

# Digitalization as a step towards a safe and sustainable mining future

## The illuMINEation project

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# BRIGHT CONCEPTS FOR A SAFE & SUSTAINABLE DIGITAL MINING FUTURE

Nineteen project partners from Austria, Finland, Germany, Poland, Spain & Sweden teamed-up in the EU-funded illuMINEation project. The consortium's aim is to set the scene for a paradigm shift in mining via the adoption of pioneering innovations & extensive utilisation of digitalisation in mining.



**9**

Mio. Funding



**19**

Project Partners



**6**

European Countries



**5**

Use Cases





# Project Consortium

## DISCLOSURE STATEMENT

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# Key Objectives

## Safe Zone Concept for the mining industry

- Rock stability assessment
- Environmental monitoring
- Positioning & localisation
- Drones as first response unit



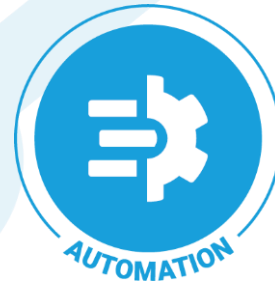
## Sustainable & intelligent mineral resource extraction

- Advanced drilling techniques
- Borehole deviation monitoring
- Optimised rock fragmentation
- Improved resource grade control



## Advanced predictive maintenance & efficient operation

- Drones as Agile Inspector
- Condition monitoring of batteries
- Additive manufacturing of spare parts
- Analysis of equipment telematic data



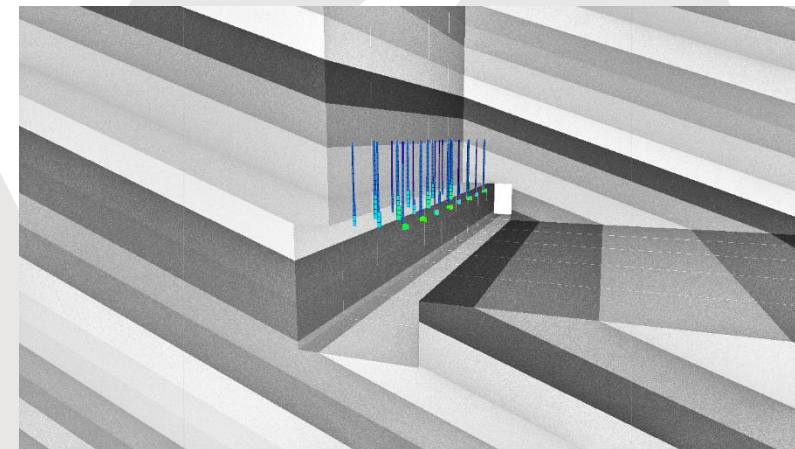
## Dependable multi-level distributed Industrial Internet of Things Platform & novel User Interfaces

- Rock stability assessment
- Environmental monitoring
- Positioning & localisation
- Drones as first response unit

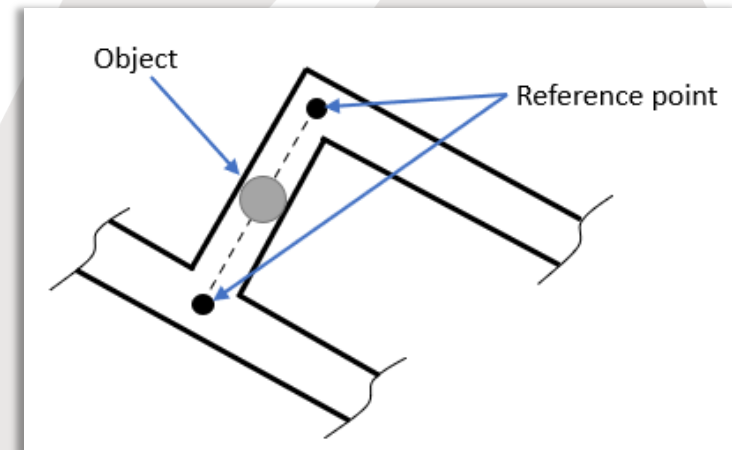
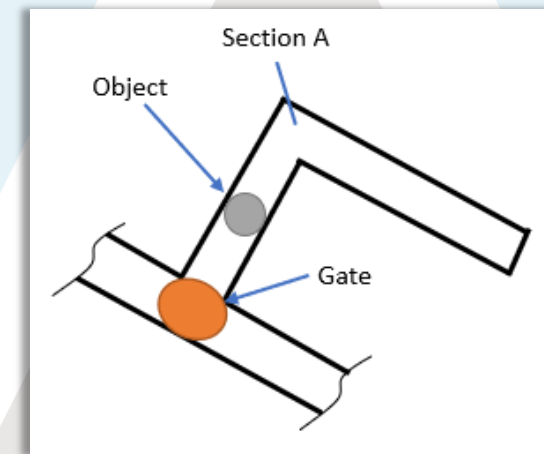




