IMPRESE INNOVATIVE TORINO

micpola
OPTOELECTRONICS

laser sources and optoelectronic devices

Who we are

optics • laser • electronics

microla OPTOELECTRONICS

was born in **2006** as **Spin-Off** of **Politecnico of Torino**

Full time people employed 8

Laboratories and facilities 300 m^2

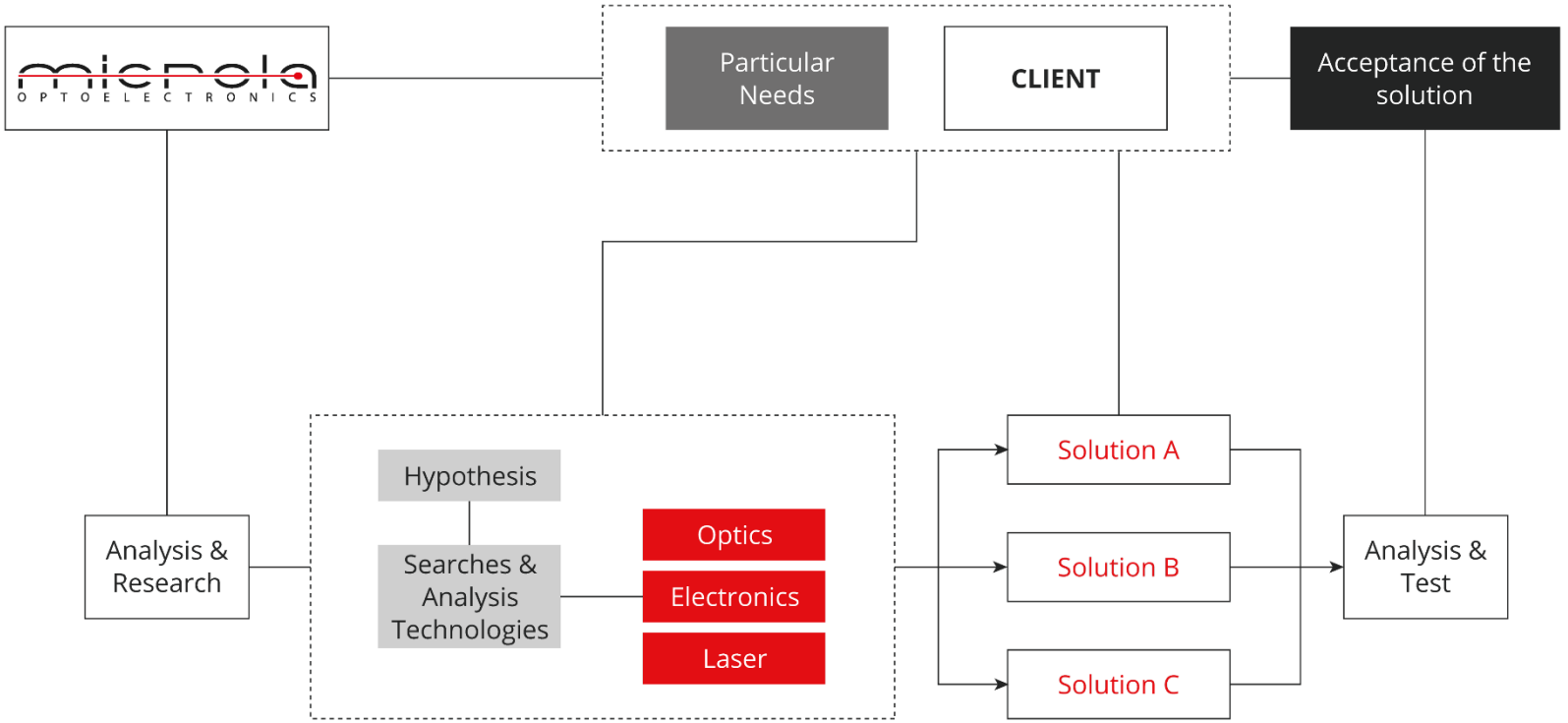
Administration and offices 250 m^2

Consolidated Turnover more then 600k€

Microla represents a national reference in the fields such as optical design and processes by laser micromachining.

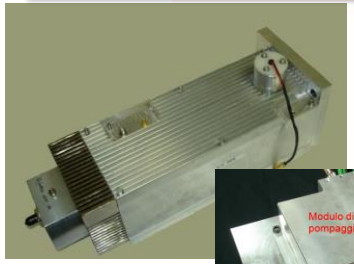
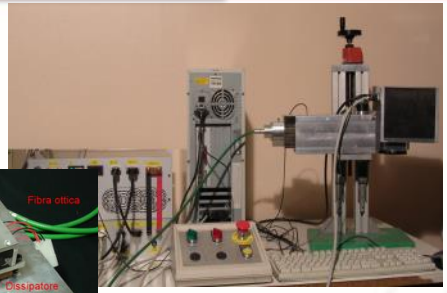
Our Philosophy

Microla is able to design and implement integrated systems that meet the needs of the customer.

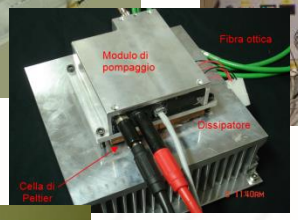


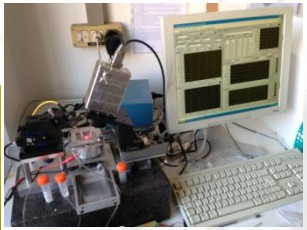
10 years, 60 projects

optics • laser • electronics

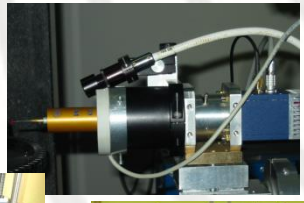




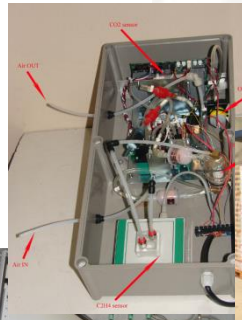




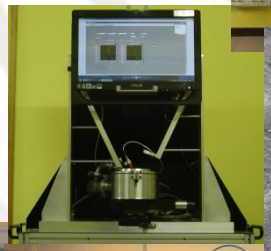
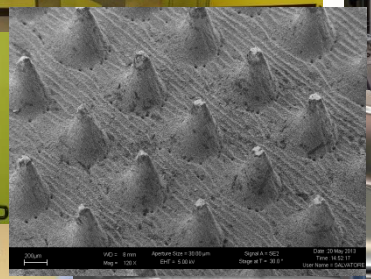






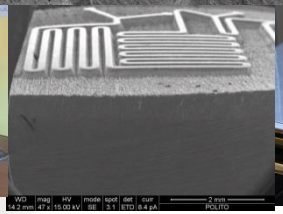
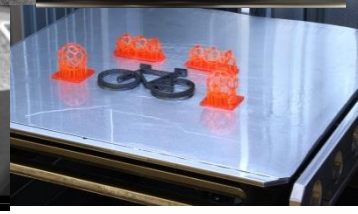








