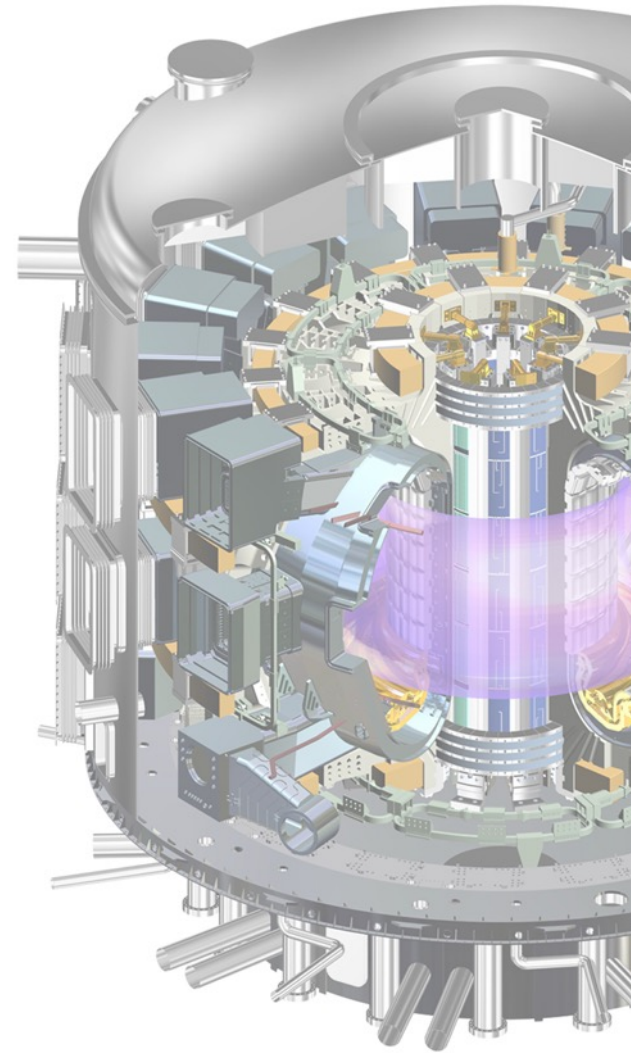


Status of US ITER

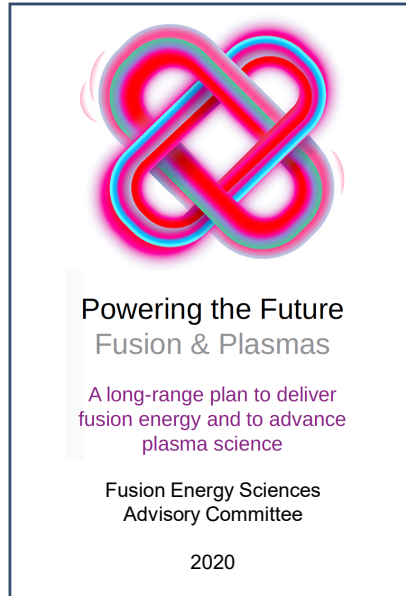
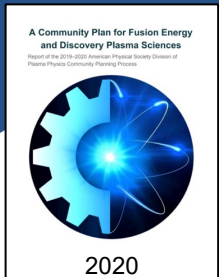
Kathy McCarthy
Project Director

Fusion Power Associates Annual Meeting

December 16, 2021



What does ITER mean for US fusion?



"Partnership in the international ITER fusion project is **essential for US fusion energy development**, as is supporting the continued growth of the private sector fusion energy industry..."

US partnership in ITER provides access to a high-gain reactor-scale burning fusion plasma and an accompanying US ITER research team and program to exploit this facility must be developed."

"The Department of Energy should **assure maximum possible access to ITER information** for the members of the fusion pilot plant design teams."