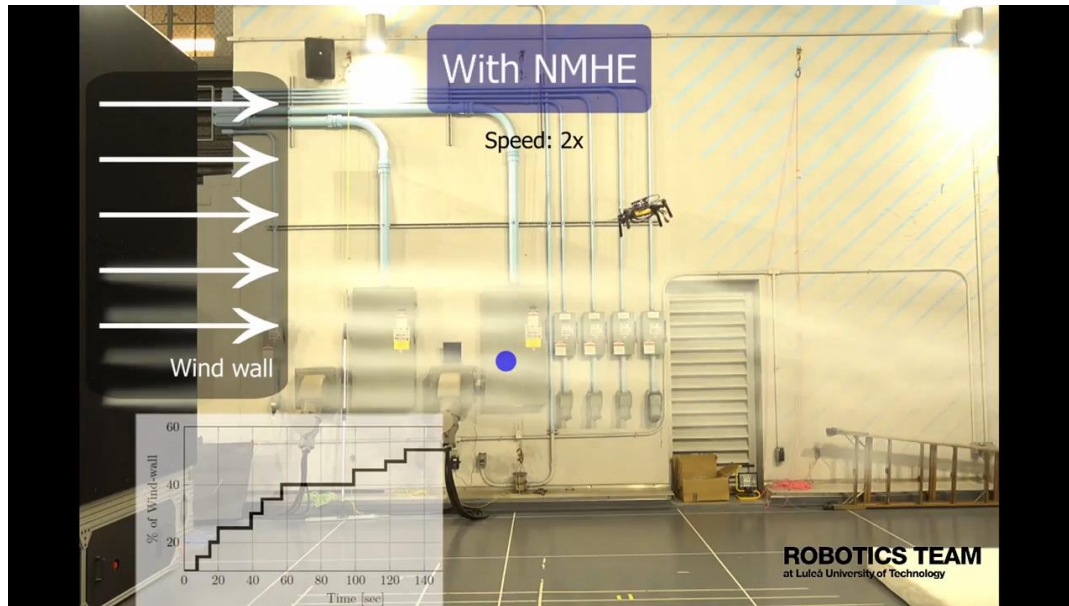
# WP - Safe zones for mining operations – intelligent rock bolts