Focused product Portfolio

optics • laser • electronics

LASER Systems

- ❑ Laser Ready
- ❑ Laser Slider

Laser Processes development

Fabrication of full custom Production machine:

marking, *drilling*, *cutting* and *welding*

Optical Design

- ❑ Beam shapers
- ❑ Fiber Pumping

Simulation & prototyping

Test set-up for processes engineering

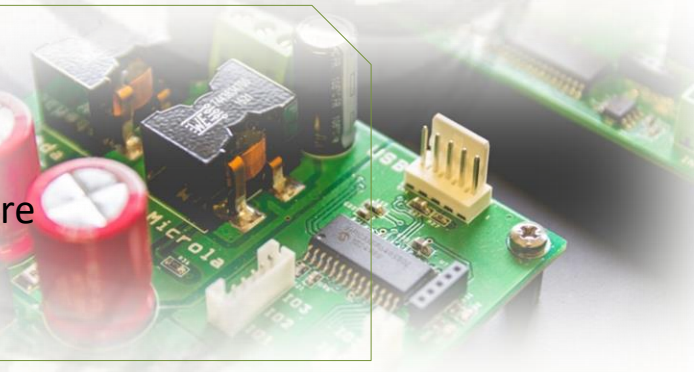
Electronics Design

- ❑ Laser's Power driver
- ❑ Automation
- ❑ Sensors

Design, test and production

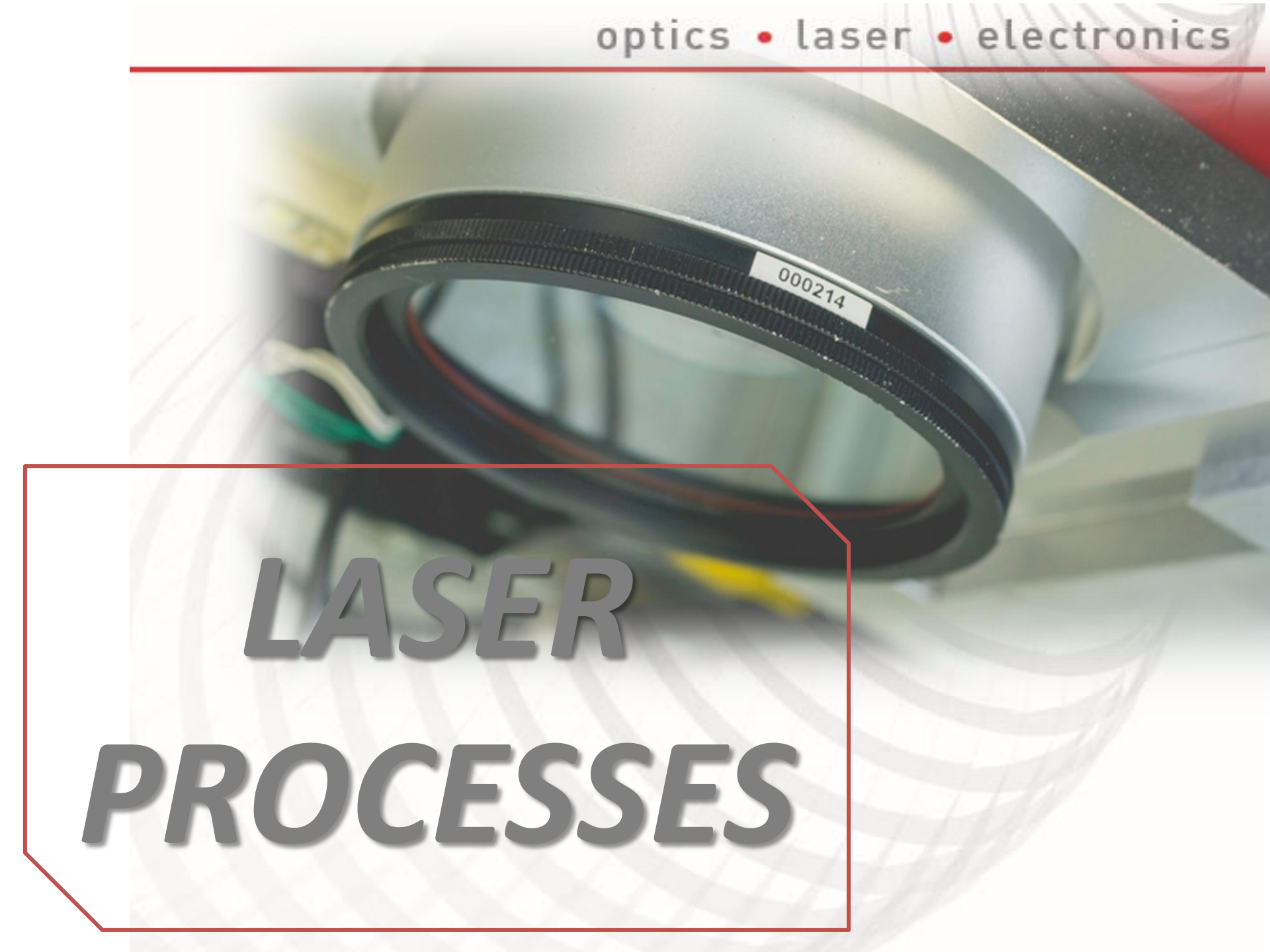
Design of full custom electronics

Hardware, Firmware and Software



Main Customers

optics • laser • electronics



LASER PROCESSES

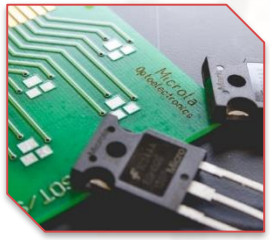
Micro Machining

Microla knowledge is based on over 10 years of experience on specific materials such as:

- ❑ Polymers
- ❑ Metals
- ❑ Glasses
- ❑ Ceramics
- ❑ Leather

Serial code, linear barcode, matrix code, QR code and logos can be engraved onto the surface of products

Certified marking processes through engraving and ablation controlled thickness.

