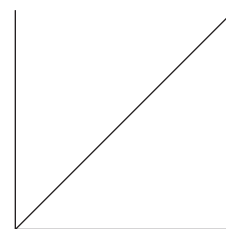RAPIDFORM®

XOR™

RAPIDFORM® XOR/REDESIGN™

Parametric CAD Models from 3D Scan Data™

RAPIDFORM®

Parametric, Native and Editable CAD Models from 3D Scan Data

RAPIDFORM® XOR/REDESIGN™ makes the process of creating parametric CAD models from real world parts faster and easier by utilizing a design process and user interface that are instantly familiar to CAD users. Capture design intent and design feature parameters, not just shapes.

The World's 1st and Only 3G Scan-to-CAD Software

Rapidform XOR is an entirely new generation (3G, third-generation) software solution that provides a new approach, yet familiar process, to build a parametric CAD model from 3D scan data. Rapidform XOR allows engineers to capture the design intent and design parameters of real world parts that may have lost their defining features during the manufacturing process or may not have ever had a CAD model. Unlike other 3D scanning software, Rapidform XOR does real reverse engineering, not just surface extraction. It has a full complement of solid and surface modeling tools to address every type of part and every kind of 3D scan data. The CAD models generated in Rapidform are real CAD models, not just "CAD-ready"

- Intelligent tools for extracting design parameters from 3D scan data - Redesign Assistant™
- Redesign within user-defined deviation tolerances - Accuracy Analyzer™
- Intelligently identify and align 3D scan data to an ideal design coordinate system - Align Wizard™
- Automatically extract design features and their design parameters including sketches from 3D scan data – Feature Wizard™
- Reduce design time by using 3D scan data as a design foundation
- Modeling history and parameter management like other CAD systems
- Standard solid & surface modeling workflows such as extrude, round, revolve, sweep and loft
- Seamless interoperability with full modeling history to SolidWorks, Siemens NX, Pro/ENGINEER, AutoCAD and CATIA – liveTransfer™

The Market-leading 3D Scanning Software Covering a Wide Variety of Applications

The Rapidform XOR creates highly usable models for a variety of applications that include rapid prototyping, CNC machining, CAE, computer graphics, medical and mass customization, and export into downstream applications for further modifications. The values of these applications are now available in a single software application that is readily accessible to a wider group of people by utilizing the common design tools of most CAD applications.
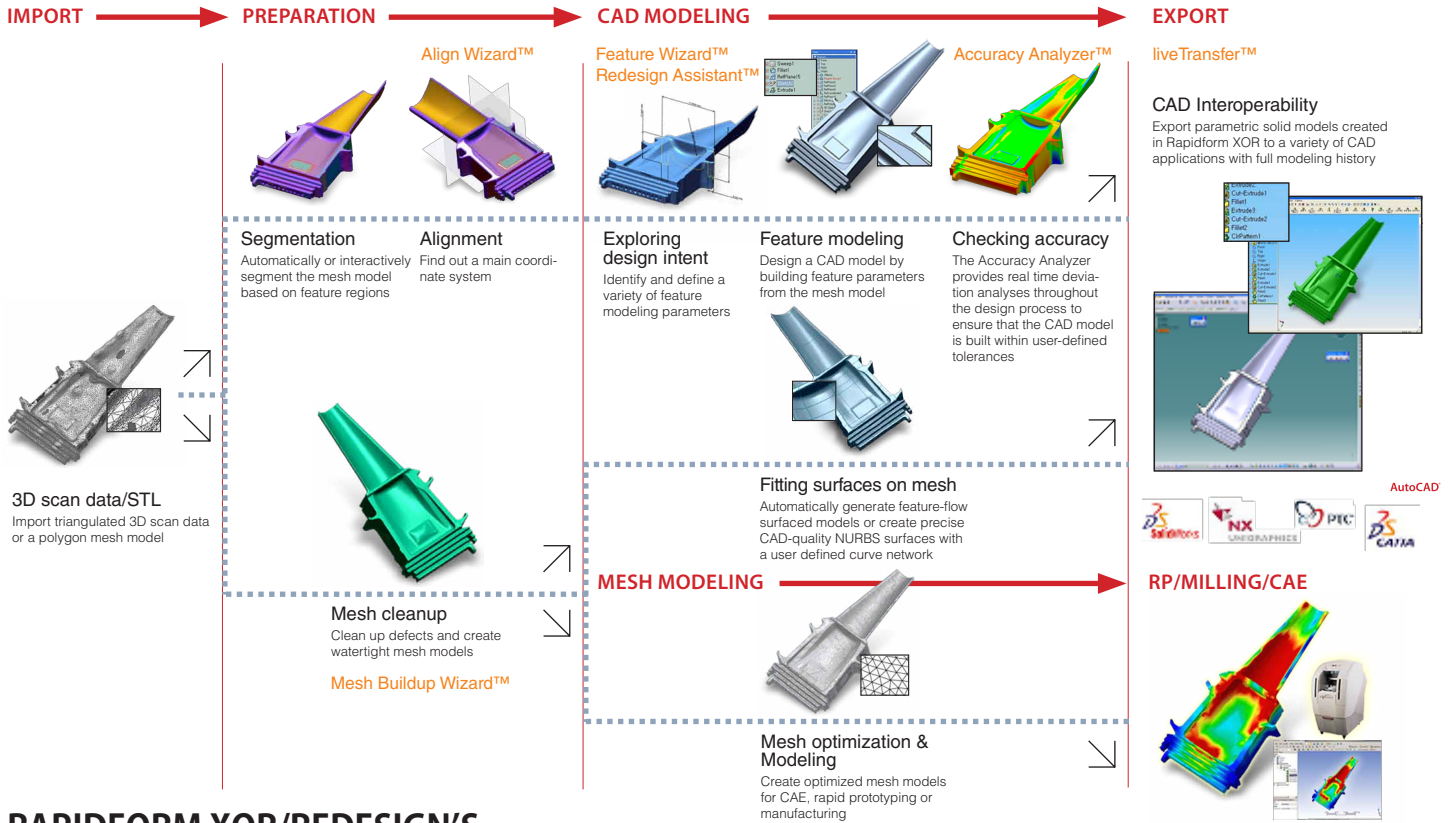
- True hybrid modeling software for point cloud, mesh, texture, freeform curve/surface and parametric solid
- Supports every possible reverse modeling workflow
  – Reflect design intent (design parameter extraction) or Generate an exact duplicate (as-built modeling with surface fitting)
- Engineering-grade CAD models from billions of points from long-range scanners
- World's 1st 100% automated tool for defect-free, watertight meshes from raw scan data – Mesh Buildup Wizard™
- Fully automated and sophisticated point cloud and mesh handling capabilities to create high quality and water-tight meshes
- One-button quick & feature flow B-rep surfacing for design analysis & verification applications
- Automatic re-meshing for generating CAE-ready functional models - Scan-to-CAE
- Various 3D photography features (direct color texture editing) to manipulate texture color parameters

