solidThinking™

where ideas take shape

The Handle, a XOX Audio Tools guitar invented and modeled in solidThinking. Design by Peter Solomon, 3D modeling and engineering by Emilio Cassani.

An Altair Company

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Why solidThinking?

Compresses the product development cycle

- **Eliminates design reinterpretation between designers and engineers**
  Directly pass 3D data to and from CAD/CAM/CAE systems
- **Reduce the number and the time required to build multiple physical prototypes**
  Visualize designs virtually with photo-realistic realism or with color prints and plots
- **Do away with manually developing physical prototypes**
  Generate rapid prototype concept models (stereolithography) directly from CAID data
- **Improve the speed and quality of decision making**
  Increases collaboration between marketing, research, product development, and manufacturing teams

Reduces product development costs

- **Minimize design errors earlier in the product development process**
  Develop realistic, accurate 3D models using design evaluation tools
- **Leverage market research prior to making capital intensive investments**
  Use realistic models in focus groups and photorealistic prints in end-user surveys
- **Avoid unnecessary prototype development costs**
  Narrow the field of viable concepts virtually with photo-realistic product renderings

Increases designer productivity and creativity

- **Facilitate the rapid creation of design alternatives**
  solidThinking instantly applies design changes to form or surface qualities
- **Extend and build upon previous designs**
  Utilize a library of shared reusable 3D models, textures, shaders, and colors
- **Visualize product concepts in realistic environments**
  Designers can visualize 3D models in diverse settings and lighting setups

solidThinking: Imagination has a new shape

solidThinking™ is the breakthrough 3D modeling and rendering environment which sets a new productivity standard for product design and presentation.

solidThinking delivers all the tools for the creation of high quality, professional 3D models and the power to render them with unsurpassed photo-realism.

