

# ***ADDITIVE MANUFACTURING SOFTWARE TOOL***



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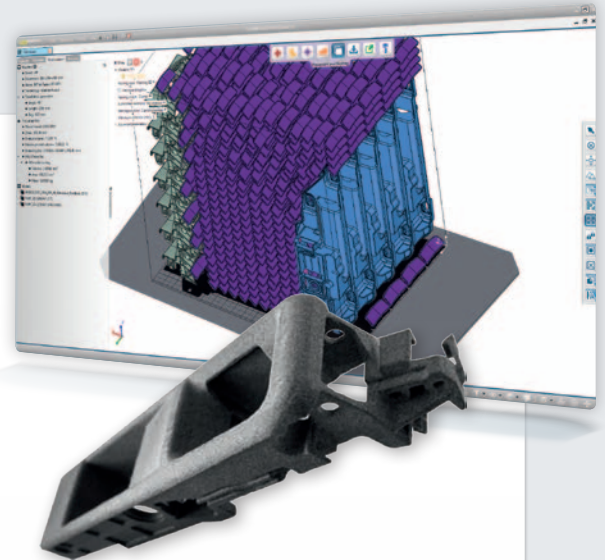
# **4D ADDITIVE**

## Create precision parts with precise B-Rep Geometry

The innovative 4D\_Additive Manufacturing Software Suite sets new standards. For the first time now 3D models from all common CAD formats can be read and prepared for additive manufacturing processes directly as an exact, intelligent and light B-Rep geometry.

4D\_Additive reads CAD data from 24 different formats such as Catia, NX, SOLIDWORKS, Creo, Inventor, STEP or JT as exact B-Rep geometry including all manufacturing information (PMI), attributes, and the design history. In addition, old or already existing models can be imported from the 3mf, amf and STL format.

The CAD models optimized for 3D printing and nested on the build plates can be saved in all common formats such as amf, 3mf and STL as well as in common slicing formats cli, sli, abf, svg, sls, usf and g-code.

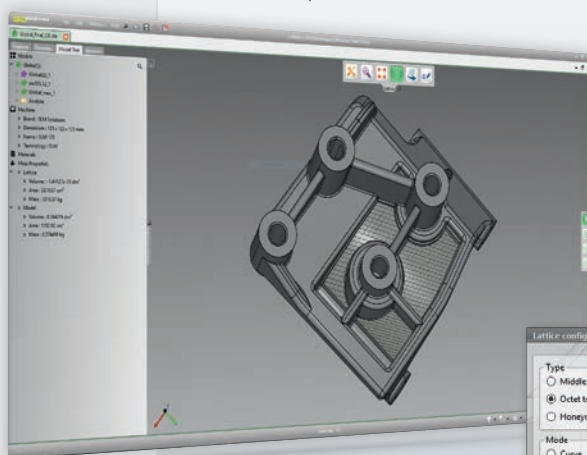


### Preparation of CAD data for 3D printing

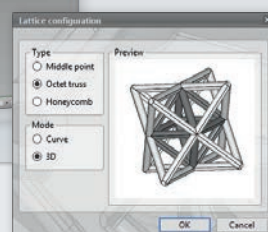
With 4D\_Additive, CAD data of all major 3D formats can be processed for 3D printing within the shortest space and with the optimum printing results.

#### DATA IMPORT AND REPAIR

B-Rep Healing and direct modeling functions ensure a seamless process as well as optimal data quality of the converted and for 3D printing optimized models. They can be saved in amf, 3mf and STL format for all machine Types and manufacturing methods.



The proven healing functions for CAD models automatically fill gaps and correct overlapping elements, twisted faces, and other geometry errors. In interactive mode, filter functions allow you to locate the geometry errors and fix them in seconds with the help of the clean-up functions.



#### 4D\_ADDITIVE SUPPORTED INTERFACES

- NX™
- CATIA®
- SOLIDWORKS®
- Creo®
- JT
- STL
- STEP
- ACIS®

... and many more.

