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Customized photonic devices for defectless laser-based manufacturing

CUSTODIAN

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Communication Kit

Work Package 6
WP6 - Exploitation, dissemination and training

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Executive Summary

Abstract	This document explains in a summarized way the different steps of the task we have carried out to update the communication kit for the Custodian project. In this sense, we have made a description of the graphical aspects of each one of the documents that our kit includes. It is important to note that the communication elements will evolve during the project.
Keywords	Flyer, roll up, poster, laser.

Revision history

Version	Author(s)	Changes	Date
1.0	Sabine Runge		23.09.2020
2.0	Sabine Runge	Updated PPT slides	24.09.2020



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1. ABSTRACT

This document explains in a summarized way the different steps of the task we have carried out to update the communication kit for the Custodian project. In this sense, we have made a description of the graphical aspects of each one of the documents that our kit includes. It is important to note that the communication elements will evolve during the project.

Key words: shape your laser, flyer, roll up, poster, presentation slides.

2. INTRODUCTION

According to the project, the Custodian Communication Kit provides the project with basic communication tools that will be useful to communicate and disseminate the progress and results. Besides, the communication kit offers strategies and resources contributing to make an effective communication and dissemination of the different actions and results within the framework of the project. The elements of the Communication Kit are regularly updated in order to stay up to date with the project development, terminology and design.

The activities of communication, dissemination and exploitation of results are oriented to show the work done, making public the successes and results of the project, and therefore maximizing its impact. The tools created in this communication kit are used to attend international and national events (congresses and exhibitions) related with both, photonics, and manufacturing domains.

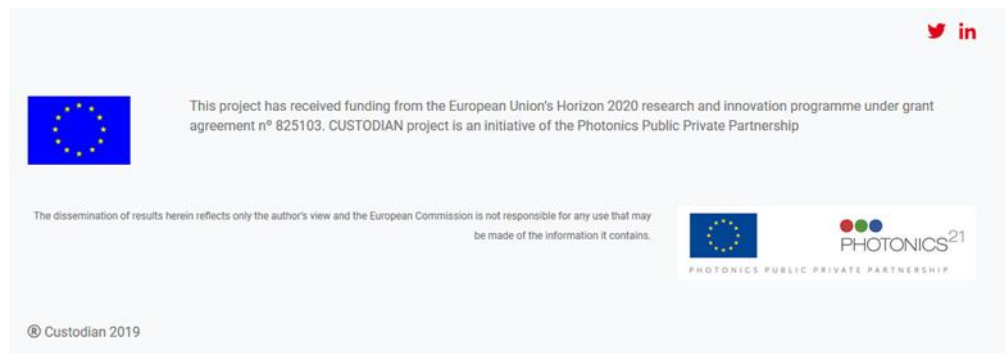
3. UPDATED COMMUNICATION KIT ELEMENTS

There are different elements included in the Communication Kit that have been updated since their first release due to changes of Partner Logos, design improvements, updates of technological terminology or replacement of pictures.

The updated elements are:

- **Newsletter**
- **Flyer**
- **Roll up**
- **Poster**
- **Presentation slides**

All the elements do include the CUSTODIAN logo as the **project brand** and a footer showing that the project has been funded by the EC and is part of the Photonics Public Private Partnership initiative.



The logos are included at the bottom of each element and the partner's logo of Magneti Marelli has been updated to the new logo of Marelli:



All images related to the project do always follow a common line transmitting different aspects of the essence of CUSTODIAN (applied research to industry, high tech, precision, etc.). Part of these images have been bought from a professional gallery of images to respect

intellectual property rights. Moreover, the project partners AIMEN, AIDIMME, NIT and PRECITEC offered new images of their own databases as certain replacements to represent all technological processes involved in CUSTODIAN (LBW, PBF-LB/M and LC) and to personalize the presentation with pictures of collaborative partner meetings and the first project outcomes.

3.1 NEWSLETTER

The newsletter design has been updated, adapting the header to the design of the previously created project poster. The basic structure consisting of a title, brief project description, project news, upcoming events, a brief section about who we are and our contact has been maintained. However, for the first edition an additional section about the project launch followed the brief project introduction. Moreover, we added a call-to-action-button at the end saying “Subscribe to our CUSTODIAN Newsletter here”, where readers have the chance to sign up for future newsletters, as we also promoted it in the project’s social media channels. Last but not least, the footnote has been updated with all necessary copyright notifications, EU disclaimers, contact details and unsubscribe options in order to meet the legal restrictions.



