Pavia, May 22th, 2024

Bright Solutions. Lasers for Aerospace and Micromachining Applications.

Luca Carrà
Bright Solutions S.R.L.

BrightSolutions
SOLUZIONI LASER INNOVATIVE

Unipv LM+

Outline

- ✔ Bright Solutions history and business
- ✔ Ongoing projects available for LM+ students
- ✔ Industrial goals

BrightSolutions
SOLUZIONI LASER INNOVATIVE

Unipv LM+

Bright Solutions history

Bright Solutions was founded in **1998** by a group of scientist and industry experts with a thorough experience in diode-pumping solid-state lasers.

Bright Solutions develops and manufactures state-of-the-art ns and sub-ns diode-pumped solid-state lasers and diode laser modules aimed at superior reliability, compactness and efficiency, suitable for industrial, medical, aerospace, military and scientific applications.

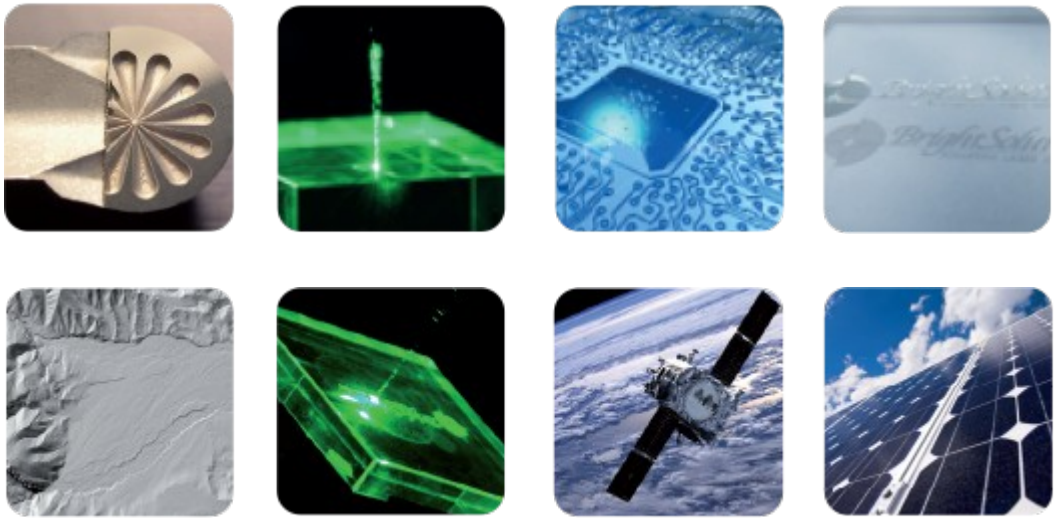
Starting from a national market, Bright Solutions business grew up at an international level, more than 5000 installed machines worldwide, **70% export** in Europe, America and Asia.

In the **last 5 years** an average **growth rate of 15%** has been achieved, number of employes doubled. In **2017 4 new high-tech start-up companies** have been founded and **a USA company has been acquired.**

BrightSolutions
SOLUZIONI LASER INNOVATIVE

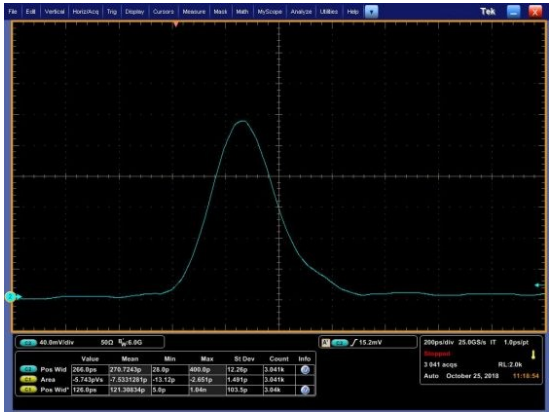
Unipv LM+

Bright Solutions business



Bright Solutions has experience in developing very compact high-energy high-peak-power sub-nanosecond-pulse lasers for industrial and airborne/aerospace applications, including:

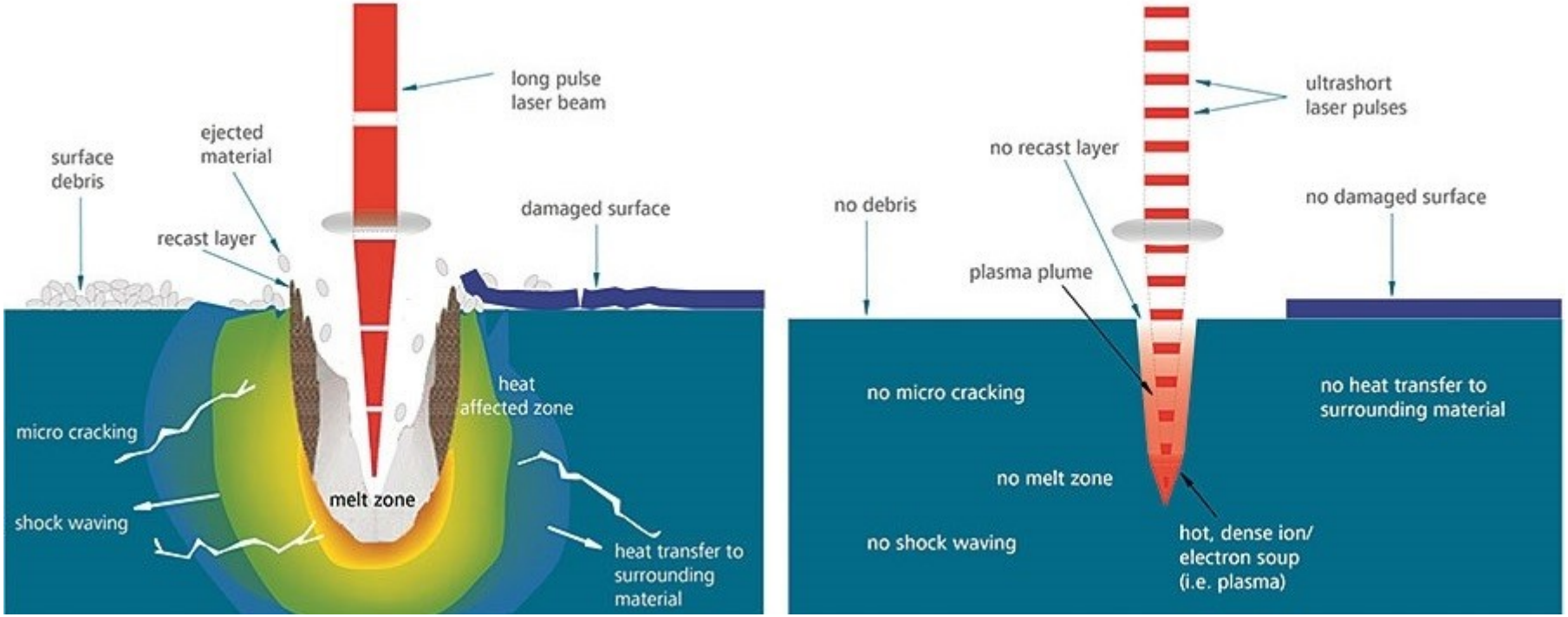
- ✔ Material processing: marking, scribing, engraving, thin-film removal, glass machining, hole drilling …
- ✔ LiDAR (Light Detection and Ranging)



BrightSolutions
SOLUZIONI LASER INNOVATIVE

Unipv LM+

Bright Solutions LM+ project proposal #1



Ultrasfast laser system for cold ablation in material processing and range sensing

- 1064/532 nm wavelengths
- < 100 ps pulse duration
- Pulse energies in the 10 – 100 µJ range

