SOLSA
Expert System

Pull your exploration campaigns into the digital age!

SOLSA EXPERT SYSTEM

The Sonic On-Line Sampling & Analysis (in short SOLSA) EXPERT SYSTEM is the unique combination of sonic drilling and automated mobile, in-field, on-line and real-time raw material analyses in an integrated continuous work-and dataflow. The SOLSA EXPERT SYSTEM will improve the effectiveness of your exploration campaigns by reducing exploration time and costs through rapid decision making based on high quality sampling, data acquisition and interpretation in real-time.
This is possible due to the following key elements:

1. Fast drilling of complete, coherent and undisturbed cores with minimal environmental impact is ensured by the SOLSA DRILL module.
2. In-field and high speed qualitative chemical and mineralogical material measurements can be performed directly on uncut drill cores or loose material by the SOLSA IDENTIFICATION 2A module.
3. In-field quantitative combined chemical and mineralogical measurements on cut or powdered samples are available through the SOLSA IDENTIFICATION 2B module.
4. An integrated continuous workflow is facilitated by the multi-interface SOLSA DATABASE module containing all generated data.
5. Fast strategic exploration and exploitation decisions can be made based on fused and interpreted data by the SOLSA SOFTWARE, available through intuitive custom interfaces.

The SOLSA EXPERT SYSTEM can deliver the validated chemical and mineralogical drill core log within a 10-hours shift. This information is presented in intuitive user interfaces for all stakeholders to be integrated in 3D modelling and therefore facilitate immediate decision making. This extremely short lead-time can save substantial amounts of drilling and mobilization costs. And of course, due to the in-field analyses, costs for core shipment and laboratory analysis are significantly reduced.

The SOLSA EXPERT SYSTEM contributes to societal and environmental sustainability goals in optimizing natural resource management through early and efficient mobile material sorting and recycling in short time, avoiding hazardous pollution.

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CompactRotoSonic-SOLSA (CRS-S)

The CompactRotoSonic-SOLSA (CRS-S) and its add-ons represent the start of a new generation of sonic drilling rigs and is a result of over 100 years of soil sampling experience. Their development is focussed on obtaining representative drill cores in the most challenging heterogeneous geological circumstances out there, in a perfectly safe, ergonomic and economic manner. And...fully connected! The added value of the SOLSA EXPERT SYSTEM starts at the core!

The CRS-S stands for:

1. Safety

A fully electronic dual channel safety system is constantly guarding for any person coming too close to hazardous areas around the rig. This system makes physical fencing, which decrease productivity, unnecessary. The remote-controlled rod handling system bans heavy manual rod lifting and makes ergonomic 'Hands Free Operation' possible. This drastically reduces the risks for both sudden and long term injuries. And of course, all systems are conform the latest environmental and emission norms.

2. Accuracy

A Measurement While Drilling (MWD) system is integrated to keep constant information about machine performance and the response of the system to changes in circumstances and/or settings. This information can be used to find the optimal configuration and settings for optimal representativeness of the drill core sample.

3. Productivity

The CRS-S makes it possible to work data driven. The MWD system keeps the operator constantly updated about machine performance and the response of the system to changes in circumstances and/or settings. Drilling with optimal settings will favour production, OEE and prevents downtime! The CRS-S is equipped with a data gateway for connectivity with the SOLSA Database. The collected performance data together with engine condition data can therefore be used for remote geotechnical analysis, condition monitoring and predictive maintenance. Since the rig is fully digital operated, it is possible to change settings within a few seconds through one centralised and intuitive touch screen. This is what we call future proof!
All these features, and many more, make the CRS-S a highly versatile, competitive and above all safe sonic drill rig. The CRS-S can be delivered together with a tooling system that suits your specific needs. The definitive step into the new century.

And... do not forget the looks...

