FUSION FOR ENERGY

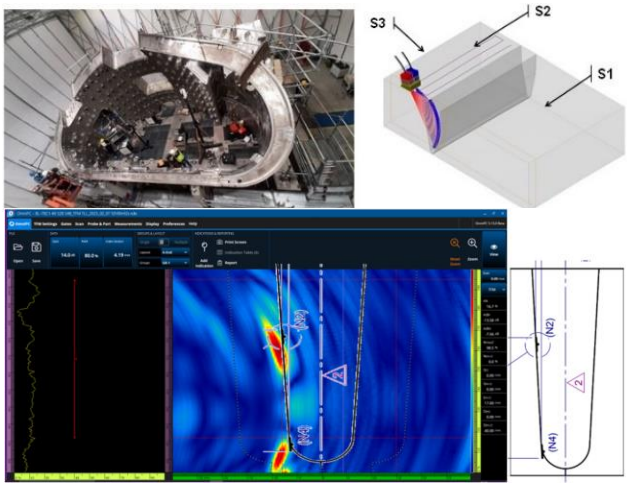
TECHNOLOGY OFFER

Novel phased-array ultrasonic techniques for the non-destructive testing (NDT) of nuclear fusion materials

In the frame of the ITER project, and under various contracts with F4E, Tecnatom (a member of the Westinghouse Group) has developed advanced phased-array ultrasonic techniques (PAUT) tailored to the stringent requirements of nuclear fusion environments. This NDT service targets challenging welds and materials, specifically the 316-grade stainless steel, used in Tokamak reactors, such as the Vacuum Vessel, Toroidal Field Coil Cases, Pre-Compression Rings, and First Wall Panels. This PAUT solution excels in highly attenuating materials like austenitic welds and composites, offering inspection precision in conditions where standard techniques may struggle.

The technology

Tecnatom's expertise lies in the qualification methodology and inspection know-how, critical in this field. These techniques, which allow ultrasonic inspection as an alternative to radiography, have been developed and qualified under the demanding RCC-MR nuclear code requirements with regulatory oversight. Tecnatom's methodology represents the first qualification process tailored to nuclear fusion for stainless steel (grade 316). This adaptable service enables high-performance inspections in similar challenging materials and components, aligning with nuclear codes and standards.



An adaptable, precise solution for high-performance NDT

Novel PAUT techniques allow Tecnatom to deliver safer, faster, and more reliable inspections by reducing inspection time, minimizing radiation exposure, and providing greater sensitivity and precision. This service also offers detailed ultrasonic data linked to exact component positioning, ensuring high-quality results independent of operator skill. Tecnatom's competitive advantage lies in its know-how, positioning it as a leader in inspection methodologies that meet nuclear code standards, particularly in the French nuclear codes for experimental reactors.

Collaboration opportunities

Tecnatom's NDT service is applicable in various nuclear fields, including new nuclear reactors, advanced microreactors, Gen IV reactors, and facilities like the International Fusion Materials Irradiation Facility (IFMIF), the Jules Horowitz research reactor (JHR), JT60-SA, and ITER. Beyond fusion, this inspection methodology can also be adapted for fission reactor inspections and extended to other industries, such as oil and gas, tank inspections, and other sectors that require precise, high-quality non-destructive testing for complex materials and welds.

Fusion for Energy Technology Transfer Programme

Email:technologytransfer@f4e.europa.eu