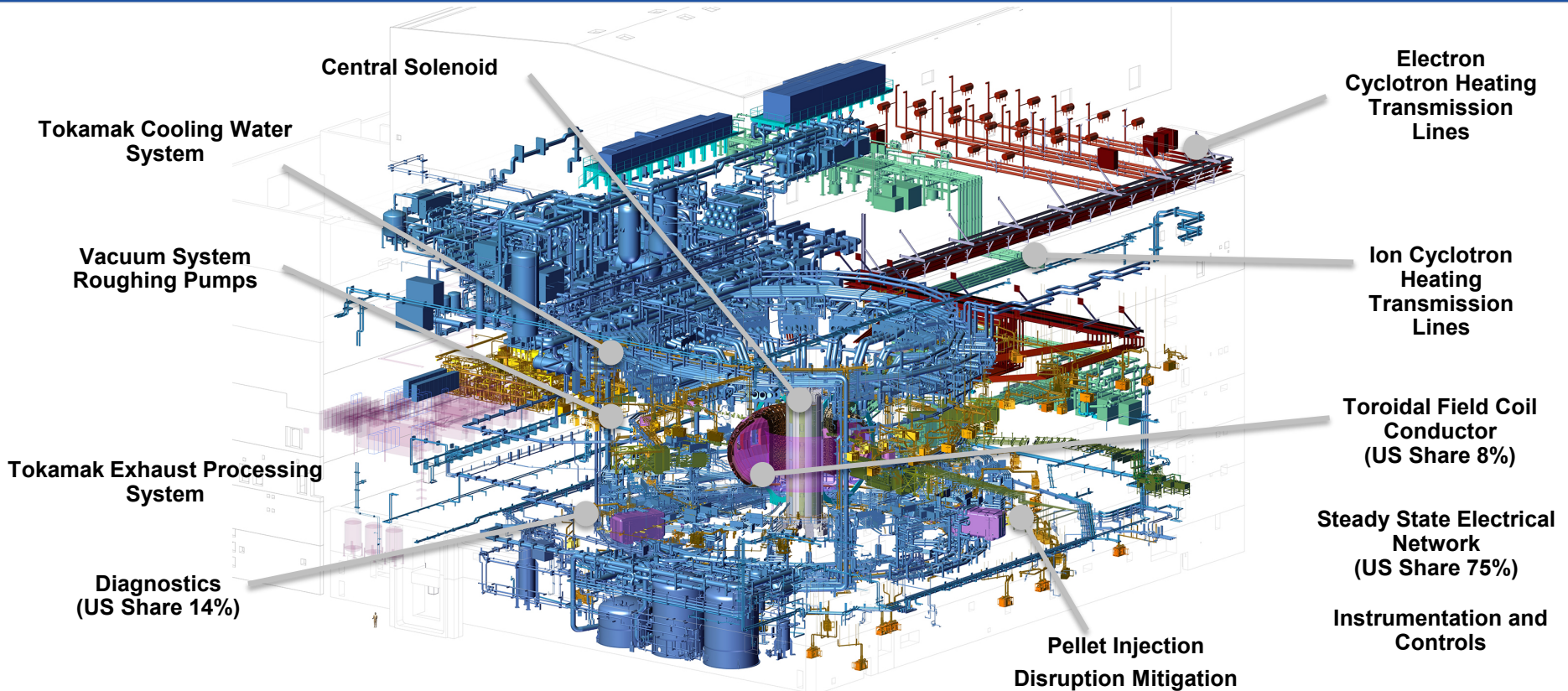
ITER fusion “firsts” provide US experience



- First fusion device categorized as a nuclear installation (France/ASN)
- Power-plant scale vacuum vessel
- Power-plant scale cryoplant
- >10,000 tons of superconducting magnets with a combined stored energy of 51 GJ
- Integrated operations of fusion systems