### CAD ENGINEERING STANDARD FOR PRECISE ADDITIVE MANUFACTURING

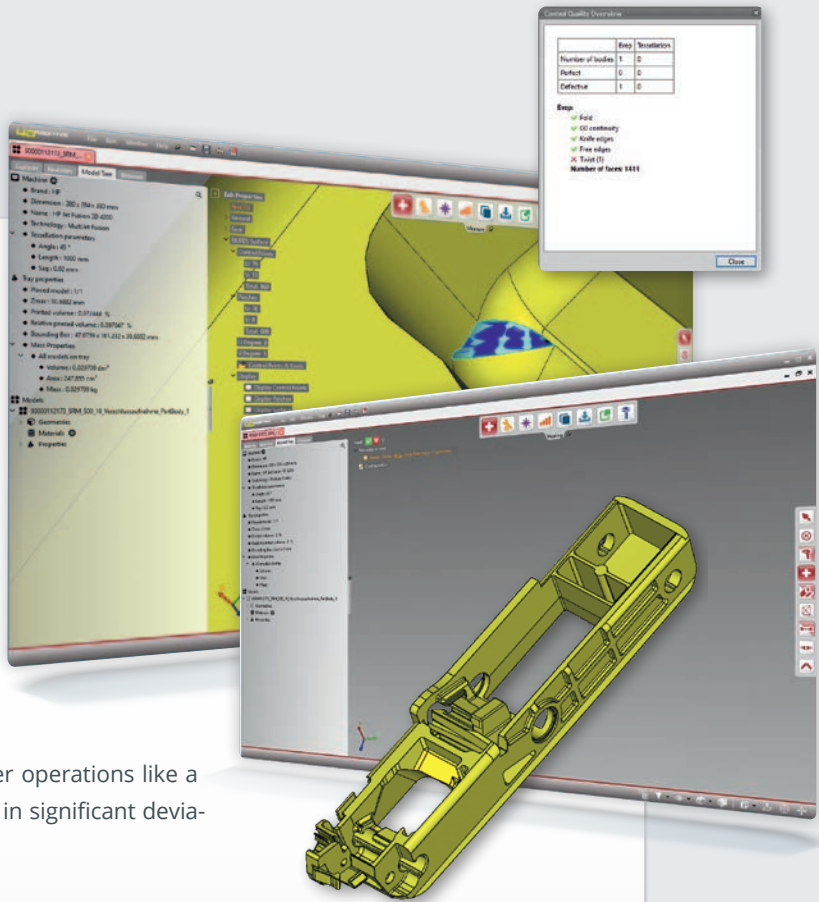
The robust B-Rep kernel of 4D\_Additive enables a quality check, repair and preparation of models in accordance to CAD-engineering standard which is based on the exact geometry. In conventional 3D printing tools, CAD models are often triangulated already during the reading process and thus converted into an approximate and imprecise STL description so that further operations like a repair of modelling errors, are resulting in significant deviations from the original shape.

4D\_Additive, on the other hand, enables the check, repair and handling of the exact, original B-Rep data according to VDA 4755/2 standard and thus for the first time a continuous additive manufacturing process that is in line with CAD Engineering Standard.

