abaut GmbH
DEQ as a tool for monitoring the mobile mining fleet

DIGIECOQUARRY
INNOVATIVE DIGITAL SUSTAINABLE AGGREGATES SYSTEMS

Workshop DigiEcoQuarry - Áridos 4.0

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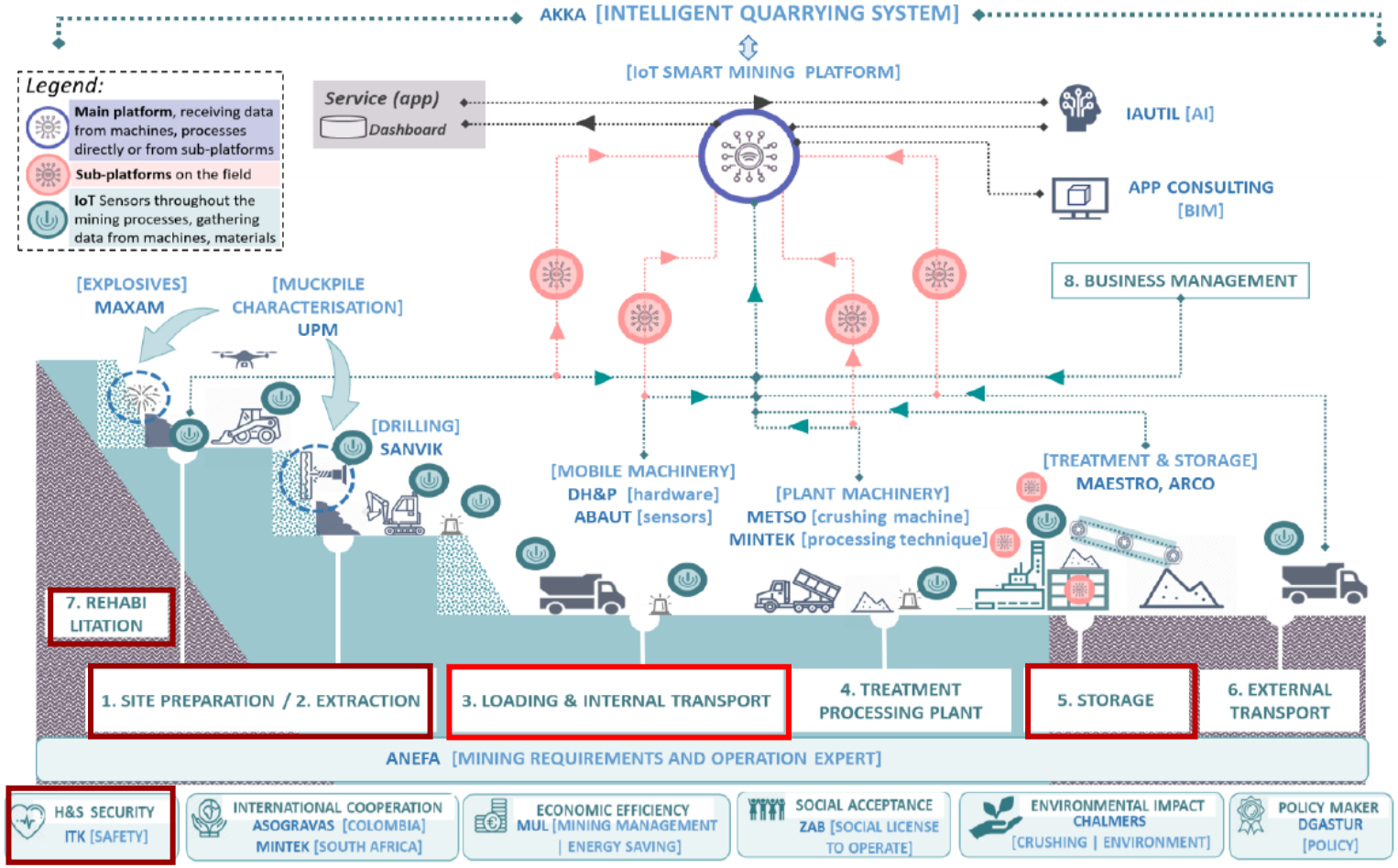
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101003750

Overview on KTA 3.2
Monitoring sensors and analysing tools for mobile minig fleet



- **Monitoring sensors and analysing tools for Mobile Machinery in Loading and Transport (both internal and external).**

abaut is in charge of monitoring the activities of the mobile machines. The activities such as loading/unloading, are recognized, and defined by location & time for improving the fleet performance

The system use advanced technologies such as cameras and sensors, combined with a high-performance data analysis based on NoSQL Databases and ML modules.

