

Experiment name: **DECOUL-Cr**

Experiment:

Improve the quality of special decorative chrome plated parts the automotive industry using advanced laser technologies and design a complete solution to be integrated into factory line.

The Business Sector

There are two different business sectors involved in the experiments, 1) Special Automotive Parts decoration from End User side (Parts manufacturer) and 2) Development of advanced laser systems from Integrator side (Machine manufacturer) to ensure the implementation of the technology at the factory level.

The Company

LASING (Integrator) develops advanced laser material processing systems for multiple applications applied to semiconductors, electronics, medical and precision engineering markets integrating precise motion systems, advanced lasers sources, vision systems and all hardware and software to ensure the specific application.

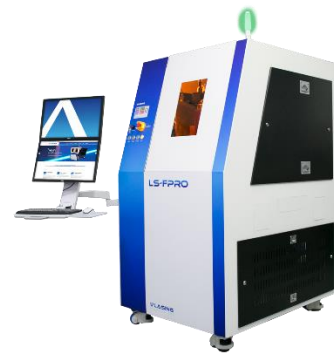


Figure 1. Example of LASING laser machining machine.

The Challenge

Precision laser applications are very complex due to the number of variables that are involved, making critical to control them for real manufacturing lines. Big thermal changes produced mainly in all industrial environments creates important problems that need to be controlled and resolved at real time as internal misalignments between laser sources and processing heads, laser power losses, 3D errors due mechanical drifts, making necessary to find new solutions capable of minimising these effects.

The solution

LASING designed a new concept of Analytical & Control tool named BGB (Beam Guide Box) that integrates all the optical and mechanical components that ensure an advanced and repeatable laser processing. The BGB can be installed in front of any laser, CW or pulsed with emission ranges from 1064nm to 320 nm and technically provides with the following specifications:

- 1) Continuous analysis of laser beam path obtaining beam pointing and beam profile data.
- 2) Automatic beam path correction using two sets of CCD's sensor and Piezo mountings.
- 3) Motorized beam size expansion from 1x to 4x.
- 4) Automated energy control using polarisation optics.
- 5) Continuous energy and 2D beam analysis.
- 6) Fast and precise divergence adjustment to perform 3D or fast 2,5D processing.
- 7) Fast pulse counting electronics capable of detecting one pulse missing during the laser processing.
- 8) 2D Galvanometer head with Fth or Telecentric lens.

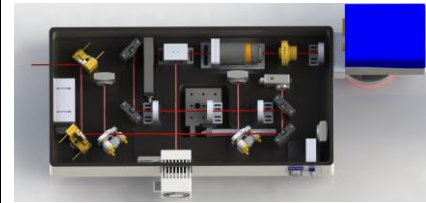


Figure 2: BGB Design.

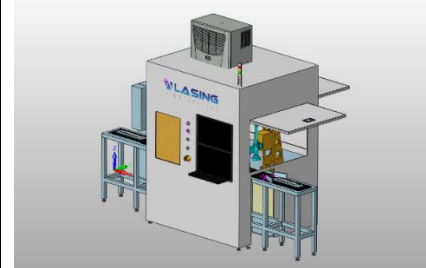


Figure 4: Conceptual design of complete solution integrating BGB unit.

The Benefits

The Main benefits for LASING are to specialise a new product line for advanced Chrome marking and the introduction of a new tool (BGB) that has been tested with Apollo laser partners.



Figure 5: BGB integrated into Appolo test Benches from Universidad Politecnica de Madrid.

The Business Advantages of the solution

Lasing plans to commercialise the BGB for the end of the year with an estimated price starting at 10K€ (depending on options included). As commented before the implementation of BGB in production lines will depend on the application and machine setups but making a desirable estimation would be 2-3 units a first year (2018), mostly integrated into our machines, and increasing a 25% of sells per year.

Regarding complete machines for specific metal marking (Chrome parts) the project really means a good opportunity for LASING to introduce itself to factory demands as, for the moment, Lasing machines has been designed more for R&D customers. As is a new market for LASING all the products and customers related to this project will introduce a new exploitation line where LASING maintains their last realistic calculations of getting close to 1M€/year of sales in 4 years, meaning close to 4 machines/year and creation a minimum of 3 jobs for design, integration and service engineering.

The Team

MAIER S. Coop. (MAI) is one of the leading plastic component supplier with over 2,300 employees in 8 countries with global sales above 296 M€, being part of the biggest cooperative group in the world (Mondragon corporation with global sales above 13,200 M€ and a workforce above 82,000 employees).

LASING, S.A: LASING (Integrator) develops advanced laser material processing systems for multiple applications applied to semiconductors, electronics, medical and precision engineering markets.

UNIVERSIDAD POLITECNICA DE MADRID: technical university, with more than 4.000 faculty members, has a strong commitment to R&D and Innovation, boasting over 225 Research Units and over 10 Research Institutes and Technological Centres. One of them, the Laser Center UPM, member of APPOLO Hub, has supported all the scientific and technical development related to process parameterisation and equipment assessment in this experiment.

The Team Benefits

UPM, through its Laser Center Activity, is becoming with the experience gained in this experiment development, a reference Lab in laser applications related to surface modification in automotive parts for decorative purposes. An important field in which, until the participation in the experiment, its activity has not been relevant.

MAIER: The results that are obtained in the experiment gives Maier the opportunity to incorporate a new decorative process to be offered in the automotive sector, increasing our current aesthetical portfolio.

LASING: The Main benefits for LASING are to specialise a new product line for advanced Chrome marking and the introduction of a new tool (BGB) that has been tested with Apollo laser partners.



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