# WP - Safe zones for mining operations – positioning and tracking



# Drones as agile inspectors

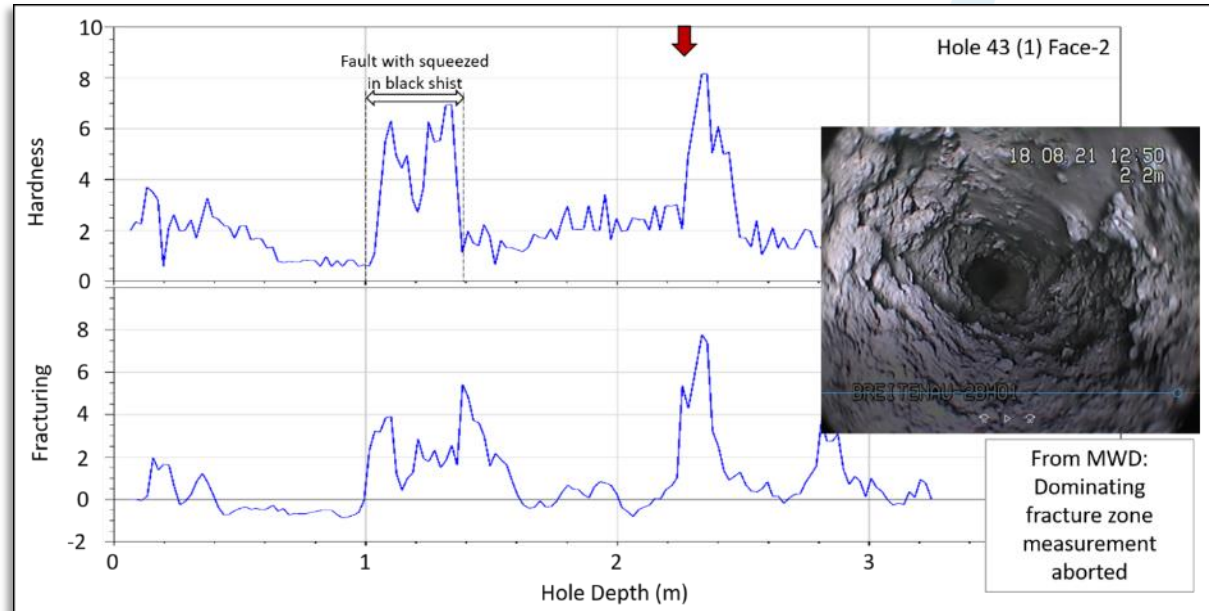


Flight path of drones in heavy wind conditions.

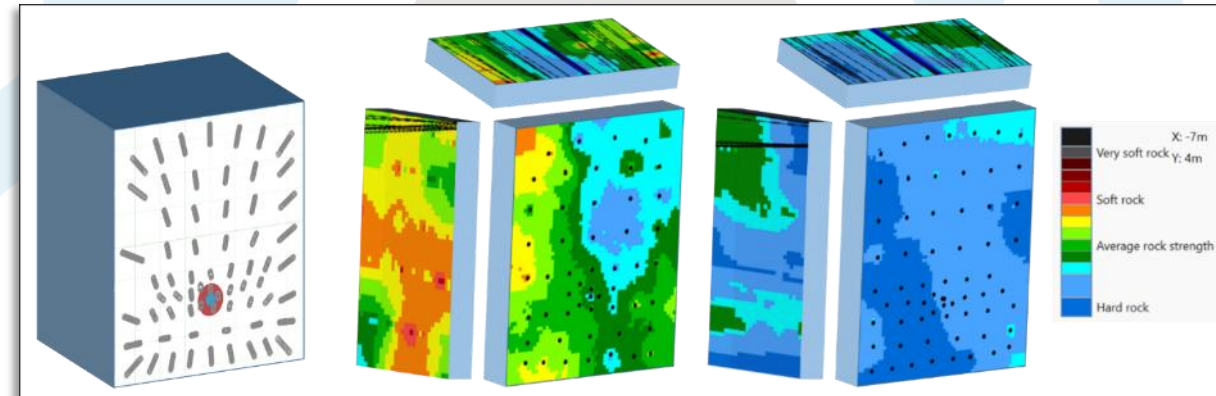


Video snapshots and 3D dimensional reconstruction of the environment based on an autonomous inspection scenario