BrightSolutions
SOLUZIONI LASER INNOVATIVE

Unipv LM+

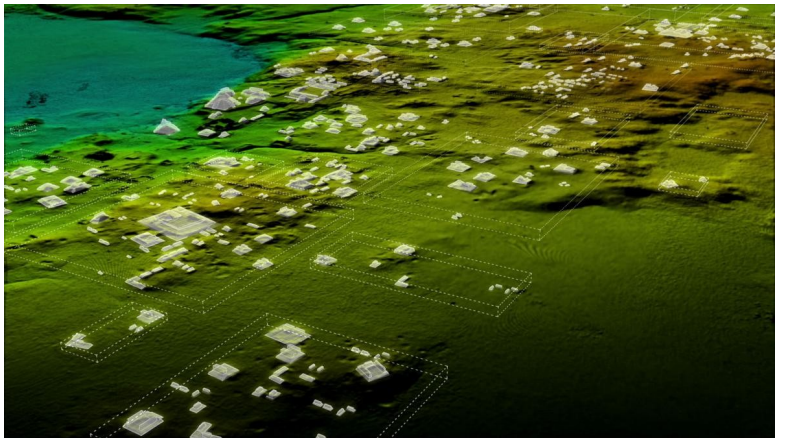
Innovative aerospace / airborne LiDARs

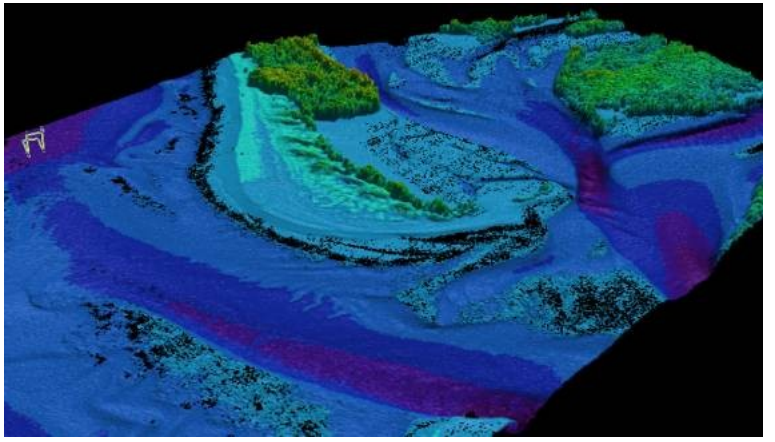
LiDAR (Light Detection and Ranging) are based on the detection of back-reflected or back-scattered short light pulses from remote targets.

- ✔ Target distance is evaluated from time-of-flight measurements
- ✔ Mapping data are collected by scanning a short-pulse laser beam over the target
- ✔ Distance resolution depends on pulse duration while repetition range and beam divergence affect transverse accuracy

LiDAR applications are in:

- ✔ Bathimetry or earth surface mapping
- ✔ Atmosphere sensing and pollution detection
- ✔ Defence and security
- ✔ Range finding

