SYNOPSYS®

Simpleware Software for High-Value Part Inspection

Key Benefits

- Intuitive, User-Friendly Interface
- Quick and Accurate Segmentation
- Advanced 3D Image Processing
- Export High-Quality Meshes for Simulation
- Develop Automated Workflows
- Expert Technical Support

Key Features

- Import Images from Multiple Modalities
- Multiplanar Reconstruction (MPR)
- Import and Fix CAD/STL Files
- Automatically Co-Register CAD and Image-Based Models
- Surface Deviation Analysis for Comparisons
- Export to FE or CFD Packages

Why Simpleware Software?

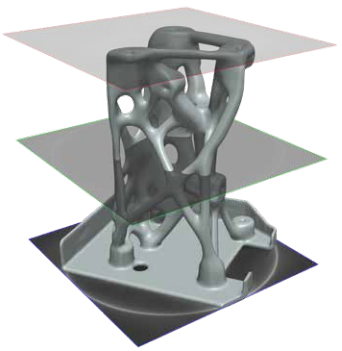
Simpleware™ software offers a fast, easy-to-use solution for 3D visualization and inspection of high-value industrial parts from image data. Employ intuitive tools to inspect and measure part defects, reducing the risk of future manufacturing errors. Use the software to generate watertight STLs for direct export to Additive Manufacturing applications, or high-quality volume meshes for FE/CFD simulation of how parts will perform in typical applications.

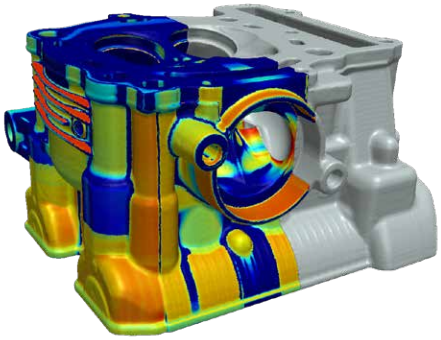
Intuitive and Customizable

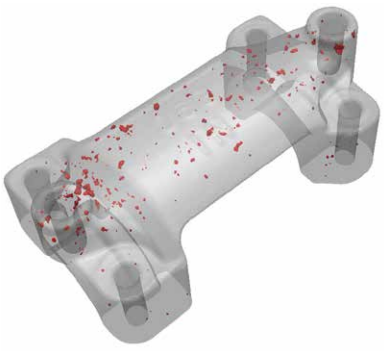
We pride ourselves on the ease-of-use of Simpleware software. Users new to the software can start processing image data within a short time frame, and very quickly visualize and identify regions of interest. Our range of fully automated, semi-automated and interactive segmentation and measurement tools allow even the most challenging image datasets to be processed efficiently. The software also offers scripting tools and plug-ins for users to customize the software and automate repetitive tasks without compromising on accuracy.

Dedicated Support and Training

Our expert technical support team are here to help you get the most out of the software, including step-by-step guidance and personalized support. We also regularly offer classroom training courses at our offices, or you can arrange customized training sessions online or at your site.







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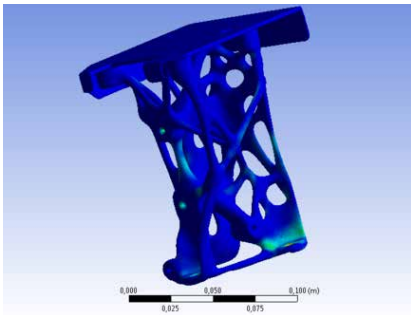
Quality Control of a Metallic ALM Part used for Satellite

J. Uzanu[1] • J. Dhennin[1] • J. Desmarres[2], ***[1]ELEMCA, France; [2]CNES, France***

Additive Manufacturing (AM) is a valuable tool for the space industry, particularly when combined with non-destructive methods such as X-ray computed tomography to inspect and analyze defects. When combined with Finite Element Modeling (FEM), the effect of defects in parts can be quantified. In this project, an aluminum AM part used for the TARANIS satellite was analyzed to identify the location of porosities within the material. Simpleware software was used to generate the model for FEM to validate its structural integrity, using a random vibration model and comparison with results from CAD modeling and topological optimization.