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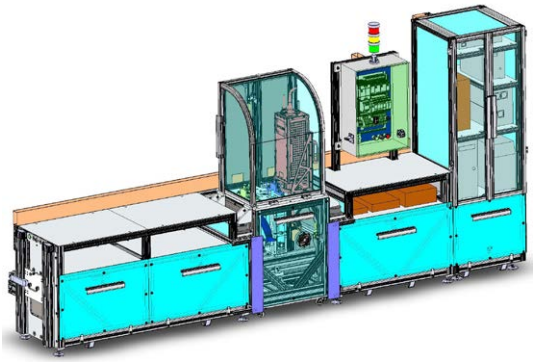
SOLSA Identification (SOLSA ID)

Designed and built as a solid and robust machine to operate on-site, the SOLSA ID system, composed of the ID 2A scanner and the ID 2B benchtop combined analysis, is mounted in a ruggedized mobile laboratory trailer designed to travel with the drill rig on the exploration site.

SOLSA ID 2A Scanner

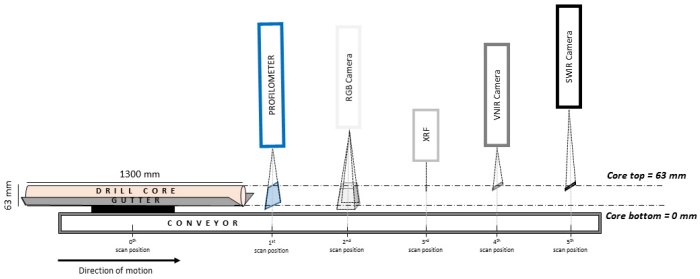
On-line, on-site and real-time core scanner for mineral, geochemical and morphological characterization.

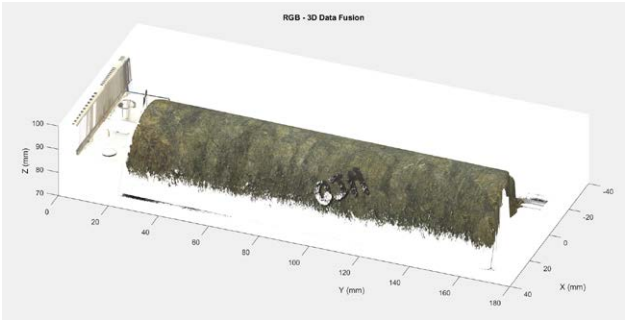


The SOLSA ID 2A scanner combines for the first time non-destructive and fast (7 minutes for 1 meter) profilometric, RGB, X-ray fluorescence and hyperspectral measurements to provide detailed morphological, geochemical and mineralogical information on uncut drill cores, lose or chip materials. Real-time data integration (fusion) from disparate sources into a unique metric referential forming a mega-file with a 30-µm high-resolution delivers structured, reliable and ready-to-analyze data. Real-time visualization and automated processing of integrated data with a decision-making software based on pre-defined key geological features allow to identify the Regions Of Interest (ROIs) and to provide geologists real-time access geological data.

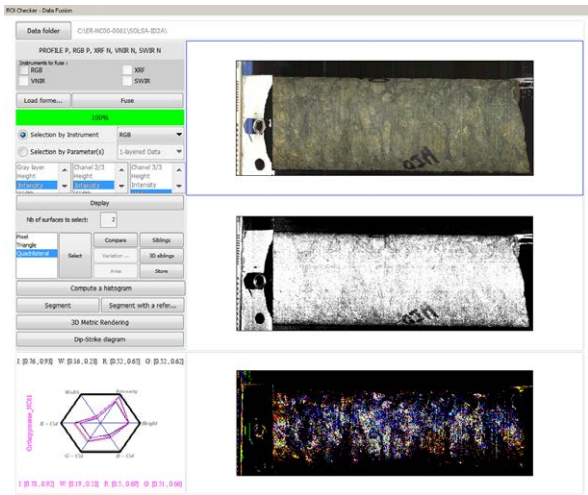
The SOLSA ID 2A Scanner stands for:

1. **Fast, in-field, high resolution and non-destructive multi-instrument analysis for mineral, geochemical and morphological identification.**





2. **Automatized real time data integration, processing and visualization.**



3. **One step from measurement to identification of the ROIs.**

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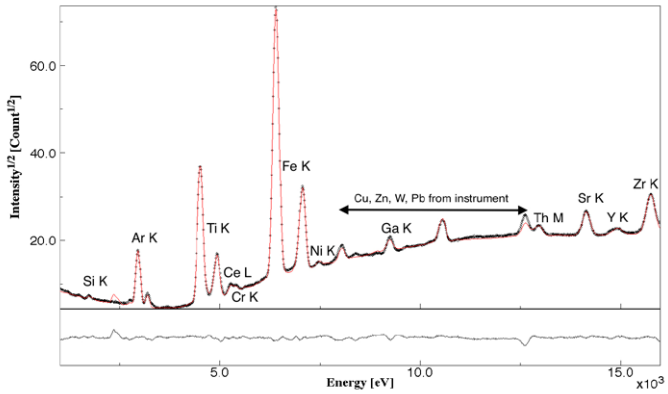
SOLSA ID 2B Benchtop Analyser

In-field benchtop analyser for global chemical & mineralogical quantification.

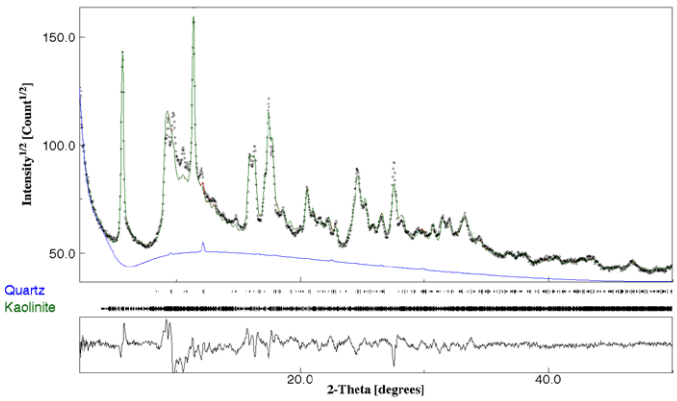
The ROIs identified by the SOLSA ID 2A Scanner are sampled and prepared directly in the mobile laboratory trailer, by reducing the particle size (< 20 µm) to obtain a homogeneous powder. An in-depth investigation of the ROI powders with the SOLSA ID 2B Benchtop Analyser combining X-ray diffraction, X-ray fluorescence and Raman spectrometry on the same sample volume, allows simultaneous mineralogical and chemical material quantification. With the SOLSA ID 2B software, data acquisition and processing is for the most part automated and the decision is optimized to be in real-time (10 min/drill core) without compromising accuracy. There are strong indications that even complex phases like clay minerals can be quantified accurately.

The SOLSA ID 2B benchtop analyser stands for:

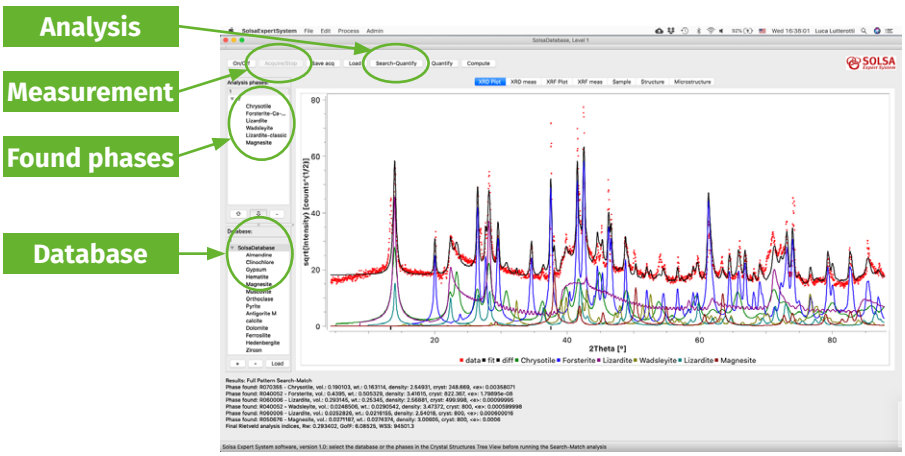
1. **Fast, in-field combined chemical and mineralogical quantification.**