Immediately Realize the Benefits of 3D Scanning

The design tools used to create models in Rapidform XOR are immediately recognizable to those already familiar with CAD applications. Engineers capable of designing with SolidWorks, CATIA, Pro/ENGINEER or Siemens NX can immediately begin modeling in Rapidform XOR. The design process in Rapidform XOR utilizes common CAD modeling features, user interfaces and processes such as extrude, round, revolve, sweep and loft. These features serve to make both Rapidform XOR and 3D scanning technology readily accessible to engineers, while the ease of use of the product allows 3D scan-based design to be institutionalized within the manufacturing process to increase the overall quality of products.

- Intelligent design process which eliminates the need for complete scans of parts
- Create high quality CAD models from imperfect scan data
- Save processing time by eliminating the need for polygon mesh cleanup and surfacing
- Update existing CAD models to reflect changes in the as-built part – CAD Correct™
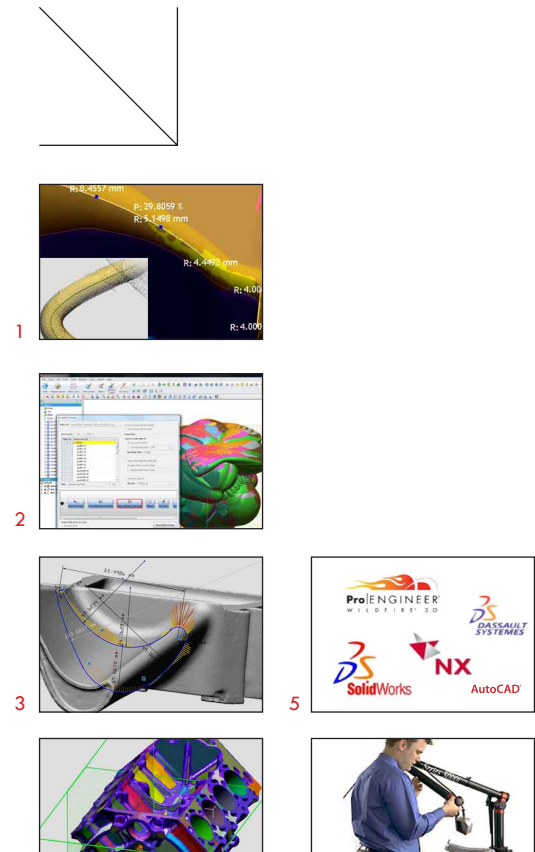
RAPIDFORM XOR/REDESIGN'S
Workflow