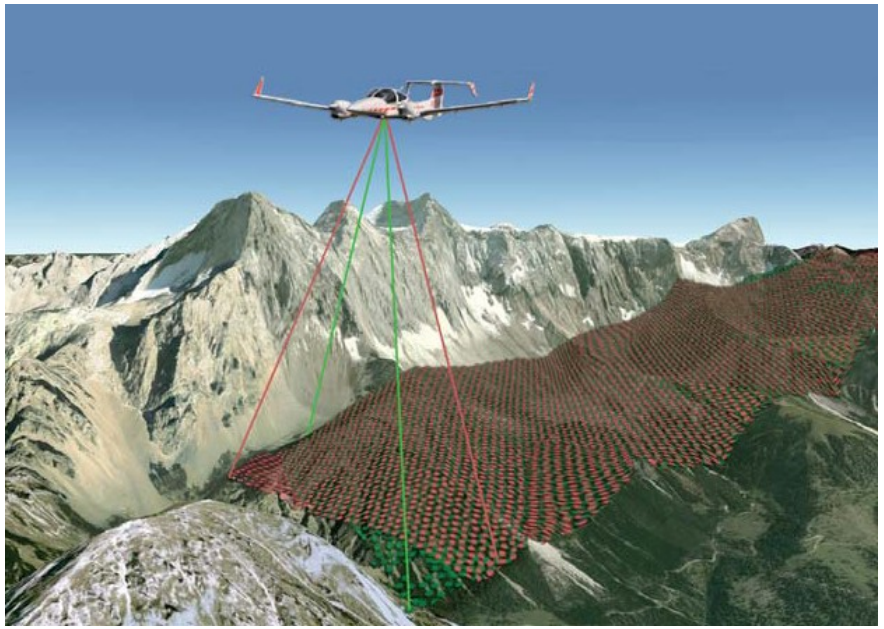


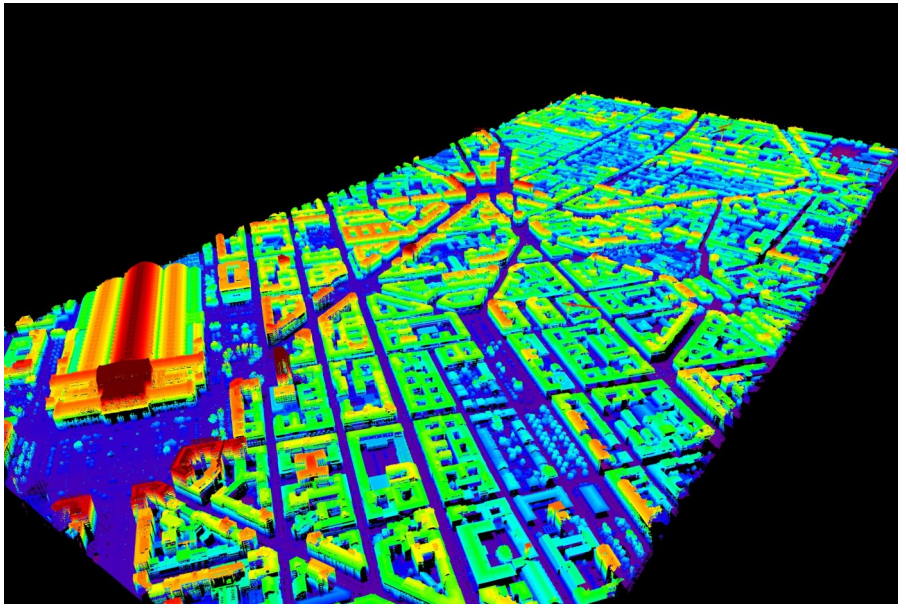


BrightSolutions
SOLUZIONI LASER INNOVATIVE

Unipv LM+

Bright Solutions LM+ project proposal #2





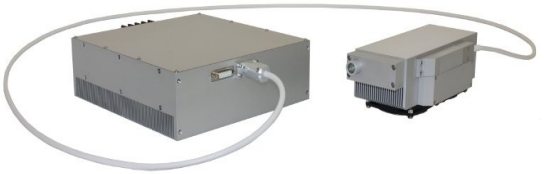
Laser system development for high repetition rate mid-range LiDARs:

- 1064/532 nm wavelengths
- Nanosecond or sub-nanosecond pulse duration
- Repetition rates up to 1 MHz
- Pulse energy > 10 μJ

BrightSolutions
SOLUZIONI LASER INNOVATIVE

Unipv LM+

Bright Solutions industrial goals



- Research for miniaturization lead the way from wardrobe-sized laser systems down to easily handable single-block devices integrating all the required electronics and optics in a single unit.

- Research for rugged solutions is a key aspect for airborne and aerospace systems, where operation is in harsh environments and service is particularly costy.

Custom solutions are usually employed for prototypes to be built in only a few units, but they guarentee the technological background for development of new standard products and applications.

BrightSolutions
SOLUZIONI LASER INNOVATIVE

Unipv LM+

Thank you for your attention!