GDES
Tech4Services

Innovative Technology and O&M Solutions for Nuclear & Power

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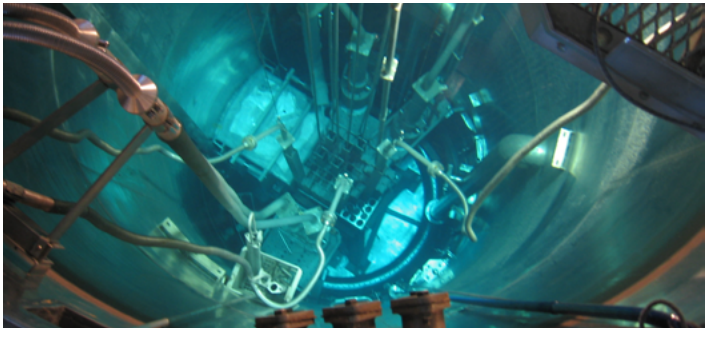
We deliver Innovative Technology and Tailored Solutions for Nuclear & Power Plants Operation and Maintenance.

GDES Technology for Services, SL (GDES T4S) was created in 2014 as a joint initiative between the utility IBERDROLA and the site service group **GD ENERGY SERVICES**, that had been collaborating since 1965. The purpose of this customer-supplier alliance is to develop effective technological solutions to support utilities' operation and maintenance; the electricity production is its vocational sector, being nuclear and renewables its priorities.



IBERDROLA participates in **GDES T4S** through its corporate venture capital program "**PERSEO**", dedicated to invest in disruptive technologies for the Energy sector for the creation of new business opportunities while granting **IBERDROLA** access to the energy technologies of the future.

GD Energy Services is an international service provider to the energy sector, leader in surface treatment, industrial maintenance, services for renewable energies, and emergencies. Thanks to its strong commitment to research development and innovation, **GD Energy Services** positions at the cutting edge of applied technology development in services.

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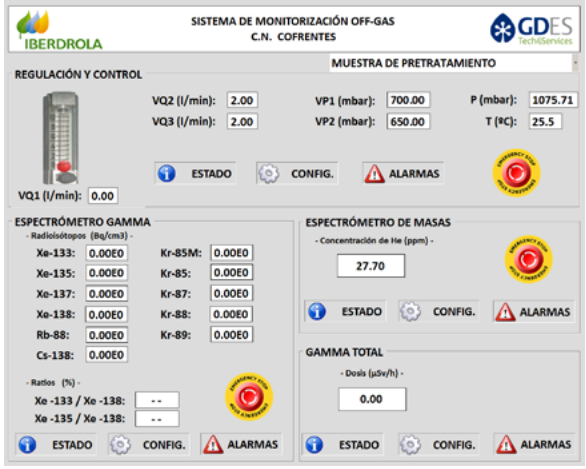
Online monitoring for fuel elements and control rods damage early detection