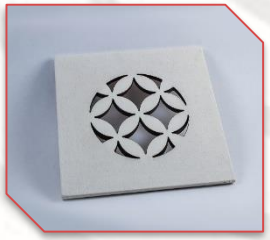


Electronic Devices

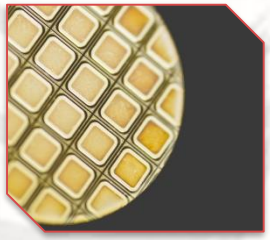
Gadget

Carbon Fiber

Organic Material



Wood



Silicon

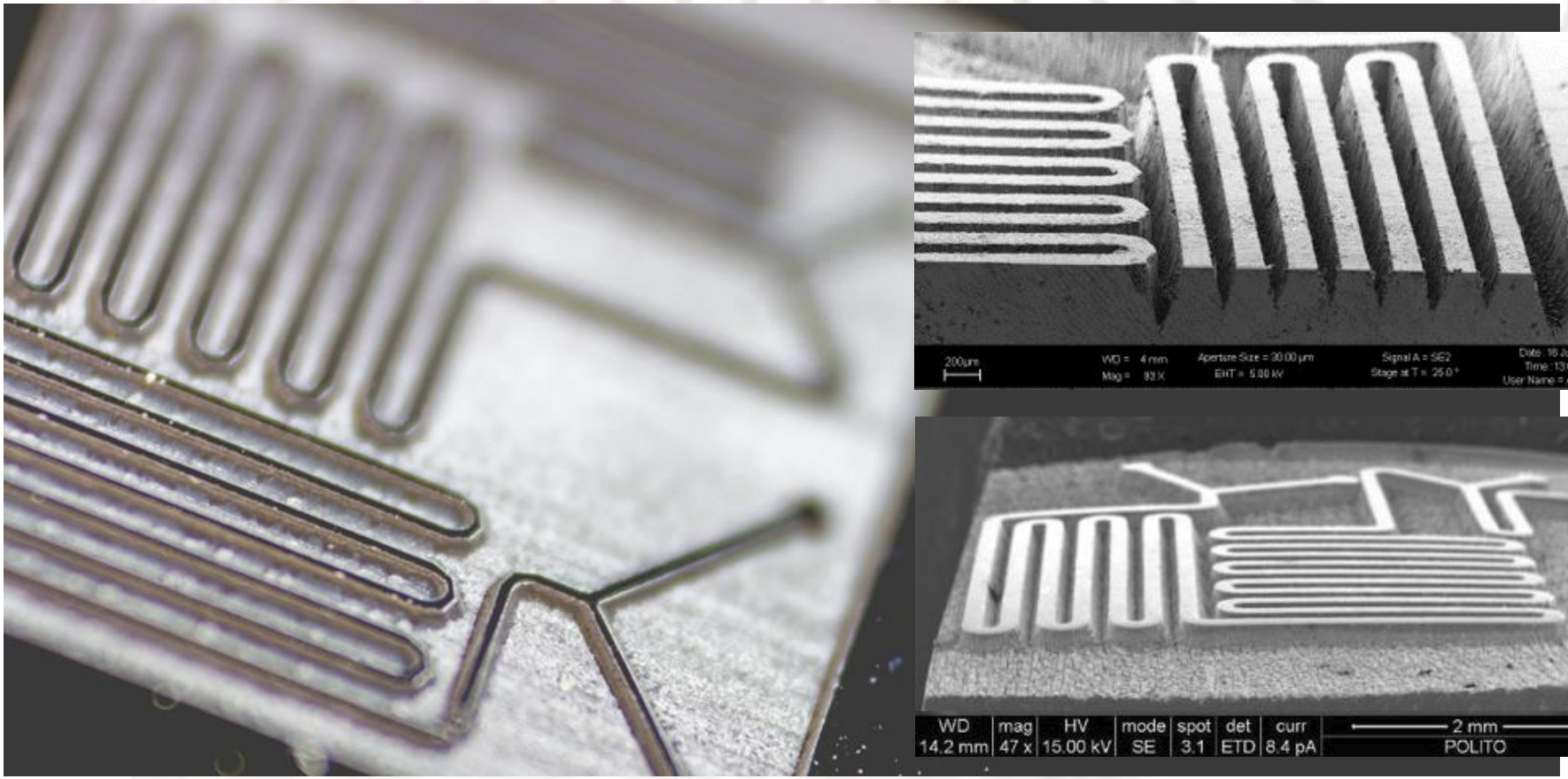
Micro Machining

optics • laser • electronics

Soft and deep engraving processes for surface micro-machining used to create special pattern designed by customer

Several application as microfluidic devices, heat transfer, chalcography and master for molding

Micro holes and slits can be performed on request in micrometric range and related dimensional analysis is available



Micro Machining

optics • laser • electronics

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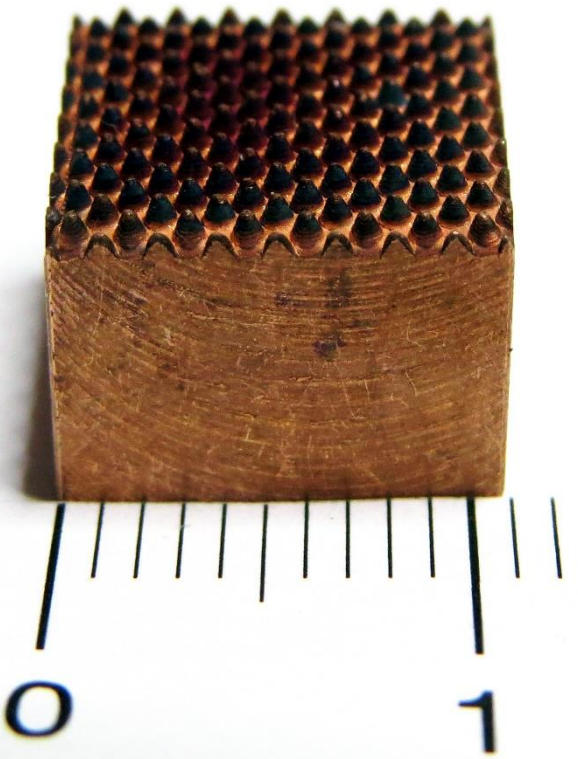
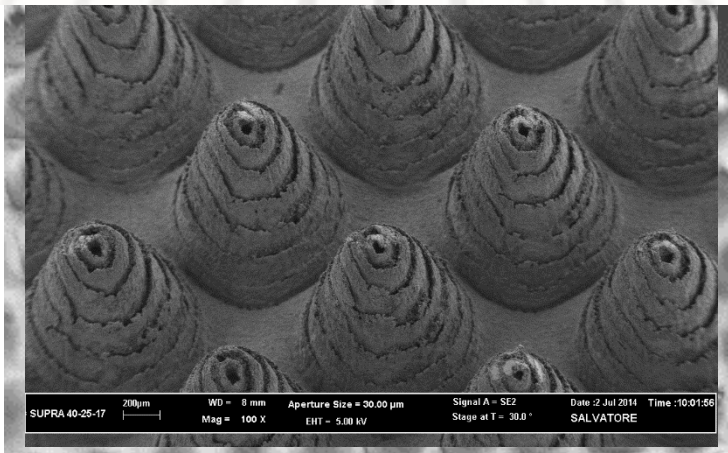
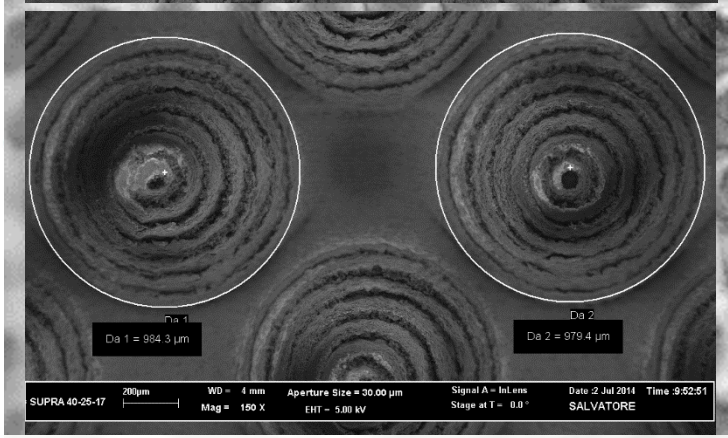
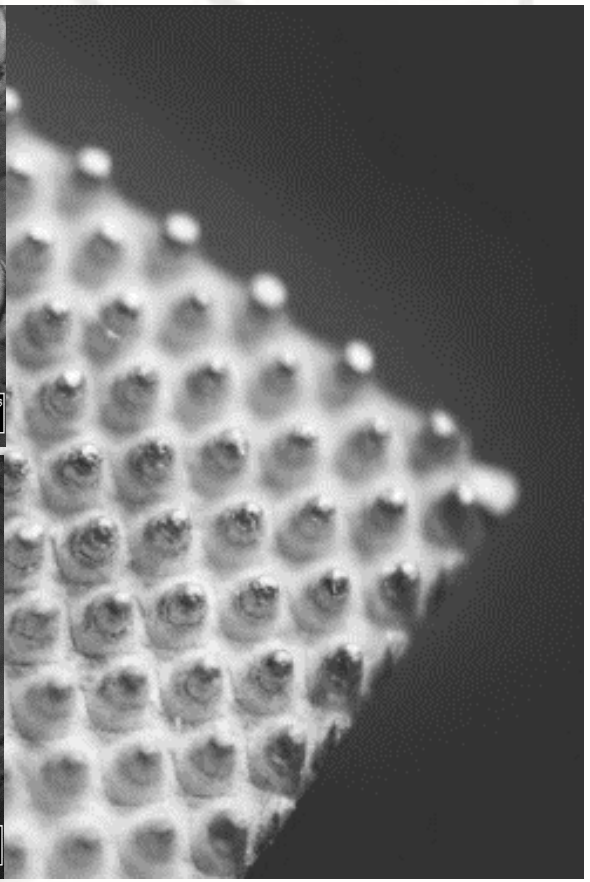