2. **Analysis of complex phases (e.g. clay minerals).**



3. **Fully automated analysis procedures.**



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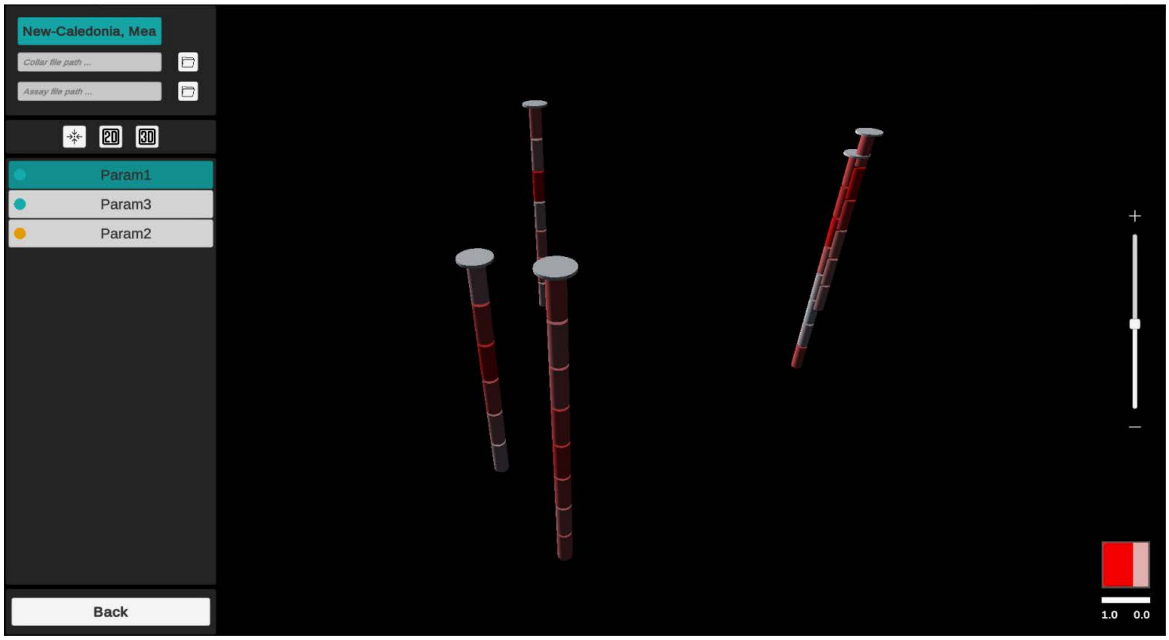
SOLSA Software & Database

The SOLSA EXPERT SYSTEM includes independently developed software dedicated to the execution of different tasks. Recorded data are stored on- and offline, databases are created and updated. The SOLSA software and database are linked and interacting with open databases (e.g. COD, ROD).

