DELIVERABLE D2.1

Laser and gas processing head

Lead Beneficiary: FhG-IAPT

Authors: O. Steinmeier[1], G. Cerwenka[1], A. Fischer[1]

Authors affiliations: [1]FhG-IAPT

Date: 30/11/2022

Dissemination Level

PU	Public, fully open	
SEN	Sensitive - limited under the conditions of the Grant Agreement	X
CI	EU classified - RESTREINT-UE/EU-RESTRICTED, CONFIDENTIEL-UE/EU-CONFIDENTIAL, SECRET-UE/EU-SECRET under Decision 2015/444	

This research is funded by the European Union (G.A. 101046937). The views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or EISMEA. Neither the European Union nor the granting authority can be held responsible for them.

Document History

Version	Date	Authors	Description
1	28/11/2022	O. Steinmeier	First draft
2	29/11/2022	All partners	Review and comments
3	30/11/2022	O. Steinmeier	Final document

Disclaimer

This publication was completed with the support of the European Innovation Council and SMEs Executive Agency (EISMEA) under the HORIZON-EIC-2021-PATHFINDEROPEN-01 programme. This research is funded by the European Union (G.A. 101046937). However, the views and opinions expressed are those of the author(s) only and do not necessarily reflect those of the European Union or EISMEA. Neither the European Union nor the granting authority can be held responsible for them.

TABLE OF CONTENTS

TABLE OF FIGURES

ABBREVIATIONS AND GLOSSARY OF ACRONYMS

Acronym	Extended definition
Al	Aluminum
CA	Consortium Agreement
CAD	Computer Aided Design
D	Deliverable
DCM	Dissemination and Communication Manager
D&C	Dissemination and Communication
EC	European Commission
EM	Exploitation Manager
EP	Exploitation Plan
FDM	Fused Deposition Modeling
GA	Grant Agreement
HE	Horizon Europe
IPR	Intellectual Property Rights
LBM	Laser Beam Melting
M	Month
PBF	Powder Bed Fusion
PC	Project Coordinator
PDEC	Plan for Dissemination and Exploitation including Communication activities
SC	Steering Committee
Ti	Titanium
V	Vanadium
VRE	Virtual Research Environment
WP	Work Package

PUBLISHABLE SUMMARY

Fraunhofer IAPT developed a new special processing head for laser drilling of rock that also can apply cryogenic gas (see figure 1). With the help of the processing head, the gas stream is directed onto the rock, which is melted by a high-power laser beam. The first operational prototype consists of the titanium alloy Ti-6Al-4V in order to meet the requirements for the component in terms of mechanical strength and temperature resistance. Fraunhofer IAPT manufactured the processing head using the 3D printing technology, which is particularly suitable for rapid prototyping and offers the option of simply printing the gas channels directly into the component. The prototype has already been successfully tested in first rock drilling experiments.

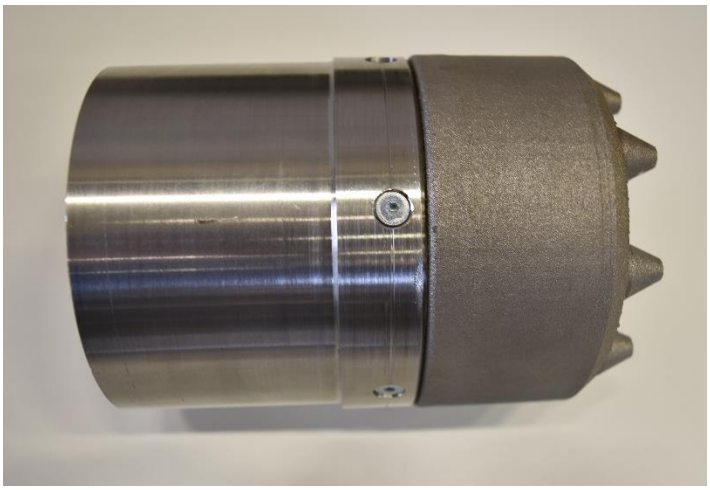

Figure 1: Laser and gas processing head