

Modulase: A re-configurable laser processing system for welding, cutting and cladding

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Laser beam processing has the capability of being highly flexible across a wide range of industrial applications; however, industries still tend to adopt separate laser systems to perform low-variety applications, since each process requires different laser beam energy distributions and different tooling set-ups. One of the main objectives in laser material processing is having flexible systems in place, which can accommodate different applications, reduce the capital investment and reduce the down time associated to changing processing heads. This paper presents recent results achieved in the development of a re-configurable laser processing system, called Modulase, capable to perform three laser processes: welding, cutting and cladding.

The system comprises a processing head with re-configurable optical set-up, capable of delivering a wide-range of energy distributions, three different plug and play end effectors, a camera-based in-process quality assurance unit and dedicated software with a user-friendly human-machine-interface. The software is suitable for either beginners or experienced engineers who would want to configure the system according to their own requirements. On board algorithms and a knowledge database have been developed to build the software routine.

Three different materials have been investigated to test the system, which are dual phase DP 600 steel, Ti6Al4V titanium alloy and S420 carbon steel. Processing and quality evaluation have been performed across these different materials. The analysis revealed the capability of Modulase to be flexible and deployable over different applications.