Press release XVII / 2015:
Diode laser and wire – a strong team for laser build-up welding and additive manufacturing

At this year's LASER World of PHOTONICS in Munich the Fraunhofer IWS Dresden and Laserline GmbH, Mülheim-Kärlich will, for the very first time, present the wire processing optics, which has been qualified for the application with a high power diode laser for three-dimensional build-up welding and additive manufacturing tasks. With up to 5 kW laser power and a wire diameter of between 0.6 mm und 1.6 mm components can be large-area coated and generated in a three-dimensional manner. Build-up rates of up to 250 cm³/h are possible due to the modified optics.

In contrast to the common off-axis wire feed optics, which have been applied so far, the coaxial wire supply of the IWS COAXwire system offers advantageously a real omni-directional welding procedure. It enables changes of welding directions and welding positions without reorientation of the wire feed. Parts can now be processed in positions which have so far been inaccessible, namely for the repair but also for the manufacturing of new parts. Of world class importance is the particularly excellent surface quality of the as-welded structures. A surface roughness of R_z = 45 µm across to the weld beads have been achieved with INCONEL 625.

Laser build-up welding offers a broad application field ranging from the large-area coating of simple component geometries to turbine blades with complex three dimensional structures. The efficiency of this technology is defined by factors such as energy consumption and coating rates and also by the degree of the utilization of the feedstock material. By substituting traditional powder material by wire, a deposition without any losses can be achieved. At the same time contaminations of the product's environment can be reduced to a minimum.
The advancement of the IWS developed COAXwire processing optics unites the benefit of the wire build-up welding technique with the performance of the diode laser developed by the company Laserline GmbH. The processing optics together with the diode laser, with an efficiency of 48 %, significantly enhances the economic efficiency of industrial laser build-up welding.

The experts of the Fraunhofer IWS Dresden and Laserline GmbH Mülheim-Kärlich are looking forward to your visit at the LASER World of PHOTONICS, hall A3, booth 121 (Fraunhofer-Gemeinschaftsstand) or hall A3, booth 403 (Laserline GmbH).

Please contact us for further information:

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Photo 1: Setup of the processing optics
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Photo 2: COAXwire at a robot
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Photo 3: High power diode laser LDF 4500-30 for wire build-up welding processes
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