

# General Atomics Electromagnetic Systems

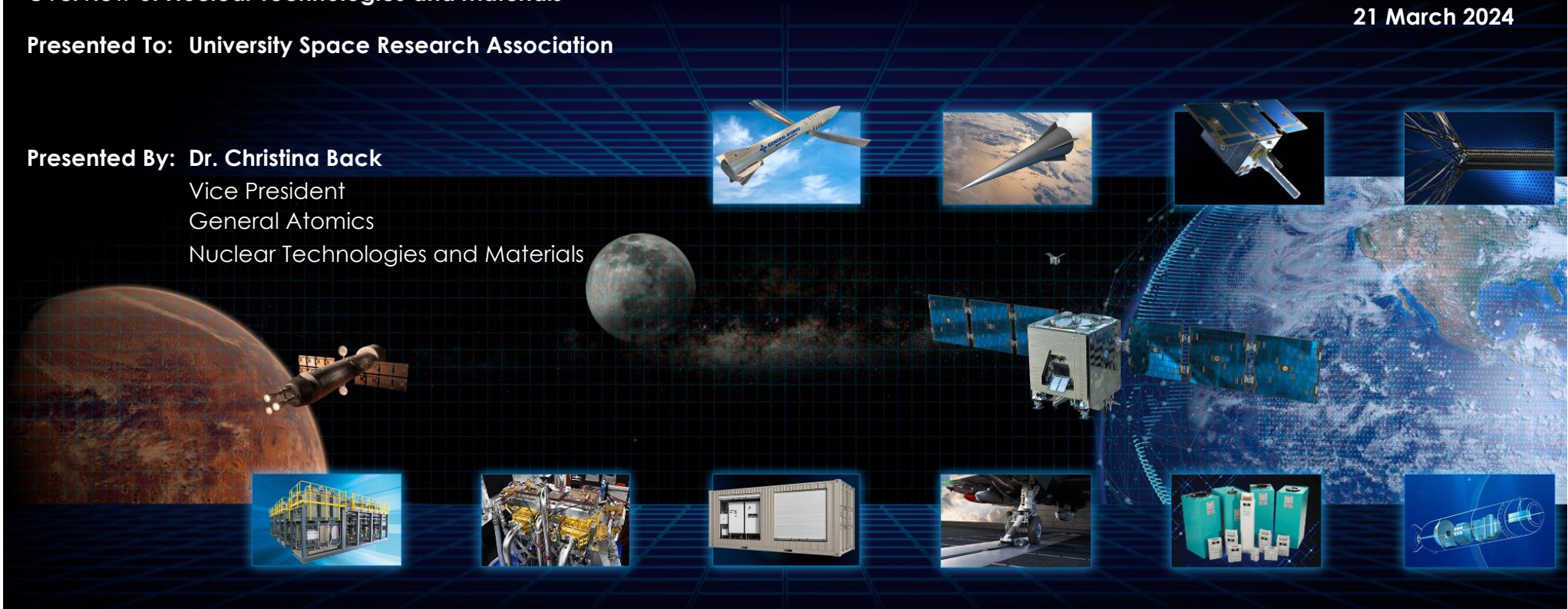
Overview of Nuclear Technologies and Materials

21 March 2024

Presented To: University Space Research Association

Presented By: **Dr. Christina Back**

Vice President  
General Atomics  
Nuclear Technologies and Materials



# General Atomics Government Business Segments



## ASI

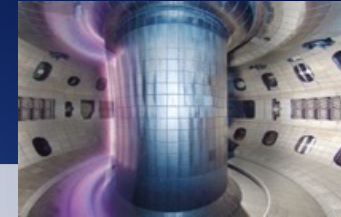
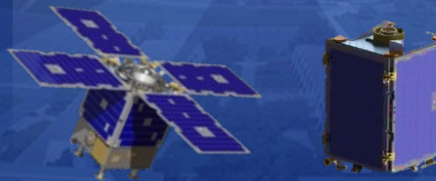
Leading designer and manufacturer of proven, reliable Remotely Piloted Aircraft (RPA) systems, radars, and electro-optic and related mission systems, including the Predator® RPA series and the Lynx® Multi-mode Radar