SOLSA Software

For a reliable definition of the ROIs of the drill core, the SOLSA EXPERT SYSTEM is equipped with the following software suite:

- The RESTful API and associated database. The database contains all analytical results, whilst the RESTful API offers an interface for storage and retrieval of these data.
- The SOLSA ID 2A driving software controls the acquisition of all SOLSA ID 2A instrumentation (RGB, profilometer, XRF, hyperspectral cameras).
- The data fusion software combines the different data acquired from the SOLSA ID 2A online-instruments and performs the pre-processing required for the hyperspectral analysis.
- The hyperspectral analysis software evaluates the mineralogy of the drill cores, produces a mineral map and allows quantification of the minerals present.
- The Graphical User Interface (GUI) presents a unified interface to facilitate the data interpretation for the end-user. GUI interacts with all individual software modules for successive data evaluation and ROI definition. ROIs can then be sampled and analyzed by SOLSA ID 2B.
- 3D-visualization of drill cores, lithologies, ROIs during an exploration campaign is possible thanks to GUI. Data can be easily linked and transferred to for example commercialized 3D geo-modelling software.
- SOLSA ID 2B driving software controls the acquisition of the SOLSA ID 2B instrumentation.



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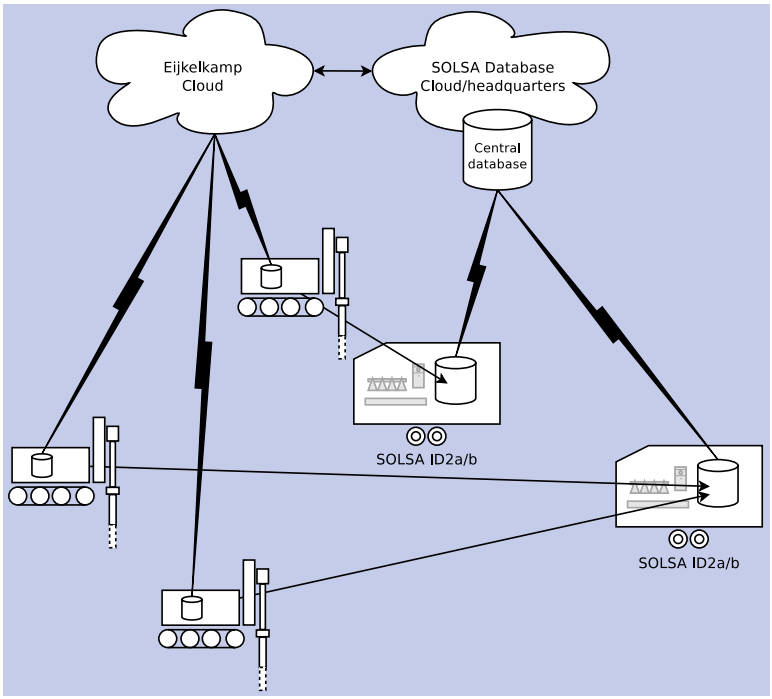
SOLSA Database

All data collected during the drilling campaign is recorded in the SOLSA Database, designed specifically for SOLSA drilling and identification equipment.

A database is located on both SOLSA ID 2A and 2B modules and stores data obtained and processed on that module. Additionally, a central database can be installed in the mine office or at the headquarters to collect data from all operational exploration equipment for better overview.

SOLSA Database features:

- Each drill core gets assigned a unique SOLSA identifier, Solsa ID, to enable drill core tracking;
- Each experiment or measurement performed on a drill core or sample is assigned a unique UUID identifier, to make sure unambiguous identification is possible;
- All numeric measurement results are stored for each experiment in specifically designed database tables; large data chunks (images, etc.) can be stored in files and the SOLSA Database will provide references to these files.



The SOLSA Database stands for:

1. Data that is always collected in a strictly ordered manner (under a pre-defined schema), immediately usable for further analysis and decision making.
2. Data that is stored in a central place and can be managed easily
3. Data that is suitable for both human inspection and automated processing by software.

SOLSA Expert System

The SOLSA Team provides the technical, logistic and scientific expertise to fully integrate the SOLSA EXPERT SYSTEM in your exploration operations. The SOLSA EXPERT SYSTEM will be customized according to your specific needs in a period of joint development prior to operation.

The SOLSA Team

The consortium by which the SOLSA EXPERT SYSTEM was developed consists of the following partners:

Contact

We encourage you to contact us to discuss all options for your exploration operations:

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