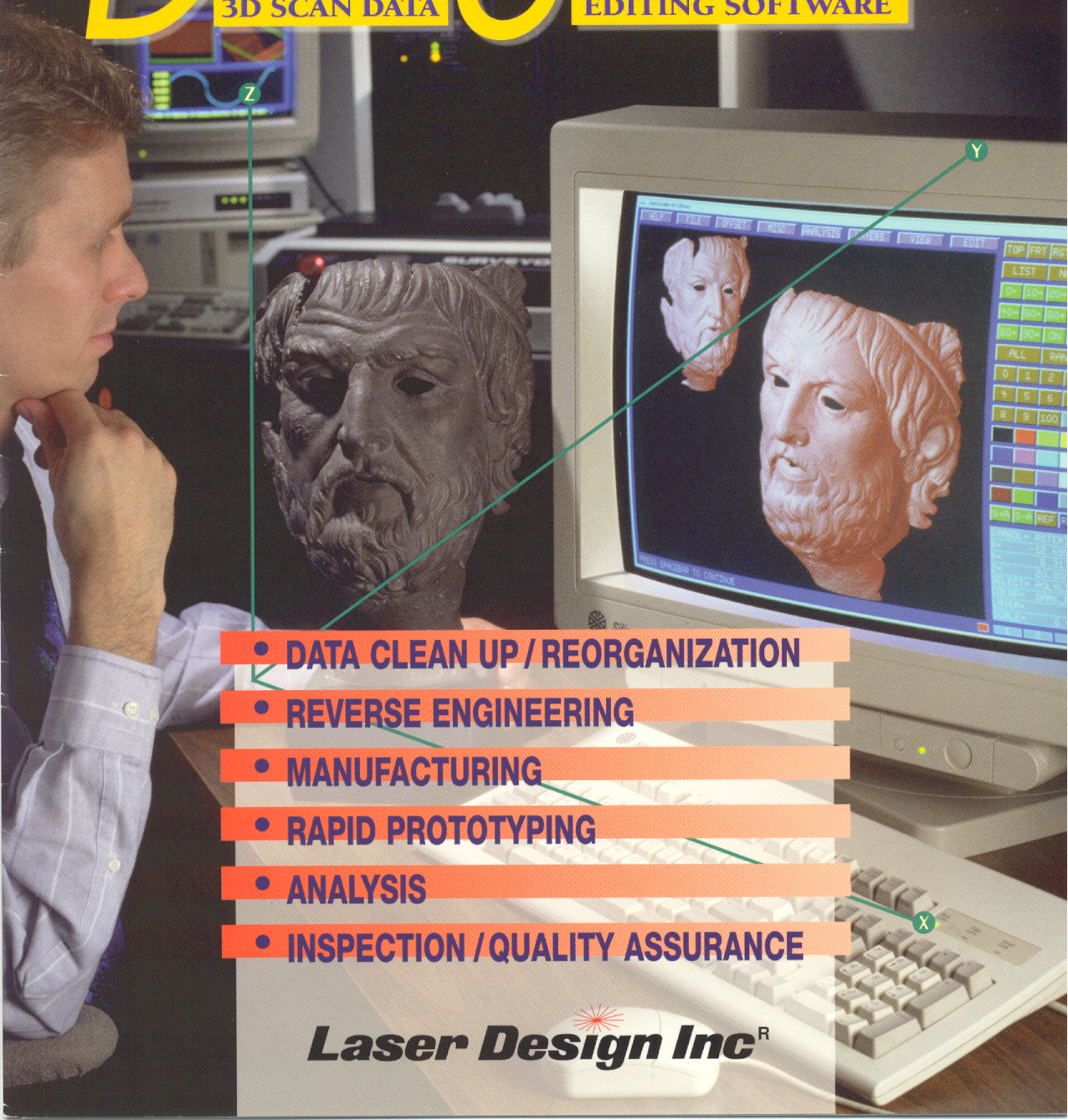


# DATA SCULPT<sup>®</sup>

3D SCAN DATA

EDITING SOFTWARE



• DATA CLEAN UP / REORGANIZATION

• REVERSE ENGINEERING

• MANUFACTURING

• RAPID PROTOTYPING

• ANALYSIS

• INSPECTION / QUALITY ASSURANCE

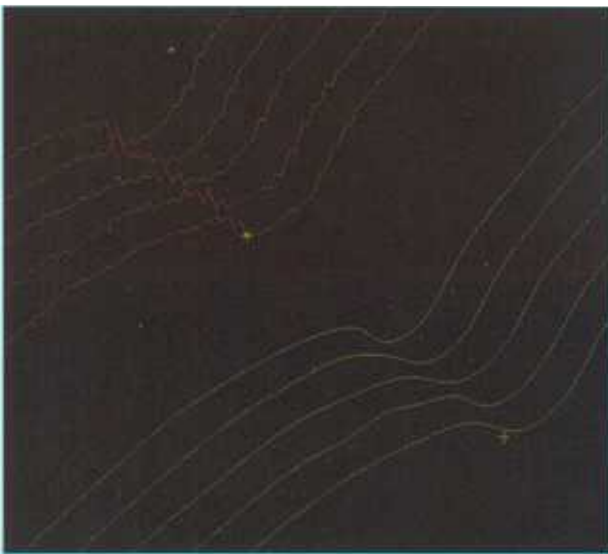
**Laser Design Inc<sup>®</sup>**

# DATA CLEAN-UP / REORGANIZATION

## X, Y, Z Points

DataSculpt® is designed to manually or automatically process high- or low-density, 2D or 3D coordinate point data. “Point cloud” or more structured scan data are improved, reduced, merged, reorganized, interpolated, and edited using many CAD-like features. All of the features and functions of DataSculpt can be automated by operator-generated macros within the software. Editing functions include:

- Filtering
- Smoothing
- Merging
- Blending
- Splitting
- Scaling
- Trimming
- Sorting
- Connecting
- Mirroring
- Deleting
- Scaling
- Parameterization
- Interpolation
- Meshing
- Cross-sectioning
- Bridging
- Offsetting
- Copying
- Many more