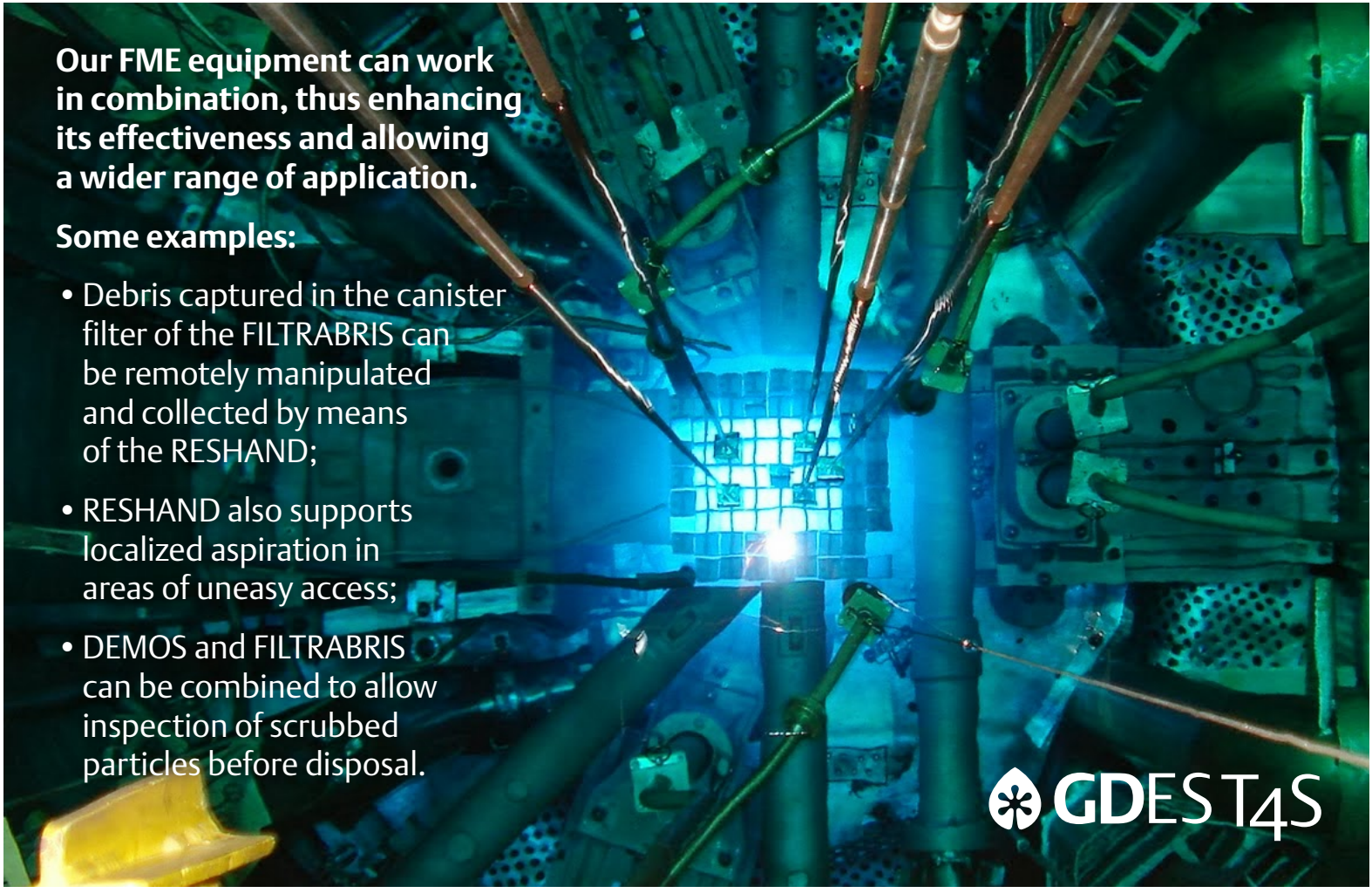
OFF-GAS

- Monitoring system for evaluation of integrity and early detection of damages of fuel elements and control rods.
- Allows real-time activity monitoring during Flux-Tilt and sequence changes, for quick and easy identification of the damaged fuel elements; also assures detection of second failures.
- Based upon continuous, real-time analysis of the Off-Gas line for specific nuclides detection before and after the delay line: (133Xe, 135Xe, 137Xe, 138Xe, 85Krm, 87Kr, 88Kr, 89Kr, He).
- Easy installation on the Off-Gas bypass, so that no modification of the plant major systems is required.

Already installed and functional at the Cofrentes Nuclear Power Plant (Spain).



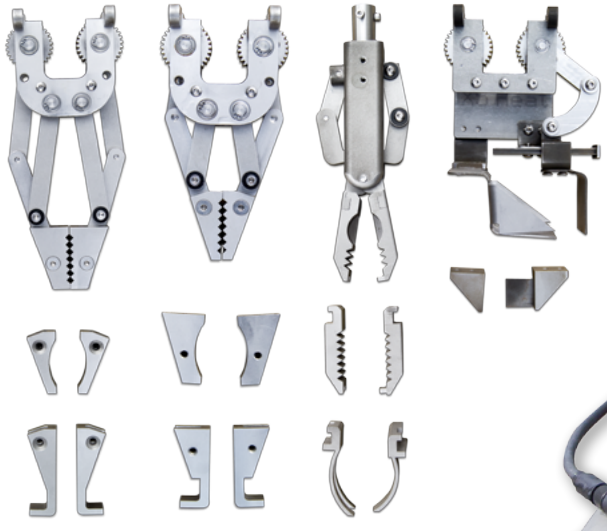
FME: *equipment for removal, collection and characterisation of debris in the NPP's pools*

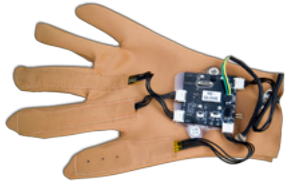


RESHAND

Remote operated robotic arm for objects retrieval in NPPs' pools

- Semi-automatic, remotely operable by one single worker by means of an electronic control glove.
- Mounted at the extremity of a pole and equipped with 2 cameras, it easily allows recovery of objects of different kind, size and geometry.
- Wide range of applications: modular system with different easily set-up configurations, completed with a set of interchangeable tools (clamps, pliers, etc).