IMPORT → PREPARATION → CAD MODELING → EXPORT

Align Wizard™

Feature Wizard™
Redesign Assistant™

Accuracy Analyzer™

liveTransfer™

CAD Interoperability
Export parametric solid models created in Rapidform XOR to a variety of CAD applications with full modeling history

Segmentation
Automatically or interactively segment the mesh model based on feature regions

Alignment
Find out a main coordinate system

Exploring design intent
Identify and define a variety of feature modeling parameters

Feature modeling
Design a CAD model by building feature parameters from the mesh model

Checking accuracy
The Accuracy Analyzer provides real time deviation analyses throughout the design process to ensure that the CAD model is built within user-defined tolerances

Fitting surfaces on mesh
Automatically generate feature-flow surfaced models or create precise CAD-quality NURBS surfaces with a user defined curve network

3D scan data/STL
Import triangulated 3D scan data or a polygon mesh model

Mesh cleanup
Clean up defects and create watertight mesh models

Mesh Buildup Wizard™

MESH MODELING →

RP/MILLING/CAE

AutoCAD

Mesh optimization & Modeling
Create optimized mesh models for CAE, rapid prototyping or manufacturing
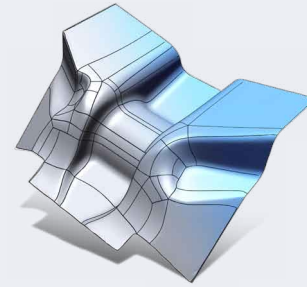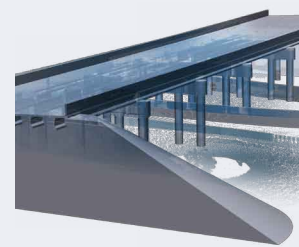
RAPIDFORM XOR/REDESIGN'S
Feature Highlight

1 Redesign Assistant™ & Feature Wizard™

The Feature Wizard with the Redesign Assistant intelligently extracts the design intent and design parameters including reference geometries and sketches throughout the process of generating a CAD model from 3D scan data.

2 WYSIWYG Batch Process Designer

Just drag and drop the commands in the order you want them to operate, and point Rapidform XOR at a folder of scan data. It will process each scan automatically, giving you optimized mesh models without any effort.

3 Accuracy Analyzer™

The Accuracy Analyzer tool provides users with real-time deviation analysis results based on user defined tolerances to ensure that the model is redesigned within allowable tolerances.

4 Align Wizard™

Rapidform XOR provides a tool that intelligently identifies coordinate systems in order of the likelihood that the original designer had used. The user can either choose the coordinate system recommended by the Align Wizard, or manually determine the coordinate system that is believed to be the most appropriate for the part, by using an intuitive coordinate system setup tool.

5 liveTransfer™

liveTransfer tool is Rapidform's pioneering approach to direct 3D Scan-to-CAD compatibility offering a seamless integration with other PLM solution such as SolidWorks, Siemens NX, Pro/ENGINEER, AutoCAD and CATIA. Rather than getting shapes that must then be assembled and edited in CAD, Rapidform XOR yields a native, complete history tree. Users can take a 3D scan of any object, convert the scan into a real history-based design model in Rapidform XOR, and then transfer it to their CAD system as a native file, with the parametric features and the relationship of those features as described in the history tree.

6 liveScan™

liveScan tool provides a real-time guided scanning interface that effectively combines data from the wide variety of 3D scanning devices. All the captured scan data through liveScan can be directly utilized as a design foundation to make a parametric CAD model. In addition to direct scanning, tactile probing is also supported to define primitives (vector, plane, etc).

New Massive Point Cloud Processing Engine

Rapidform XOR handles large point clouds much more efficiently, so copious data sets from today's cutting-edge 3D scanners are no problem.
• A new out-of–core massive point cloud engine handles billions of points from 3D scanners
• Real-time rendering of huge size of 3D scan data
• Handle huge size of scan data generated by long range 3D scanners
• Design geometric features in detail within Rapidform XOR based on huge size of scan data.

New Feature-flow Auto-surfacing with Smarter NURBS Layout

Rapidform XOR supports every possible reverse modeling workflow – reflect design intent (design parameter extraction, 3G reverse modeling) or generate an exact duplicate (as-build modeling with surface fitting, 2G reverse modeling). To make 2G reverse modeling much easier and faster, Rapidform XOR automatically creates, orderly NURBS surface models where the surface patches follow the underlying features in one click. Downstream jobs such as FEA and CAM will appreciate orderly networks that have fewer patches and are aligned to the major topology of the part. Fewer, more neatly-arranged patches are the result.