## NOISE / SPIKE SUPPRESSION

Noise and data spike suppression features allow the user to manually or automatically improve problematic data using tolerances to control the nature of data modification. The operator can **SMOOTH DATA** using averaging or signal-to-noise ratio mathematics algorithms. **B-SPLINE** fitting can also be used to approximate or improve the data.

## POINT CLOUD DATA CLEAN-UP

Unorganized “point cloud” scan data are organized into **WIREFRAMES** for CAD model development without generating NURBS surface models.

## LOCALIZED EDITING

A wide variety of selection tools allow data subsets to be marked for editing and analysis. These tools permit convenient processing of **ISOLATED DATA REGIONS**

## DATA CREATION

New geometry can be created or derived and then added to original scan data. **CAD FEATURES** allow the user to substantially **CHANGE THE SHAPE** of the scanned object. CAD files or scan data from other objects can be imported into DataSculpt and blended into the scan file.

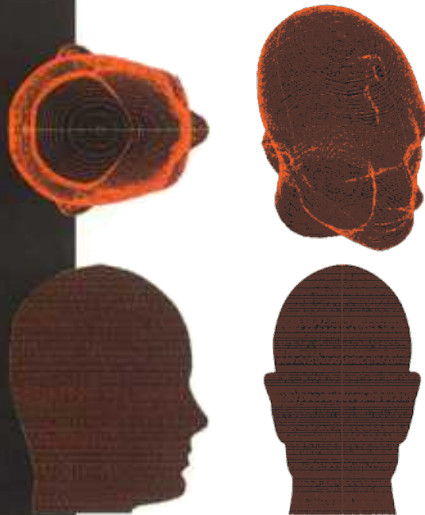
# REVERSE ENGINEERING

## CAD Wireframe

The unique power of DataSculpt accelerates CAD model development from 3D scan data. It can handle extremely large data files and provides editing functions designed to quickly determine **BOUNDARY CURVES** and **CHARACTER LINES** needed for either surface or solids models.