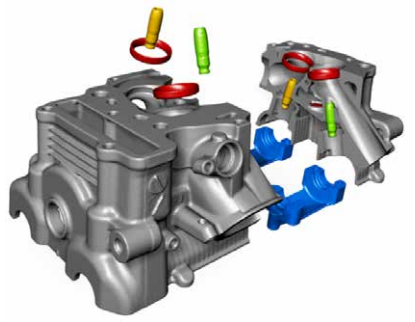


Von Mises stress simulation in ANSYS Workbench identifying porosities and validating structural integration

Reverse Engineering Automotive Parts

M. Miyazaki, ***JSOL Corporation, Japan***

Reverse engineering and analyzing industrial automotive parts can be a challenge, given the complexity of materials used and the need for precision when processing image data. Researchers have used Simpleware ScanIP to overcome these difficulties in a project involving the conversion of CT data of a cylinder head into a high-quality 3D model suitable for inspecting defects and exporting simulation-ready meshes. A particular focus was placed on segmenting valve seats in order to carry out thermal simulation analysis. This considered the influence of voids stemming from the casting process.

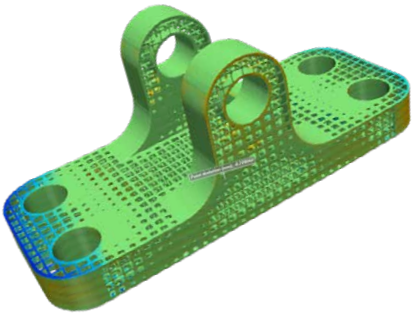


Reconstructed CT scan of a cylinder head with different parts in different colors

Inspecting Design Deviation in Manufactured Part

N. Brinkhoff[1] • S. Pilz[2], ***[1]North Star Imaging, USA, [2]Ansys, USA***

Some manufacturing processes still carry risks in terms of accuracy, quality, strength and reliability. For many industries, it is crucial to gain insight into the real-world performance of parts and the impact of defects. In this example, a bracket designed by the University of Pittsburgh was scanned in a North Star Imaging CT system and imported into Simpleware software, where it was combined and compared with the original CAD design. This approach revealed two internal manufacturing errors which were analyzed in ANSYS for structural performance. Having this knowledge from the scanned parts means that manufacturing defects can be identified and resolved before a costly production process.

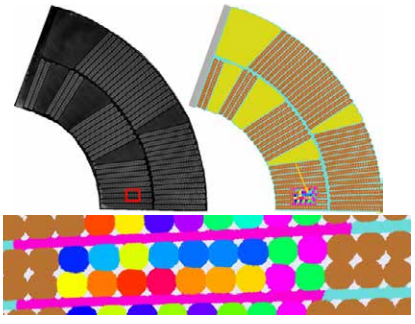


Surface deviation in Simpleware CAD showing differences between CAD part and scanned part

Optimizing Coil Design for the Large Hadron Collider

M. Daly • A. Fontenla • O. Sacristan de Frutos • R. Gauthier • M. Guinchard • C. Loffler • F. Savary • D. Smekens, ***CERN, Switzerland***

The High Luminosity (HiLumi) upgrade of the Large Hadron Collider (LHC) relies, amongst other additional upgrades, on superconducting 11 T dipole magnets for increasing the luminosity of the beam to enlarge the data sample for physics experiments. 3D image-based modeling using Simpleware software allows the HiLumi Project at CERN to characterize representative coil geometries to predict behavior at different scales using advanced material models. This research is enabling realistic simulations to be carried out at the strand and filament level by accounting for the global stresses of the realistic coil geometry.



Cross section of Coil 107 imaged in high resolution and strands segmented using Simpleware ScanIP

For more information on Simpleware Software Solutions go to www.synopsys.com/simpleware

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