US ITER Hardware Scope

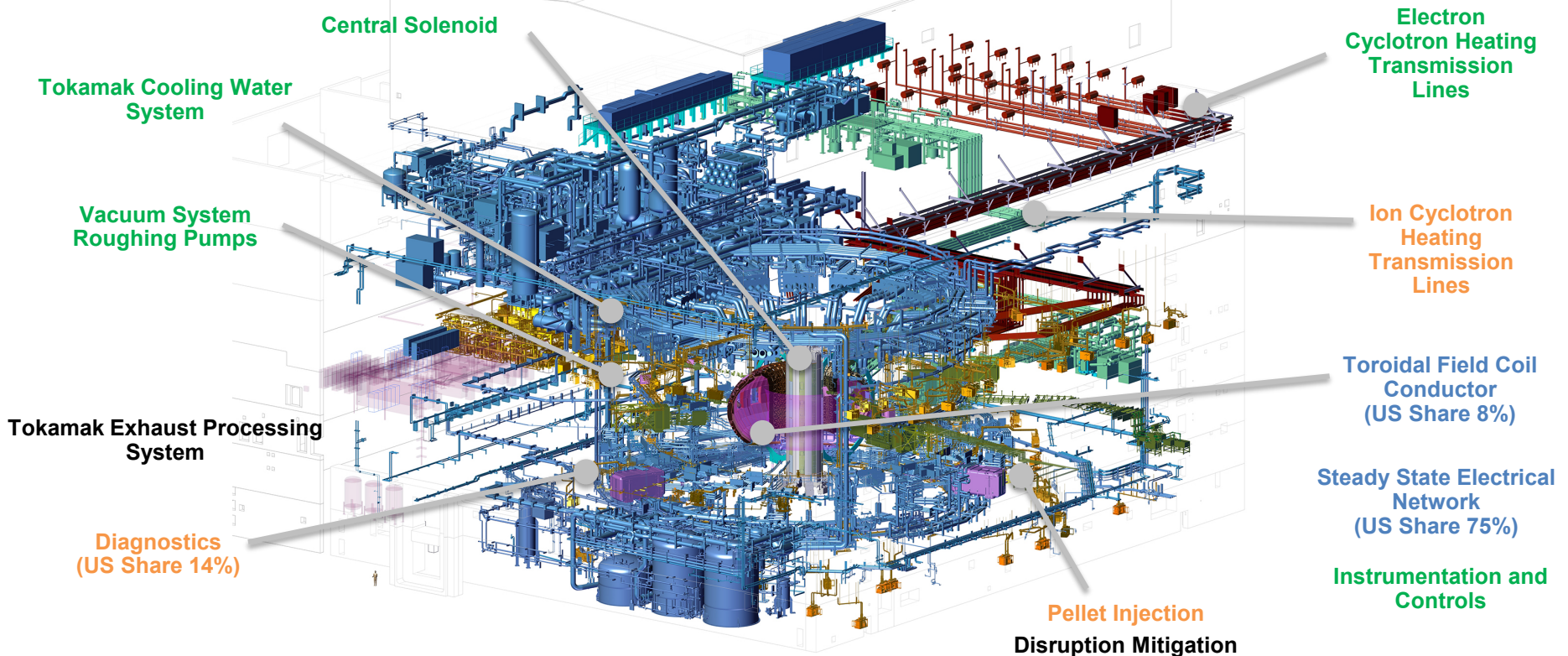
US contributes 9% to construction



US contributes 9% to construction



Key: **Finished** • **Hardware in fabrication** • **Prototypes in fabrication** • **In design**



Most US ITER funding remains in the US



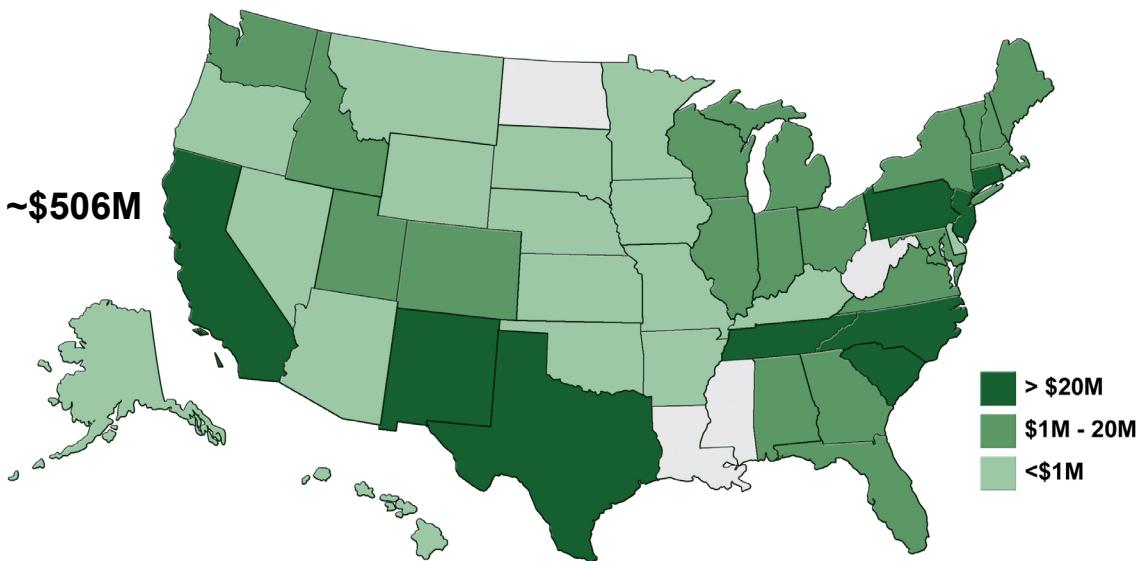
As of June 2021, ~\$1.3 billion has been awarded to US industry and universities, and obligated to DOE national laboratories in 46 states plus the District of Columbia.