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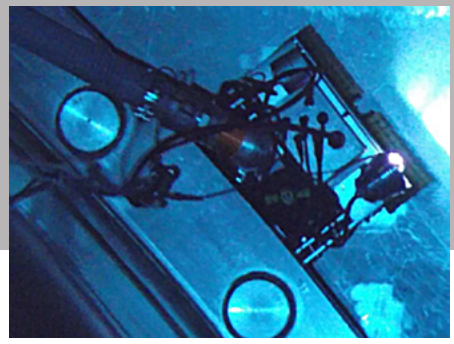
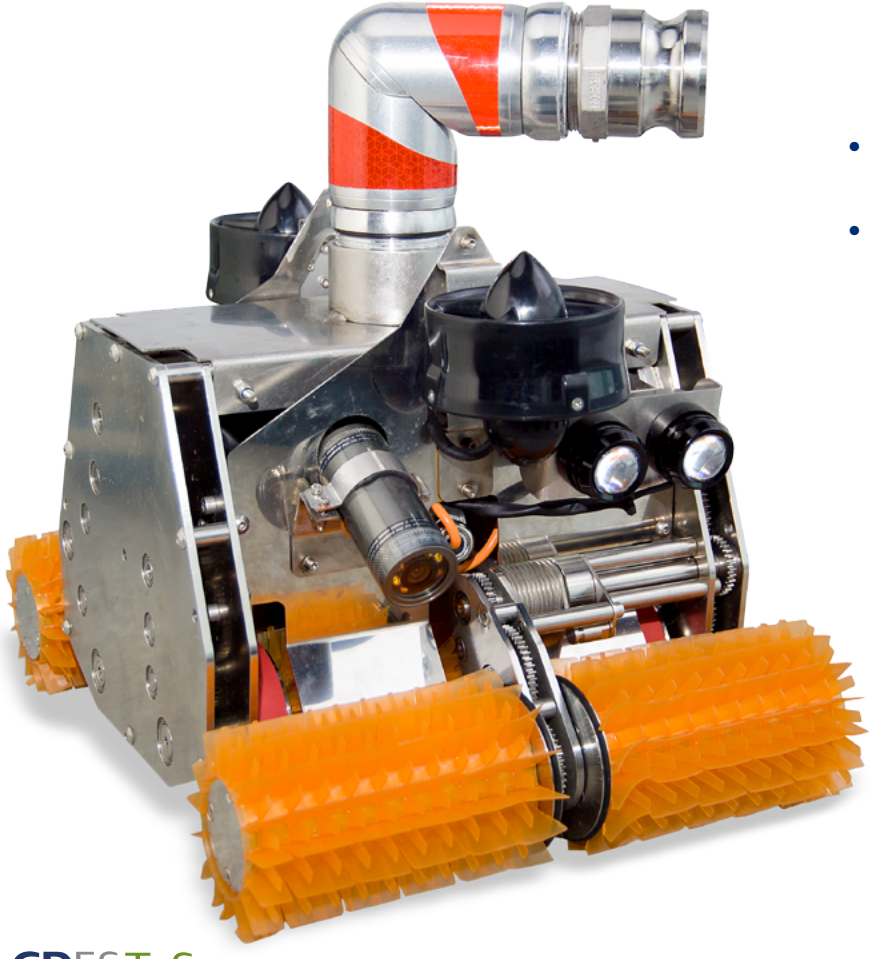
DEMOS

ROV for the mechanical cleaning and decontamination of floor and walls of NPPs' pools





- Remote control operation with on-line viewing and video recording of the activity.
- In combination with FILTRABRIS, after the scrubbing, the aspired particles are filtered, inspected and collected for further analysis and disposal.

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FILTRABRIS

Aspiration and filtration system for the analysis of debris accumulated in NPPs' spent fuel elements

- It couples to the lower end of the fuel element; anti-debris filter removal is not rerquired.
- Aspired debris is collected in a canister filter equipped with camera and lights for visual inspection .
- Fuel channel crud is collected into a second cartridge filter of high filtering capacity to prevent its dispersion in the pool.