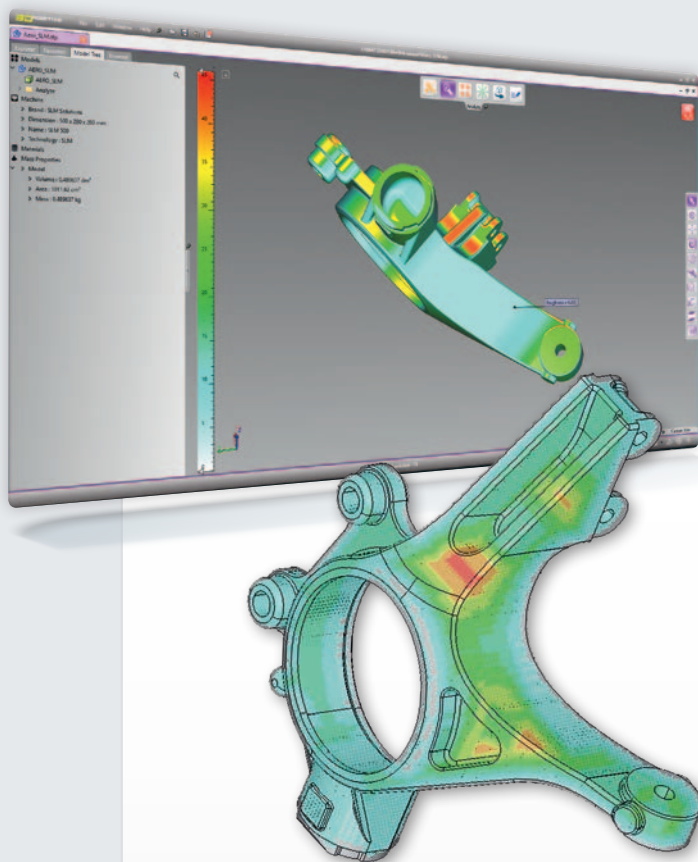
Sophisticated checking and healing functions analyze the CAD models and automatically eliminate gaps, overlaps, mini-elements, twisted faces and other types of errors. Errors that are not automatically correctable, e.g. Knife edges, are displayed clearly and can be corrected within seconds by means of easy-to-use Clean-Up and modeling functions. 4D\_Additive ensures the production of precise quality models.

### GEOMETRY OPTIMIZATION FOR ADDITIVE PROCESSES

Within 4D-Additive CAD models can be modified as an intelligent B-Rep geometry through robust "direct modeling" functions, which has clear advantages over a process based on tessellated models. Optimization can be achieved by de-featuring and modifying critical areas of the geometry, as well as merging small surfaces which results in an efficient reduction of complexity. The modern, structured and simple handling graphical user interface of the software allows the easy generation of offset surfaces. The unique scaling function is able to deform models differently along the three major axes to compensate for shrinkage or distortion.







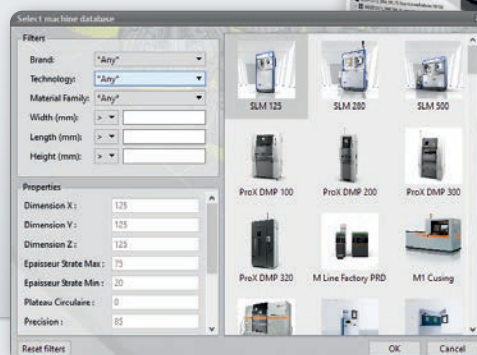
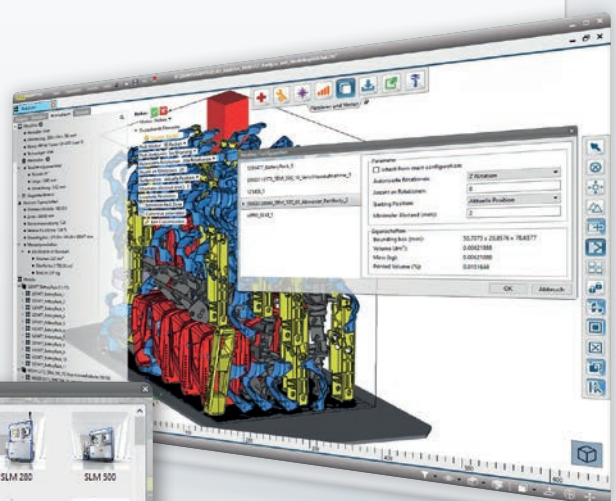
### ADVANCED GEOMETRY ANALYSIS

For the best possible heat distribution, the Software automatically indicates massive zones that are areas with very large wall thicknesses, in which possibly a heat concentration takes place. These areas are highlighted in color and provide information on future component design or positioning of the component.

The wall thickness checker on the other hand can be used to find the areas that are critical for certain processes because of very small wall thicknesses. In addition, the gap measurement i.e. backlash test makes it possible to detect problem areas and details that are too small for the respective method, such as holes with too small a diameter.

