

Project title	Hi-PAS : High-Precision Hybrid Laser-based Additive & Subtractive Manufacturing
Duration	01-01-2019 → 31-12-2022
Abstract	<p>Within this project we will explore the capabilities of a beyond state-of-the-art hybrid laser-based additive and subtractive manufacturing platform. Here, the term “hybrid” refers to the combination of a laser-based additive manufacturing process with a Laser Beam Micro Machining (LBMM) process. The unique approach of combining both processes in a single state-of-the-art manufacturing unit paves the way to manufacture metallic components with an extended complexity and precision. The focus within this proposal is on creating a fundamental insight and physical understanding with respect to a set of key challenges, and also how they affect each other, within the scope of “hybrid manufacturing” of metallic components.</p> <p>Therefore, four interrelated key objectives are identified as main challenges within this proposal. More specifically: 1) investigate the potentiality to exceed the state-of-the-art of integrating an in-situ in-line and/or at-line metrology approach to measure the form geometry and surface roughness; 2) develop a robust closed-loop in-situ melt pool monitoring system; 3) the quantification of residual stresses in hybrid manufactured components by assessing the possibilities of integrating a non-invasive approach into the process chain in order to better understand the impact on the level of deformation and the final geometrical precision level; 4) create a deep fundamental insight on which process parameters affect the fatigue behavior and corrosion mechanisms of a printed and ablated surface. Through a rigorous approach we will create a fundamental insight on these topics. The unique combination of the obtained knowledge with the available state-of-the-art facilities is certainly a high fruitful potential to valorize the research through a spin-off activity.</p>
Project Coordinator	VUB-AVRG
Involved research partners	
<ul style="list-style-type: none"> • VUB-AVRG • VUB-SURF • VUB-MEMC • KU Leuven – AM • UA – Op3Mech 	
Industrial partners	
<ul style="list-style-type: none"> • Airbus Helicopters • 3D Systems • TE Connectivity • Bosch Rexroth • Air Liquide • Fike Europe 	
Total budget	3.088.151 €
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Financing body	FWO - Research Foundation – www.fwo.be