## EMS

Develops technologies for the DoD, DOE, Agencies, IC, and commercial customers

GA-EMS is a world leader in the application of electromagnetic power and energy technologies, pulse power, nuclear fission, adaptive optics, lasers, sensors, undersea systems, missile systems, projectiles, and space systems



## ENERGY

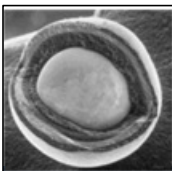
Develops sustainable and alternative energy solutions and materials

Operates the DIII-D National Fusion Facility

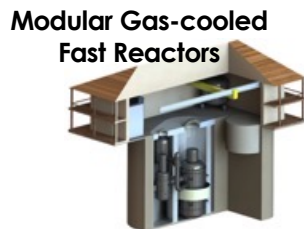
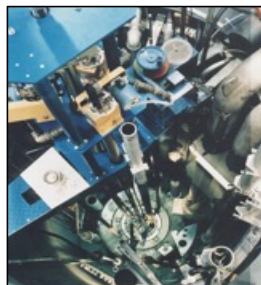


# GA-EMS Develops Nuclear Technologies Applicable to Space Reactors

*General Atomics Delivered 66 TRIGA Reactors: the World's Safest Reactors*



## TRIGA Reactors, Controls and Fuels



## Nuclear Reactors and Specialized Fuels

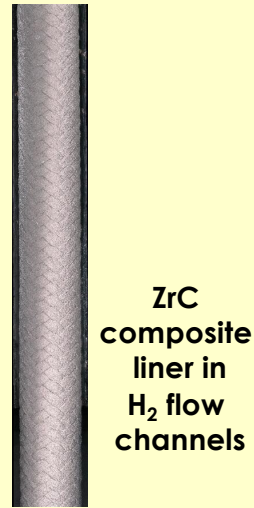
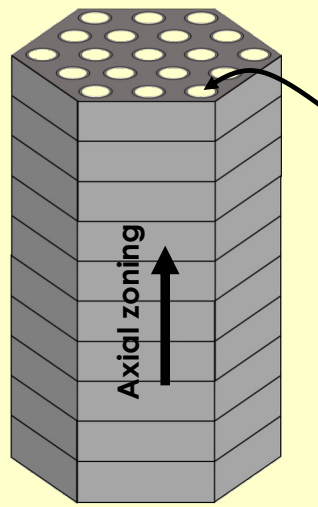
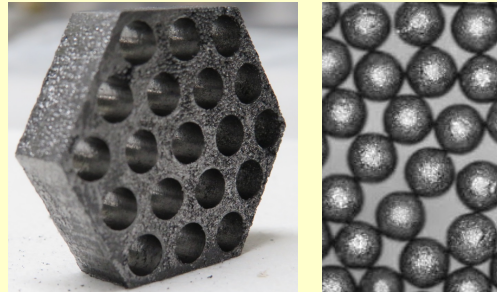
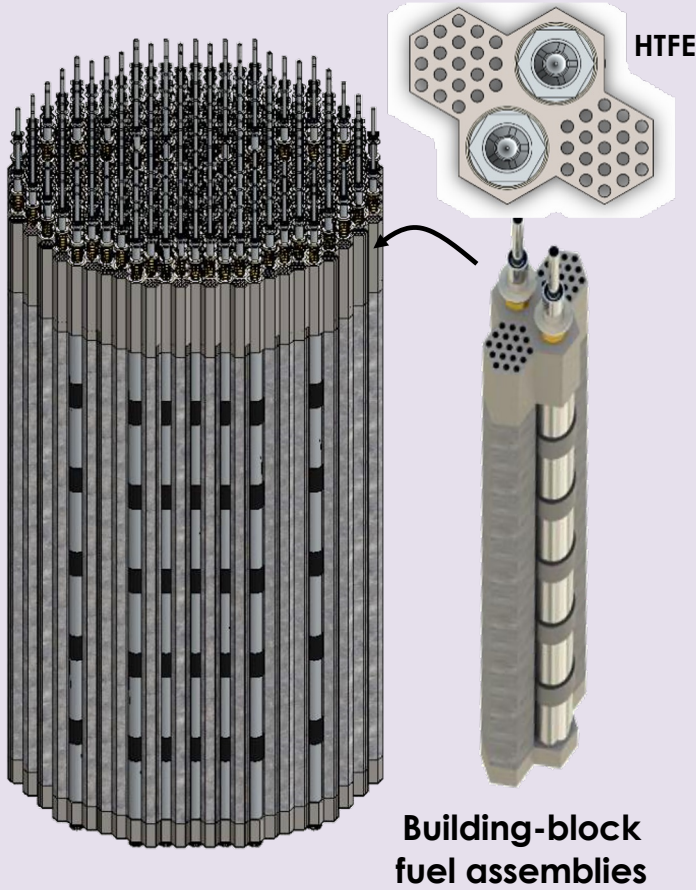


