

CSEM SA – Additive Manufacturing and Component Reliability sector
High-precision, flexible and sustainable production of complex products –
including with the use of lasers

Short description:

CSEM SA focuses on the development of end-to-end laser additive manufacturing (AM) process for complex novel mechanism and materials. The development includes development of novel materials, powder feedstock qualification, AM optimized design, process parameter optimization and testing, post-processing development including surface treatments, and quality assurance. Among the AM technologies mastered at CSEM are Laser Powder Bed Fusion (Trumpf TruPrint 1000 and EOS M290 Fine Detail Resolution) for metals, functionally graded multimaterials and metal matrix composites as well as high precision stereolithography (SLA) for polymers and polymer matrix composites.

CSEM has developed and patented a concept of 3D printed embedded electrical conductors manufactured during the printing phase of laser AM. This approach has been successfully applied in various projects aimed at developing complex multifunctional 3D mechanisms with embedded functionalities such as flexure based precision motion guiding, electrical connectors and conductors as well as integrated sensor. This was achieved by combining advanced AM design, ink-jet printing (IJP), AerosolJet printing (AJP), Laser Powder Bed Fusion (L-PBF), and parts post-processing (thermal, surface). One such complex monolithic, multifunctional and lightweight part is a compliant mechanism CRTM shown in Figure 1.

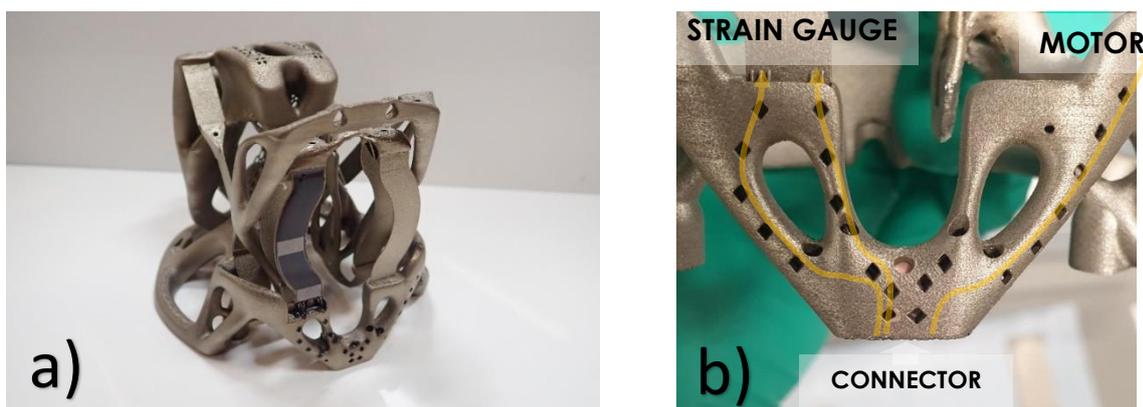


Figure 1. a) compliant monolithic rotation to translation mechanism (CRTM) with thinwalled lamelas and printed wires and connectors, b) close up depicting the internal connectors and wiring leading to the strain gauge sensor and motor

Partnership / cooperation possibilities:

Our research and technology center is primarily looking for new partnerships with new applications for high precision complex multifunctional parts which could lead to improvement of specific properties and performances of components while at the same time taking advantage of the design freedom enabled by AM.

Possible H2020 call:

HORIZON-CL4-2023[2024]-TWIN-TRANSITION-01-02: High-precision, flexible and sustainable production of complex products – including with the use of lasers

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