## DATA BLENDING

Scan data from multiple orientations can be assembled into a common coordinate system. Blending and slicing tools make it possible to easily reconstruct planar cross sections in the new reference frame.

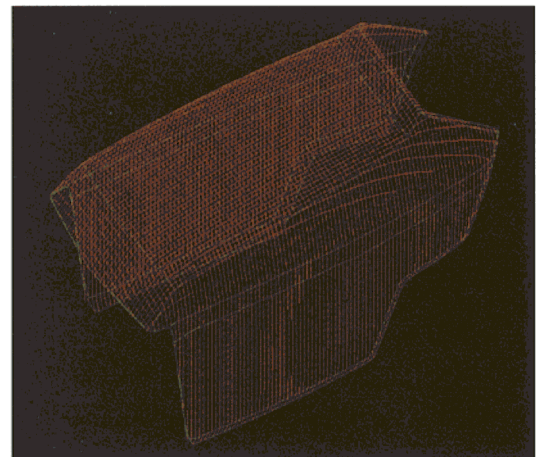
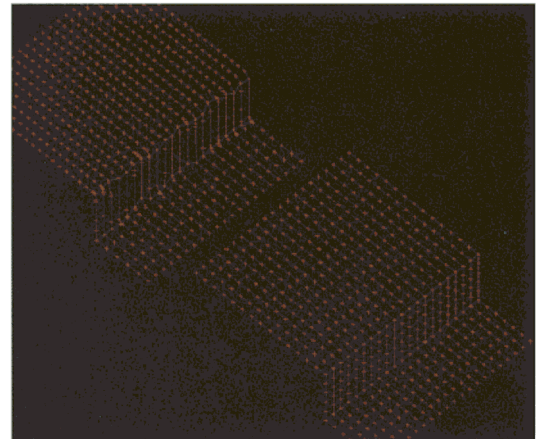


## CROSS-SECTIONING

Scan files may be intersected with planes to find important cross-sectional curves needed for CAD modeling or **INSPECTION** applications. Toolmakers can use this feature to expedite the manufacture and inspection of **MOLDS** and **DIES**. Measurements of difficult-to-model shapes needed in **MEDICAL** and **APPAREL** applications, such as the human body, can also be derived through the use of this feature.

## WIREFRAME DEVELOPMENT

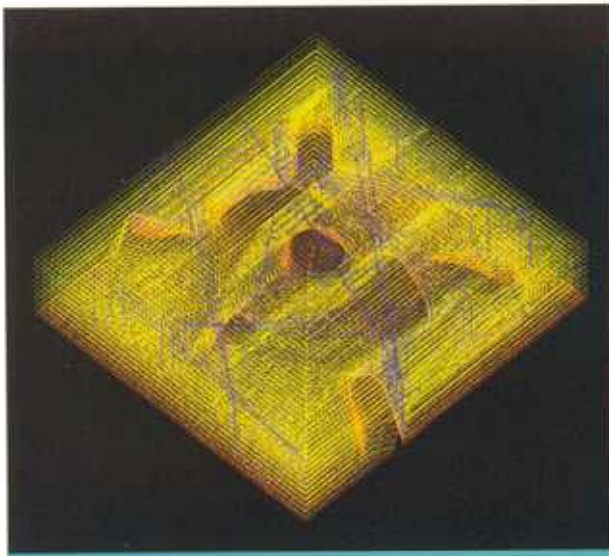
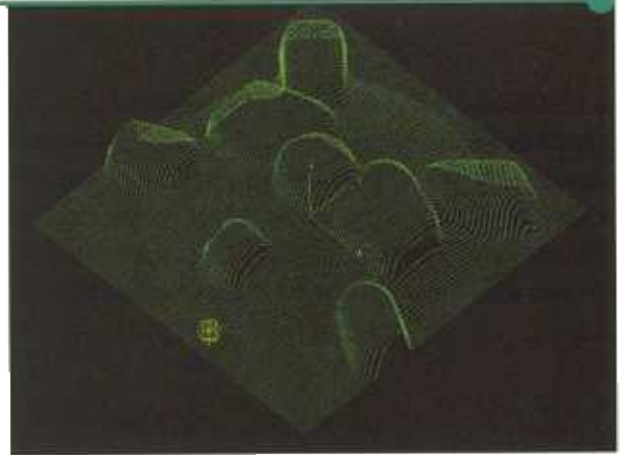
DataSculpt allows the user to quickly determine where ideal edge or boundary curves are located. Corner vertices are automatically detected by the software. These points are **SMOOTHED** and **SPLINED** to produce a **PERFECT EDGE**, which is then blended back into the scan data. The result is a smooth transition from scan data to perfect edge. This process generates NURBS surface boundary curves, character/style lines, and also parting lines for tools.