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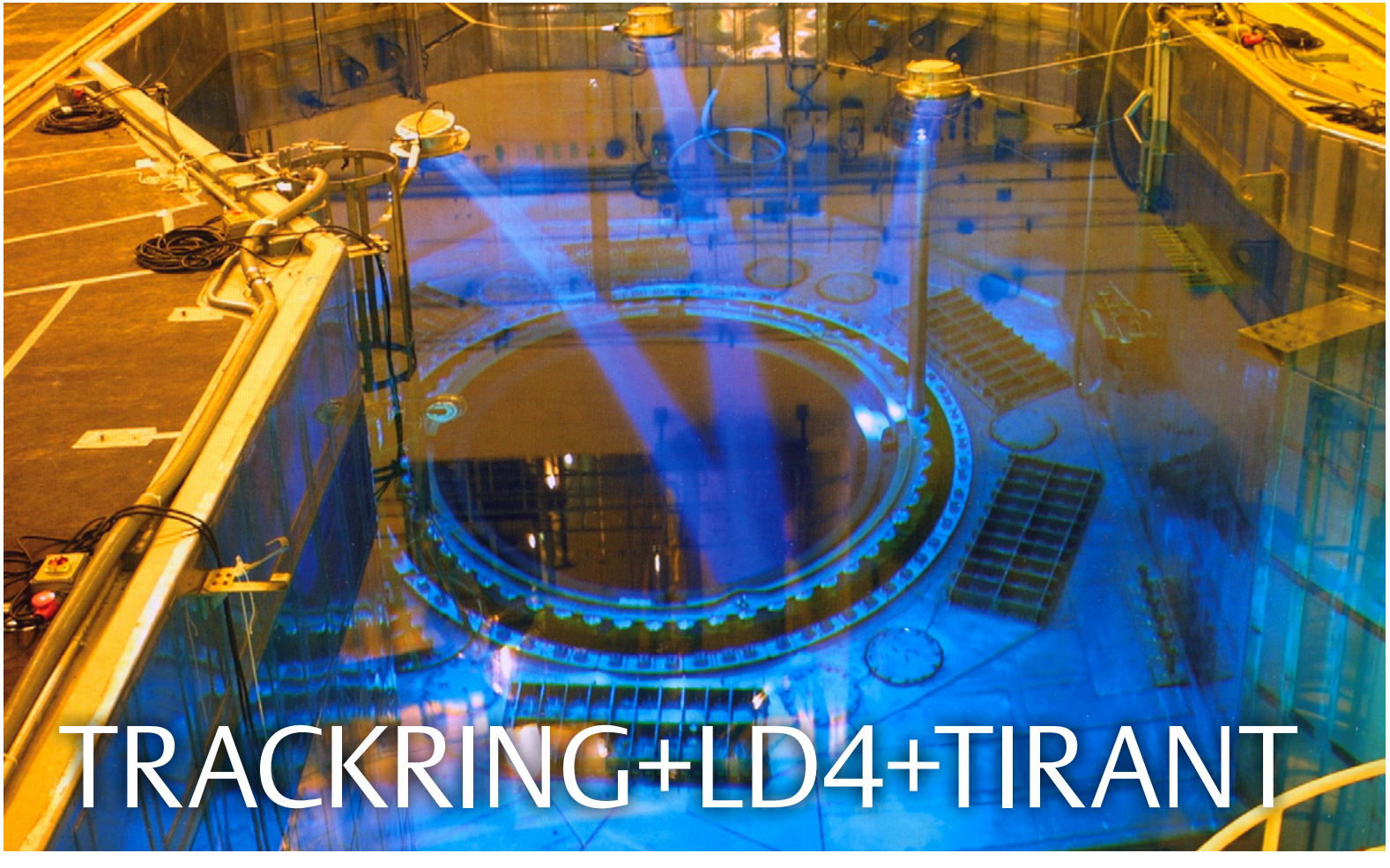
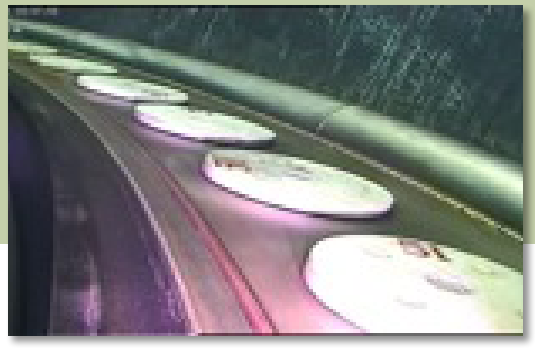
Remote systems and automation to reach higher safety levels, schedule compression and operational dose reduction

