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SIGGRAPH Evolves Along With Technology

Many technologies designed for the gaming and entertainment industries will find an important place in CAD product design as well.

Aug 21, 2008
By: Jeffrey Rowe

Years ago the CAD industry got a lot of its horsepower from academia and programs emanating from the defense industry. Over the years, however, the main source of CAD's underlying technologies has shifted. Though there is still a huge contribution from academia, the other major contributing parties are the entertainment and gaming industries, and SIGGRAPH is *the* venue to see where graphics and interactive technologies are today and heading tomorrow.

Last week I attended the 35th International Conference and Exhibition on Computer Graphics and Interactive Techniques ([SIGGRAPH 2008](#)) in Los Angeles, where once again it provided a glimpse into the future. SIGGRAPH itself is evolving along with the computer graphics and interactive techniques communities that it caters to. This year I really noticed the borders diminishing between traditional SIGGRAPH programs, resulting in a more fluid, interdisciplinary conference that provided more flexible options for sharing a vast body of ideas that appeals to a much broader base.

SIGGRAPH 2008 attracted more than 28,000 artists, engineers, research scientists, gaming experts, developers, filmmakers, students, and academics from 87 countries. More than 230 companies exhibited, demonstrating all sorts of graphics-oriented hardware, software, services, and education. With all the educational classes, presentations, informal discussions, and exhibitions, SIGGRAPH can overload the senses, but it really delivers an exciting opportunity to imagine how these ideas and technologies might be applied to the future benefit of CAD users.

Below is a brief rundown of 10 of the more significant products I explored on the exhibition floor at SIGGRAPH 2008 and the impact they might have on the future CAD community.

mental images RealityServer

mental images, now owned by NVIDIA, has been around more than 20 years, and its best known product to date probably is mental ray, photorealistic rendering software that is licensed to several CAD vendors. At SIGGRAPH 2008, mental images introduced RealityServer v2.2, a server-based, scalable 3D Web application and services platform. This version is geared for providers of 3D Web application services, including Software-as-a-Service (SaaS). RealityServer was designed as a platform for displaying high-quality renderings for 3D model visualization, such as detailed automotive and aerospace designs. It allows users to create and deploy 3D interactive Web services and applications, and it is well suited for collaboration because RealityServer enables real-time viewing and interaction with high image quality across the Web without the need for downloads or client-side viewer applications. Unlike client-based 3D technologies, RealityServer maintains and processes original content on a server — streaming in response to users' demands. Potential CAD impact: High

Shapeways Creator

Shapeways is both a new platform and a community for 3D design and 3D printing with its Shapeways Creator engine. You can submit either original designs that you have modeled, or you can use the company's beta library of pre-designed product templates upon which to base your design. You then upload 3D designs using STL, X3D, or Collada formats. The company claims that upon submitting a 3D design for production, you will receive a tangible 3D product (from the company's Objet SLS or FDM machines) within 10 working days, at an average cost of \$50-\$150. Potential CAD impact: High

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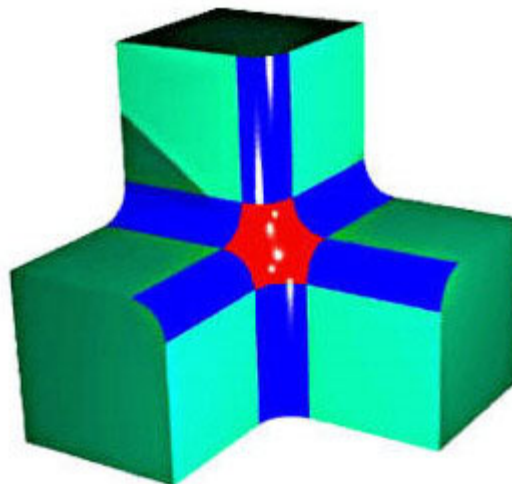
A 3D sample object created through the Shapeways Creator engine and 3D printing process.

Web3D Consortium/X3D

There was a lot of activity around this booth with people intent on getting CAD data out to the enterprise via X3D, a royalty-free, open standards file format and run-time architecture to represent and communicate 3D scenes and objects using XML. X3D is an ISO-rated standard that provides a system for storing, retrieving, and playing back real-time graphics embedded in applications, within an open architecture. X3D has a comprehensive set of componentized features that can be tailored for use in many types of visualization, including CAD. Real-time communication of 3D data has evolved from its beginnings as the Virtual Reality Modeling Language (VRML) to the more mature, robust, and refined X3D standard. Based on what I saw and heard at SIGGRAPH 2008, X3D seems to be gaining visibility and viability in some circles, including CAD. Potential CAD impact: Medium

Solid Modeling Solutions

An independent supplier of the source code for a powerful suite of geometry kernels, SMS provides several NURBS-based geometry libraries used for developing 2D and 3D applications, such as simulation, graphics, Web development, animation, game development, medical modeling, and CAD. For example, the Solid Modeling Library (SMLib) is a geometric modeling kernel based on NURBS curves and surfaces. Since trimmed surfaces are one of the most popular forms for representing 3D shapes in geometric and graphics applications, the Trimmed Surface Library (TSNLib) provides a comprehensive suite of utilities for constructing and interrogating trimmed surfaces, solids, and open shells. The General Surface Library (GSNLib) is an object-oriented software toolkit that provides a set of objects and corresponding methods to create, edit, query, and analyze geometric representations. What struck me here was the straightforward approach employed by SMS in licensing its technologies and its willingness to assist in product development. Potential CAD impact: Medium



This example of Solid Modeling Solutions' SMLib's capability is an N-sided patch filleting six edges at one vertex.

