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R&D status on in-sodium ultrasonic transducers for ASTRID inspection

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In Service Inspection of the sodium cooled fast reactor prototype ASTRID leads to a large R&D effort for selecting, developing and qualifying ultrasonic techniques and tools.

Several ultrasonic transducers are developed and tested: TUSHT model (CEA), TUCSS model (AREVA) both based on piezoelectric material, and Electro Magnetic Acoustic Transducers (EMAT, CEA). Each type of transducer presents advantages and drawbacks regarding the various ultrasonic applications considered for ASTRID: sensor location, ultrasonic techniques ("contact" or "immersion", bulk or guide waves...), temperature, and the nature of measure (telemetry/vision or defect detection).

This article describes development and qualification programs that are currently performed. This program aims at ultimately selecting the most appropriate transducer for each ASTRID ultrasonic application. They involve simple targets and elaborate ones (with defects to be detected or specific shapes to be measured/seen), in-water tests and 200°C in-sodium tests. Associated simulation is also performed, using CIVA software platform.

Country/Int. Organization

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Primary author: Mr BAQUE, Francois (CEA)

Co-authors: Mr LHUILLIER, Christian (CEA); Mr LE BOURDAIS, Florian (CEA); Mr NAVACCHIA, Frederic (CEA); Dr SAILLANT, Jean-Francois (AREVA); Mr AUGEM, Jean-Michel (EDF); Mr MARLIER, Regis (AREVA)

Presenter: Mr BAQUE, Francois (CEA)

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