# WP – sustainable & intelligent mineral resource extraction – measurement while drilling



MWD – Data compared with live situation



Rock mass properties ahead of face



# WP – sustainable & intelligent mineral resource extraction – Analysis While Drilling



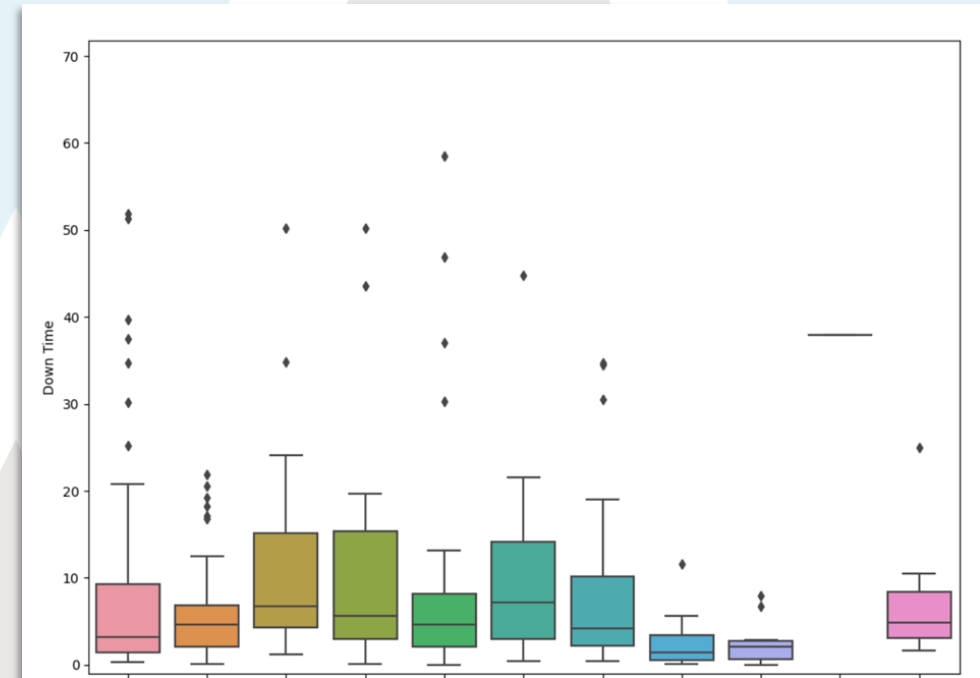
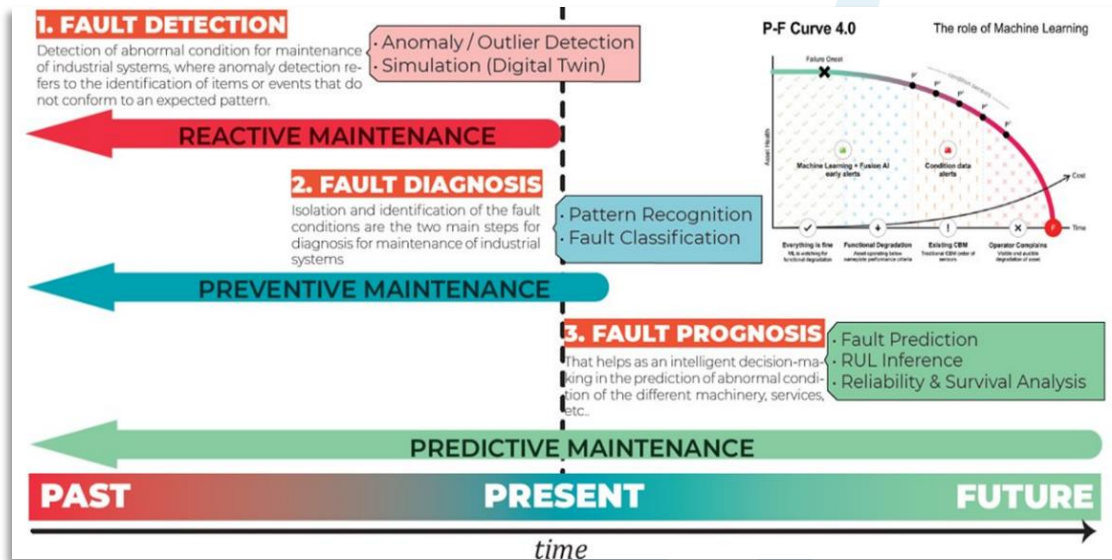
sampling funnel