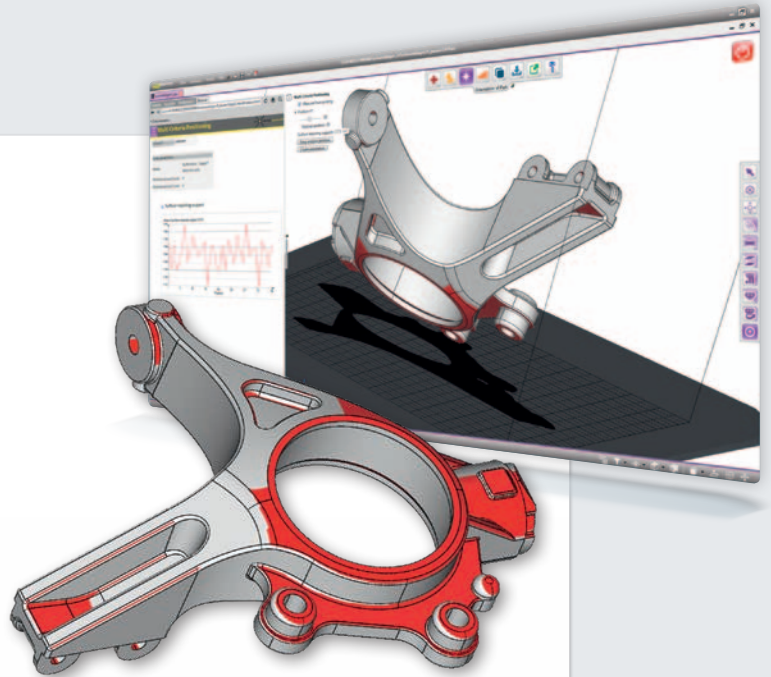
### MACHINE AND TECHNOLOGY DATABASE

In the database, common machine types with the respective build space and technology parameters such as layer thickness, smallest possible detailing like a minimum hole diameter as well as the costs factors are stored. The database can be supplemented with user-defined machines and technology parameters.



### AUTOMATIC PART ORIENTATION

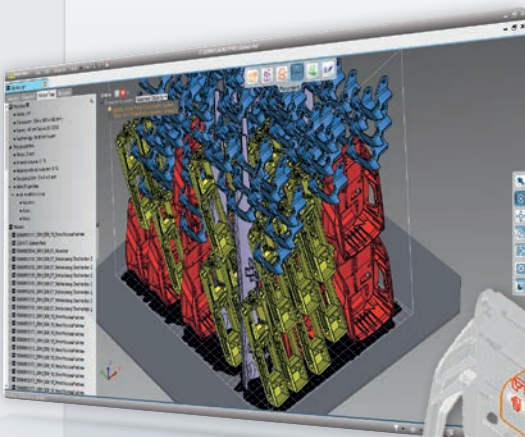
A special analysis function makes it possible to visualize the expected surface quality in real time and to achieve optimum orientation of the part within a very shortest space of time. A fully automatic part orientation through the Multi Criteria Positioning function serves an optimal surface quality of selected areas or for a minimum of support geometry volume and/or costs of the the part. The automatic function also helps inexperienced users and drives the automation of additive manufacturing processes.



