## micado MICADO "Executive view"



The main techniques are:

- Hot spot search and gamma spectroscopy for the identification of the energy spectra and the quantification of the gamma emitters (<sup>60</sup>Co, <sup>137</sup>Cs...) for the detection of fissile materials (U, Pu) and define isotopic compositions and activities. The identification of hot spots of a higher activity will help on the material handling or repackaging;
- Neutron active and passive measurements based on <sup>3</sup>He detectors to evaluate the Pu activity, combined to gamma measurements. Neutron coincidence techniques are also used to measure the spontaneous fission (Pu and Cm) or measure the U and Pu fissile mass and their activities using neutron induced fissions;
- Photofission measurements to evaluate the U and Pu activities for higher or high-density waste packages
- Long term monitoring system based on scintillating optical fibers and SiLi6Fi technology to have a low cost and distributed grid of sensors surrounding the waste packages in the storage repository.







**CLEANDEM – Cyber physical Equipment for unmAnned Nuclear DEcommissioning Measurement** 

NFRP-2019-2020 - 3 years projects starting the 1st March 2021

11 Partners from 4 different countries

CLEANDEM aims at improving current processes involved at different steps of *decommissioning and dismantling (D&D) operations*. The ambition is to deliver key achievements in respect of D&D, enabling:

- 1. a significant reduction of the dose received by operators
- 2. the optimisation of time and cost related to D&D operations
- 3. high-quality level of measurements
- 4. *improvement of the competitiveness for the companies involved*

CLEANDEM focuses on the development of new technological solutions, based on current state of the art and innovative building blocks and fully dedicated to nondestructive characterization. Key features will enable a continuous and online dose rate monitoring, measurement of low-level alpha/beta contamination, gamma-ray spectrometry and neutron measurements using single detectors, remote localization of hot spots using miniaturized gamma-ray imagers, air contamination monitoring.



## CLEANDEM involves:

- Technologies embedded on Unmanned Ground Vehicles (UGV) to enable the full remote non-destructive characterization in harsh environments, hence reducing human exposure to radiation.
- A Digital Twin (DT), enabling to save and update in real time the radiological status of a facility to be decommissioned, and which will be considered as a digital memory.