



Industrial parts can be dimensionally measured using computed tomography (CT). In contrary to tactile and optical measuring devices, even complex parts with inner structures can be digitized completely. Computed tomography provides new opportunities to perform industrial inspection tasks, requiring new, powerful methods. The software module **CT-Inspection** offers the possibility to analyze and compare CT image and voxel data to a nominal model (CAD model). Alternatively, a surface model can be reconstructed from the measuring data.

Applications

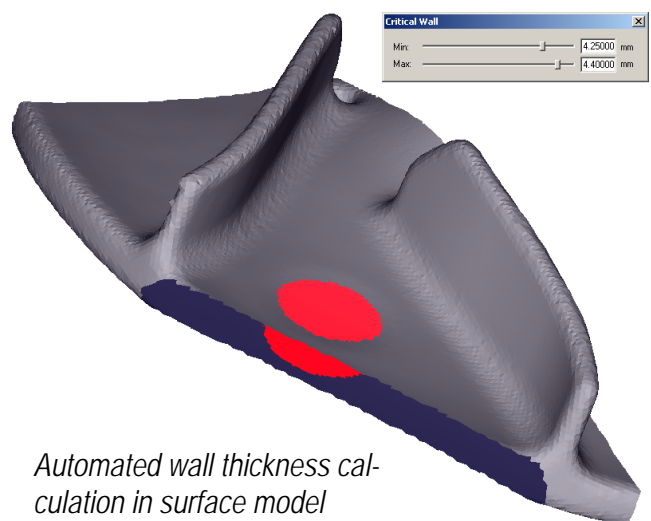
- Measuring of complex parts
- First article inspection
- Surface reconstruction and CAD-update
- Defect analysis

Features

- Analysis of CT image and voxel data independent from CT hardware (2D and 3D CT)
- CT image processing
- 3D contour extraction and 3D surface reconstruction, resulting in a triangulated point cloud (STL)
- Optimization of the triangular mesh: Correction and mesh reduction
- Defect analysis
- Automated wall thickness calculation
- Automated feature extraction
- Feature based and best fit registration to nominal CAD model
- Automated comparison of geometric entities, inspection of freeform surfaces, reporting of deviations



Contour extraction in CT image



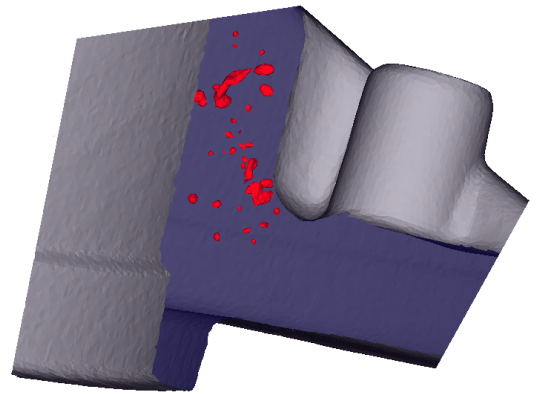
Automated wall thickness calculation in surface model

Methods

- Image and voxel data: Local segmentation methods and marching cube algorithm
- Surface model: State-of-the-art point cloud processing
- Feature extraction: Approximation tensor of curvatures and region growing
- Registration: Feature based registration and generalized multi-view iterative closest point algorithm (ICP)

Implementation

- Programming language C++
- Modular design either for the integration into existing software systems or as stand-alone application including visualization (OpenGL) and reporting of the deviations
- All tools optionally as separate modules
- Support of multi-core architectures and 64-bit platforms



Detection of air bubbles in surface models of casted parts

