

# The PLM Components Newsletter

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Welcome to the third edition of *The PLM Components Newsletter*. PLM Components are software tools developed by UGS for product design, manufacture, engineering, simulation, visualization and collaboration that are made openly available to other application developers in the CAD/CAM/CAE/PLM industry. Readers that are new to PLM Components will find more information on [www.ugs.com/products/open](http://www.ugs.com/products/open).

### Increase the profitability of software applications

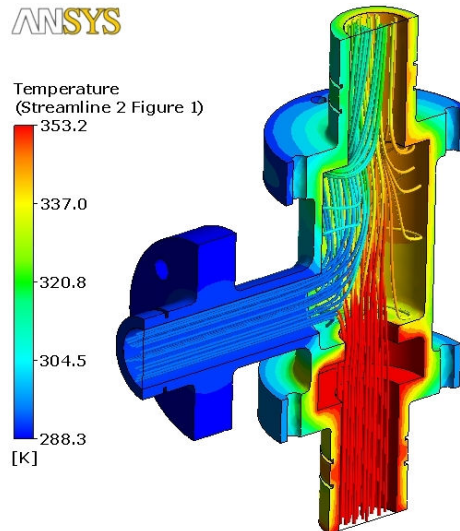
PLM Components increase the profitability of software applications by raising their value and lowering their costs. This is achieved by supporting innovation, improving interoperability, ensuring quality and reducing time to market. Flexible licensing arrangements and a simple, proven integration process enable any organisation, large or small, to bring innovative capabilities to any of their applications quickly and economically.

### Integrated CAD drives software vendor revenues

Many software companies in the PLM business, such as Computer Aided Manufacturing (CAM) and Computer Aided Engineering (CAE) suppliers, earn a higher proportion of their end-users' spending by providing their own integrated CAD capability. The attractions of this offering to the end-users include more tightly integrated user interfaces, workflows, technical support and supplier relationships.

Many of these vendors have chosen UGS' PLM Components to rapidly implement CAD functionality that complements their core product lines. In CAE for example, the Parasolid® and D-Cubed components power the design/pre-processor modules in UGS' own NX Digital Simulation and Femap systems. Other applications based on PLM Components include DesignModeler from ANSYS (pictured), Abaqus/CAE from Abaqus, MSC.Patran CAE Solid Modeling and MSC.ADAMS/View from MSC.Software and Comet-Design from CD-Adapco.

Where CAM, CAE and other applications are integrated with external CAD systems through partnership programs, PLM Components are often also the basis of such design systems. Examples include UGS' own NX and Solid Edge, as well as CATIA and SolidWorks from Dassault Systèmes, Inventor from Autodesk, OneSpace Designer from CoCreate, SolidMX from Fujitsu and ICAD/SX from Dipro. The wide range of applications based on PLM Components is strong evidence for the value they provide to software vendors and their end-users.



*DesignModeler from ANSYS, based on the Parasolid modeling and 2D DCM sketching components from UGS*

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## Business news

**NIKA GmbH** (now part of Flomerics), Germany, licensed Parasolid Designer for use in their general purpose fluid flow and heat transfer analysis EFD line of products.

**CADNexus, Inc.**, USA, licensed Parasolid Editor for use in its CAPRI CAE Gateway Middleware designed for bi-directional CAD-CAE integration.

**Toyota Caelum**, Japan, released the CDM in its Caelum XXen CAD system. The CDM adds interactive, accurate collision and clearance computations to Caelum XXen's 3D DCM based assembly modeling environment.

**Thermwood Corporation**, USA, released the 2D DCM in eCabinet Systems, a CAD/CAM application for the woodworking industry.

**New members of JT Open** support the growth of this leading lightweight 3D data format from UGS:

- Perspectix AG, Switzerland
- Magna International, Canada
- Parallel Graphics, Ireland

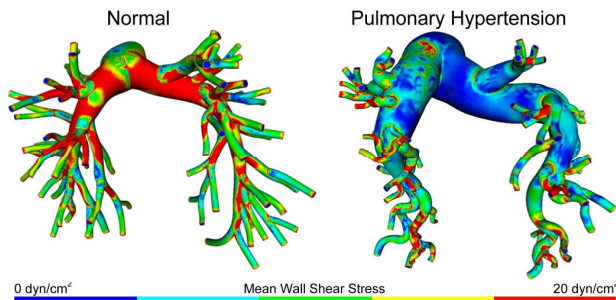
More business news inside.