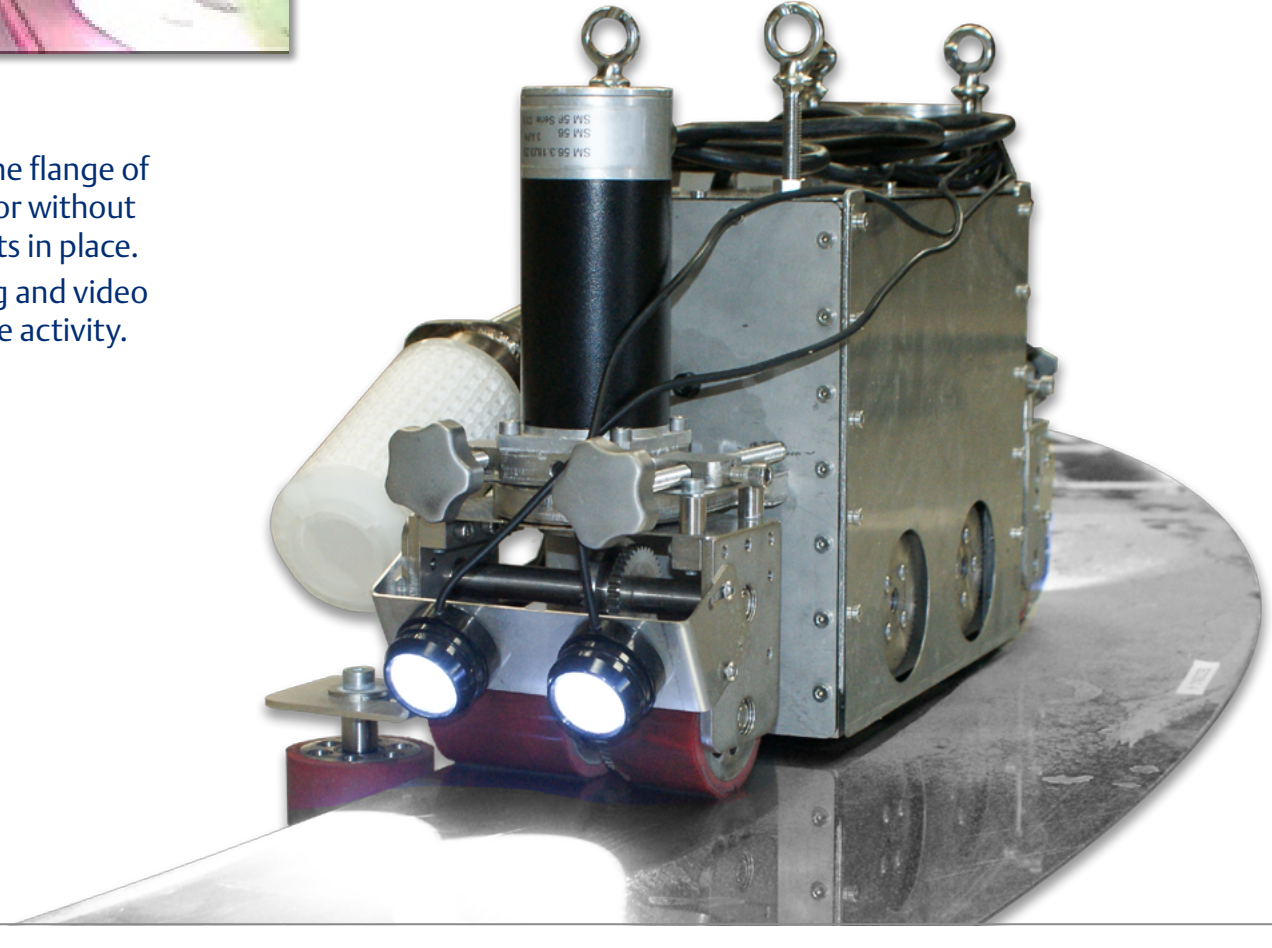


TRACKRING

Robotised underwater cleaning and decontamination of reactor vessel flange



- Adaptable to the flange of any LWR, with or without the reactor bolts in place.
- On-line viewing and video recording of the activity.



