How 3D Non-contact surface metrology improves additive manufacturing processes

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Production of mass-customized products promises great improvements in e.g. prosthetics.
Mass-customized production is nowadays made possible by digital manufacturing, i.e. additive processes (3D printing).
But how can 3D printing processes be control to a level that ensures scale up from lab work/prototyping to mass-customized production?
How tolerancing of 3D printing processes could be designed and assessed?
The present talk addresses three basic questions about dimensional and surface finish control of 3D printing industrial processes.
1. Why metrology is required for optimizing 3D printing processes

2. What technologies are available nowadays to address: dimensional, geometrical and surface finish control of 3D printed parts.

3. How tolerancing can be defined based on parameters calculated from of state-of-the-art 3D optical metrology.

The above is discussed throughout the presentation with reference to selective laser melting (SLM) additive manufacturing process and based on 3D optical metrology techniques such as: Confocal, interferometry, focus variation, and fringe projection, made available by Sensofar Metrology. The above technologies are compared with other micro-nano metrology tools such as: SEM, CT and contact measurements, respective merits and drawbacks are outlined.

Eventually two study cases are presented (on respectively shape and surface finish quality control).