RAPIDFORM XOR/REDESIGN'S
"WOW" FACTORS
- ONGOING INNOVATIONS

CAD Correct™ - Bridging the gap between CAD and Actual Part

CAD Correct feature is an unprecedented tool to compensate the gap between an original CAD model and an actual part when you already have a CAD model but its real-life counterpart has been modified manually. In this case, Rapidform XOR automatically refits the original geometries of the existing CAD model onto the digitalized mesh model and then optimizes them with preserving the original geometric information such as continuity and surface parameters.
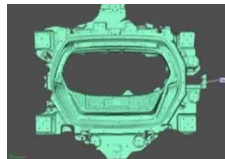
• One-button CAD Correct using CAD-to-Scan Refit
With Rapidform XOR, you can import an existing CAD model and update the geometry to match a scanned physical part. CAD-to-Scan "Refit" provides an easy way to update the CAD model to reflect the As-Built geometry.

• Local modification for CAD Correct using Redesign Assistant™
Missing CAD design features which exist in an actual part due to manual tryout or hand-crafted processes can be easily and accurately redesigned directly on the original CAD data using 3D scan data of the actual part.
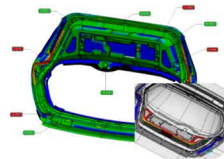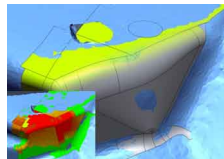
6 Newly duplicated die

1 3D scanning of stamping die in production
2 3D scan data processing
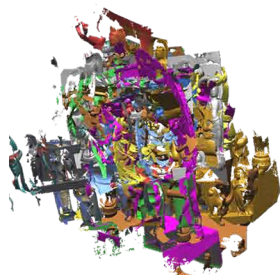**3** Explore CAD-to-Scan design inconsistencies
4 Local CAD redesign and One-button CAD-to-Scan
5 Die machining with CNC

Mesh Buildup Wizard™ - World's 1st 100% automated tool for defect-free, watertight meshes from raw scan data

Rapidform XOR is the world's 1st software offering fully automated scan data processing to allow user to make a NURBS model from raw 3D scan data within a few button clicks. Mesh Buildup Wizard's wizard-style interface has been developed to automate the creation of a defect-free and watertight mesh model from multi-shot raw scan data. Also, it has fully automatic multi-shot registration and merging features inside.
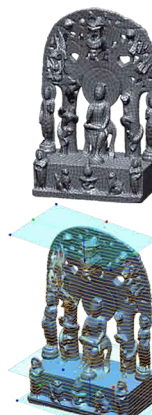
One-button Automated Scan Data Processing
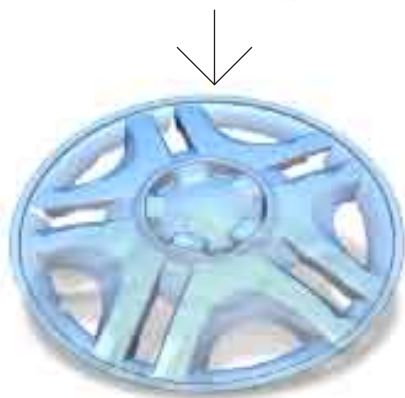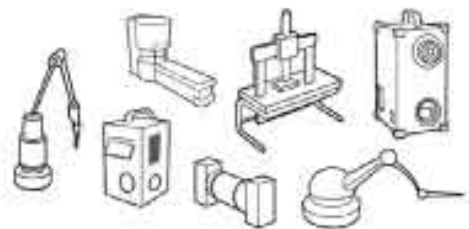
One-button NURBS Conversion

Design Curve Extraction

Downstream Applications

Other CAD Systems

Rapidform XOR makes real CAD model from 3D measurement data!

A great time & cost saver saving 100% over conventional reverse engineering work flow while staying in the allowable deviation range

Because the interface and design process of Rapidform XOR were developed to be similar to popular CAD applications, users can utilize their existing CAD modeling skills to immediately begin designing in Rapidform XOR, leading to incredible time savings over traditional reverse engineering software while simultaneously creating output in the form of parametric CAD solid models. The Rapidform XOR's design process removes the need to clean the scan data of a part. A complete scan of a part is unnecessary provided there is enough data to recognize design parameters. Time savings can be realized through:

Easy to Use
A reduced learning curve through the use of a familiar CAD interface and design process

A Great Time Saver
A design process that removes the time consuming requirement of cleaning the scan data of a part

All-in-one
A single software solution that fulfills the scan data processing, mesh healing and CAD modeling needs

Automated
A intelligent tool that automatically extracts design feature parameters from 3D scan data - Redesign Assistant™

Removes Doubt
A built-in, real-time deviation analysis tool – Accuracy Analyzer™

Easy Alignment
A smart tool that intelligently indentify and align 3D scan data to an ideal design coordinate system - Align Wizard™

Captures Design Features
A magical tool that automatically extracts design features and their parameters including sketches from 3D scan data
- Feature Wizards™

RAPIDFORM® XOR/REDESIGN™

AutoCAD®

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