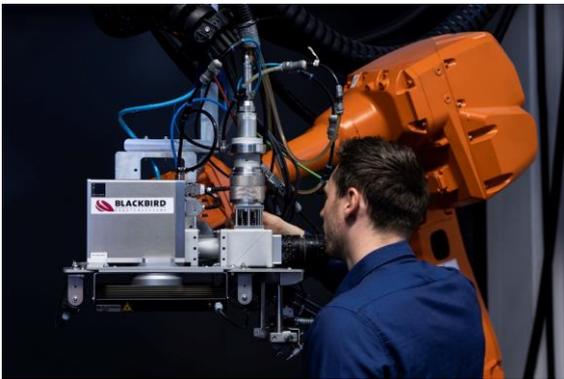


PRESS RELEASE

Scan Head with Beam Shaper Increases Throughput in Fuel Cell Production

Collaboration of photonics experts exploits new applications

Puchheim, March 10, 2022 – SCANLAB GmbH together with its sister companies Blackbird Robotersysteme GmbH and Holo/Or Ltd. is developing promising new system concepts for laser applications such as laser welding of bipolar plates and additive manufacturing (metal 3D printing). By integrating tailored beam shapers, the novel scan setup showed the potential to nearly double the productivity of welding bipolar plates for hydrogen fuel cells.



Fuel cell technology was considered a niche market for a long time. Due to the transition phase in energy generation and the search for alternative drives, the market demand might grow notably. For efficient mass production an increase of throughput in welding of metal bipolar plates, used to build the stacks in a fuel cell, is needed. High welding speeds require fast scan systems and high power

lasers, both available. However, it's the welding process itself which determines the maximum reachable speed. Weld seam failures such as humping effects and undercut occur when a certain speed limit is exceeded.

Blackbird Robotersysteme set up a test rig integrating the 2D scan head intelliSCAN from SCANLAB and HOLO/OR's latest development the Flexishaper, a full range adjustable beam shaper. The necessary beam shape was determined based on welding process simulations. The layout of the utilized beam shaper is the result of a combined optical design, integrating both diffractive optical elements (DOE) and scan system. The processing tests demonstrated to shift the speed limit of failure free welding speed from 45 m/min up to 70 m/min.

Adopting processing experience with DOEs

Thin sheet welding of bipolar plates has similar requirements to laser powder bed fusion (LPBF) processes. Both require scan field sizes up to 500 x 500 mm² with a typical processing speed around 1m/s and below. Also in metal 3D printing the processing speed is not limited by the speed of the scanner or the available laser power, but it is mostly the process itself which limits the throughput. Thus, the encouraging laser welding results are the first step on the way to further optimize LPBF processes as well.

“Our joint company holding creates the trust that is necessary for such a close cooperation to explore innovative solutions. Only in a setup like this you can openly analyze the upcoming market requirements and transfer the outcome in an optical design” recounts Georg Hofner, CEO SCANLAB.

“Our sister companies provide a construction kit for us, which we can translate into tangible benefits for our markets and customers based on our specific experience and application knowledge” adds Karl Christian Messer, CEO Blackbird Robotersysteme.

“This is exactly the kind of cooperation that creates high value products by combining our unique beam shaping expertise with our sister companies market deep understanding” concludes Israel Grossinger, Owner and President of HOLO/OR.

The next steps will be to test the laser welding concept in a larger scale setup and to pursue different applications in parallel. As the fiberSYS meets requirements of both LPBF and laser welding processes, the integration of DOEs into this scan system, particularly suited for multi head laser machines, was included in the development road map.

Image material is available to download at
<https://www.scanlab.de/en/news-events/image-library>

About SCANLAB:

With over 35,000 systems produced annually, SCANLAB GmbH is the world-leading and independent OEM manufacturer of scan solutions for deflecting and positioning laser beams in three dimensions. Its exceptionally fast and precise high-performance galvanometer scanners, scan heads and scan systems are used in industrial materials processing and the electronics, food and beverage industries, as well as biotech and medical technology. For more than 30 years, SCANLAB has secured its international technology leadership through pioneering developments in electronics, mechanics, optics and software, as well as the highest quality standards.

About Blackbird Robotersysteme:

Blackbird Robotersysteme GmbH manufactures system solutions for remote laser welding with scanning optics. The mirror-based beam deflection units can be integrated seamlessly into industrial manufacturing systems, particularly robot cells. The company's core competency is the development of powerful control technology, intuitive user software and additional process monitoring solutions.

Combined with 2D and 3D scan systems of the affiliated company SCANLAB, Blackbird offers machine and system builders a broad range of highly efficient pre-integrated solutions for high-volume production in the automotive industry, e-mobility and numerous other manufacturing sectors.

About HOLO/OR:

HOLO/OR Ltd., founded 1989 in Israel, develops, designs and manufactures diffractive optical elements (DOEs) and micro-optical elements. These components are used for various applications mainly involving high precision and high-powered lasers.

Over the last three decades, HOLO/OR has gained considerable expertise in the design, simulation and manufacturing of DOEs, using its in-house software, tools and facilities.



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