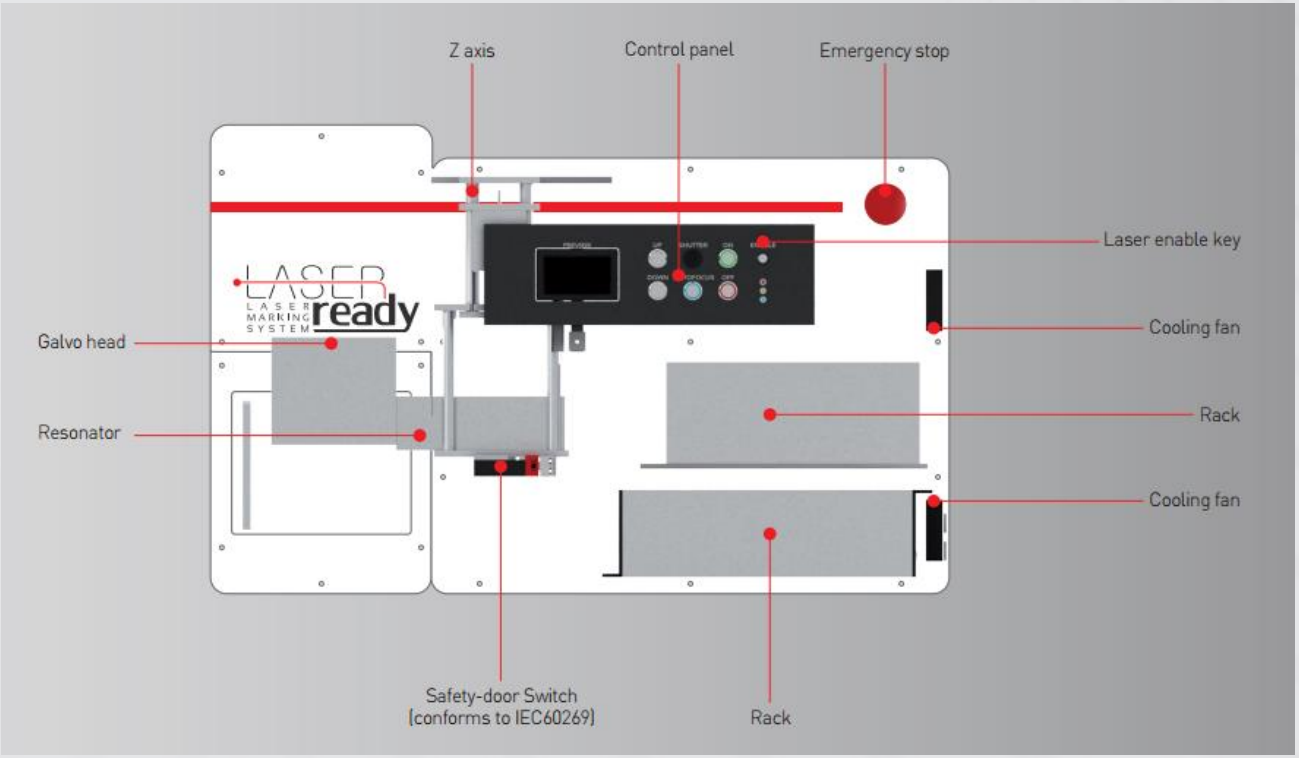




PRODUCTS

LASER
LASER MARKING SYSTEM ready

Micro Machining



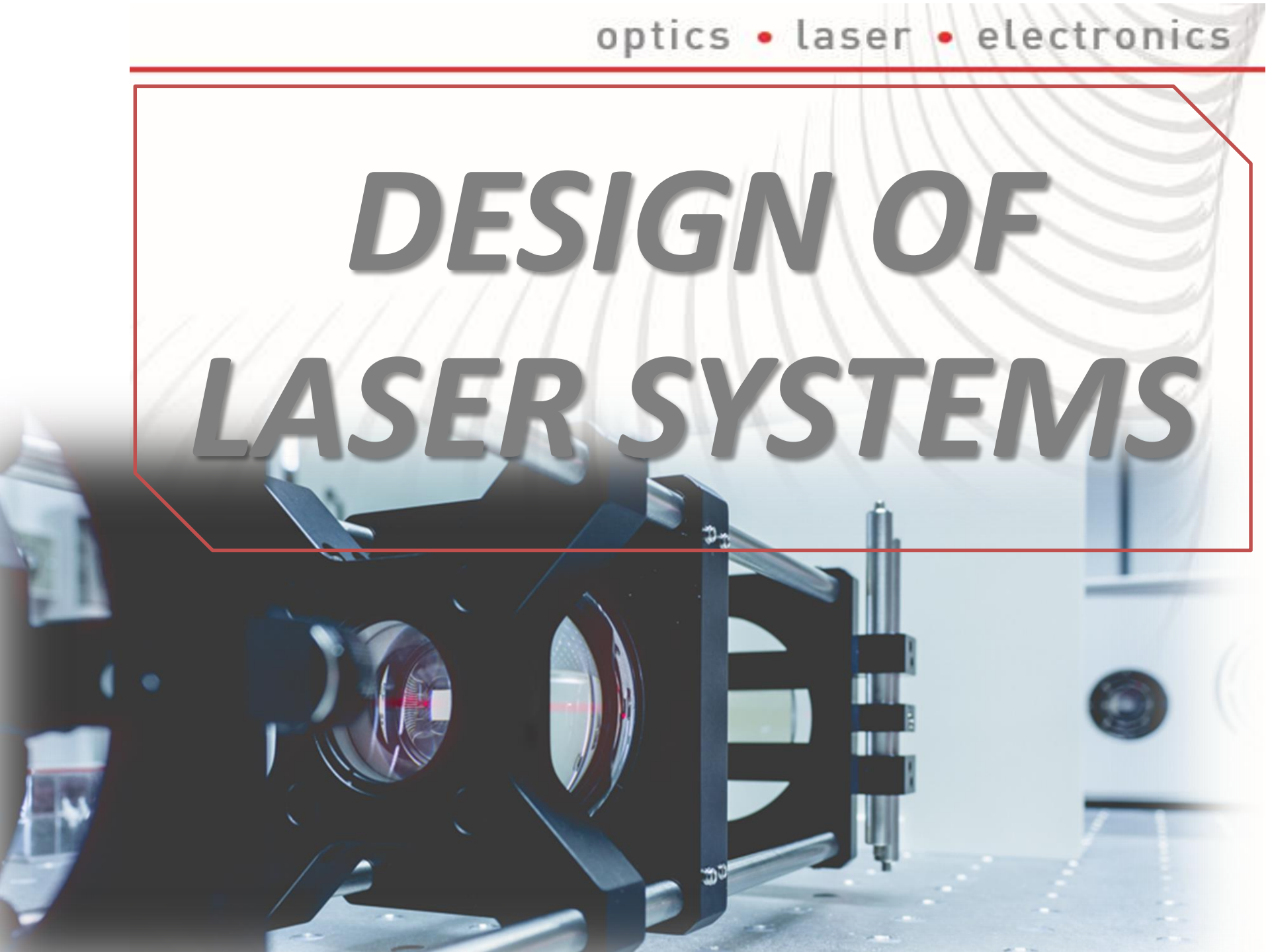
LASER SOURCES

Source	Power	Marking
Nd:YVO4	10 - 20 W	Metal - Plastic
Fibra	10 - 50 W	Metal - Plastic
CO2	25 - 50 W	Organic Materials - Paper Plastic - Glass