remote control unit

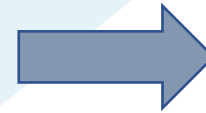
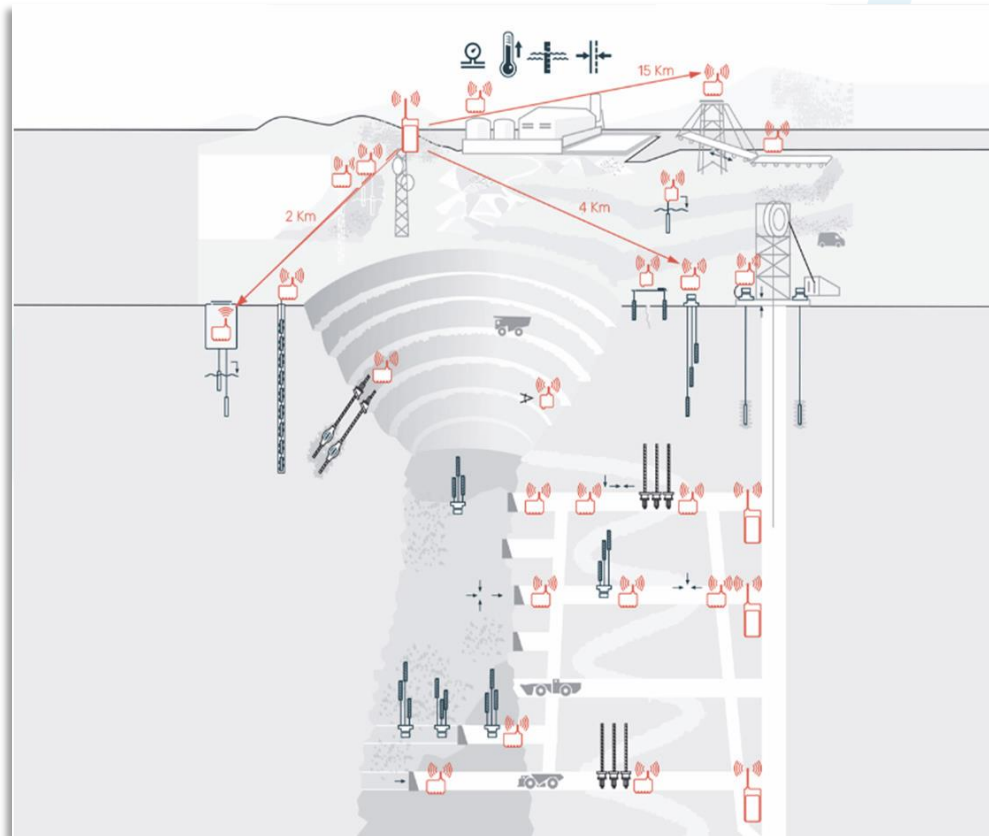
Auto-sampling of drill cuttings and Analysis While Drilling












