

## Efficiency gain in AM calibration

RAYLASE expands SCAN-FIELD CALIBRATOR for multi-field applications to boost efficient additive production

**Weßling, Germany - October 26, 2023 - RAYLASE, renowned market leader in laser technology, is expanding its portfolio for the AM market. In doing so, RAYLASE offers not only application-specific beam deflection units, but also complementary products for the further tasks around the exposure process.**

**With the new multi-field functionality of the Scan-Field-Calibrator (SFC), RAYLASE gives users the option of calibrating not only individual deflection units, but also entire multi-head systems quickly and precisely.**

**Jointly, RAYLASE products ensure that customers can realize the full potential of their laser scanning solutions, thus enabling users to take the step towards scalable AM production.**

A **precisely calibrated processing field** is crucial for the part quality of an AM machine. After all, poor calibrations can quickly render the product unusable, especially in aerospace or medical technology applications. In addition, **accurate and regular calibration** ensures that the machine produces consistent parts across different batches and time periods. This is important for series production. But **calibrating** AM machines, and especially **AM multi-head systems**, is complex and time-consuming. To support the user here, RAYLASE provides the SCAN-FIELD-CALIBRATOR (SFC). It measures the scan field **fully automatically** and creates **optimized correction files for the deflection unit** in the xy and z directions.

The SFC offers an average **correction accuracy in the process field of  $\pm 15 \mu\text{m}$** , comparable to that of a coordinate measuring machine. The complete calibration process is performed via a user interface with just a few clicks. This avoids a media break and thus **reduces possible sources of error**.

### SCAN-FIELD CALIBRATOR MULTI-FIELD - PRECISE CALIBRATION OF MULTI-HEAD SYSTEMS

In order to simplify the **calibration of multi-head systems**, RAYLASE has now extended the SFC with the **multi-field option**. This allows the SFC software to **calibrate several AM modules simultaneously in a single measurement process**, while at the same time ensuring **accurate and consistent alignment of adjacent scan systems in the overlap area**. This makes even the regular calibration of multi-head systems in AM production a convenient routine.

For fast AM production, it is advantageous if several AM modules can **work in parallel on a single workpiece**. Therefore, in addition to individual calibration, the **precise alignment of the deflection units to each other** is also crucial in a multi-head system. For this reason, RAYLASE has developed a simple and safe process that allows quick and easy calibration of multi-head systems.

For calibration in multi-field applications, neighboring deflection units place marks in the common working field on a calibration plate. Due to the **asymmetric shape** of the marks, they can be **assigned to the individual deflection units**. Thus, **shifts and rotations of the scan fields to each other** become **detectable**. The marked plate is then read by the SFC and the **marking pattern is analyzed**. From this, **correction files** can be created automatically. Instead of a time-consuming and complex "manual" measurement with a coordinate measuring machine, the alignment of multi-field systems with

the SFC is now **a matter of minutes**. For field sizes up to 600 x 600 mm<sup>2</sup>, a **single calibration plate** even is sufficient to **calibrate multiple deflection units simultaneously**. Depending on the complexity of the AM machine and the number of deflection units installed, this can **save up to 95% of the calibration time**. At the same time, the analysis of the marking patterns is **very accurate** and, thanks to simple software handling, calibration is **virtually error-proof** for the user.

## DOCUMENTATION AND PROCESS CONTROL

In addition to an initial calibration of new systems during start-up, the multi-field option of the SFC also allows **regular control and documentation** of the multi-field system. This is important for **high process reliability** in AM production and is already required in critical industries.

After all, it is often sufficient to check regularly whether the calibration has changed.

In this way, **changes in the alignment** of the scan heads to each other can be detected and corrected by **regular measurement** with the SFC, even before the part quality suffers. Depending on the quality standard that is to be maintained, **individual threshold values** can be defined above which **readjustment** of the deflection unit is necessary.

In addition to each calibration measurement, a **database** tracks which operator performed the measurement and when, and records **laser and environmental parameters**. This enables **precise documentation as well as process and quality control**, which is particularly necessary in the aerospace and medical technology sectors.