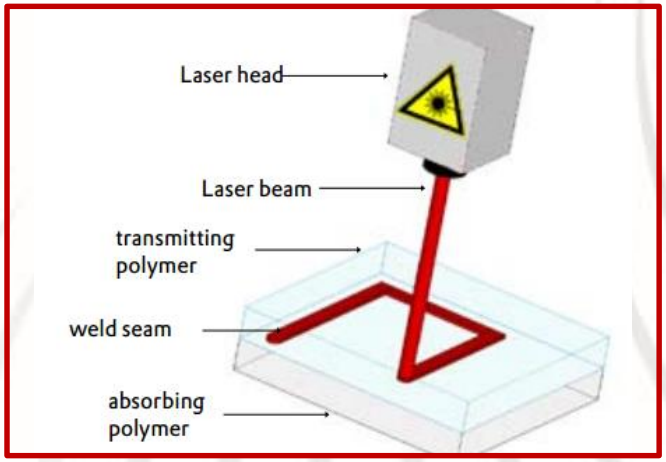
LASER
LASER MARKING SYSTEM slider

optics • laser • electronics

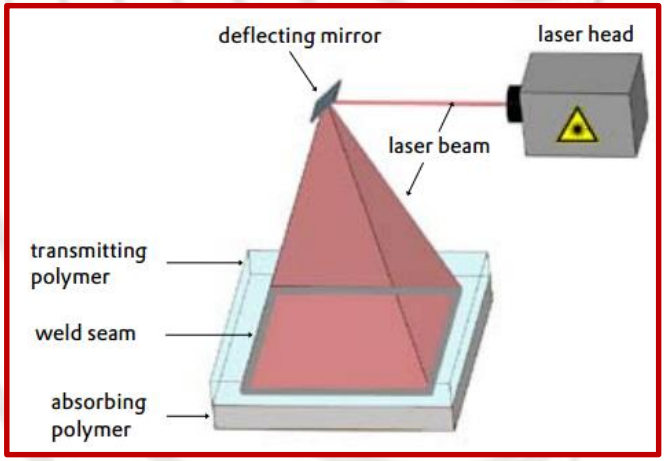
DESIGN OF LASER SYSTEMS



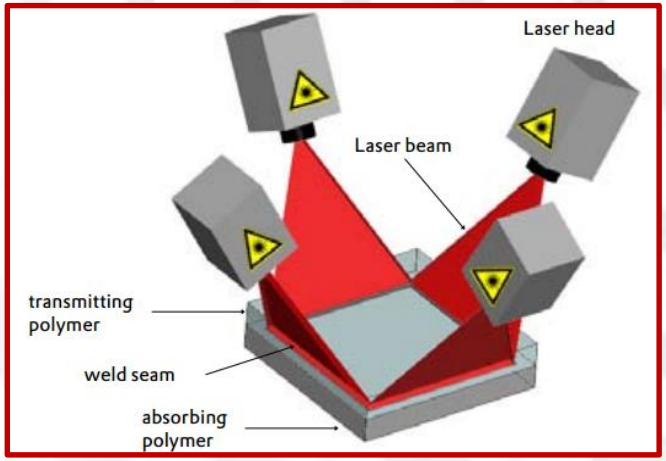
LASER Plastic welding: Designing of Optical, Electronics and Soldering process



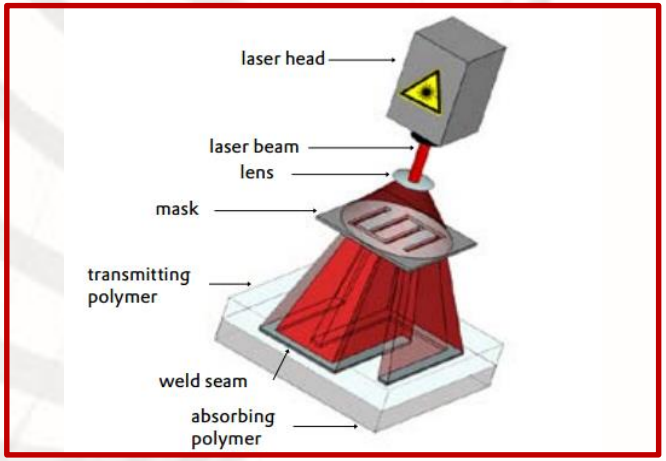
Contour Welding



Quasi-simultaneous welding



Simultaneous welding

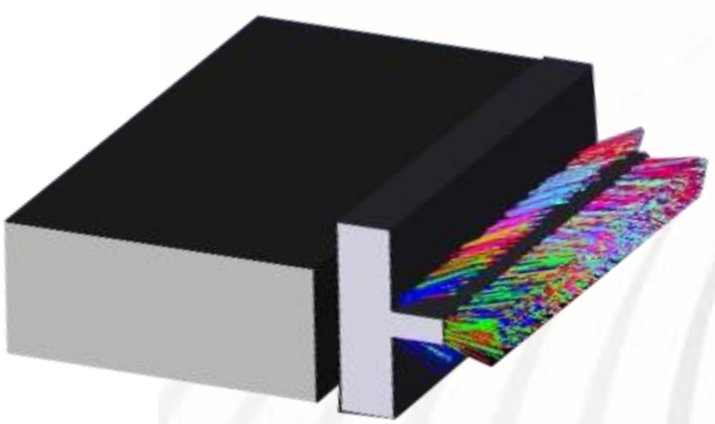


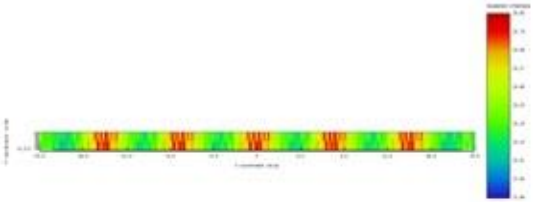
Mask welding

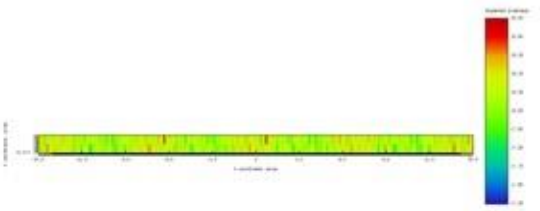
LASER welding

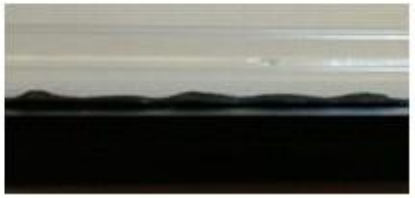
optics • laser • electronics

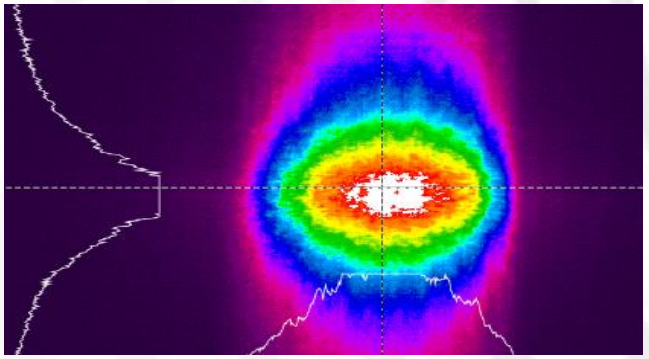
Microla designs laser systems for laser welding machines producers

