

## Software Review: SpaceClaim 2008, changing the way you design

This software review is one in a series that span the entire mechanical design and manufacturing process from conceptualization to CNC code covering all the steps along the way. Some software being reviewed is tightly focused on one specific process, like Finite Element Analysis or Simulation, while other more comprehensive offerings such as CATIA®, PTC\Pro Engineer®, Solidworks® and Inventor® span across multiple processes and include specialized modules tailored for such tasks as automobile, ship or aircraft design.

SpaceClaim's software is unique. It allows designers to intuitively conceptualize, create and modify assemblies that are imported or developed in SpaceClaim, manipulate geometry, optimize designs for FEA, create or modify sheet metal assemblies, work in either a 2D or 3D environment, and export the results in an array of popular formats.

**SpaceClaim 2008** is a new and innovative design tool that hides its mammoth power beneath an uncluttered and easy to use interface. The more I delved into the software the more I appreciated the elegance of its design, its ease of use, and its ability to take mechanical design processes to the next level. This feature packed tool can help virtually any designer increase his or her productivity, and in many cases, can pay for itself the first month out of the box.

At its most fundamental level, SpaceClaim allows designers to virtually grab a model and interact with it in an intuitive and real world way. You create and modify geometry using an adaptive modeling approach by pulling and moving directly on geometry while also building associations or design intent into the model.

When using other weightier mechanical design tools engineers work on a sketch then hit regenerate and hope that what they've changed is what they really intended to change. With SpaceClaim there's no finger crossing or breath holding, you see the 3D model transform visually as you're manipulating it and you instantly know when you've achieved the desired outcome.

### **Working in 2D Drawings with 3D Compatibility**

Many designers are accustomed to working in a 2D drawing environment, and since SpaceClaim is mode independent they can work on a design equally in SpaceClaim's Part, Assembly, Drawing Sheet, or Mark-up environments. The boundaries between 2D and 3D designing are transparent and switching between the two is only a mouse click away.

With SpaceClaim's 2D/3D capability you can work with 2D legacy data and then easily export 3D data for machining. Watch this machining demo to see SpaceClaim in action: [View the 2d design video.](#)

In the below two screenshots, from one of SpaceClaim's many video tutorials, a 2D

assembly was simply copied from the drawing and pasted directly into the 3D design environment where it was converted and then reinserted into a drawing in its 3D form complete with dimensions and notations.

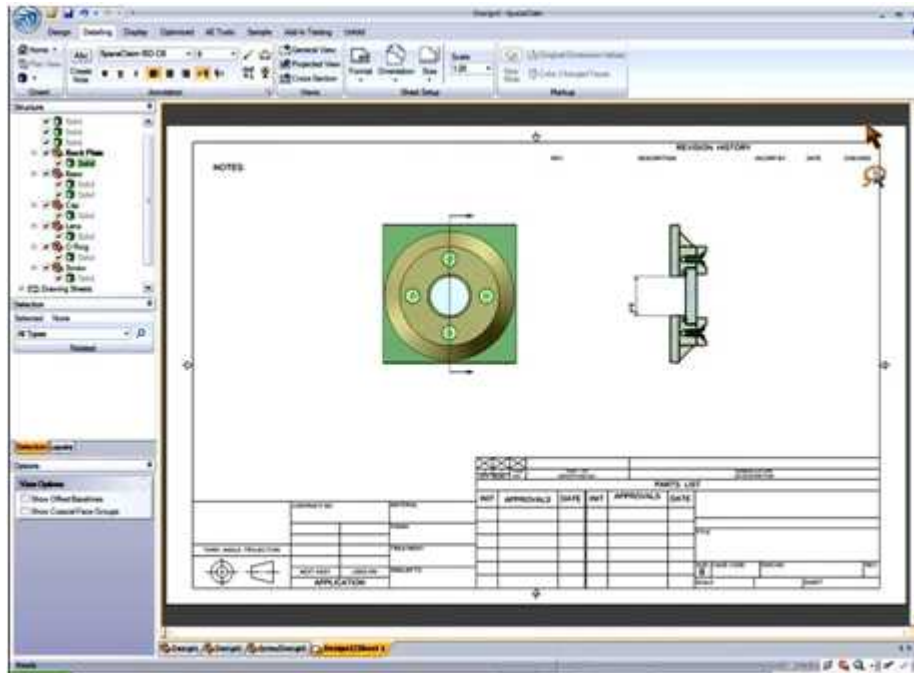


Figure 2: New Drawing after conversion to 3D  
(Note: In this example not all dimensions were specified.)