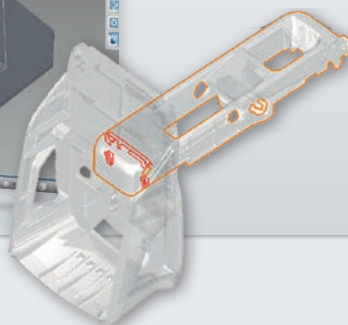
### NESTING AND OPTIMIZATION OF THE BUILD PLATFORM

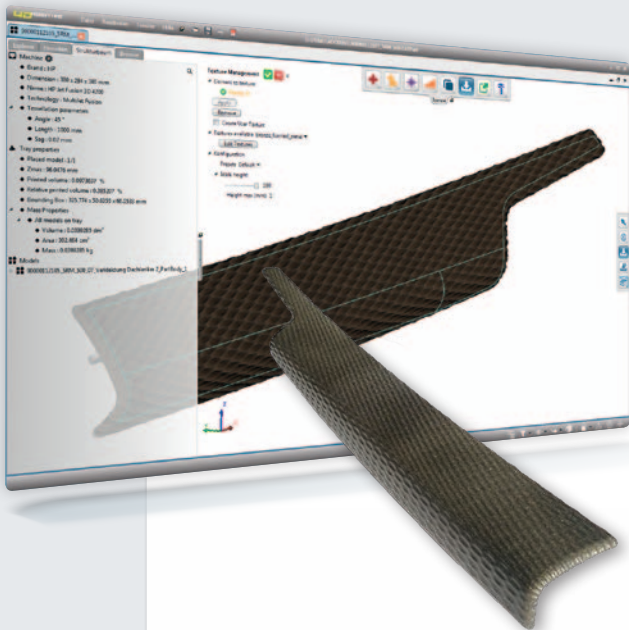
Intelligent 2D and 3D nesting capabilities with multiprocessor computation ensure fast automatic fill up with optimal build volume utilization for all machine types available in the database, as well as for customized machine types. The extremely fast nesting function of 4D\_Additive uses a superfast multiprocessing and provides a maximum of automation.

Especially for powder bed processes, such as HP Multijet Fusion, fully automatic nesting offers great benefits, since the time saved by eliminating time-consuming manual work is reflected in the price of the parts. The user can specify the respective number of parts as well as a minimum distance. The construction volume is then filled automatically, so that an optimized number of components is accommodated on the platform.



The relative density of the installation space is pre-defined in favor of a sensible heat management in order to optimize quality and costs. Here, large parts can also be positioned by hand to then automatically add a large number of smaller components automatically. For the manual arrangement of the components in the build space, the system offers a collision check so that reliably indicates if parts penetrate each other or fall below the desired minimum distance.





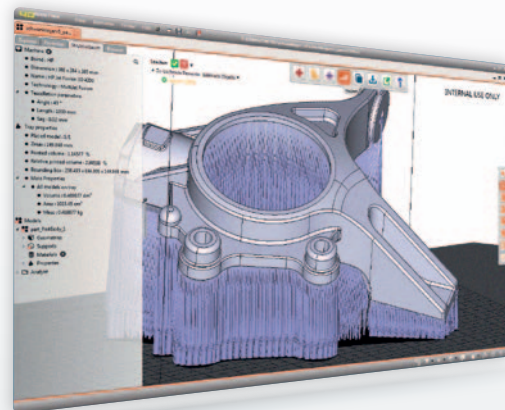
### 3D TEXTURES REVOLUTIONIZE PART DESIGN

Just select with a single click, the desired surface areas and then apply the texture from the database. The innovative Texture Module, allows the user to access more than 5,000 different 3D texture structures. 4D\_Additives makes it easy to define textures on the CAD model. The size, resolution, position and height of the structure can be visually adjusted, whereby a rendered, photo-realistic representation of the model facilitates the work. The software ensures distortion-free projection automatically, of the grain over surface boundaries. The graphical

representation allows real-time assessment of the designed geometry and fires the creative process when designing new parts.

### SUPPORT GENERATION

For metal printing processes and also for other processes, a wide variety of special support structures can be generated in automatic and/or manual mode. The automatic analysis identifies areas where support structures are needed for manufacturing. The support structures of various shapes can be changed and customized by the user.



### CUTTING PARTS

Components that are too large for the space of a machine, can be splitted with different patterns such as T-shape, dovetail or puzzle shape. In addition to the shape also the position of the splitting plane can be defined easily on the model. The functions then works automatically, creating two solid models that can be perfectly mated after printing.