Awards to industry: ~\$729M

Awards to universities: ~\$26M

Obligations to National Laboratories: ~\$506M

Total: ~\$1.3B



Central Solenoid (CS) Modules 1 and 2 delivered



CS Module 1 was delivered to Building B17 at the ITER site on September 9, 2021.



CS Module 2 during loading at General Atomics; it reached the ITER site on October 15, 2021.

Central Solenoid Structures fabrication and deliveries continue



Fabrication and deliveries continue to make strong progress, including tie plates, lower and upper supports, tensioning components, and prototypes for pre-compression tests.



Toroidal field bracket

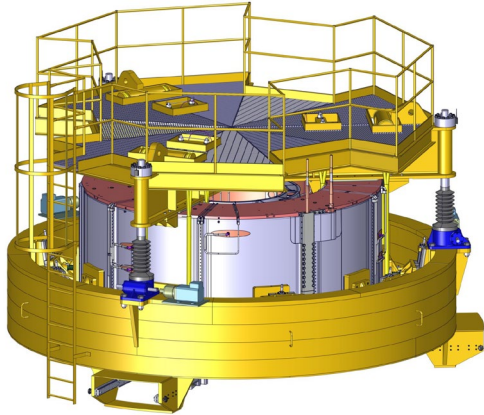


Multi-jack tensioners



Tie plate machining

Final US-provided delivery completed for Central Solenoid Assembly Tooling



Tokamak Cooling Water System deliveries and fabrication continue

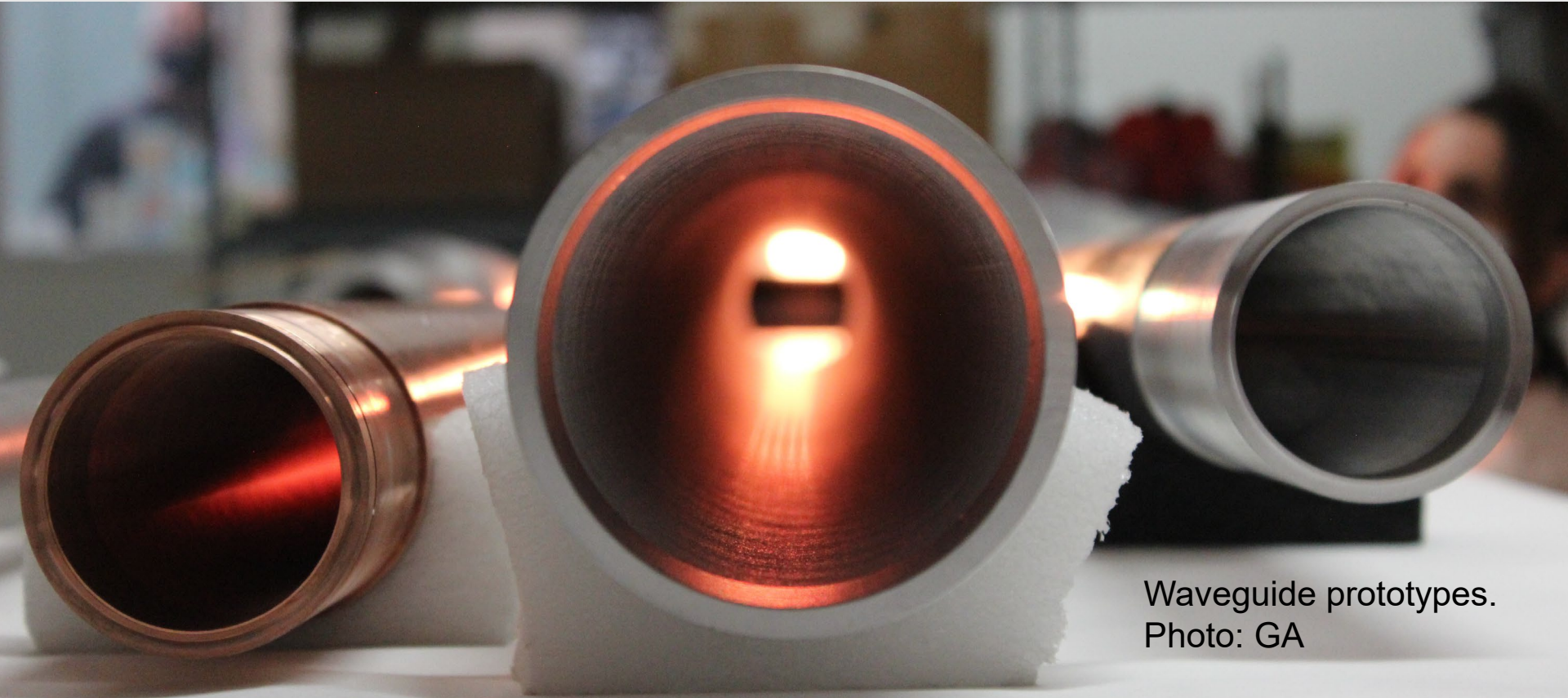


Volume control tank was delivered to the ITER site



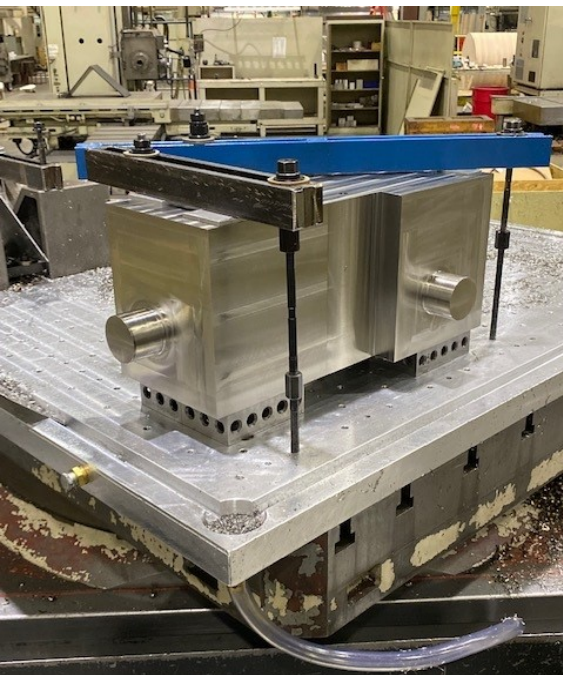
Drying system nitrogen storage tank in fabrication

Fabrication underway for electron cyclotron heating transmission lines first articles

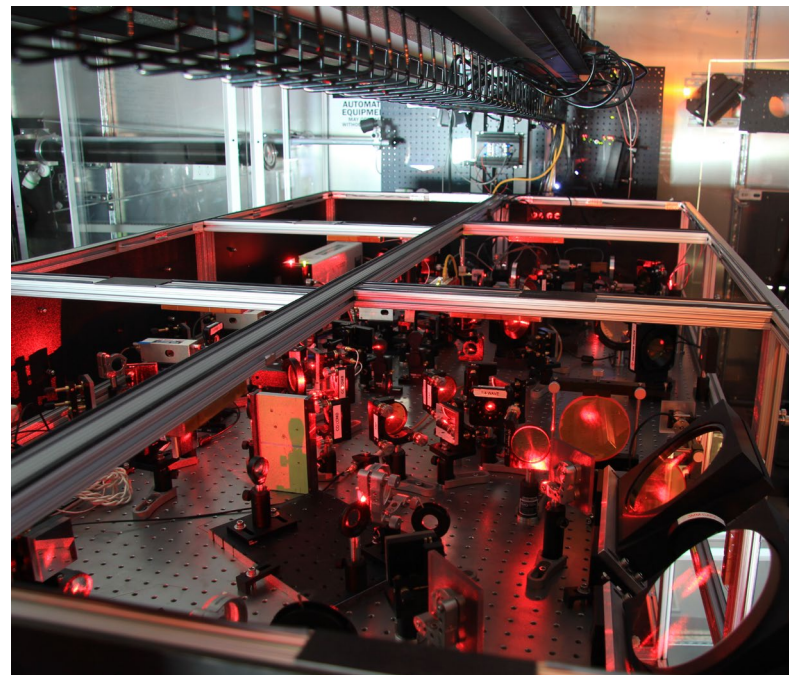
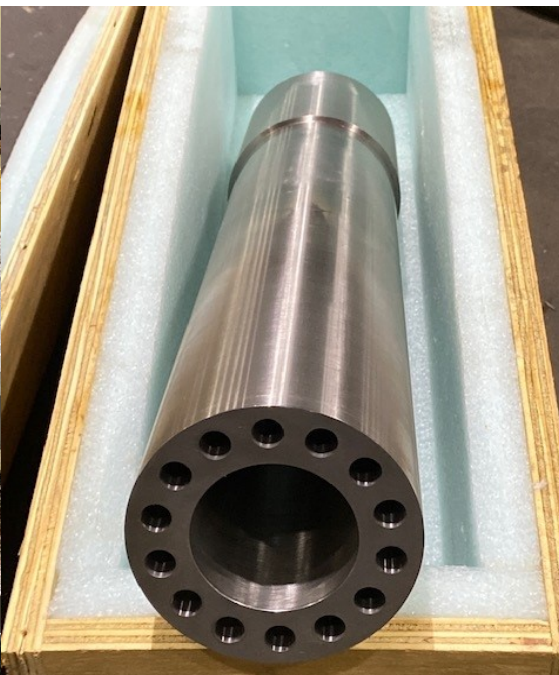