SiGA<sup>®</sup>

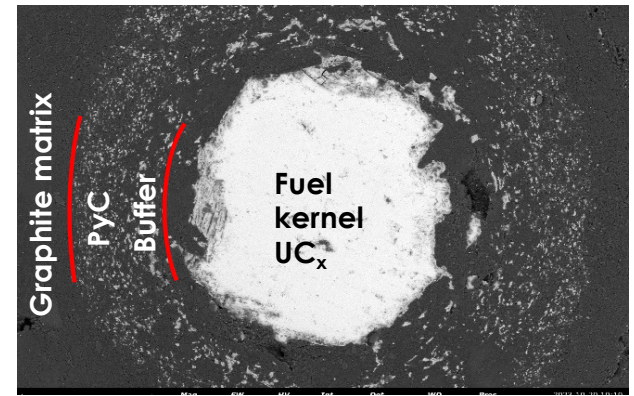


## Engineered Materials

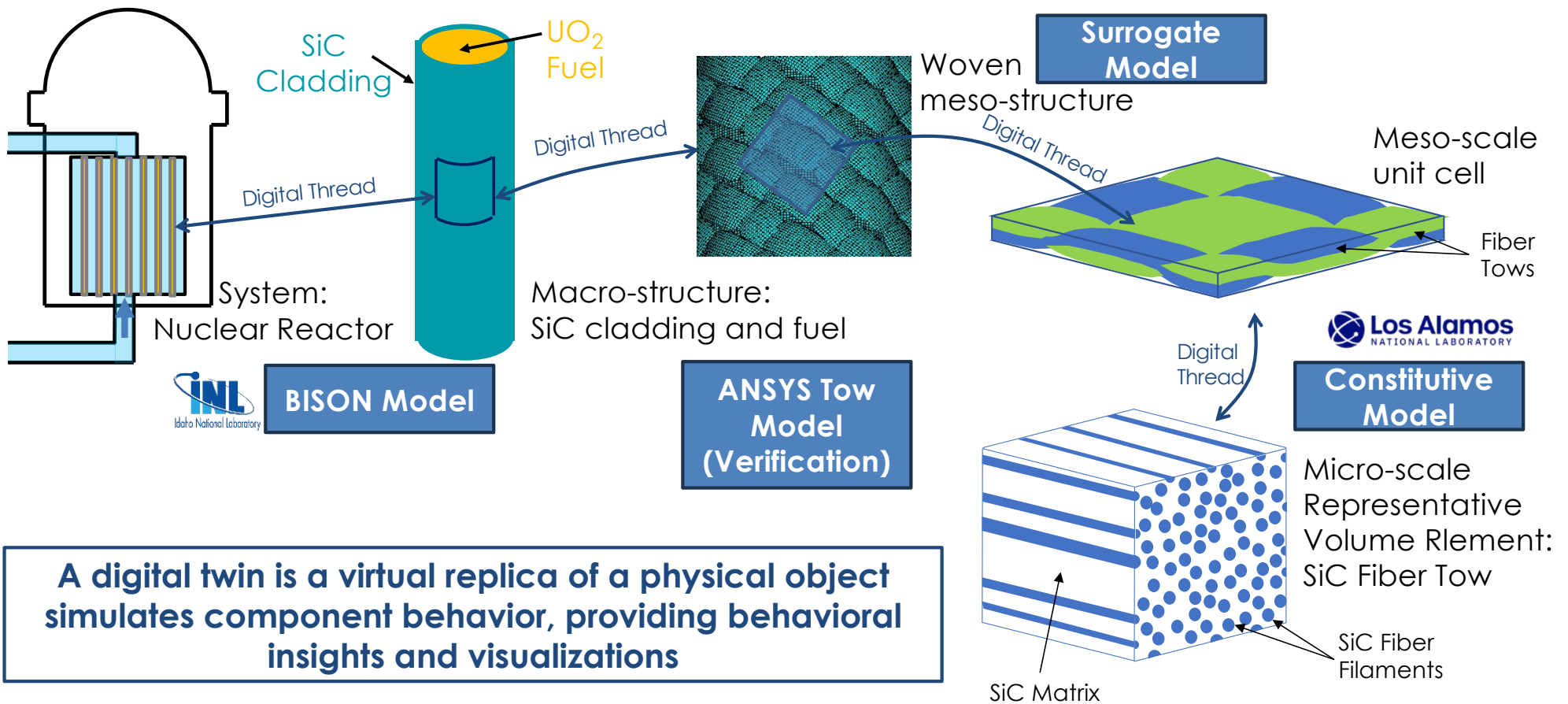
# NASA Nuclear Thermal Propulsion Reactor: GA-EMS Prototypes and Tests Critical Reactor Core Elements



Successful 3000 K test of GA-EMS coated particle fuel and liners



# GA-EMS/LANL Digital Twin of SiGA<sup>®</sup> Cladding Is a Multiscale Model Used to Predict Performance and Quality



**A digital twin is a virtual replica of a physical object simulates component behavior, providing behavioral insights and visualizations**

# GA-EMS Values Collaborations To Advance Programs

- **University of South Carolina**

- Advanced characterization, BISON modeling



- **Massachusetts Institute of Technology**

- Irradiation, corrosion, stress modeling



- **Univ. California-Berkeley**

- Micro-scale mechanical characterization, corrosion



- **San Diego State University**

- Ceramic sintering and consolidation, testing



- **University of California-San Diego**

- Structural characterization of SiC-SiC



- **Oregon State University**

- Micro-scale modeling of SiC-SiC composites



- **University of Tennessee Knoxville**

- Multi-physics modeling (TRISO)



- **University of Florida**

- Mechanical testing, non-destructive examination



- **University of Illinois at Urbana-Champaign**

- Micro-scale thermal characterization of SiC-SiC



- **University of Wisconsin, Madison**

- Corrosion and protective coatings, Thermo-hydraulics, CRUD



- **University of Virginia**

- Mechanical testing, composite analysis



- **University of Michigan**

- Corrosion, ion-beam irradiation



- **University of Minnesota**

- Mechanical testing



- **International:**

- **Manchester University**

- Micro- and Nano-scale characterization at temperature



- **University of Oxford**

- Micro-scale composite mechanical testing



- **University of Bristol**

- In-situ mechanical loading and tomography



- **University of Huddersfield**

- Corrosion response of SiC-SiC

