
for full component
inspection



“The fuel assembly channel fasteners were printed at ORNL using additive-manufacturing techniques, also known as 3D printing, as part of the lab's Transformational Challenge Reactor Program and installed on ATRIUM 10XM fuel assemblies at Framatome’s nuclear fuel manufacturing facility in Richland, Washington.”

Framatome website (Dec 2020)

Questions?



Clean. **Reliable. Nuclear.**