Waveguide prototypes.
Photo: GA

Multiple diagnostic system prototypes underway plus captive support hardware fabrication

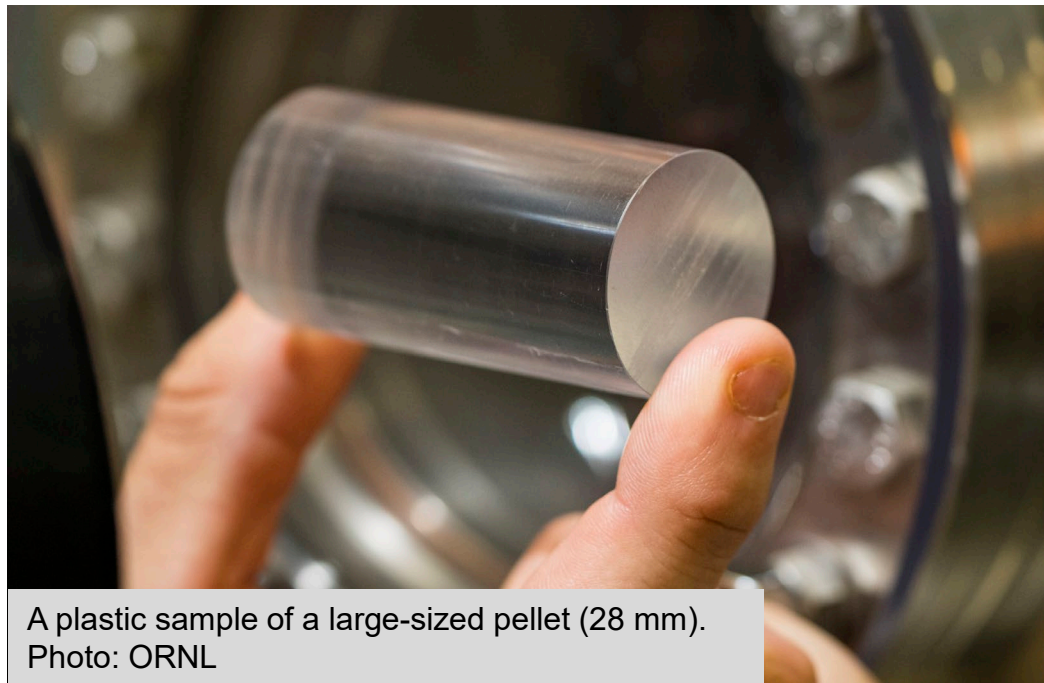


Low Field Side Reflectometer test antenna block assembly manufacturing development. Photos: GA