## Parasolid product news

### Parasolid at the heart of medical research

A major focus of Simbios, a Stanford center for biomedical computation, is physics-based software simulations of biological structures. Using Parasolid, Simbios has developed SimVascular (<http://simtk.org/home/simvascular>), an integrated system for cardiovascular modeling and simulation that could dramatically impact the research and treatment of cardiovascular disease.

*SimVascular helps researchers and clinicians understand cardiovascular dynamics. This image shows the differences in anatomy and mean wall shear stress in the pulmonary arteries of a normal subject and a patient with pulmonary hypertension*

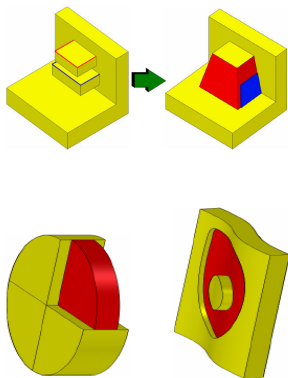


“SimVascular creates Parasolid based geometric models from 3D medical images, converts those models into finite element meshes, models the properties of the blood flow and its interactions with the vessel wall and then generates visualizations of the results”, says Charles Taylor, project lead and associate professor of bioengineering at the Cardiovascular Biomechanics Research Lab (CVBRL), Stanford University. While developing SimVascular, researchers at the CVBRL tested several solid modeling kernels. “We selected Parasolid because of its cross-platform support, robustness, and speed at manipulating complex models of blood vessels,” says Nathan Wilson, Chief Software Architect.

“Simbios provides free and open access to its software to seed development of these technologies in academia and industry”, says Bill Katz, senior scientist at Simbios. We invite researchers to explore physics-based simulation tools and software at [www.simtk.org](http://www.simtk.org) and contact UGS’ Evan Knuttila ([evan.knuttila@ugs.com](mailto:evan.knuttila@ugs.com)) to obtain access to Parasolid (under Parasolid’s normal commercial terms).

### Parasolid v18.1 released November 2006

Some of the new features in Parasolid v18.1 include:



- New modeling functionality for advanced blending, general sweeping and complex tapering (left image) allows greater support for design intent.
- Interoperability support extended with enhanced continuity in geometry construction, together with optimizations in tolerant modeling and model interrogation.
- End-user productivity is boosted through increased automation in offsetting (left image), patterning and imprinting.

Released in parallel was Parasolid Bodyshop v9.1, the Parasolid-based toolkit that repairs, optimizes and validates imported 3D models. The release included enhancements in output pre-processing, tolerancing, quality and performance to maximize downstream success in modeling and interoperability.

## More business news...

**ASCO DATA GmbH**, Germany, developer of CAM applications around cutting and bending licensed Parasolid Designer for implementation of ASCO-SB, a specialized automatic 3D-simulation and NC-data generating application for bending parts with Slew Bending Centers.

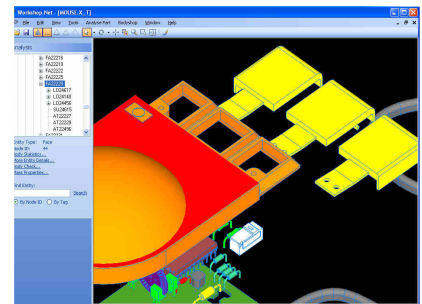
**FAST AG**, Germany, licensed Parasolid Designer for use in the GraphiteONE Linux based CAD System complementing the D-Cubed 3D DCM licensed in 2005.

### Parasolid tops 2 million seats

Late last year the estimated number of Parasolid-based application seats in use exceeded 2 million, a landmark of which UGS is justly proud. The global acceptance of Parasolid as a key enabling technology in 3D applications is powerful evidence of the success of UGS’ open innovation strategy. Indeed, as well as providing the core modeling capabilities in many well known CAD, CAM and CAE applications, Parasolid is increasingly supporting innovations in fields such as architecture, specialized machinery, reverse engineering and optical and medical research.

### Parasolid v19: new application

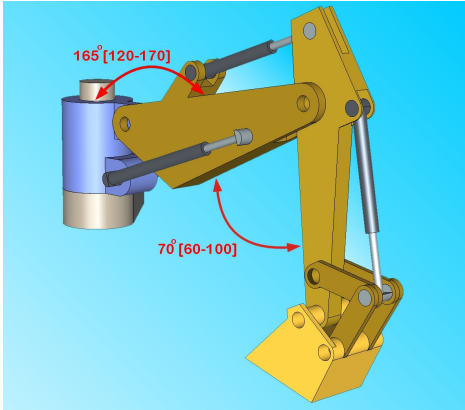
Scheduled for shipment in May 2007, Parasolid v19 will include a new support application, Parasolid Workshop.Net, for viewing and analyzing XT data. Written in C# and shipping with full source code, it will demonstrate best practice Parasolid application development.