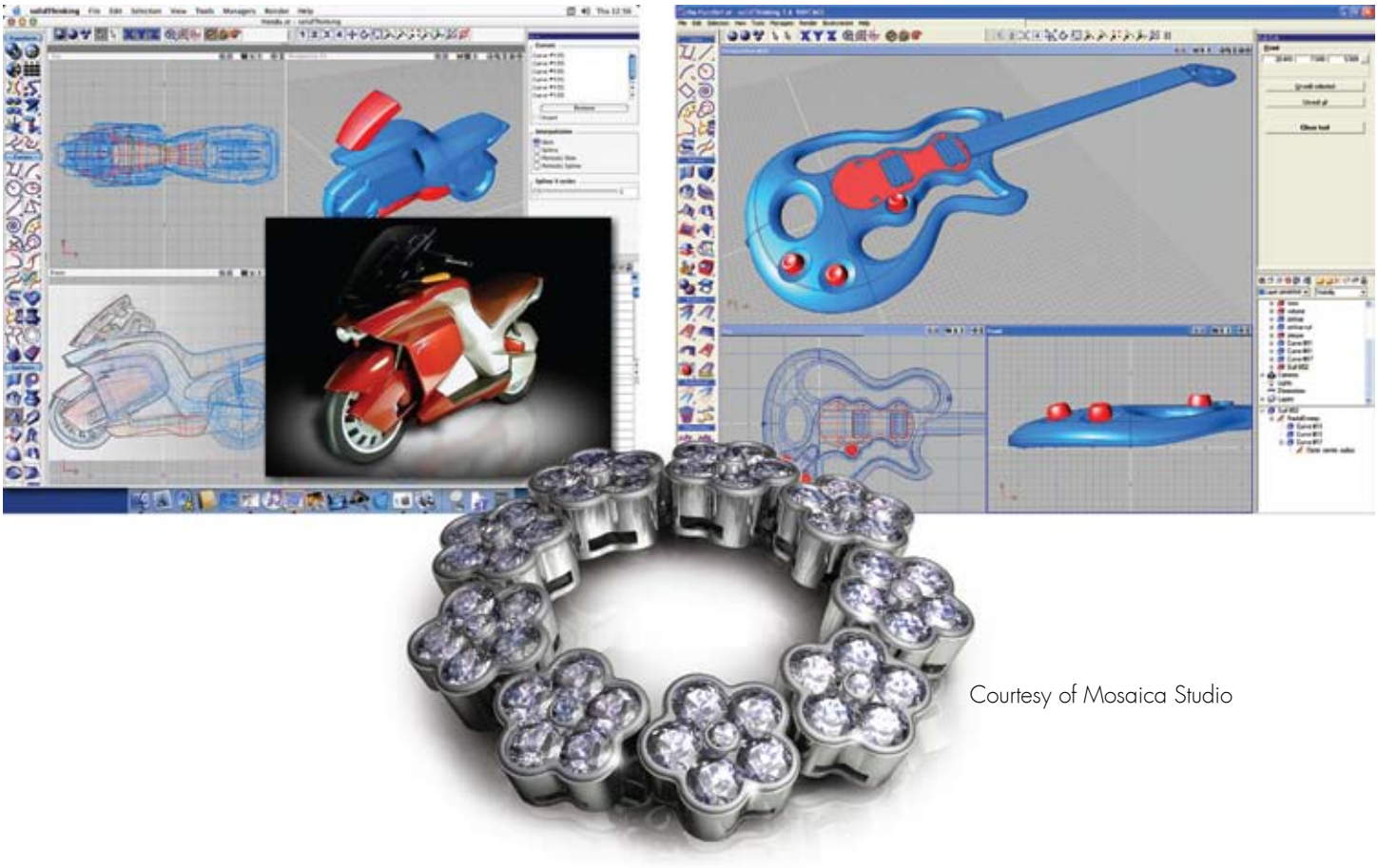
Courtesy of Automotive Lighting Italia

solidThinking lets you work in an intuitive and comfortable manner allowing you to create complex scenes in the fastest way possible.

You are certainly aware that your productivity does not simply depend on the power of the tools you are provided with: it depends just as much on how easily these tools can be used. solidThinking has been developed with this fundamental concept in mind.

The name itself expresses our aim: designing a tool for you to give shape to your ideas quickly and easily.

A desktop environment designed by designers



Courtesy of Mosaica Studio

The solidThinking user interface is a carefully designed environment where you can work with intuitive ease. Icons are self-explanatory. Fewer commands are needed. The interface prompts you throughout the creation process.

Full OpenGL support lets you work interactively as you design models, assign materials, and position lights to get superior results more quickly than ever.

Tremendous flexibility to customize and personalize the interface to create an ideal configuration for any project. You can adjust the resolution of the display to any level of detail you choose.

Grids simplify the placement of points and objects into the scene with precision. You can define up to four grids, each with its own origin and spacing, grid type, and color, and choose from multiple snap options.

"We have been using solidThinking for the last six years to translate our thoughts into three-dimensional objects. What we find unique about solidThinking is the easy and flexibility it provides to our product designers. It's one of the few software designed and tailored for product designers". — *Jr Neville Songwe, Joneso Design and Consulting*

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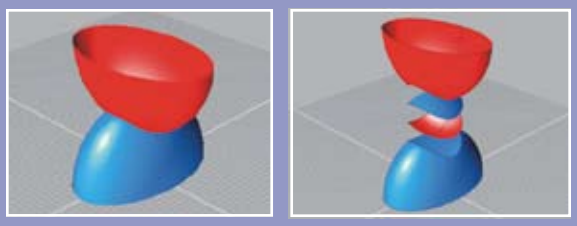
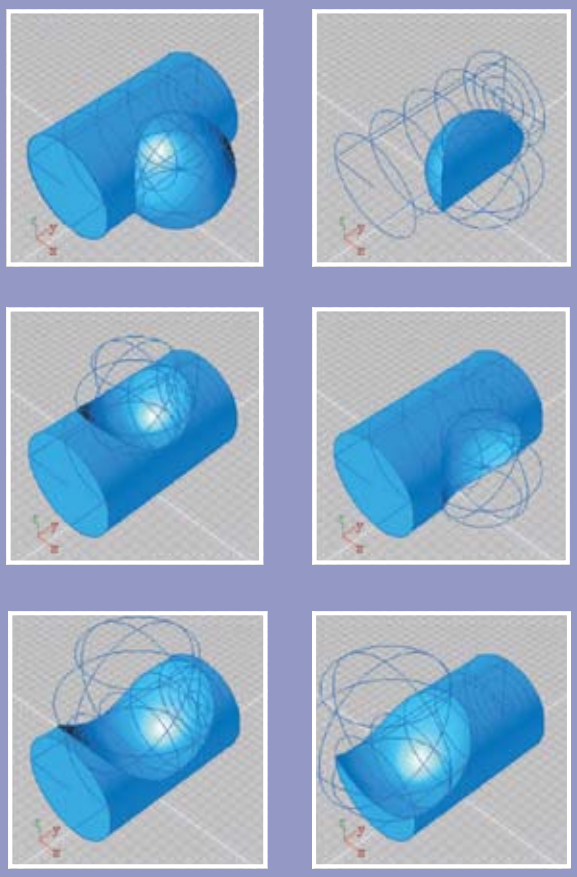


