

THE SOLSA CORESCANNER: AN AUTOMATIZED MULTIFUNCTION ANALYTICAL TOOL FOR ON-SITE DRILL CORES ANALYSIS IN LATERITIC ENVIRONMENT

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On-line-real-time combined analysis on drill cores allows efficient, cost-effective and sustainable improvement of ore deposit exploration and mining leading to optimal definition of geo-metallurgical parameters and more confident geo-models and economic evaluation.

In this frame, the EU-H2020 SOLSA project (www.solsa-mining.eu) aims to develop an expert system coupling sonic drilling with an on-line-real-time analytical core scanner to operate in nickel lateritic environments and other ore types. The core scanner system combines for the first time systematic morphological, textural, mineralogical and chemical analyses on drill cores using a profilometer, RGB and Infrared hyperspectral cameras (VNIR, SWIR) and a X-Ray Fluorescence spectrometer (XRF).

The development of such a scanner requires accurate real time integration (data fusion) of the acquired data into a unique mega-file. This is performed using a 3D space-time model to generate a metric description of scanned cores. The treatment of the fused data, both individual and combined using different data processing algorithms (e.g. color segmentation, grain shape and grain size, structural information, mineral identification) allows to automatically extract and correlate the geological characteristics, and to build a cartography of scanned drill cores in real time.

Treated data matching to key geological parameters (e.g. cut-off grade, lithological facies, presence of a specific mineral, metal anomalies) via a “decision-making-software” allows to localize Regions of Interest (ROIs). Characterization of these ROIs (distribution, statistical representability, variation along depth) will thus bring valuable information for ore deposit exploration and mining. ROIs mineralogical and chemical characteristics can be further in-depth investigated in the field thanks to a benchtop system combining X-ray diffraction, X-ray fluorescence and Raman spectrometry allowing quantification of the major mineral compounds.