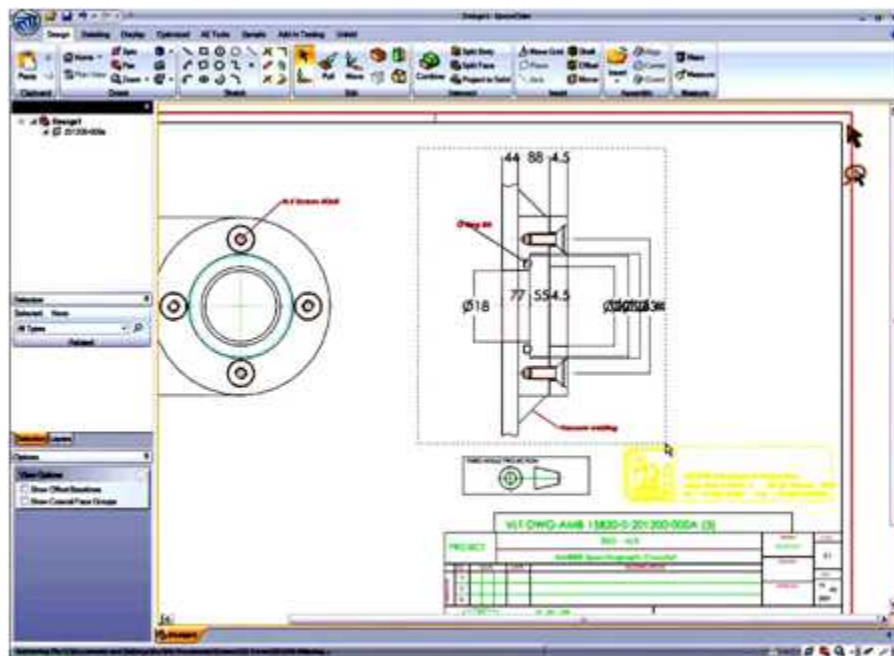


Figure 1: Copying From 2D Drawing

## Design Re-use and Collaboration

SpaceClaim allows you to work with bits and pieces of geometry brought in from virtually any system and then modify and interconnect them as if they were native. Yes, you can create intuitively directly in SpaceClaim, but you can also import designs and components directly from the likes of Pro/Engineer®, CATIA®, SolidEdge®, SolidWorks®, and Inventor®. You can then manipulate them, add them to your work, and then export your final amalgamated design in a wide array of industry standard formats. You can also export your design as a SpaceClaim XML file (.scdoc) that's perfect for collaboration and that allows third parties to get the information they need from SpaceClaim without talking directly to the SpaceClaim API.

A great example of SpaceClaim's ability to re-use designs is shown in one of their many online videos. In this one the designer begins with a miter saw model, then adds a saw blade casting and sawdust filter designed in another CAD system, and then modifies it in SpaceClaim.

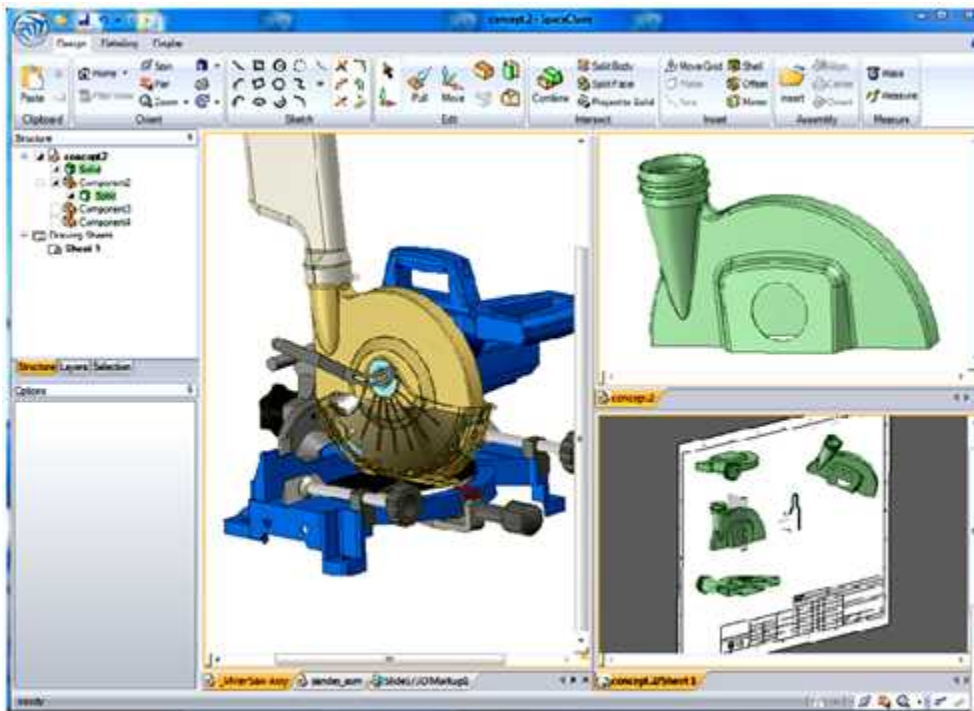
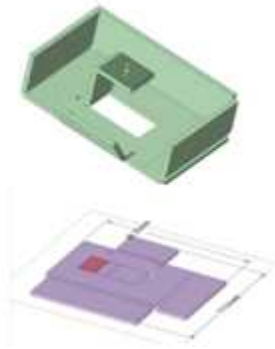