Intersect: splits surfaces along the curves resulting from the intersection between the two.

Advanced modeling tools and numerous construction aids (alignment tool, tangency control, and snaps) enable you to create any shape you can conceive.



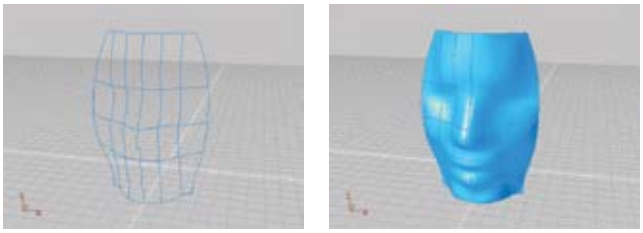
Boolean operations applied to a cylinder and a sphere. After the Boolean operations are performed, the two solids can still be modified. Changes are instantly updated.

Matchless NURBS power

The most complete modeling environment for Windows and Mac operating systems

State-of-the-art NURBS (Non Uniform Rational B-Splines) modeling and embedded Construction History make solidThinking an unrivaled tool for designers and graphics professionals.

solidThinking uses NURBS as its basic geometry. This curve and surface-definition method offers the greatest flexibility and precision. NURBS are capable of representing any desired shape, analytic or freeform. Algorithms are extremely fast and stable.



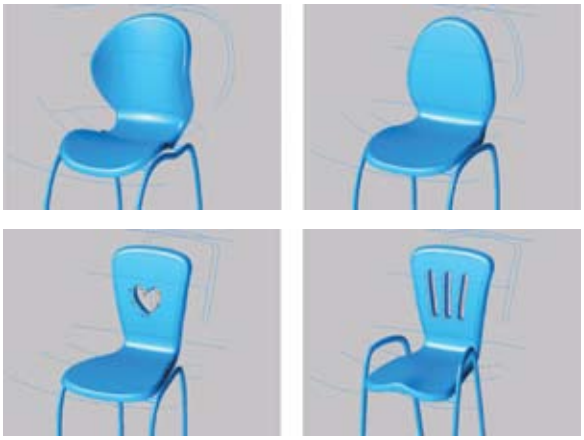
Curves Network: creates a surface that interpolates a network of intersecting curves.

solidThinking offers the most complete set of surface creation tools of any modeling program available on the Windows and Mac platforms, including sophisticated tools like curves network, n-side, blending, fillet, surface intersections, automatic Boolean operations, interactive trimming of surfaces, rebuild of curves and surfaces, and many others. The new Round command allows you to create constant or variable radius fillets with Construction History to handle even the most complex designs.

solidThinking also features an advanced polygonal modeler with support of n-side polygons. The unique implementation of Interactive Subdivision Surfaces with Construction History provides great power for refining and smoothing polygonal meshes.

The Construction Tree: Try it. You'll never want to be without it.

The Construction Tree is a fundamental structure of solidThinking. It allows you to adjust parameters at any time while you're creating a complex object.



When a parameter changes, all the actions down the tree are notified and re-evaluated, propagating the change along the tree. There are no limitations on the number of actions or objects in the Tree.

The Tree gives you real-time updates when you modify curves, parameters or surfaces. You can freely manipulate your models, experiment with new shapes, and easily evaluate design alternatives. Once you experience the Construction Tree you won't want to part with it.

solidThinking allows you to replace source objects within the Tree with immediate reconstruction.

You can freely manipulate the parameters and the points of all objects. solidThinking never forgets the steps involved in construction — the entire tree is saved inside the file and is accessible at any time. You can browse a graphic representation of the Construction Tree to identify and select source objects and actions.

If you need to, you can collapse the Construction Tree to remove the history from an object.