The data analyzed is included in the IQS – Data Lake of the project in order to be combined with the rest of the partners for the creation of the ‘’Quarry 4,0’’

DEQ will provide easy digital tool that measures, analyze and support the management at the decision-making step.

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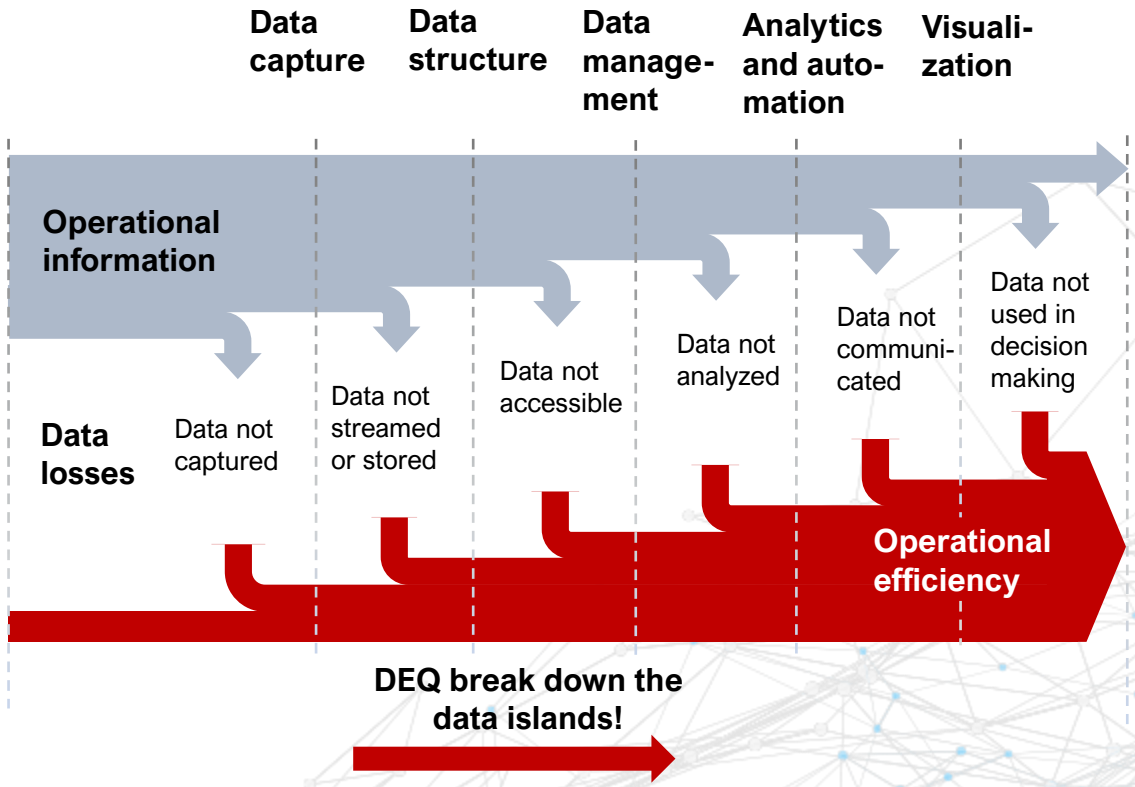
The Importance of DEQ in the Aggregate Sector

In mines, quarries and gravel pits, the available data and information are not used for decision-making. With only little effort, relevant operational data can be measured and analysed, offering enormous potential for increased operational efficiency.