## CONCLUSION:

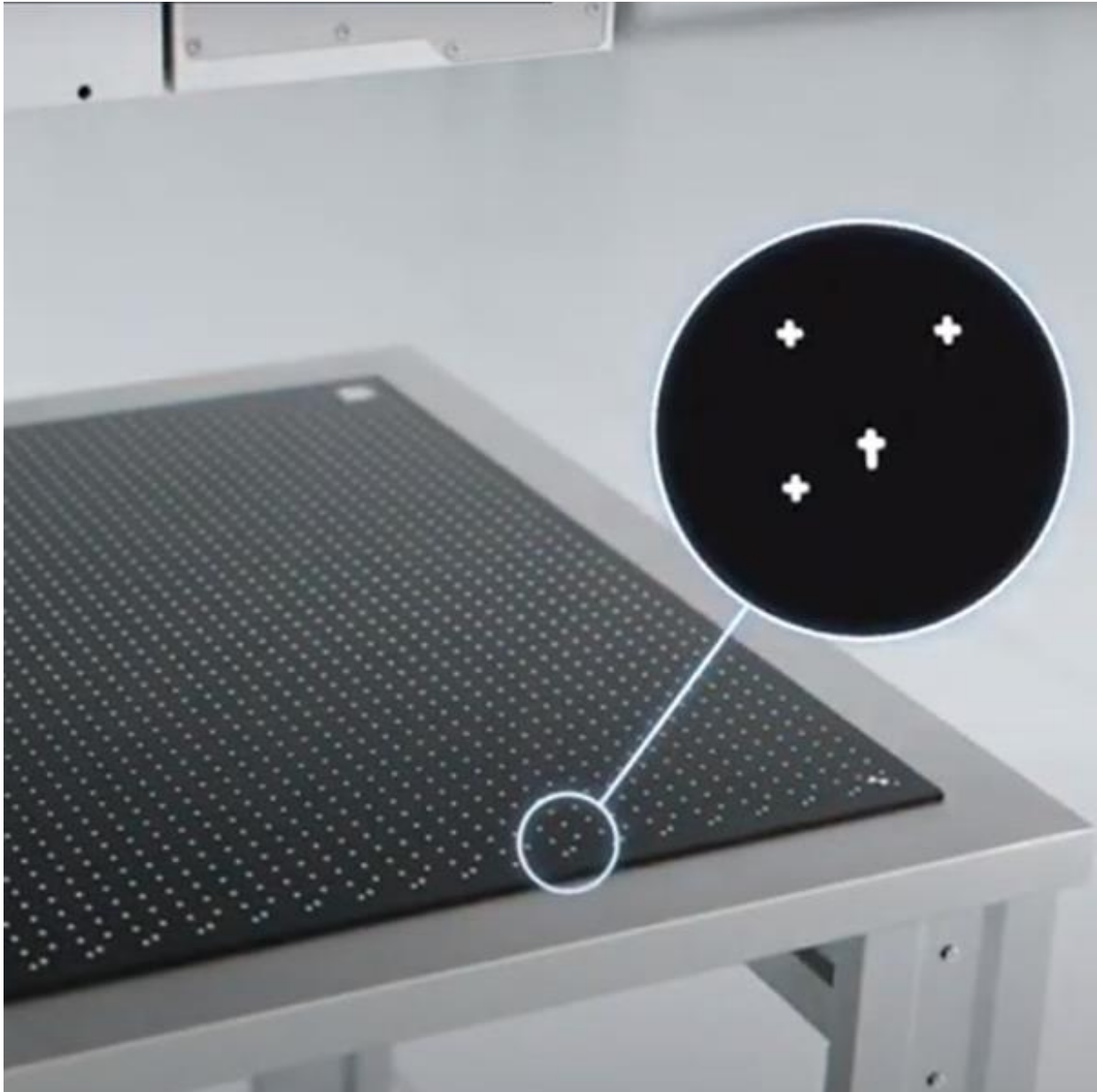
With the latest launch of the **multi-field extension** for the SCAN-FIELD CALIBRATOR, RAYLASE reaffirms its position as an expert in additive manufacturing. With the ability **to calibrate multiple AM modules simultaneously** and ensure precise alignment of adjacent scan systems, RAYLASE effectively addresses the complexity and time involved in the **calibration process of multi-head systems**. These advances are a result of RAYLASE's continued focus on the technical challenges of AM production. Its goal is to provide **precise and user-oriented solutions** that meet the needs of industry. For deeper technical discussions and inquiries, the RAYLASE team is available.

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## About RAYLASE

RAYLASE GmbH is the solution provider for laser applications in industrial environment. Since 1999, the Bavarian company from Wessling near Munich, provides innovative laser deflection systems for precise and efficient laser material processing. By combining opto-mechanical scanners with sensor technology and intuitive software, it enables optimized laser systems that are made for industrial production.

RAYLASE has its focus in the e-mobility and AM market as well as in the solar and electronic sector. With its subsidiary and its own additional production facility in Shenzhen, China, it offers a high production depth and optimized delivery times. Together with several international representatives in the US, Italy, Japan, Korea, and Taiwan, the RAYLASE group with its 170 employees supports customers worldwide with industrial solutions for laser cutting, laser welding and laser surface processing.



The SCAN FIELD CALIBRATOR 600 simplifies and speeds up the calibration process for laser systems. It provides fast and accurate calibration in xy and z directions and significantly reduces the time and effort required to achieve a stable and reliable process. In a multi-field calibration, all deflection units are used to place marks in the overlap areas. These are then automatically measured and translated into coordinated correction files.