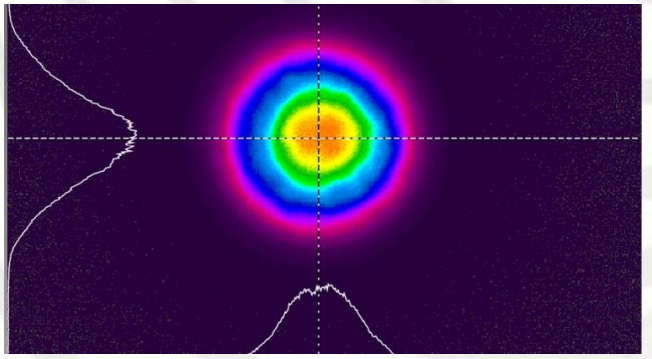








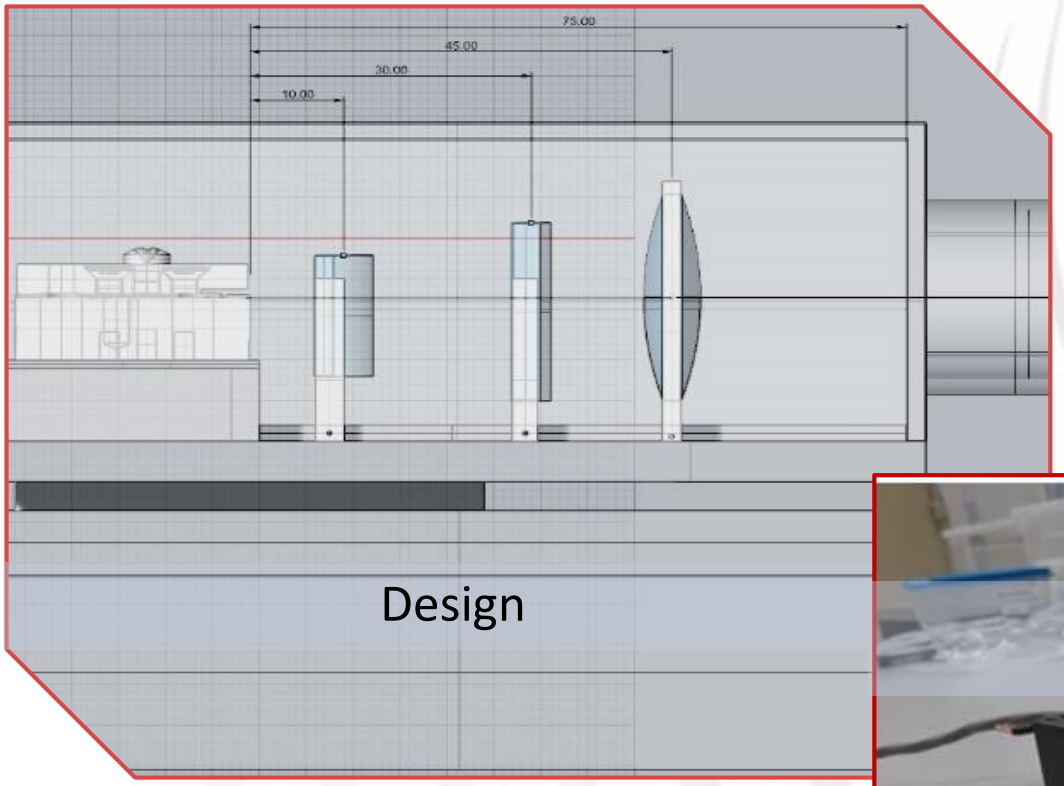




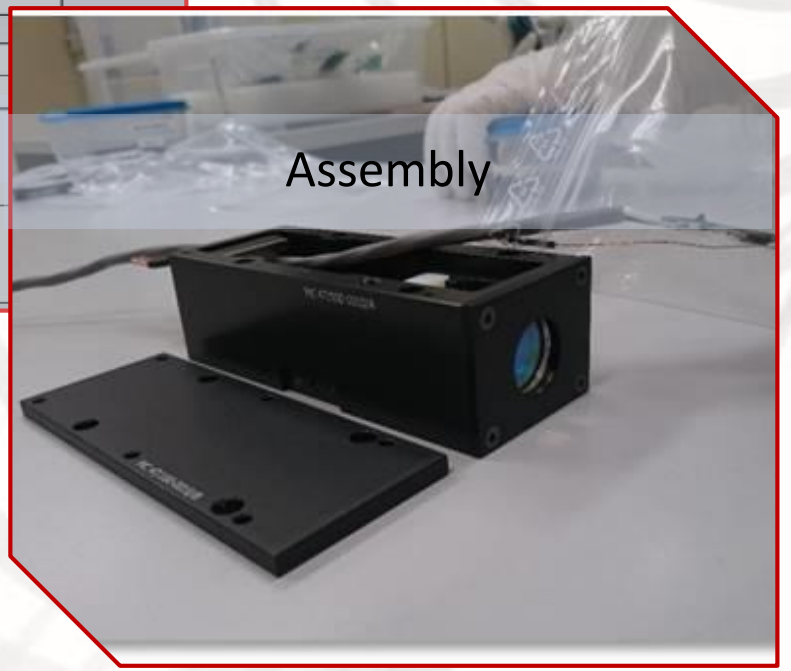
- ❑ Optical systems design & Fabrication
- ❑ Electronics design & Fabrication
- ❑ Thermal heat sink design & Fabrication