"solidThinking is a great solution for designers because it enhances creativity. Thanks to its Construction Tree, it is possible to evaluate more design alternatives and develop better products"

Luca Buttafava

Master In Design Coordinator, Domus Academy

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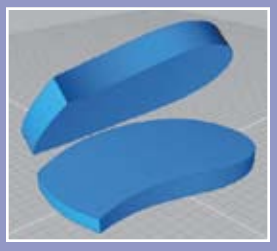
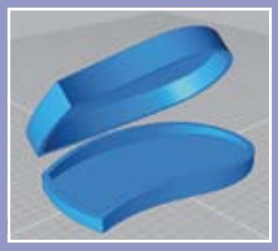
The MultiSweep modeling tool creates a single, continuous surface by sweeping one or more profile curves along one or more rail curves. This is similar to the Birail tool, but with an unlimited number of profiles and rails.

RadialSweep creates a single continuous surface by sweeping one or more profile curves between a common rotational point and a control rail curve. The tool includes options to control the rotation and interpolation of profiles, as well as the overall complexity of the surface.



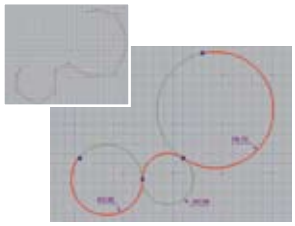


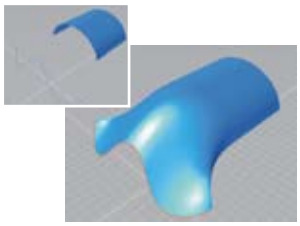
The Shelling command, also exclusive to solidThinking, is a new solid modeling feature. It allows you to create a shell and define its thickness simply by selecting the faces you need to remove. Wall thickness can be easily changed in the Modeling Tool panel, which includes full support for positive or negative offsets.

The Solid Offset command allows you to offset or inset a solid on all of its faces, or just an interactively selected few. With robust options for automatically rounding edges to maintain offset distances, and precise control of solid enclosure tolerances, Solid Offset gives you another advanced solid modeling tool to insure easy tooling, molding and manufacturing.

Exclusive solidThinking design tools

With solidThinking's advanced curve editing, you can specify position, tangent direction, curve magnitude and curvature radius at any point on a curve, interactively or by numeric input. These values can be set equal to the values relative to a point on any other curve. You can pick and drag the Position, Tangent or Curvature hot spots to interactively change the local shape of the curve.

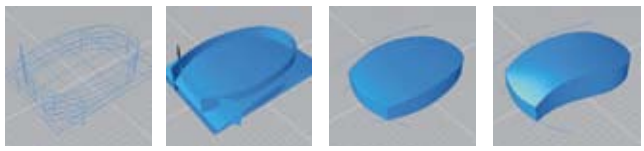




The Curve-to-Arcs tool allows you to obtain a new curve made up of a series of accurate arcs approximating the original planar curve. This capability is useful for exporting to CAM solutions, where a succession of joined arcs is preferred to a generic curve.

Extend Curve and Extend Surface commands allow you to extend a curve/surface for a user-defined distance or to a given curve/surface.

solidThinking's exclusive Make Manifold command deletes excess faces, edges and vertices to produce a manifold solid or cellular topology from a nonmanifold topology.



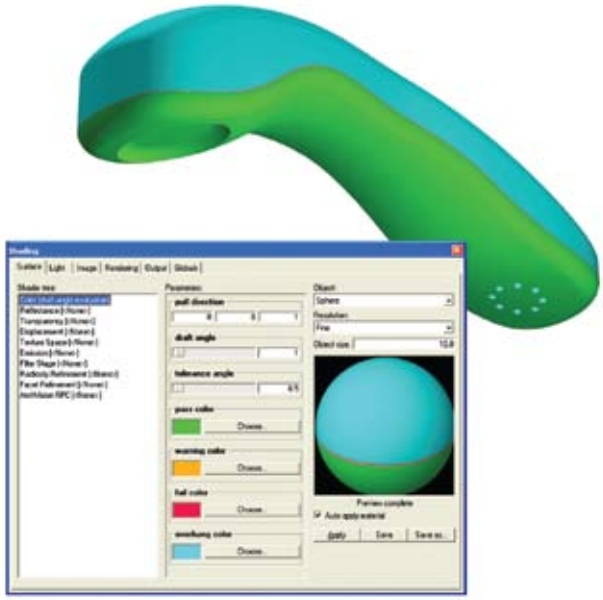
The Make Manifold command maintains the Construction History, giving the designer the power to evaluate multiple design alternatives.