Custodian involves 10 entities focused on industrial laser solutions to develop a new and disruptive methodology in the laser-based manufacturing applications for sectors like automotive, energy and aerospace sector. The idea of the project is to create a methodology of application-driven laser beam, by tailoring the material microstructure and deploying this beam to solve hot-cracking in LBW (Laser Beam welding) and LPBF (Laser Powder Bed Fusion).



Project Launch

Custodian has been launched in December 2018. It is the first project aimed at valuing the unique capacity of the laser to make a personalized energy contribution to the needs of material, a task that, at present, is not possible with

What happened so far?



MWIR camera installation in LPBF technology for melt pool monitoring and closed loop control

The Custodian partners got a step closer to their aim of creating a methodology of application-driven laser beam, by tailoring the material microstructure and deploying this beam to solve hot-cracking in LBW and LPBF.

[Read more](#)



Third consortium meeting in Vienna after first project year

In December 2019, the Custodian partners organised the third consortium project meeting in Vienna, Austria, hosted by our project partner TU Wien.

[Read more](#)



AIMEN and NIT visit AIDIMME's facilities for laser tests and characterizations

Our CUSTODIAN partners: David Diego from AIMEN and Germán

Upcoming events



Webinar - 22 June 2020

Meet the Custodian Partners and find out more about industrial laser solutions for better efficiency and lower cost.

[Click here](#)

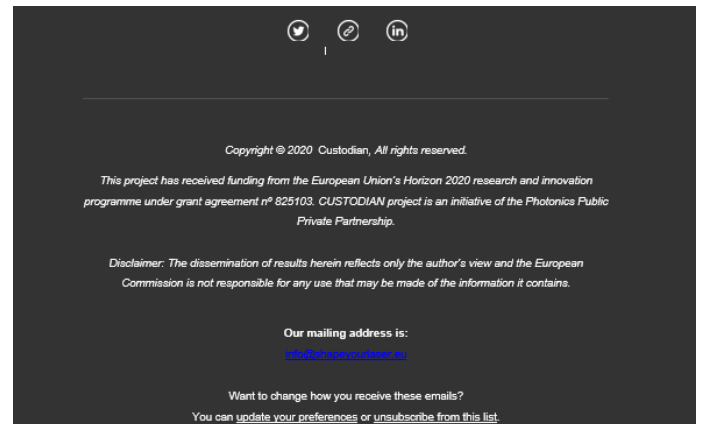
What is Custodian?

A laser research project to achieve better efficiency and lower cost

Continuous-wave (CW) lasers are sources that continuously pump and emit light and we can employ them in the automotive, aerospace and energy industries as well as the medical sector. They provide great benefits in manufacturing such as high efficiency and speed. Nevertheless, high energy concentration not always is the best possible ally, because it can generate very fast cooling rates and generate brittle structures. An example is hot cracking.

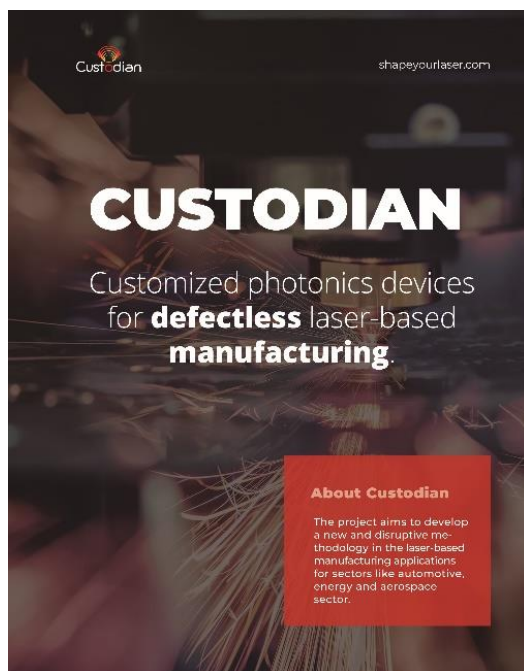
[Read more](#)

Subscribe to our CUSTODIAN Newsletter here



3.2 FLYER

The flyer has been updated with the new Marelli logo and the correct terminology for PBF-LB/M instead of SLM, as initially indicated.



