framatome

RPV Nozzle Inspection from ID with FRANIS systems

Underwater manipulator for the complete Nozzle examination of all BWR and PWR including UT, ET, VT Inspection methods

Framatome leverages on experience in more than 100 nozzles and RPV inspection and introduces new underwater manipulator for complete examination of RPV nozzles in varied dimensions. State of the art motion control and Inspection technology ensures fast, reliable and off-critical path inspection for our customers.

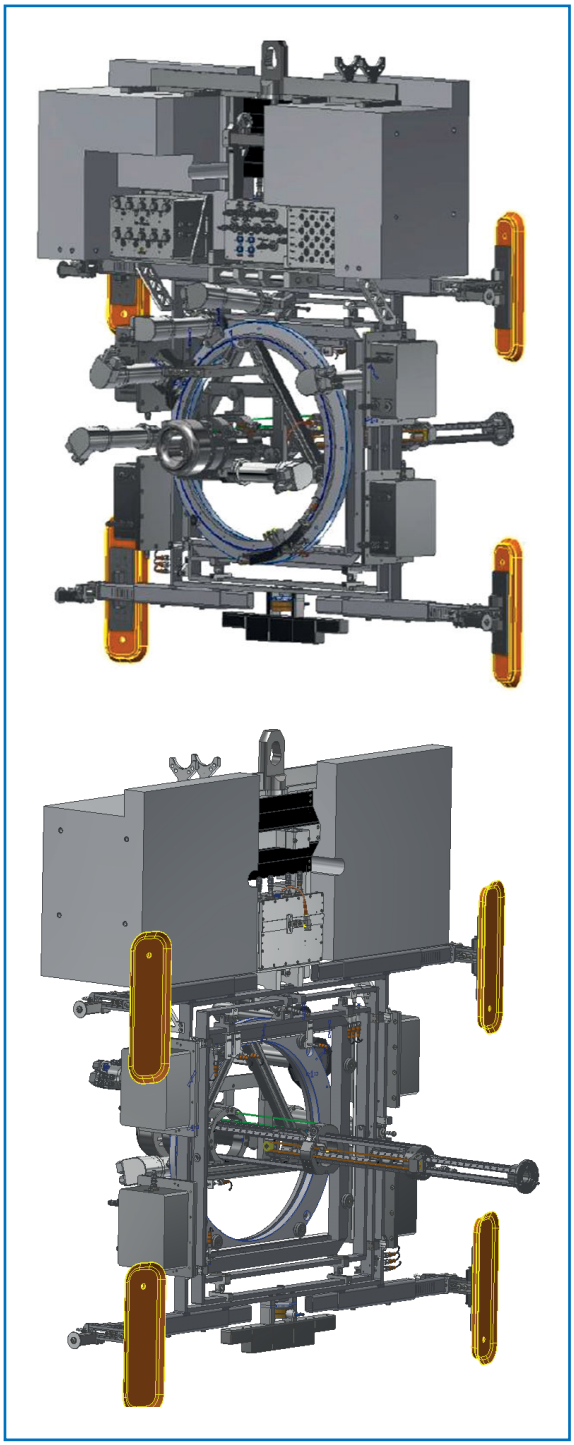
Challenge

The reactor pressure vessel examination is usually on the critical path of the power plant's outage. Tight and multitasking outage schedule requires form RPV in-service inspection (ISI) team application of a lightweight and portable system which can be set up, manoeuvred and removed quickly to enable shortest possible vessel occupation time.

Solution

Framatome offers competent ISI service with the Franis – comprehensive inspection system for ultrasonic (UT), eddy current (ET) and visual testing (VT) of all examination areas at RPV nozzles in one manipulator. Also the nozzle cladding can be inspected either with UT or ET or VT. The system can move to any point in the RPV and is supported by two compact submarines for precise navigation. Before inspection, the manipulator docks to the inner wall of the vessel by means of several suction feet, allowing a fast and stable fixation.

Fine adjustment and centering in the nozzle is realized by means of a 5-axis movable telescopic arm. The telescopic system can be adapted to all existing BWR, PWR, including VVER and EPR nozzles configuration and inspection tasks.



