

# **“Laser-as-a-Service” with Dynamic Beam Shaping for Acceleration of Smart, Decentralised and Sustainable Factory of the Future**

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This talk will introduce the project LasersMaaS, recently funded by the EU Horizon Europe, for acceleration of smart, decentralised and sustainable factory of the future. Lasers4MaaS recognises the strategic importance of digital servitisation of laser welding processes and builds upon the rapidly growing advancement in dynamic laser beam shaping as “all-in-one” welding tool, allowing many new materials and process optimisations to be enabled from the same laser source. The deployment of dynamic beam shaping within laser welding for manufacturing industries has an immense potential for servitisation: manufacturers will be able to build products on-demand, without the need of re-investment in new equipment, thereby enabling rapid repurposing. Initially, the talk will demonstrate the technology in autogenous and non-contact laser welding of 6xxx Al-alloys for the manufacturing of cooling plates in automotive e-vehicles. Beyond this initial application, the underlying principles will be presented for nuclear fusion, food packaging, aerospace and hydrogen sectors. Integration with digital enablers will be also highlighted. This includes modular production schemes to maximise flexibility and reconfigurability; harmonized protocols and distributed/centralised ledgers for data interoperability across factory boundaries; IIoT solutions for remote monitoring/predictive maintenance; real-time AI-based decision support for improved product quality; advanced physics-based digital twins; life cycle-based tools for environmental impact and costing assessment.