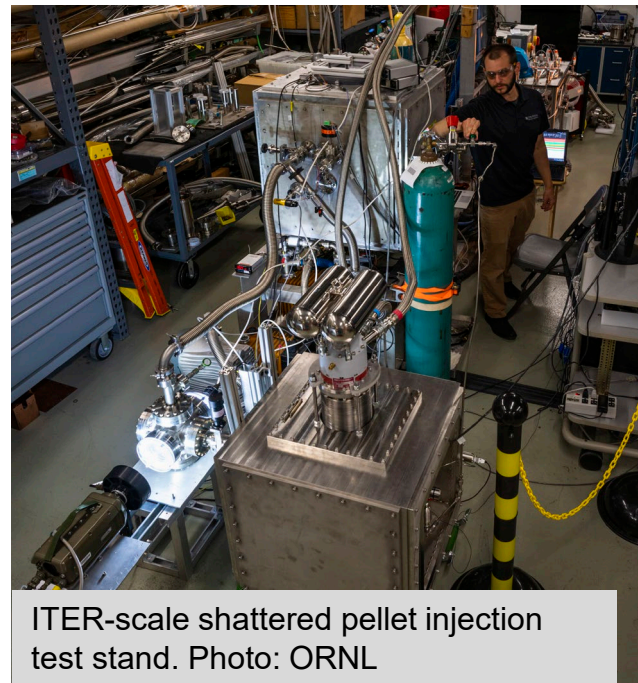


Toroidal Interferometer/Polarimeter (TIP) test stand. Photo: GA

Disruption Mitigation: Pellet experiments are providing essential understanding for ITER design



A plastic sample of a large-sized pellet (28 mm).
Photo: ORNL

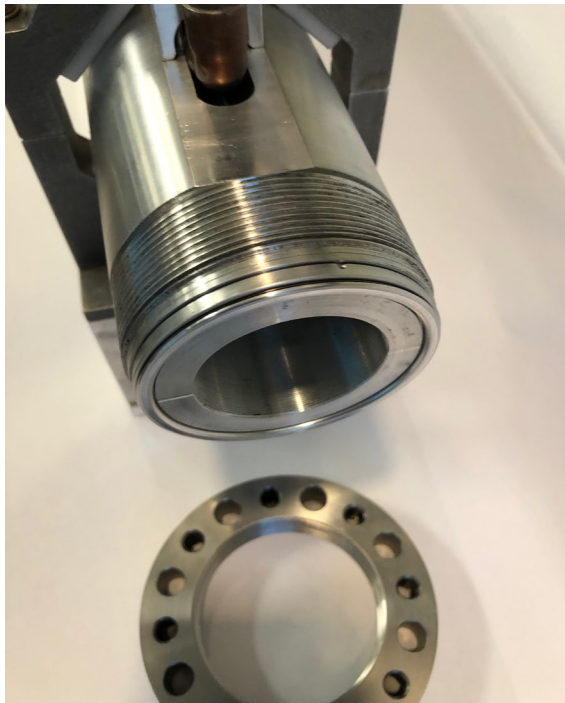


ITER-scale shattered pellet injection
test stand. Photo: ORNL

The project is solving the technical challenges that are part of delivering to exacting specifications



Module Coaxial Joint Testing



Electron Cyclotron Waveguide Flanges



Central Solenoid Lifting Fixture

US ITER benefits US fusion activities...yielding new IP and experience



- Tools and strategies for plasma control and performance
- Superconducting magnet technologies
- Radiation transport analysis
- High-powered plasma heating
- D-T fuel cycle technologies
- Continuous plasma fueling
- Fusion materials
- Fusion power and particle handling
- Burning plasma science and diagnostics



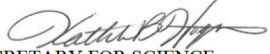
Department of Energy
Office of Science
Washington, DC 20585


ESCS-006260
EXEC-2021-001322

Office of the Director

June 14, 2021

MEMORANDUM FOR THE SECRETARY

THROUGH: KATHLEEN HOGAN 
ACTING UNDER SECRETARY FOR SCIENCE
AND ENERGY

FROM: J. STEPHEN BINKLEY 
ACTING DIRECTOR
OFFICE OF SCIENCE

SUBJECT: **ACTION:** Requesting Approval of and Signature on the U.S.
Contributions to ITER Project Baseline Strategy Report to
Congress

ISSUE: Whether to approve and sign the U.S. Contributions to ITER Project Baseline Strategy Report to Congress.

BACKGROUND: The Report to Congress responds to legislative language set forth in the Joint Explanatory Statement accompanying the Consolidated Appropriations Act of 2021 (Public Law No. 116-260):

Baselining Report to Congress
signed and approved by DOE
July 21, 2021

Thank You!