Advanced analysis tools and reverse engineering

solidThinking introduces a new advanced analysis tool to interactively control tangency and curvature continuity.

This program examines selected adjacent edges relative to the continuity of affiliate surfaces. It checks point-to-point possible openings, non-parallelism among tangent plans, and differences of curvatures. Edges where continuity is respected (G0, G1, or G2 depending on the check type you set in the Modeling Tool panel) are displayed in green.

Analysis tools are useful for calculating area, volume, length, and curvature, but they can also be used to evaluate and improve the quality of your design. Surface curvature display, reflection lines and environment mapping allow you to visually analyze smoothness, curvature and other important properties of your models as you edit them.



The Draft Angle analysis shader allows a quick review of a model to see if all surfaces are drafted.

solidThinking provides crack-free tessellation to maximum levels of precision for rapid prototyping.

The reverse engineering process involves measuring an object, then reconstructing it as a 3D model. The physical object can be measured with 3D scanning technologies such as laser scanners or digitizers.

Courtesy of Cad Modelling Ergonomics

"solidThinking's construction history is still unmatched in its depth and flexibility. The Construction Tree enables designers to experiment in real time with confidence, with modifications made to objects, points, curves or parametric values instantly propagating up the tree, providing immediate feedback".

Mike De La Flor, 3D World

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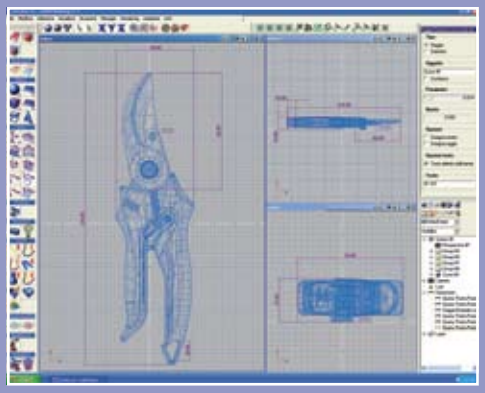
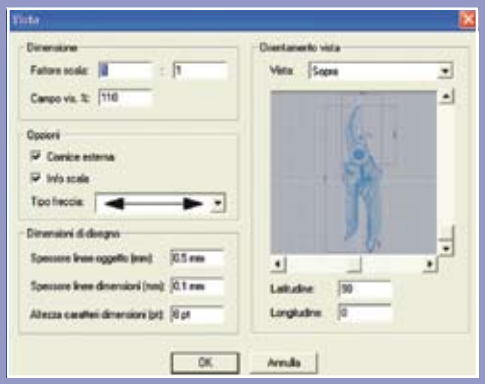
Associative dimensioning and plotting





solidThinking offers 2D and 3D automated dimensioning of horizontal or vertical aligned linear dimensions, arcs and circle radii, curvature radii of NURBS curves at any given point, diameters, edges, and angular dimensions. A Leader command enables the rapid creation of leaders (text annotations).

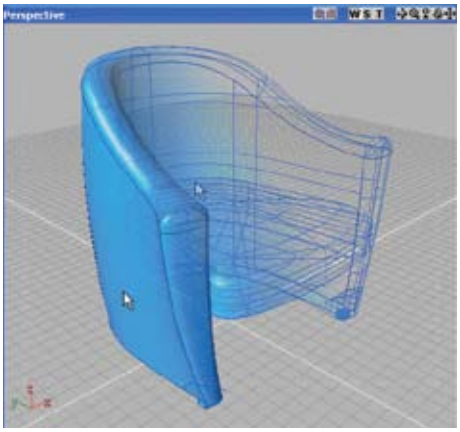
The power of Dynamic Associative Dimensioning is realized when a revision to a drawing is required, or a design changes.

Using Associative Dimensioning on your model, you can edit your entities and have the dimensioning change as well — in real time.

solidThinking lets you compose drawings and pictures on a virtual sheet of paper and configure plot scale, paper size, plot area, and paper orientation. Multiple drawing layouts are possible.