HP Mobile Workstations

Mobile workstations are nothing new, but ones that don't weigh 10+ pounds and don't cost a fortune are. The ISV-certified HP EliteBook 8530w Mobile Workstation provides the portability of a 15.4" diagonal wide-screen notebook with the power of a workstation, all in a nicely styled package that weighs just over six pounds. It has a sleek design with HP's DurCase, an anodized aluminum skin with a sturdy magnesium internal structure. Several Intel quad-core mobile processor, graphics card, and hard drive (up to 320 GB) options are available. HP's upgrade bay also lets you swap out the optical drive for a second hard drive. HP said that battery life is expected to be in the five-hour range. The HP EliteBook 8530w Mobile Workstation should be available any time now, and starts at \$1,499. Potential CAD impact: High

HyperMove

Bunkspeed simplifies 3D animation by integrating a proprietary physics engine with visualization in HyperMove. Just as its sibling product, HyperShot, generates photorealism in still images without previous rendering expertise, HyperMove's automation lets new users bring natural-looking motion to a 3D scene. HyperMove integrates with the HyperShot renderer, where you set global lighting effects and assign materials to a 3D scene. After applying colors, decals, and texture maps to their 3D objects, you set a few simple animation parameters to create a movie. HyperMove can import models from a wide range of 3D CAD applications such as Rhinoceros, SolidWorks, and Pro/ENGINEER, and exports to several standard movie formats. Potential CAD impact: High

3D Animation at Full Sail
 Learn the Art of Computer Animation & Special Effects for Movies & TV.
www.FullSail.edu

Google 3D Warehouse
 Search, share, and store 3D models. Download or submit your own models!
sketchup.google.com

3D Animation School
 3D Animation Workshops & Programs. Maya Software, Learn From the Pros.
www.NYFA.com

3d Animation Tutorials
 The Art Institute Online - Join the Media Arts & Animation Program.
www.aionline.edu

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Bunkspeed's Hypershot produces photorealistic 3D images quickly after adjustment of just a few lighting and materials settings.

T-Splines for Rhino

This surfacing add-in for Rhino lets you create organic/freeform models that can actually be manufactured. It looks like it is relatively easy to use and is a natural extension to the capabilities found in Rhino. I saw some complex surfaces and forms created and manipulated in demos that showed how T-Splines accommodates different workflows and facilitates evolving designs. For downstream manufacturing purposes, T-Splines models can be converted to NURBS (IGES and STEP) or meshes (STL). Potential CAD impact: High

Scaleform GFx

Although Scaleform GFx is currently used exclusively in video game development, I could see a possible future for it in the CAD development environment. Scaleform GFx is a user interface (UI) and vector graphics engine and employs visual authoring tools, such as the Adobe Flash Studio, with hardware graphics acceleration. Using Scaleform GFx, companies can change from a programmer-centric, static UI development environment to an artist-driven dynamic UI and workflow. The core of the Scaleform GFx media engine is the Scaleform VGx hardware accelerated vector graphics technology that tessellates vector graphic shapes into triangles that 3D video cards can render. By converting the data into triangles, Scaleform VGx can output vector graphics faster than traditional software rasterizers, allowing it to be used within high-performance multimedia environments, including future CAD environments. Potential CAD impact: Low

HIPP 2009

HighRES Integrated Point Processor (HIPP) is a new stand-alone software technology for reverse engineering and inspection that provides control over scanned 3D point clouds. HIPP can handle millions of points and directly processes raw digitized data from many types of touch probes, laser scanners, and optical scanners. HIPP can import and export DAT, TXT, XYZ, ASCII, and proprietary HighRES files. In addition, HIPP files integrate with HighRES CAD/CAM native integrated software. Data sets can be imported upstream to CAD/CAM systems, including AutoCAD/Mechanical Desktop, Rhino, Autodesk Inventor, Siemens NX, KeyCreator, Solid Edge, Mastercam, SolidWorks, and Pro/ENGINEER as native entities, virtually eliminating data translation issues. Potential CAD impact: High

LightWave 3D v9.5

The major highlights I saw in LightWave v9.5, a 3D animation system, include improved rendering quality and speed, with major upgrades to the radiosity (an illumination algorithm used in 3D rendering) sampling system and interpolated modes. Also, there are new disk-based caches for radiosity: the Static Cache, for animations in which only the camera moves; and the Animated Cache, in which any element of a scene can move. LightWave radiosity can now be rendered at reduced resolution and applied to the full-size final render, providing a higher quality output with faster render times. The lighting system is now a plug-in API, allowing third parties to create custom lights and lighting plug-ins. Potential CAD impact: High

Over the coming weeks I'll take a closer look at many of these products and technologies, because I believe many of them will have a significant impact on CAD and the way you will do business moving forward.

Admittedly, SIGGRAPH is a lot of ground to cover, but the conference is always exciting because it offers so much insight on what might happen in the future CAD arena.

[SIGGRAPH 2009](#), the 36th International Conference on Computer Graphics and Interactive Techniques, will be held in New Orleans, Louisiana, August 3-7, 2009.

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