# MANUFACTURING

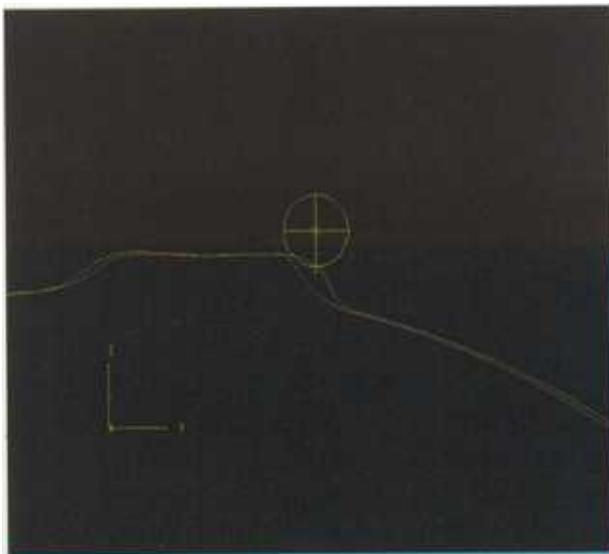
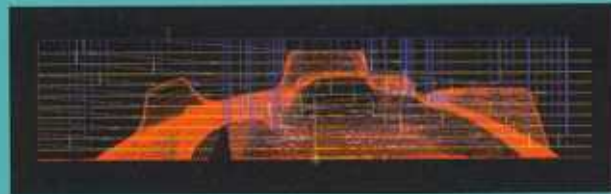
## CNC Toolpaths

Three-axis CNC toolpath generation **DIRECT FROM 3D SCAN DATA** files accelerates mold/tool/die production and CNC carving applications. Core and cavity toolpaths for a variety of cutters can be produced from a single set of scan data. DataSculpt's built-in **UNIVERSAL POST-PROCESSOR** outputs toolpaths directly to most CNC machining centers or routers.



## PLANAR ROUGHING

**AUTOMATED PLANAR ROUGHING** routines are built into DataSculpt to efficiently remove material prior to finish machining. DataSculpt allows the user to select size and type of cutters, planar cutting patterns, and other features typically found only in the most advanced and expensive CAM systems.



## FINISHING / SEMI-FINISHING

Users can select tool sizes and shapes for producing the desired surface finish during final shape machining. Polyline data derived from CAD models may also be imported and machined using DataSculpt which operates as an **AUTOMATED CAM** system for both roughing and finishing. This versatility puts tremendous manufacturing capabilities in the users' hands by augmenting existing shop software.