*Parasolid Workshop.Net*

## D-Cubed product news - new developments for parametric modeling

### Assembly constraining and 3D sketching enhancements



Bounded dimensions in the 3D DCM

The 3D Dimensional Constraint Manager (3D DCM) now supports a major new dimension type, the *bounded dimension*. Distance and angle dimensions can be bounded with upper and lower limits to specify a range of values when the 3D DCM computes the configuration of a model. Used in combination with other constraints in an assembly context, bounded dimensions can confine the scope of a moving part's angular or linear motion, creating a more realistic assembly model.

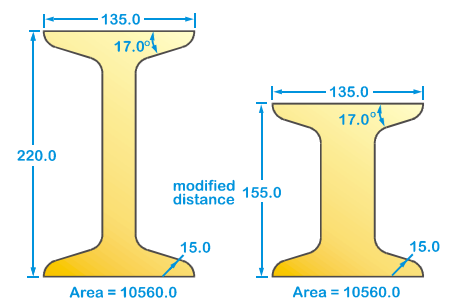
Another significant application for bounded dimensions is 3D sketching. 3D sketches are used in a variety of contexts, such as surface design and routing center-lines in piping, wiring and HVAC applications. Dimensions and constraints enable applications to specify the shape and relative position of the curves in a 3D sketch. Bounded dimensions can ensure that the lengths of individual sketch elements do not fall below zero or exceed a maximum value, for example.

3D sketching applications now also benefit from a new 3D parametric curve length dimension, recently introduced in the 3D DCM. CAD systems that use the 3D DCM in support of 3D sketching include Solid Edge and SolidWorks.

Animations available at [www.ugs.com/products/open/d-cubed/animations/3ddcm/](http://www.ugs.com/products/open/d-cubed/animations/3ddcm/)

### 2D sketching enhancements

The Profile Geometry Manager (PGM) brings the next generation of sketching functionality to 2D DCM-based sketchers. Recent extensions to its capabilities include the calculation and constraint of the length and area of a profile.



Profile area constraint in the PGM

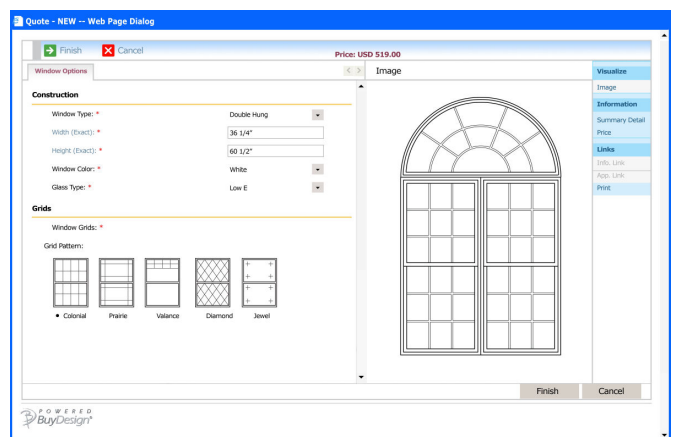
In addition to the new profile constraints, the PGM provides advanced offsetting functionality, automatically inserting, extending and trimming edges as required, as well as solving constraints to loops of geometry rather than individual edges.

### 2D DCM brings CAD to product configurators

Product configurators, also known as sales configurators, provide the means for manufacturers to efficiently enable their customers to identify and purchase the products that they require.

Producing a CAD model is often an important part of this process. This can be achieved by linking the product configuration software to a commercial CAD system, though this can be an expensive and over-engineered solution. Alternatively, product configuration software vendors can use UGS' Parasolid, 2D DCM and 3D DCM components to rapidly and inexpensively develop the geometric configuration solution that is best suited to their customer requirements.

TDCI, of Columbus, Ohio, use the 2D DCM to enable their BuyDesign configuration system to create and visualize product families. The results can be configured and made accessible to sales professionals via web based or stand-alone applications.