# WP - advanced predictive maintenance & efficient operation



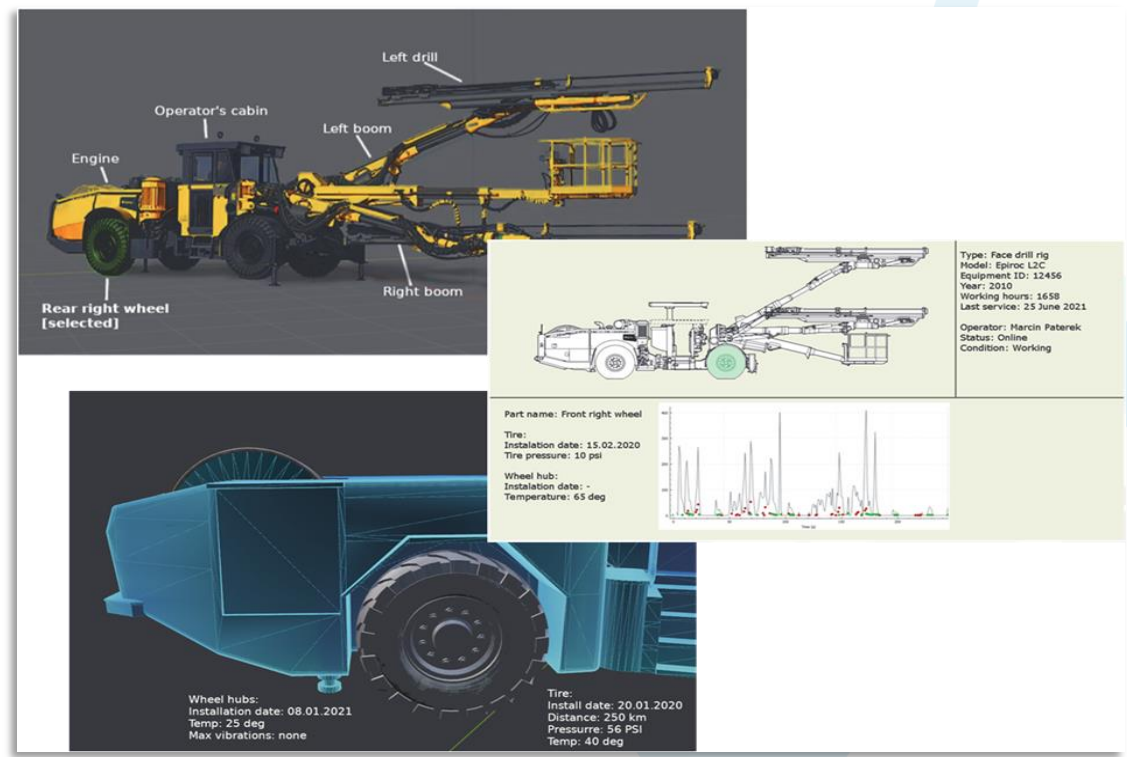
E.g. Downtime per type of error

# IloT - Infrastructure

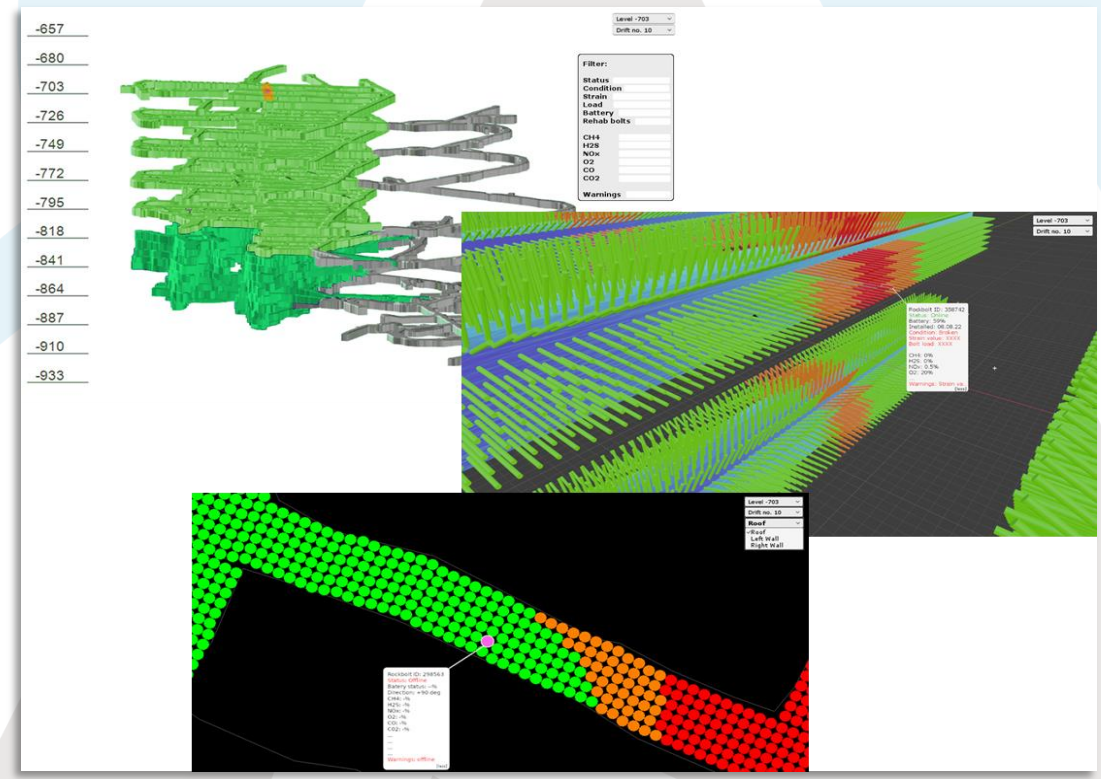


<b>Headquarter</b> 	<b>Cloud Layer</b>  Hyper scale / global scale cloud services
<b>Mine</b> 	<b>Fog Layer</b> At least one data center per mine  Site 1 .. n
<b>In the Mine</b> 	<b>Edge Layer</b> Many (independent) edge zones  Zone 1 .. n
<b>At the borehole In the environment</b>  	<b>Edge Device Layer</b> Many independent devices   

# Live visualisation of key data and aspects



Maintenance status of machine



Rock bolt status during excavation

# Takeaways



- Digitalisation as a key aspect
- All data centrally managed in IIoT-platform
- Dedicated dashboards and evaluations
- Enhancing
  - Safety
  - Productivity
  - Efficiency
  - Sustainability



## Contact

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