



## Digital Acquisition, Processing and Manufacturing Software

Cyfex AG employs cutting edge software technologies in the fields of 3D acquisition, computer graphics, image processing and physical simulation in order to solve unique engineering and process challenges.

Based on these technologies, our customers are able to gain a competitive edge by introducing optimized design and production processes. Today, our highly optimized software is used daily and world-wide in medical applications for dental restoration and hearing aid construction. With the systems of our customers, a tremendous number of patients have access to a better, faster and cost-saving treatment.

If you too would like to take your business to a next step of productivity using the most advanced CAD/CAE/CAM technology, we would be interested in providing you with tailor-made software development and technical consulting.

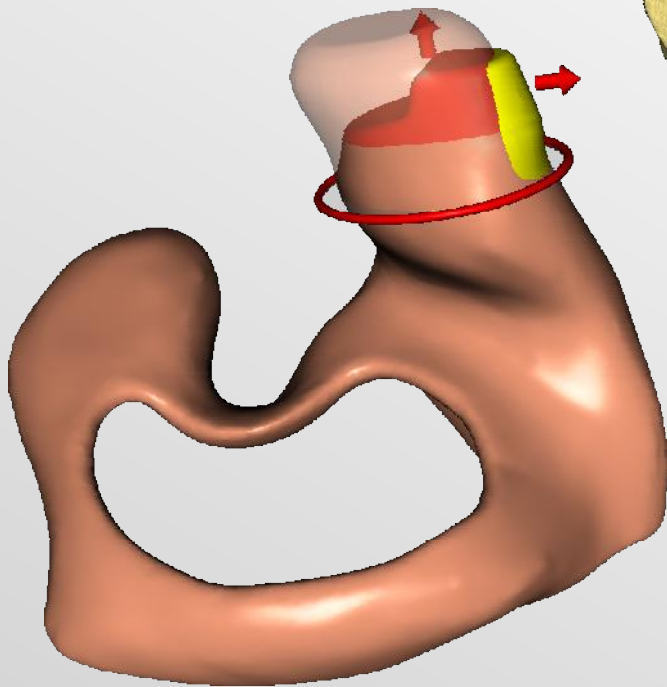
Acquisition

Preprocessing

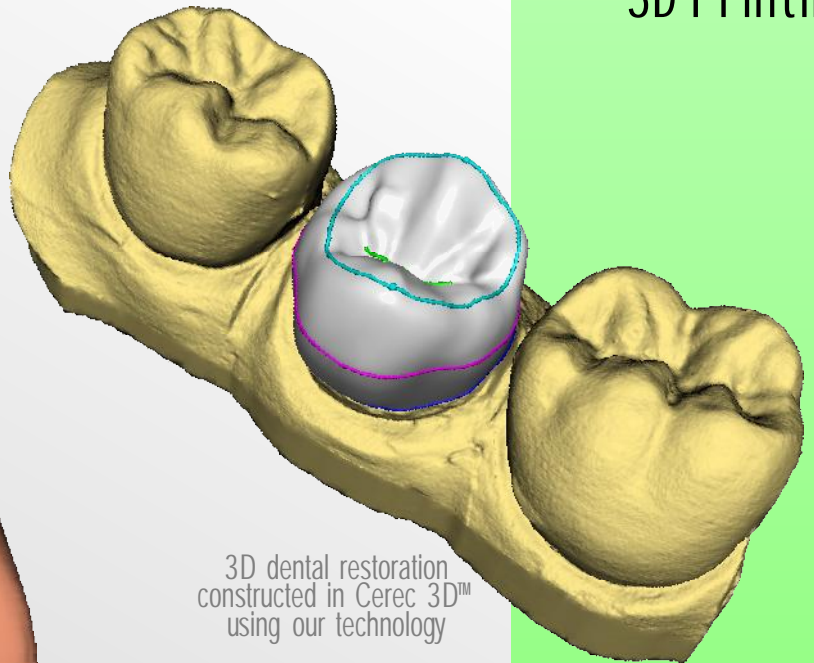
Modeling

Review

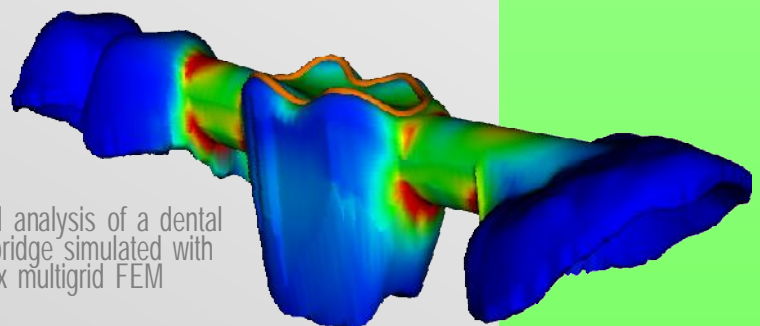
3D Printing



3D earmold construction created with Cyfex technology



3D dental restoration constructed in Cerec 3D™ using our technology



Force load analysis of a dental ceramic bridge simulated with Cyfex multigrad FEM

**3D Acquisition** The creation of an accurate 3D model of a physical object starts with capturing the object of interest with an appropriate scanner. We are able to assist you in selecting a non-contact-based digitizer fitting your needs. Furthermore, we are capable of developing or customizing the accompanying digitizing software. We offer specialized algorithms for optical error reduction and we facilitate the calibration process of the digitizing system by software enhancements.

**Preprocessing** Most digitizers deliver scanned point data. Our software enables the creation of shape models from the loose scanner output. Moreover, we may apply a collection of enhancements to the acquired surface or volume data set, like noise reduction or hole filling techniques. Additional information from the scanned data set can be obtained by sophisticated mapping and feature detection algorithms. We also deploy fully automatic registration techniques for combining independently recorded scanned data sets.

## Seamless Integration of Physical and Virtual Worlds

**Modeling** At this point, a high-quality digital model comprising 3D geometry and structural properties has been created. Design and engineering applications may now modify or customize the data. Our modeling toolbox supports many high-end modeling paradigms like multi-resolution modeling, wax tools, line based construction, and volume based construction. Depending on the application requirements, we also offer subdivision surface techniques, physics-based modeling and collision detection.

**3D Printing** Finally, the thoroughly designed and customized object needs to be manufactured. 3D printing and solid freeform fabrication have matured over the last years and became best-practice technologies for rapid-prototyping and mass customization of one-of-a-kind products. We are competent at simulating milling paths in software and implementing methods for 3D printing support, like optimizing the amount of required printing media.

**Review** During the processing and modeling steps, our visualization library uses state-of-the-art rendering techniques like real-time hardware rendering and shading, volume rendering, and photorealistic rendering. We naturally support multiple kinds of analyzing techniques, like intersection views or penetration shading. Since our technology allows for a perfect alignment of the physical and the digital world, powerful and reliable applications for computer-aided inspection or reverse-engineering can easily be developed.

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