Courtesy of Cofra

Access to all industry-leading rendering techniques



Once you've created your models, you can take advantage of a truly comprehensive rendering system that will satisfy the most advanced graphics professional. It integrates all the industry-leading rendering techniques, including wireframe, hidden-line, flat, Gouraud and Phong shaded, scanline, and ray-tracing.

Efficient memory management, unlimited output resolution, and multi-threaded/multi-processor rendering ensure the highest productivity.

solidThinking also features hybrid rendering for the integration of radiosity with ray-tracing or other rendering methods, saving computer memory and cycles while achieving the highest levels of realism. Architects, builders, lighting engineers, and anyone interested in creating realistic images can use it to simulate real-world lighting effects.

With shaded rendering methods, the appearance of an object is derived from the combination of four independent components, called shaders: color source, reflectance model, transparency source, and displacement function. This model provides a highly flexible and versatile environment for specifying material properties. Surface-curvature-evaluation shaders are ideal for automotive and product design.

Courtesy of Gattoni Rubinetteria

You can position and control an unlimited number of light sources (including area, volumetric, and goniometric lights) just as you would in a photographer's set. solidThinking handles light sources by treating them as shaders, which have positions, intensities, and other properties such as directions and colors. Shadows can be produced through shadow mapping or shadow ray casting. solidThinking's ability to produce shadows with softened edges is extremely useful for producing realistic images.

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Ray-traced and Final Gather rendering is now 1.5-1.8 times faster on a dual processor than on a single processor, 3-4 times faster on a quad processor, and over 6 times faster on an eight-processor system.

HDRI (High Dynamic Range Image) can be used for image-based lighting to create more realistic images.

Sketch Rendering Courtesy of Terzani

Animation

Timeline

Global illumination and animation

Courtesy of Foinox

Courtesy of Curti Costruzioni Meccaniche

Global Illumination provides users with advanced technologies for calculating indirect illumination, enabling accurate lighting simulation and increased realism. Global Illumination combines innovative hybrid radiosity with final gather technologies to render realistic images at maximum speed while providing the ultimate in image quality.

Final Gather is a technique that can be used with or without radiosity to calculate the effects of diffuse secondary illumination in a scene.

Sketch rendering allows you to make compelling stylized presentations. It can be used for artistic representations or, for example, in product illustrations that can be used for printed catalogues.

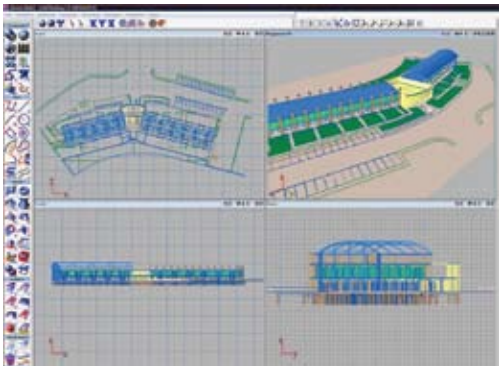
A sketch rendering can be crucial for communicating ideas at a project's early stages, when not all details may have been defined. Available sketch rendering styles include cartoon, color wash, pencil, ink, paint effects and many more.

Designers can build and render animations directly within solidThinking. An easy-to-use yet powerful keyframing animation technique is available to create animated presentations of products or show how a product can be assembled.

Supports third-party renderers and direct data exchange

solidThinking's open architecture design directly supports third-party commercial rendering systems — including Maxwell Render and PhotoRealistic RenderMan — providing seamless integration to deployed or preferred rendering applications.

Courtesy of Arnes International



A QuickTime VR output can be used to present panoramic movies and object movies.

solidThinking offers other advanced features such as feature-following anti-aliasing (FFAA), which brilliantly performs extra anti-aliasing around features in the image, and image post-processing, for adding effects such as lens flares and depth of field.

A solidThinking plug-in uses Viewpoint Experience Technology (VET) streaming formats to export 3D objects or scenes and integrate them into HTML pages.

These technologies create a compelling interactive user experience for many e-business applications, from advertising and e-commerce to online customer service and internal training.

Continuously updated import/export plug-ins include IGES, STEP, VDA/FS, DXF, DWG, 3DS, 3DStudio Max, Lightwave, Maya, RIB, SolidWorks, STL, VET, VRML and many others.

solidThinking's Plug-Ins Development Kit contains documentation for developers and users that want to create their own modeling tools and rendering plug-ins. Included in PDK are code samples that serve as a reference guide for your programming.

