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#08-53 The Euratom project MICADO and its innovative characterization process of the Nuclear Waste Packages

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In 2019 the MICADO (Measurement and Instrumentation for Cleaning And Decommissioning Operations) project started under the H2020 Euratom call aiming to become a reference in the nuclear waste characterisation field. It can be possible by the system under development and to the partners involved representing some of the most important actors of the sector. They are covering the roles of academia, industry, and the end-users.

All over the world the nuclear waste management sector is always considered by the population a scaring problem and it is always part of the public debate, mainly due to complexity and costs coming from the storage and management of the waste produced. It is important to underlying that this waste is not only produced by the nuclear power industry, but also by hospitals, universities and non-nuclear industries like oil and gas companies with the production of NORM (Naturally Occurring Radioactive Materials) and TENORM (Technologically Enhanced Naturally Occurring Radioactive Materials) waste. Independently from their origin, the main concern is the radiation emission, which makes it a particular hazard for human health and the environment. It must therefore be managed with special care, from production to final disposal.

The situation gets even more complicated when considering country dependent legislation, storage and final disposals sites. This means dealing with different definition of waste categories and activities (i.e. free release), the necessity to use multiple radiological sensors with not compatible outputs inducing the need to reprocess the characterization at each site, to analyse a large amount of off-line data, process manual reports of the operators, etc.

MICADO wants to show a way to improve the characterization of nuclear waste packages and change current manual operations applying a digital analysis procedure, waste-type dependent, and combining information from different detectors to better qualify the waste package under investigation.

MICADO has established a characterization process, data analysis and information storage able to cope with different types of waste activities (VLLW, LLW, ILW, legacy waste), types (Metallic & concrete filling) and drum dimensions.

This is done with a toolbox with up to date and novel gamma and neutron detection technologies (two other abstracts submitted on the monitoring grid and on the photofission system), working as modular elements, and a digital software platform used as a base for the digitalization of waste information and the off-line analysis for the uncertainties assessment. The procedure was defined to reduce the measurement time in each step and being able to select the required detection technology avoiding multiple identical measurements of the same waste package. The combined data analysis, like other big-data studies, fuses different measurements results to extract information not available by the individual system and reduces the individual uncertainty. This aspect is extremely important as a possible solution to the problem of having a satisfying and reliable categorization of the waste package activity of complex cases as high density waste drums or the request for the free release. The software platform also aims at reducing operator costs and improving the ALARA principle, decreasing the time spent on field by the operators and promise a simple and easy data control on historical basis of all the already characterized waste packages.

The presentation will start with the project overview but will focus on the status of the overall technologies after one year, from its start and tests performed. It will also be given a look to the future steps toward the end of the project and more till the organization of the final demonstration.

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