Frontal



Back

3.3 ROLL UP

The roll up has been updated with the new Marelli logo and the correct terminology for PBF-LB/M instead of SLM, as initially indicated.



The poster features a background image of a laser manufacturing process with a blue and orange color scheme. The Custodian logo is in the top left corner. The main title 'CUSTODIAN' is in large white letters, followed by the subtitle 'Customized photonic devices for defectless laser-based manufacturing.' Below this, the poster is divided into two columns. The left column is titled 'CUSTODIAN OBJECTIVES' and describes the goal of developing a new methodology to solve laser defects. The right column is titled 'CUSTODIAN BENEFITS' and states that the methodology aims for a drastic reduction in time and cost. At the bottom, the slogan 'SHAPE YOUR LASER' is prominently displayed. A row of partner logos follows, including dimen, secpho, LPP/PHOTONICS, NIT, cabotus, MAGNETIC, TU, and others. A small disclaimer text is located below the logos, and the website 'WWW.SHAPEYOURLASER.EU' is at the very bottom.

CUSTODIAN
Customized photonic devices for defectless laser-based manufacturing.

CUSTODIAN OBJECTIVES
To develop a new and disruptive methodology that solve laser defects such as hot cracking in Laser Beam Welding (LBW) and Powder Bed Fusion with a Laser Beam on Metal (PBF-LB/M).

CUSTODIAN BENEFITS
The Custodian methodology aims for a drastic reduction of time and cost in manufacturing.

SHAPE YOUR LASER

dimen secpho LPP/PHOTONICS NIT cabotus MAGNETIC TU

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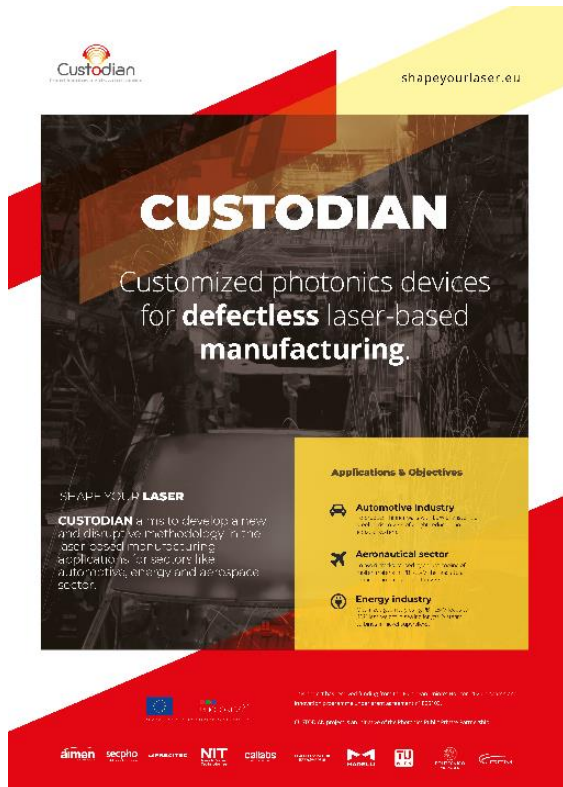
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PHOTONICS²¹ PHOTONICS PUBLIC PRIVATE PARTNERSHIP

WWW.SHAPEYOURLASER.EU

3.4 POSTER

The poster has been updated with the new Marelli logo and the correct terminology for PBF-LB/M instead of SLM, as initially indicated.



3.5 PRESENTATION SLIDES

The general project presentation about CUSTODIAN to be used for external events, has been updated with the new Marelli logo and the correct terminology for PBF-LB/M instead of SLM, as initially indicated. In addition, certain images have been replaced as requested by the technological project partners to represent all technological processes involved in CUSTODIAN (LBW, PBF-LB/M and LC). Finally, the content of some slides was updated to describe the technological challenges and benefits of the CUSTODIAN methodology and outcomes in a more complete way. The initial presentation was rather focusing on solving hot cracking in Laser Beam Powder Bed Fusion (PBF-LB/M), while the updated version also includes increasing quality and productivity in laser beam welding (LBW) and laser cutting.

