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The CORSAIR Project a Cloud Oriented Radiation Sensor for Advanced Investigation of Rocks

The CORSAIR (Cloud Oriented Radiation Sensor for Advanced Investigation of Rocks) project was born to meet the EU guidelines 2013/59/EURATOM on safety standards for protection against ionizing radiations. The project designed an automated, transportable and non destructive detection system capable of providing a real-time measurement of the radioactive activity concentration index for building materials according to regulations of more than 20 different countries. Measurements are conducted through in situ γ-ray spectroscopy based on a non destructive techniques placing the device on top of stone blocks of rock at quarries and processing centers, and quantify the activities, the abundances and the related effective dose-rates of natural radionuclides (40K, 232Th, 238U and their progenies) in stone materials for the building industry.

The innovative aspects of the detector are in its autonomous operation and the easy fruition of the results of the material characterization. The cyber-physical system empowered by cloud-based technologies consisting of sensing nodes, data collection gateways and a centralized cloud application. These components are interconnected in a star-of-stars topology, exploiting respectively LoRa WAN and Internet network, and provide specialized user interface that can be remotely controlled thanks to a dedicated Android app. Moreover, it makes those data available to all stakeholders (i.e. producers, exporters, constructors, etc.), enabling to trace the materials along the full market chain, from extraction to the final customer, with the modern RFID technology.

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