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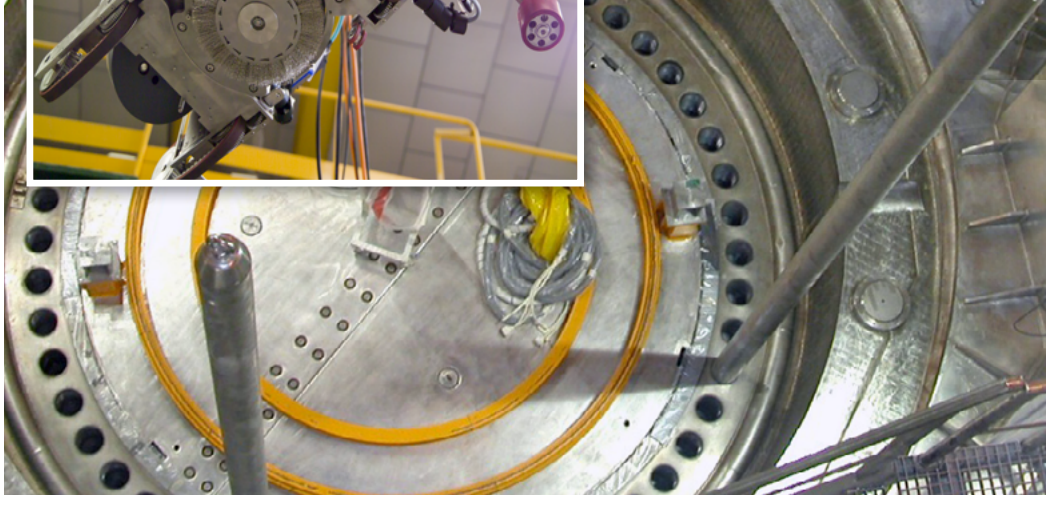
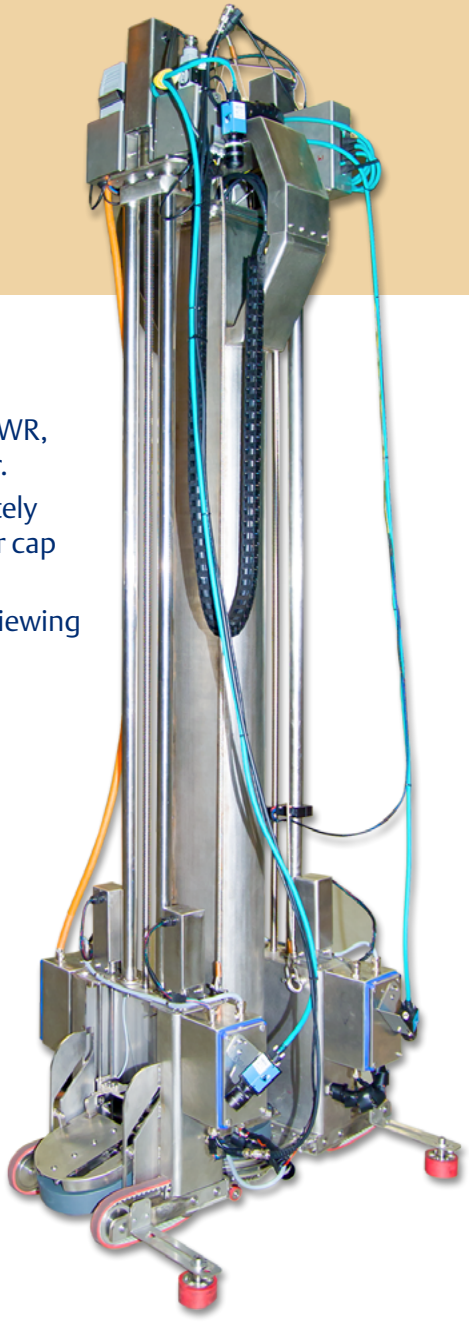
LD4 +

Robotised mechanical cleaning of reactor vessel bolt housings



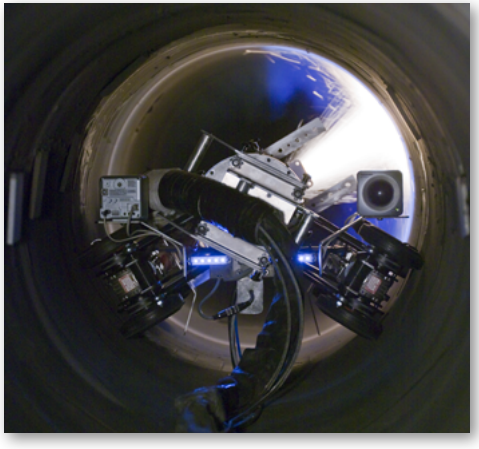
- Decontamination and cleaning of reactor vessel bolt housings in any LWR, regardless of vessel or bolt diameter.
- Can be either autonomous or remotely operated, with or without the rector cap in place.
- Remote control operation: on-line viewing and video recording of the activity.