The 2D DCM based geometry engine in TDCI's BuyDesign configuration system

***"We interface directly with full 2D and 3D CAD products for certain capabilities within BuyDesign, but we didn't want that overhead in the front-end sales process where people would be configuring products over the web or on desktop or laptop PCs. The D-Cubed 2D DCM gives us the ability to dynamically create configuration-specific 2D images without the cost or processing overhead of a full CAD system."*** - Dan DeMuth, President and COO of TDCI

## JT Open - UGS publishes JT file format

Further evidence of UGS' commitment to openness is provided by the publishing of the JT file format. This has paved the way for a common 3D language for the global manufacturing industry and facilitated the secure long term archival of 3D data. Furthermore, user confidence in the format is enhanced, accelerating the development of JT-enabled software applications, promoting product innovation through enhanced collaboration. More at [www.jtopen.com](http://www.jtopen.com).

***"The publishing of JT is a ground-breaking step towards better industry-wide collaboration and an exciting and innovative move on the part of UGS."* - Charles Foundyller, CEO, Daratech**

## UGS' open approach to business drives innovation

Software vendors are striving to increase revenue growth through greater innovation. Recently much has been written about the benefits of open approaches to innovation and technology. PLM Components is an example of UGS' open approach to business, and supporting innovation, enabling resources to be focused on core competencies, creating value for customers and reducing time to market.

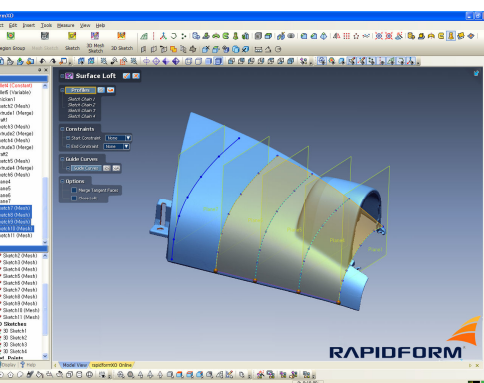
Henry Chesbrough, Executive Director, Center for Open Innovation, Haas School of Business, UC-Berkeley, has written of the significant benefits of openness, including "the ability to draw upon more diverse sources of knowledge, the ability to access a wider range of possible solutions, the chance to exploit work done in another area, and repurpose that work for the focal task at hand, as well as the enormous benefit of having many people examine the technology to see if it works for their own needs."<sup>1</sup>

## Reverse engineering a parametric model with PLM Components

PLM Components have brought the benefits of parametric modeling to many diverse applications. These benefits, including tightly-integrated, fast and accurate modeling, were delivered to the customers of INUS Technology after the company implemented the Parasolid modeling kernel and D-Cubed 2D Dimensional Constraint Manager (2D DCM) sketch engine in its *Rapidform XOR/Redesign* reverse engineering system.

Like other reverse engineering applications, Rapidform XOR/Redesign creates mesh models from 3D scan data (point clouds) sampled from real-world objects. However, a major innovation is the capability to convert of meshes into fully parametric solid models. During conversion, cross sections of the mesh elements are converted into 2D DCM based parametric sketches. Parasolid is then used to extrude, sweep or rotate the sketches into parametric 3D solids.

Users are provided with the familiar parametric modeling operations within rapidformXO Redesign, and they can also export the model for use in their preferred CAD applications.



*Reverse engineering a parametric model in INUS Technology's Rapidform XOR/Redesign*

***"We wanted to provide integrated design capabilities that would be familiar to the users of major CAD systems, and this was made possible by leveraging the same UGS component technology that is used in so many of the leading applications."* - Calvin Hur, VP Marketing & Sales, INUS Technology, on licensing Parasolid and the 2D DCM**

## PLM Vis

PLM Vis provides 2D/3D visualization and markup tools that are easily integrated into PLM applications. It is used to enhance applications and develop new business practices through the power of custom visualization.

A major UGS automotive customer licensed PLM Vis to create a custom, enterprise-wide front-end to their implementation of Teamcenter PDM system. The PLM Vis Development team worked with yet another automotive customer to provide custom, hi-fidelity viewing and accurate measure to their extended enterprise over the Web, without the vulnerability of having IP exposed via the browser cache.

PLM Vis supports UNIX and Windows and can be embedded in standalone applications or as internet browser plug-ins. PLM Vis enables organizations to develop user interfaces focused on their specific requirements, the results being easy to use and free from the distractions of more general purpose applications.

More at [www.ugs.com/plmvis](http://www.ugs.com/plmvis).

## Contact details

Contact details for each technology covered in the newsletter can be found on the website listed in the relevant section.

Alternatively, please use the contact details below and your enquiry will be forwarded to the appropriate recipient:

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