CAD-Model FRANIS

Your performance
is **our** everyday **commitment**

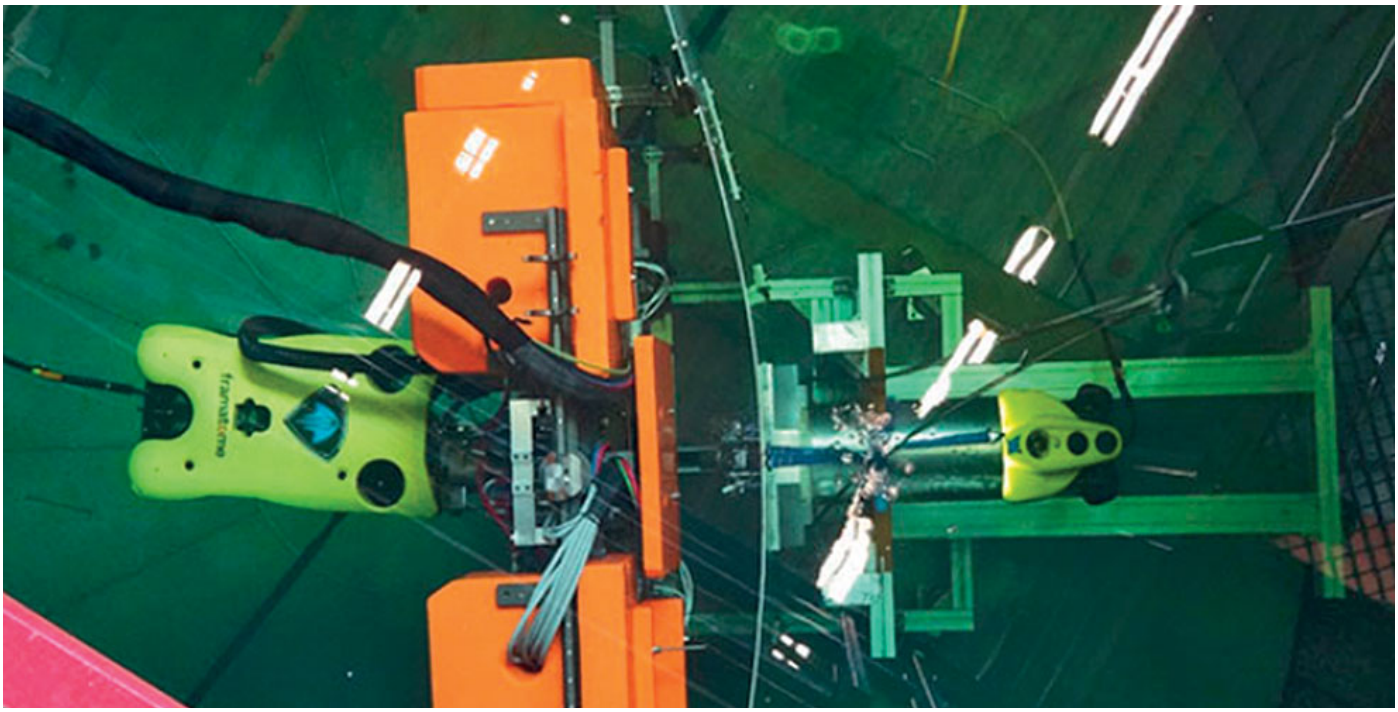
Technical information

Technical Features:

- Overall accuracy less than 2 mm
- Scan speed up to 50 mm/s
- 5 axis manipulator
- Water tight against water ingress up to 30 m
- Very high accuracy with UT phased array technology

Customer benefits

- Portable and autonomous Inspection System – does not require use of support bridge and minimize use of polar crane
- Fuel loading and other service activities can be performed in parallel during the inspection
- Exact positioning and proven fixation at nozzles
- Multiple areas with the wide range of diameters can be examined in a short period of time:
  - Nozzle-to-shell weld
  - Nozzle-inner-radius
  - Cladded surface of nozzle
  - Dissimilar mental weld
  - Nozzle-to-pipe weld



FRANIS System during the inspection of a RPV nozzle mock-up at the Framatome trainings center

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