"solidThinking helped us to compress the product development cycle by several times. We are pleased to see the continuous enhancement of this product"

Aristide Barone, Design Manager, Mares

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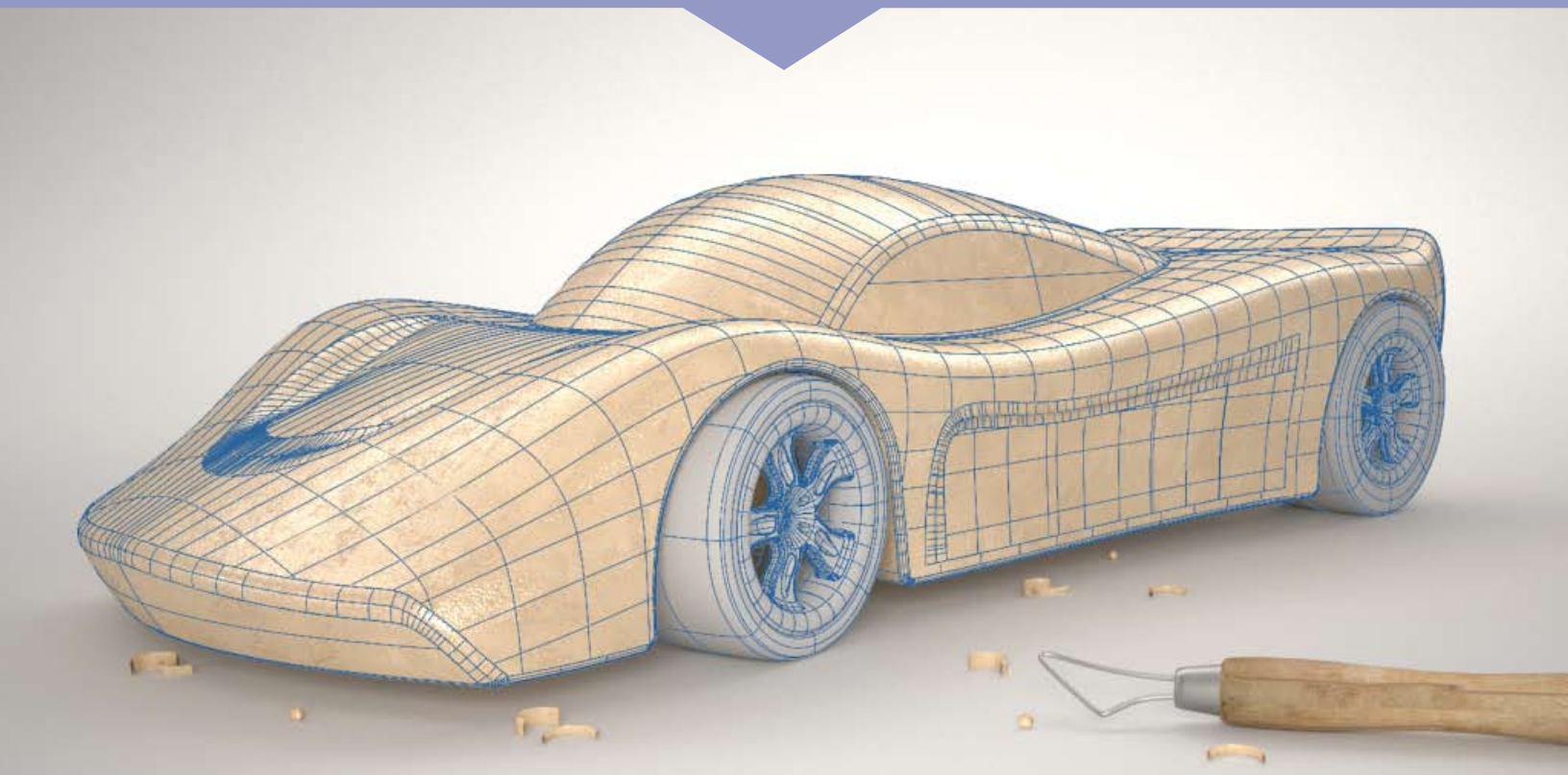

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