TIRANT

Robotic arc-spry metallization of large bore pipes

- Robot for the automatic arc-spray metallisation process of the inner surfaces of pipes.
- The resulting coating has anticorrosion properties, as well as increased hardness and therefore abrasion resistance.
- Minimises radiation dose and other operatonal risks workers might otherwise be exposed to.



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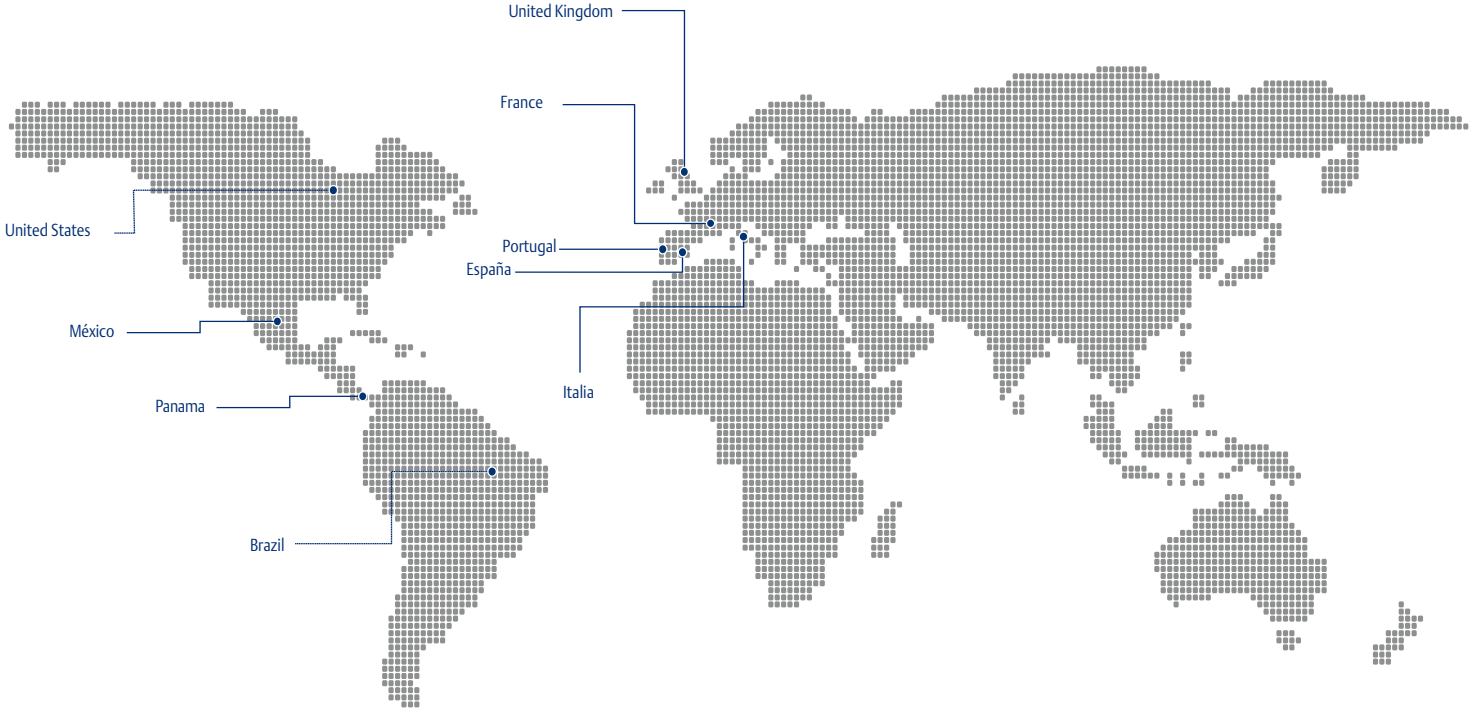
International presence



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