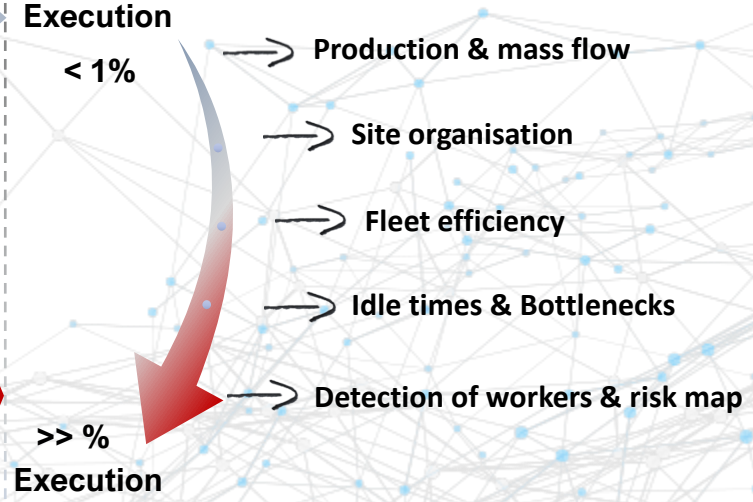
Mining companies only use a fraction of their data [I]

[I] Source: McKinsey; https://www.mckinsey.com/industries/metals-and-mining/our-insights/how-digital-innovation-can-improve-mining-productivity

DEQ provides the platform to tackle the performance gap



What abaut does in DEQ



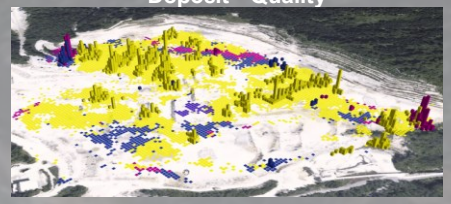
[II] Source: abaut GmbH; Project analysis

Our expertise - Monitoring Tool for the Mobile Mining Fleet

Loading performance

Drilling & Blasting

Deposit - Quality



Overburden

Raw material

Residues

Transport cycles, road conditions & inefficiencies

Intermediary stockpiles

Processing plant

Our expertise - Monitoring Tool for the Mobile Mining Fleet

Decision-making map-based information on mining activities, in near-real-time.

Process recognition

Location, time and duration of mining activities are detected and displayed for each type of machine.

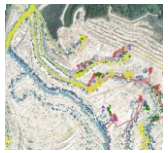
Transport cycles

- **Loading & Unloading**
  Place, duration, timestamp, Mass-flow according working areas
- **Haulage activities**
  Route, duration, distance, Height difference up/down, Speed
- **Idle & Queuing times**
  Place, duration, time stamp

