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## 3D-Master-Based Method for Optimizing the Cost Calculation of PBF-LB/M Manufactured Parts

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The 3D Master method aims to reduce effort and misinterpretation while transferring product information from the design office to the production department, thanks to 3D model files containing all the product manufacturing information (PMI).

Thus, for a metal additive manufacturing (MAM) part, the 3D Master method gives direct access to crucial data, such as the product's materials and 3D models associated with their respective geometric dimensions and tolerances (GD&T) for each manufacturing step. By providing this valuable set of data, the 3D Master can enable the automatic selection of the most relevant additive manufacturing (AM) technology regarding a specific MAM part and allows a more accurate calculation of the manufacturing cost.

This paper presents a method that relies on the 3D Master to automatize the calculation of precise manufacturing costs for MAM parts with powder-based fusion (PBF) processes. It is shown that an ideal set of information (raw and final part models and PMI) combined with a thorough theoretical and statistical approach to calculating the optimal volumetric energy density enables accurate manufacturing cost calculation. With the help of 15 reference MAM parts with three different geometrical complexity levels, it has been demonstrated that values lower than 10 % can be reached for the standard deviation of the normalized actual and calculated cost difference.

Our 3D-Master-based cost calculation method, when associated with a PMI generator powered by artificial intelligence (AI), provides a solid foundation for a commercial online platform offering a trustable quote for producing AM parts within a few minutes. A brief introduction is also given in this regard.

### Speaker Country

Switzerland

**Primary authors:** Dr LANFANT, Briac (ZHAW-IPP); Mr LACK, Silvan (ZHAW-IPP); Mr MEYER, Benjamin (ZHAW-CAI); Dr ABDULKADIR, Ahmed (ZHAW-CAI); Dr STADELMANN, Thilo (ZHAW-CAI); Dr SCHMID, Daniel (ZHAW-IPP)

**Presenter:** Dr LANFANT, Briac (ZHAW-IPP)

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