- New image by NIT – slide 3:




The Challenge

CW lasers are mainly focused on **high power output**, being used for laser heat treatment, cladding, cutting, welding and Additive Manufacturing (AM).

They are **widely employed** in the **automotive, aerospace, energy** industries as well as the **medical** sector.




- New image by AIDIMME – slide 4:



The Challenge

The biggest **benefit** of using a CW laser is that:

- it emits one, **constant beam**
- which allows **smooth and efficient manufacturing**
- at **high efficiency and speed**,
- while requiring **little maintenance**.


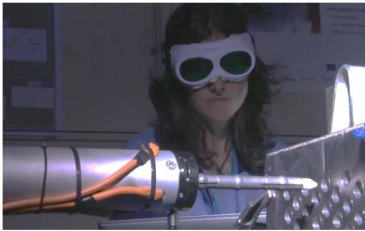


- New image by AIMEN & updated text – slide 5:

The Challenge

Nevertheless, at **high-speed laser processing**, it can generate **brittle structures**.

Productivity Improvements and greater process robustness are necessary to **absorb geometric variations in production using Laser Beam Welding (LBW) and Powder Bed Fusion with a Laser Beam on Metal (PBF-LB/M)**.



- New image by PRECITEC – slide 6:



The Challenge

That's a **serious obstacle** for the **Industrialization** of laser technologies.

Anyway, different beam shaping technologies open the possibility to relieve this problem. **Beam shaping enables to tailor energy delivery** using a tailored spatial and temporal power distribution in laser light intensity.




- New image by PRECITEC & updated text – slide 7:


The Project

The project aims to **develop a new and disruptive methodology** of application-driven laser beam tailoring of the material microstructure, and deploy this beam:

- to **solve hot cracking** in Laser Beam Powder Bed Fusion (PBF-LB/M)
- and to **Increase quality and productivity** in laser beam welding (LBW) and laser cutting




- New image from visit of AIMEN & NIT at AIDIMME facilities – slide 8:




Project Developments

To accomplish the deployment of customized beam shapes, CUSTODIAN will perform a **twofold photonic development**:

- **Compact, robust and dynamic beam shaping technology (MPLC)**
combined with specific strategy for laser beam deployment over the working surface.
- **Closed loop inline control system based on uncooled SWIR/MWIR sensors and an FPGA architecture**
to ensure the quality and dynamicity of the beam shape requirements.




- New image from visit of NIT at AIDIMME facilities & updated text – slide 10:



- **New methodology**
a new methodology of application-driven laser beam tailoring of the material microstructure.
- **Beam for LBW**
An intensity distribution to increase quality & productivity in Laser Beam Welding
- **Beam for PBF-LB/M**
An intensity distribution to solve hot cracking in Laser Beam Powder Bed Fusion
- **Beam for Laser Cutting**
An intensity distribution to increase quality and productivity in Laser Cutting
- **Control system**
A closed loop inline control system based on uncooled SWIR/MWIR sensors and an FPGA architecture to ensure the quality and dynamics of the beam shape requirements

Outputs

CUSTODIAN aims to develop different parallel tasks to provide a new methodology, three customized laser beams and a control system. All of them integrated and tested in relevant industrial environment.



- New image by PRECITEC – slide 12:

Applications



 **Automotive industry**
Produce thinner walls with LBW of austenitic steel leads to 25% of weight reduction in exhaust system.

 **Aerospace sector**
Avoid cracks caused by abrupt cooling of molten material in PBF-LB/M the leads to a reduction in time and cost in 25%.

 **Energy industry**
Optimized geometry using PBF-LB/M leads to 40% less weight in sealing for gas & steam turbines in nickel superalloys.




- Updated Partner Logos – slide 13:

Partners

10 entities focused on industrial laser manufacturing














4. CONCLUSIONS

To finish the explanation about the creation of this communication kit, it is important to repeat that the communication elements will further evolve during the project. New communication elements are foreseen once the CUSTODIAN technology has been finalized towards the end of the project, demonstrating the project methodology and results. Additional communication materials might be created upon request for specific dissemination activities, if needed.