LASER welding

Microla design laser systems for laser welding machines producers



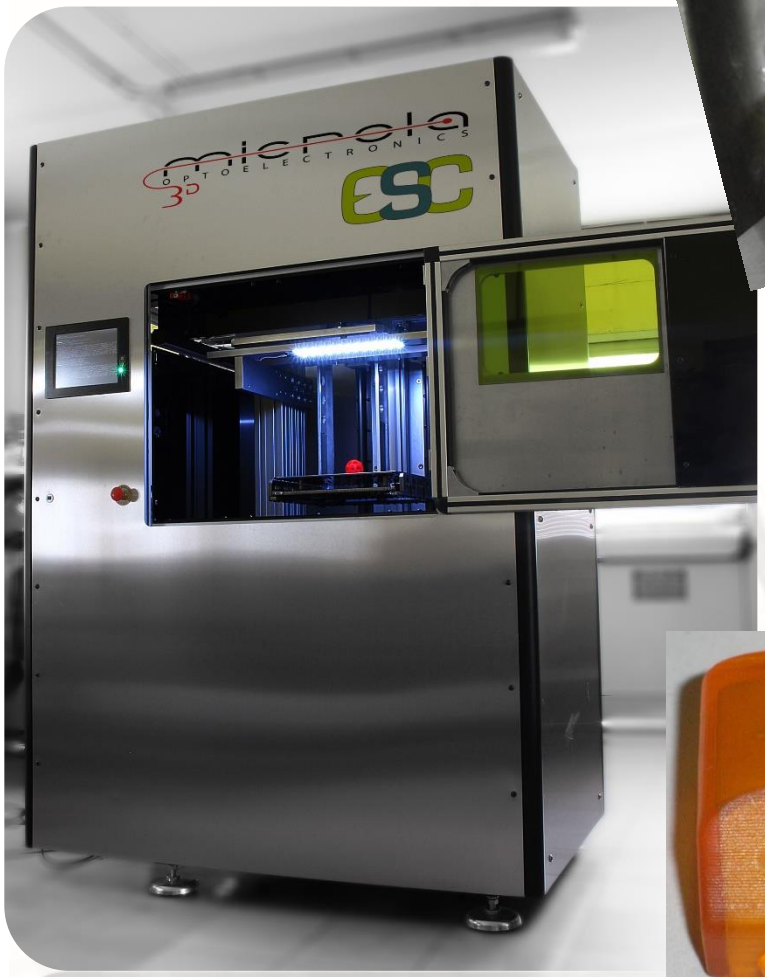
Design

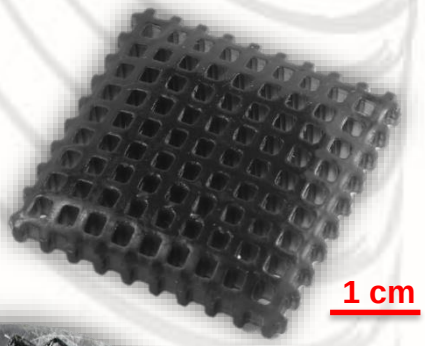


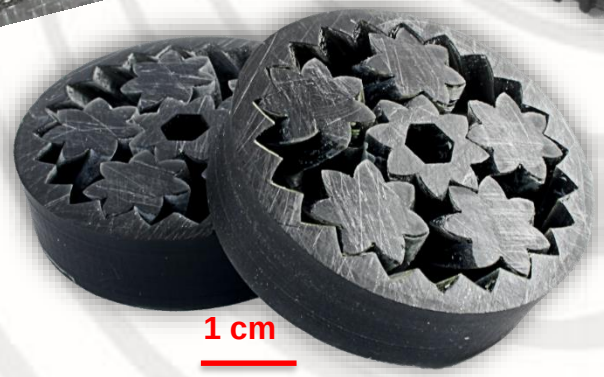
Assembly

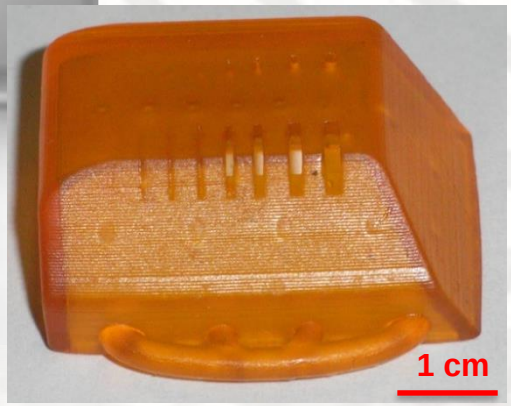
Forma: Polymeric Stereo-lithography

LASER

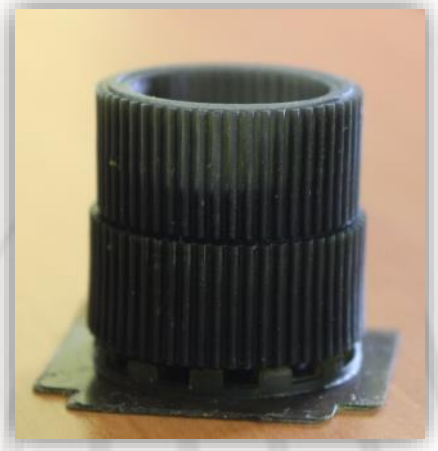








3D - Printing



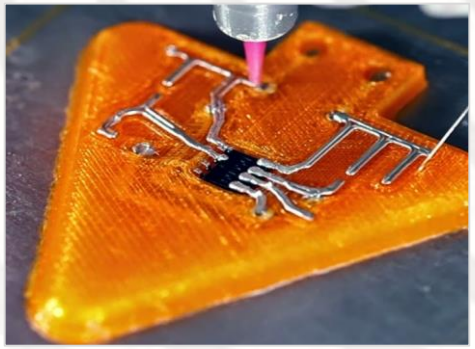
Microla's SLA Machine

4D - Printing

4D printing is: creating objects with **advanced materials and innovative processes**

Self assembling structures

Embedded optics

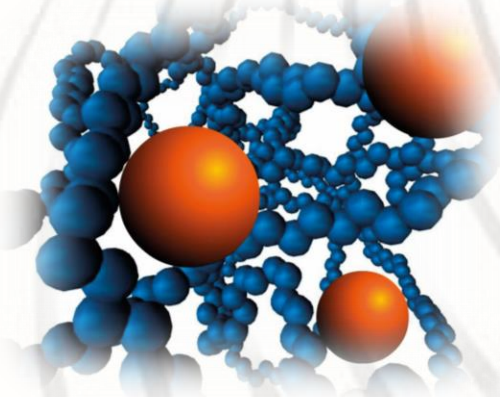


Embedded electronics

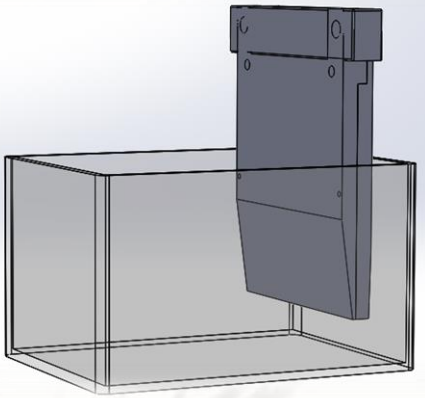
4D - Printing

4D printing is: creating objects with **advanced materials and innovative processes**

CONDUCTIVE POLYMERS

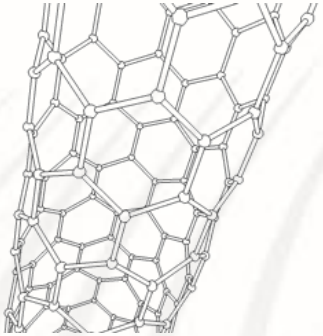


FILM DEPOSITION IN STEREOLITHOGRAPHY



4D - Printing

4D printing is: creating objects with **advanced materials** and **innovative processes**



Our nano-filler: carbon nanotubes

length/diameter=10^4

external diameter= 0.7-100 nm

Other properties:

- High thermal conductivity
- High electrical conductivity
- Strong mechanical properties

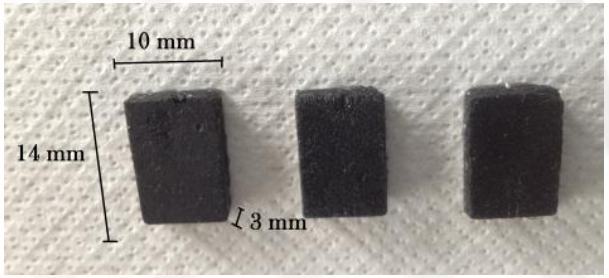
	Thermal conductivity [W/mK]	Electrical conductivity [S/m]
Carbon nanotubes	>3000	10^6 - 10^7
Copper	400	$6x10^7$
Acciaio	208	0.4	7.8

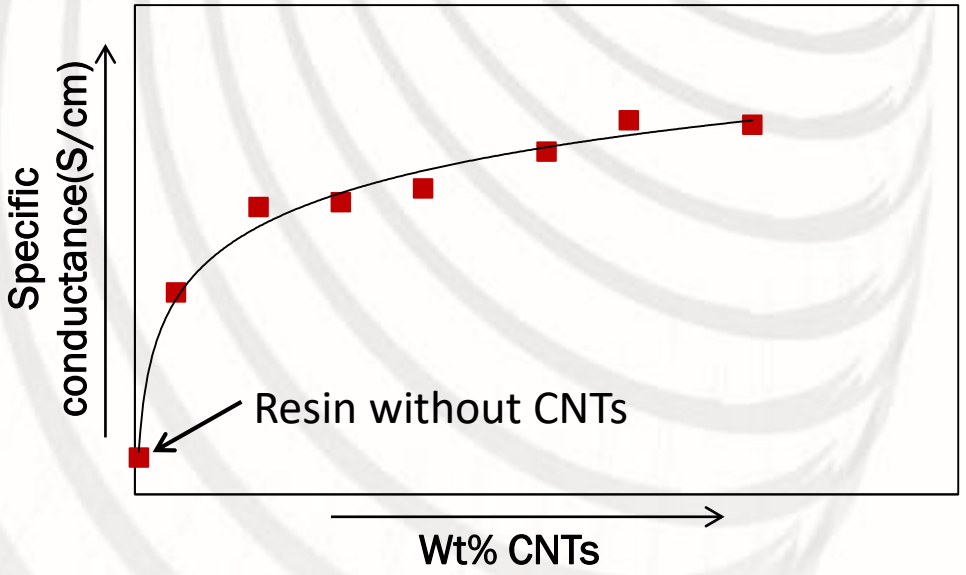
J. Lu and J. Han, Int. J. High Speed Electron. Sys. 9, 101 (1998)