## RAPID PRODUCT DEVELOPMENT

### Rapid Prototyping

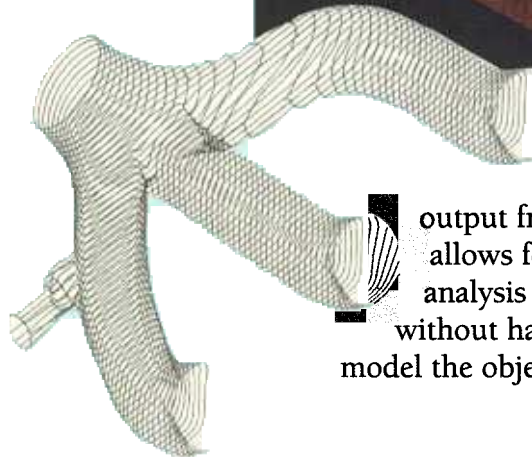
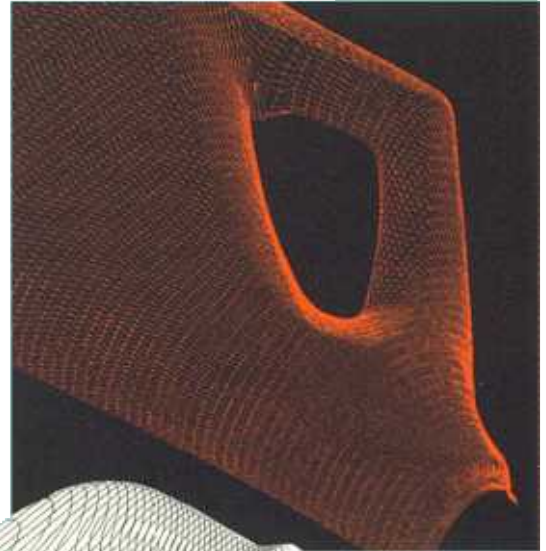
DataSculpt features the ability to output scan files directly into any rapid prototyping device supporting the STL data format. Several **MESH DEVELOPMENT** tools make it possible to produce STL files for shapes that are difficult to model in CAD. Mesh optimization, verification, and rendering tools help eliminate costly errors during the **RAPID PROTOTYPING** process.



## ANALYSIS

### FEA Mesh

The DataSculpt software includes tools for computing surface area, volume, and arc lengths, along with tools to **BEST FIT** lines, arcs, and spheres. Mesh files can also be produced for use in **FINITE ELEMENT ANALYSIS (FEA)** and **COMPUTATIONAL FLUID DYNAMICS (CFD)** applications.

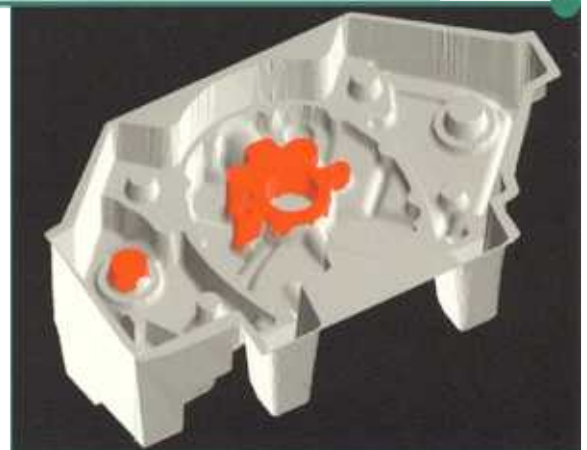


FEA Mesh output from scan data allows for fast FEA analysis of scanned objects without having to CAD model the object.

## INSPECTION / QUALITY ASSURANCE

### Comparisons

Scan data from an unknown model can be **COMPARED** to the scan of a reference model via highly graphic functions and features. Tabular reports may also be produced. Macros may be developed within DataSculpt to repetitively determine whether shapes are **WITHIN TOLERANCE (IN TOL/OUT TOL)**. CAD polyline data can be imported from outside CAD/CAM systems for the purpose of comparison.



## INPUT DEVICES

### DataSculpt accepts scan data from a variety of digitizing technologies:

- Laser-digitizing (point and line range sensors)
- CT/MRI
- Touch probes/Stylus (CMM's)
- Digital video
- Moire interferometry
- Sonic
- Laser radar
- Photogrametry
- Any high density point/vector-based digitizing technology

*Output formats must conform to Laser Design data input requirements.*

### Supported Platforms

#### DataSculpt is available on several computer platforms including:

- IBM®-compatible PCs
- Silicon Graphics, Inc.®
- SUN Microsystems, Inc.®
- Hewlett-Packard®

*All trademarks registered by their respective corporations.*

*System configuration compatibility must be verified by Laser Design.*

*Specifications subject to change without notice. April, 1996.*

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