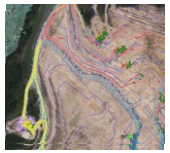
Map layers

Map backgrounds, suitable for the analysis of the mining processes

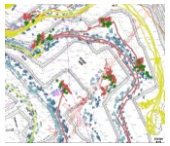
- **Satellite**



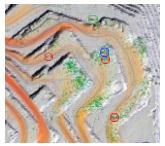
- **Drone**

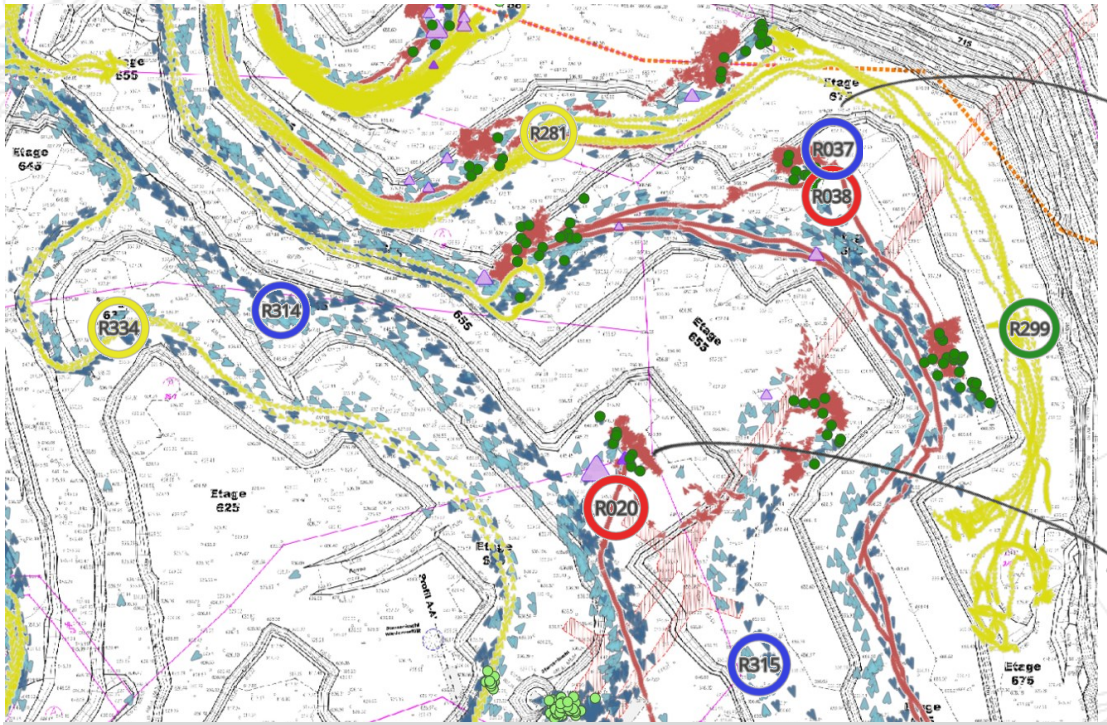


- **Survey map**

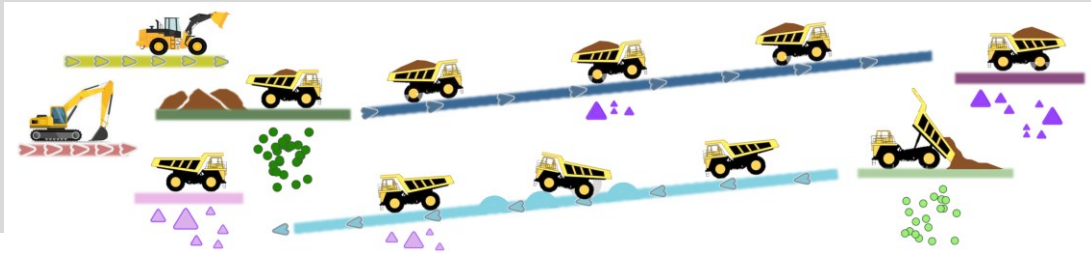


- **Shaded-Contour**





Legend for transport cycles and loader activities



Value-added activities

A detailed analysis of the activities of the mining fleet enables optimal utilization

Activity analyses in detail

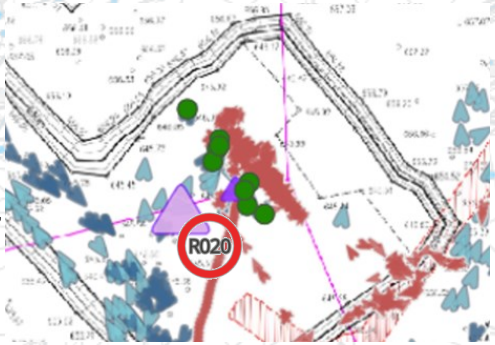
- **Loading performance**
  Location, duration, timestamp, Analysis of the muck pile
- **Combined activity of the fleet**
  Interaction of the machines during common activities such as loading, unloading, ...
- **Logistic activities**

Standstills & Bottlenecks

Inadequate organisation leads to avoidable stoppages and bottlenecks

Bottlenecks in detail

- **Idle times**
  Place, duration and time stamp for each machine
- **Unneded driving**
  Equipment, duration
- **Queuing**
  Place, loading/unloading location, Duration, time stamp



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