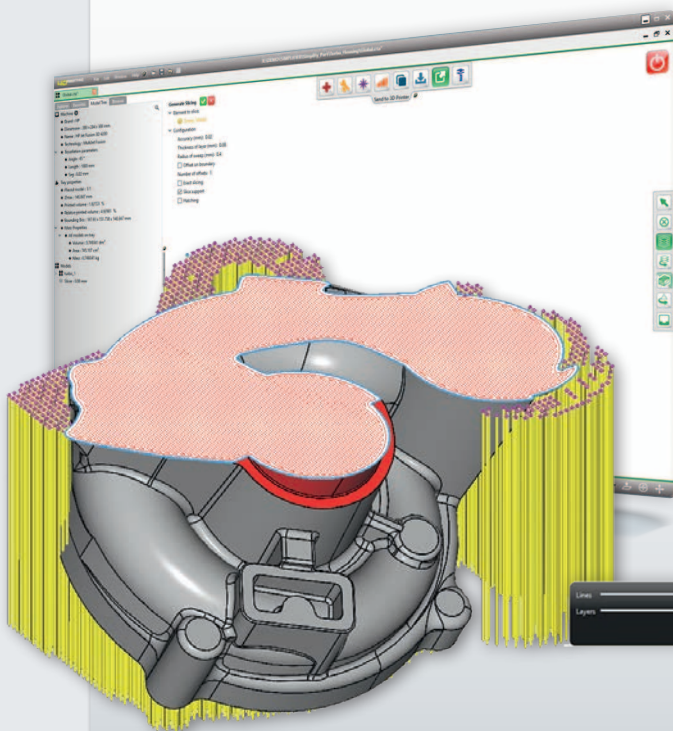
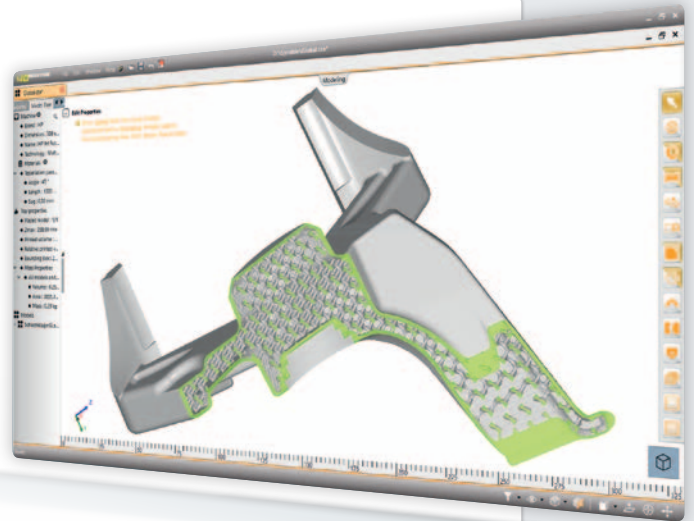




## HOLLOW AND LATTICE STRUCTURES

To save material and reduce the heat input, the massive model can be hollowed for a user defined wall thickness at the push of a button. The areas of accumulations of material previously found through the Massive Zone test can be dehumidified to reduce mass and heat input.

The excavated models can be filled with different lattice patterns of any size. The calculation using multiprocessors is extremely fast. In this case, the "outer" model can also be replaced with Lattice structures, whereby the previously defined areas, such as functional areas, remain as the original geometry. For the filling of the Lattice areas, different patterns can be selected – such as Honeycomb, Octet or center point.



## SLICING WITH MULTIPROCESSOR

The slicing is unrivaled fast due to the multiprocessor calculation and using the exact B-Rep it is also possible to generate and save exact slicing curves as vector graphics. The default slicing parameters are taken directly from the technology database. In addition, different hatching patterns are available. The results can be saved in the general slicing the formats like abf, cli, clf, cls, cmb, slc, sli, svg, sls, ssl, usf and g-code.



## ABOUT CORETECHNOLOGIE

CoreTechnologie is an international software developer with locations in Germany, France, USA, Italy, Japan, India and Ireland. In the CAD interoperability universe, CoreTechnologie is the leading global producer of the most comprehensive 3D conversion and collaboration software tools available today. Our goal is future-oriented development and customer centric technology to optimize interoperability, thus helping organizations to streamline their Product Life Cycle management. We work with highly professional automated processes and we are always one step ahead from the latest technology. The top priority for us is that our software has the possibility to adapt to all customer requirements.

The customer portfolio by CoreTechnologie comprises more than 400's customer from several sectors like automotive-, aerospace-, mechanical engineering- and consumer goods industry.



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