4D - Printing

4D printing is: creating objects with **advanced materials** and **innovative processes**

Results



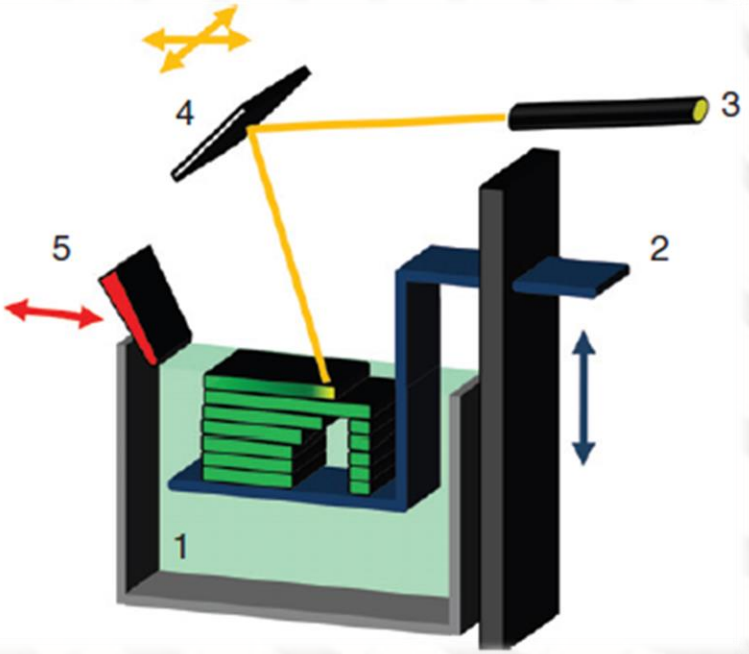


http://dx.doi.org/10.1016/j.polymer.2016.12.051

4D - Printing

4D printing is: creating objects with **advanced materials and innovative processes**

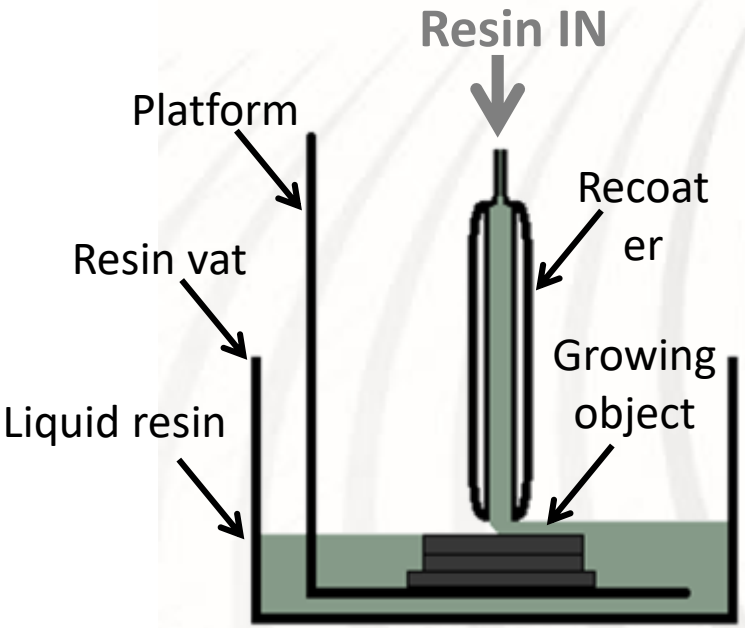
Stereolithography process

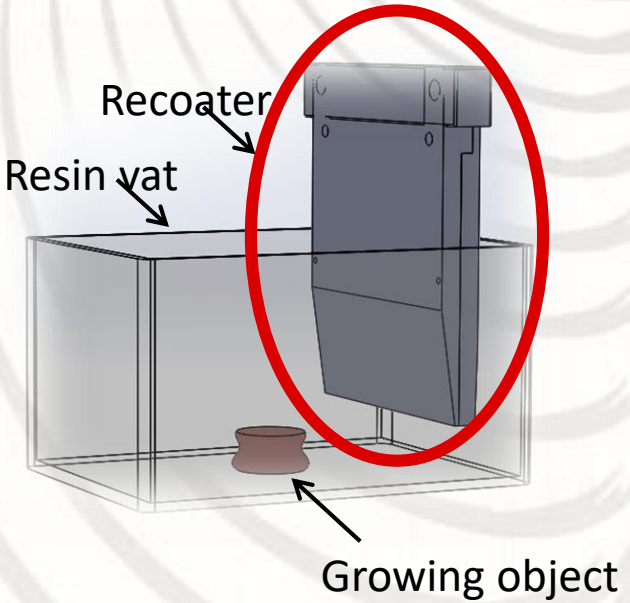


4D - Printing

4D printing is: creating objects with **advanced materials and innovative processes**

Film deposition





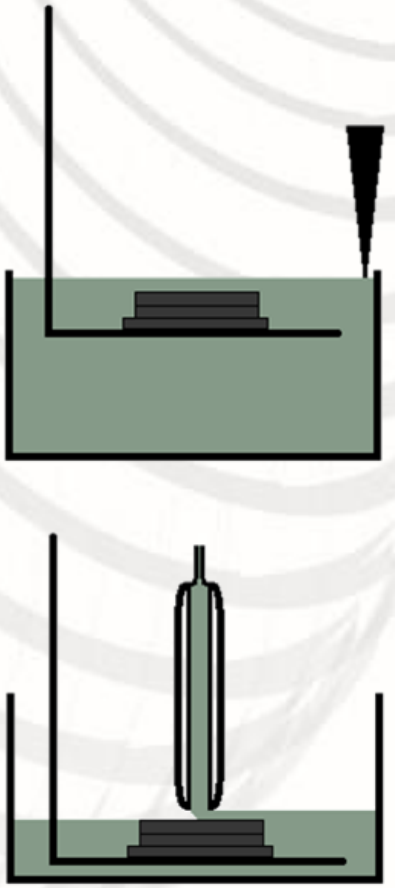
4D - Printing

4D printing is: creating objects with **advanced materials and innovative processes**

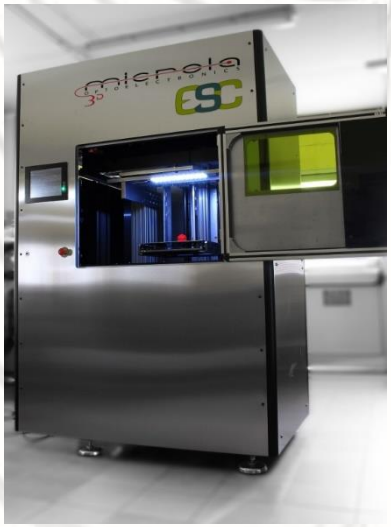
Film deposition

Advantages:

- Less material consumption
  - The recoater holds minimum resin quantities
  - The resin reservoir feeds directly the recoater
  - Simple resin recovery at the end of process
- Accurate recoating
- Faster process



Future perspectives



Finding optimal printing parameters

Multi-material stereolithography

Embedded micro/nano electronics with our printer and polymers!

We will be on the market as soon as our 4D printer will be ready!

Thank you

Felice Catania

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