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DELIVERABLE D2.4

Temperature management for process adapting to different types of rock

Lead Beneficiary: FhG IAPT

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ABBREVIATIONS AND GLOSSARY OF ACRONYMS

Acronym	Extended definition
F	Fixed Requirement
I²C	Inter-Integrated Circuit
IP	International Protection Codes
IR	Infrared
LIDAR	Laser-Induced Detection and Ranging
M	Minimum Requirement
NTC	Negative Temperature Coefficient
OCT	Optical Coherence Tomography
P	Priority Level
PTC	Positive Temperature Coefficient
SPI	Serial Peripheral Interface
TRL	Technology Readiness Level
UV	Ultra Violet
VIS	Visible
W	Wishes

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PUBLISHABLE SUMMARY

In order to drill different types of rock and layer compositions with different melting points, it is necessary to adapt the laser drilling process. For this purpose, a sensor-based closed-loop temperature management was developed, whose algorithms are to be implemented in the control unit of the laser drilling system. The automated algorithms use both real-time sensor data near the borehole bottom and elaborated knowledge about the laser-gas-rock interaction from laboratory experiments and analysis. The information acquired by the sensors is the type of rock and/or the melting phase of the rock, the environmental conditions at the borehole bottom, and the condition of the laser drill string to set the corresponding process temperature or parameters.