Tampere University

Aston University Birmingham

AMPLICONYX

PULSE

The PULSE Project

High-Power Ultrafast LaSErs Using Tapered Double-Clad Fiber

LUNOVU Integrated Laser Solutions

Nanotypos ADVANCED NANOMANUFACTURING

FORTH INSTITUTE OF ELECTRONIC STRUCTURE AND LASER

Prime Laser Tech

CRF

MODUS Research and Innovation

HOCHSCHULE MITTWEIDA UNIVERSITY OF APPLIED SCIENCES

ONOSTAMPI

Ceramoptec

Get in touch...

@PULSEProjectEU

PULSE Project

pulseproject@modus.ltd

www.pulse-laser.eu

PHOTONICS21 PHOTONICS PUBLIC PRIVATE PARTNERSHIP

This project is an initiative of the Photonics Public Private Partnership and has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 824996

The PULSE Project

High-Power Ultrafast LaSErs Using Tapered Double-Clad Fiber

The EU funded PULSE project brings 12 partners throughout Europe together for one mission – enabling the shift to an advanced manufacturing industry by developing a high-power pulsed laser system.

Europe is the world leader in laser technology, and maintaining this lead is important. To do this, new materials processing technologies must be developed at a competitive cost – and PULSE intends to provide this.

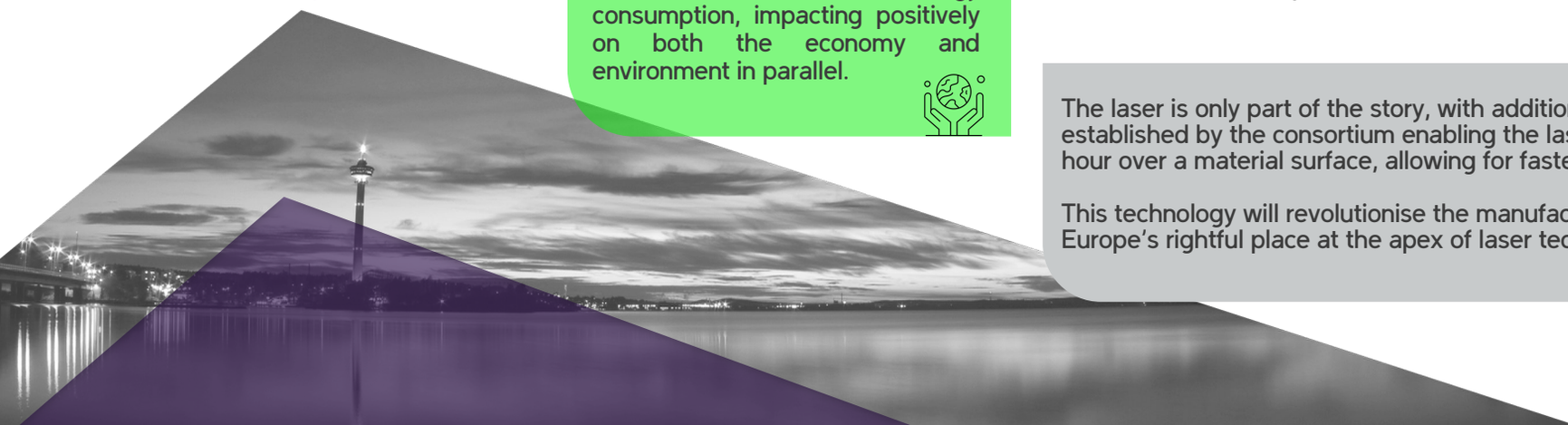
Our main focuses:

- Ultra-Hard Materials Cutting
- Automotive Boron Steel Cutting
- Welding of Dissimilar Materials
- Laser Surface Texturing

"This is a truly innovative project with genuine prospects to revolutionise laser-based digital manufacturing and reap huge economic benefits for Europe."

- Dr Regina Gumenyuk
Project Co-Ordinator

PULSE aims to develop a complete laser system with the ability to cut even the hardest steel used in car construction, texture materials at unimaginable speeds and weld dissimilar materials. This will result in reduced waste and energy consumption, impacting positively on both the economy and environment in parallel.



How will we do it?

Using state-of-the-art techniques, we aim to build an ultra-high power 2.5kW laser system providing ultrashort pulses down to femtosecond range with repetition rates up to 1GHz.

Tapered Fiber Amplifiers

- High immunity to nonlinear effects
- Large mode diameter
- Pure single-mode operation
- Low cost production

High-Power Polygon Scanner Technology

- Extreme high-power operation
- Ultra-high speed of up to 1.5 km/s
- Precise control of the processing

3D Nano-Imprint Lithography

- Complex geometry directly on the top of the fiber
- High-power resistant materials
- Beam tailoring optics

High Purity Glass Material

- Single mode delivery fiber
- Extreme high peak power damage threshold
- High beam quality, immunity to bending

Fully Integrated Laser-Machining System

- Full integration of the above components
- Fully developed software and algorithms for machine control
- Precise positioning of the scanner head relative to the workpiece

The laser is only part of the story, with additional technological advances being established by the consortium enabling the laser to travel at over 5,000km per hour over a material surface, allowing for faster manufacturing processes.

This technology will revolutionise the manufacturing industry whilst maintaining Europe's rightful place at the apex of laser technology.