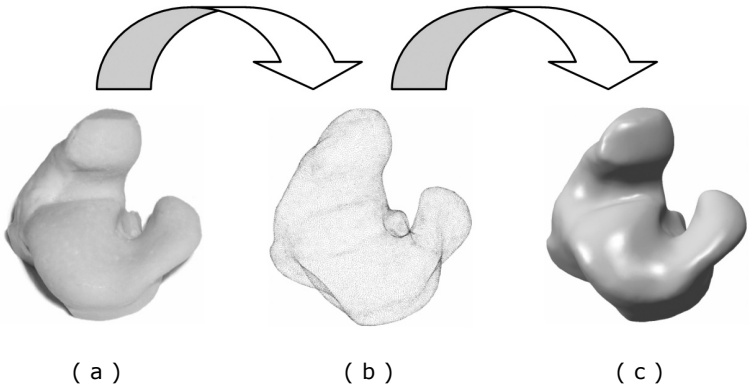
3Shape Ear Impression 3D Scanner

3Shape's 3D scanner is the point of entry of the automated hearing aid production system. It creates accurate digital 3D copies of the patient's ear impression in a few minutes. The 3D models can be used directly in 3Shape's modeling software, ShellDesigner™. The modeled shells are manufactured on 3D printers.

Our scanning system runs on standard Windows™-based PCs (included with the system) and requires no specific technical expertise to be operated.

3Shape's ear impression 3D scanner accurately captures and processes full concha ear impressions



Overview of the 3D model creation process. The original ear impression (a) is captured as a point cloud (b). The surfaced 3D model (c) is a perfect replica of the original impression

Technology

The scanning of an ear impression is performed using an optical scanning system, whereby laser planes are projected onto the impression. Four high-resolution digital cameras acquire images of the lines created on the impression. 3Shape's unique image processing software tracks the corresponding lines in each image with subpixel precision.

Complete geometry in one scan

Unique features of the scanner guarantee superior scan results. In particular the scanner is able to capture the full geometry of a full concha ear impression in one scanning session. This eliminates the painstaking process of stitching different scans together or obtaining scans with occluded areas.

- State-of-the-art projective geometry and a novel calibration of our multiple lasers and cameras ensure consistently high levels of precision

- Rotation and translation: to ensure maximum exposure of the ear impression's geometry to the cameras and lasers, the impression is placed on a rotation plate (360 degree rotation) and moves along a linear axis (translation). Moreover, the system analyses the impression during the scanning process to make sure that the object is moved optimally to cover hidden areas

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Accurate and compressed output

The initial output of the scanning process is a point cloud of approximately 200.000 points, depending on the impression. 3Shape's unique surface creation software module then automatically optimizes this data and creates a 3D polygonal model. The final surface is reduced to approximately 25.000 triangles. It is an accurate replica of the full original impression in a compressed format, which makes it easy to manipulate and transfer.

User-friendliness

The "one-button" scanning software offers superior user-friendliness and can easily be operated by a non-expert user with a minimum of training. To perform a 3D scan, the user merely needs to place the impression in the scanner and press one button in the scanning software. No settings need to be adjusted. The system handles all operations automatically.

Specifications

Precision	10 - 100 microns
Total scanning and surface creation time	1-3 minutes
Points scanned	app. 200.000
Final 3D model	app. 25.000 triangles
Scan output format	STL polygonal model
Cameras	4
Lasers	2 x Non-Gaussian line generators
Processing hardware	1.7 Ghz Pentium 4, 380 Mb ram
Miscellaneous hardware	Cables, calibration object (all included)
Interface	Standard TCP/IP based network
Object movement	Rotation and translation
Operating voltage	110/220 V
Ear impression color requirements	All non-transparent colors

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