Figure 3: Miter Saw Model with added saw guard dust filter and 2D Drawing

I highly recommend watching this video if you want to get a very quick overview of SpaceClaim's capabilities and see how you'll use it in your work environment.

[Download and watch the Miter Saw video.](#)

## Working with and Designing Sheet Metal Assemblies



Full sheet metal 3D design and manufacturing optimization capabilities are built into the latest 2008 SpaceClaim release. You quickly design a sheet metal assembly in your choice of metal thickness, add the appropriate bends and through-holes, and then unfold the bended piece and make adjustments to ensure that your design unbends with no overlaps so it's ready to be machined and manufactured.

You can quickly change and fix troublesome corner junctions, reliefs, bends and bend allowances or work in the bent or flat state and see your changes in both. Using SpaceClaim you're able to speed the manufacturing process by splitting a single part into multiple parts at critical junction areas saving time and money during the manufacturing process.

### Data Exchange

3D Data Exchange capabilities include both industry standard formats, included with SpaceClaim Professional, and native CAD file formats. The complete list of supported formats and versions follows:

- Data Import: CATIA® V5 R6 – R17 SP1 and V4 4.1.9 – 4.2.4, NX® versions NX1 – NX4 and UG v11 – 18, Pro/ENGINEER® 16 - Wildfire 3, SolidWorks® version 98 - , Inventor® 6-11, ACIS®, Parasolid® v10.0 – 18.0.141, IGES up to v5.3, STEP AP203, AP214 (geometry), VDA FS 1.0, 2.0 and JT Open.

- Data Export: CATIA V5 R17 SP1, ACIS, Parasolid v18.0, IGES v5.3, STEP AP203, AP214 (geometry), VDA FS 2.0 and JT Open.

Note: IGES, STEP, VDA, DWG and DXF data exchanges are included with SpaceClaim Professional. Support for vendor-specific file formats, ACIS and Parasolid, and JT Open requires a separately purchased add-on product.

### Space Claim in the Real World

To do this review I rolled up my sleeves and immersed myself in the tool starting with the basic 'make a bracket' exercise and working my way up to complex assemblies I'd fabricated using assemblies and parts designed on a wide array of high-end mechanical design tools. I then added and modified new geometries of my own.

I jumped into SpaceClaim 2008 as a complete novice, and within a few minutes was creating my own simple designs, and today, after just a week, I'm a proud 'SpaceClaimer.' Who would have known?

But, a critical part of this review was my need to understand how SpaceClaim is used in the real world. To meet this need I first interviewed Dan White, president of Keuka Studios who design and fabricate custom metal railings. And then, as luck would have it, I realized that one of the world's foremost industrial product design firms, Nicholas Talesfore's 1D3D Design, was in the same building as us. I introduced 1D3D to SpaceClaim, arranged for a demo, let them work with the tool, and then asked Nicholas and his lead mechanical engineer about their experience. Both these interviews are summarized below to give you valuable insight from a user's point of view.

### **Dan White – Keuka Studios ( [www.keuka-studios.com](http://www.keuka-studios.com) )**



Keuka Studios does custom architectural iron work and its founder and president, Dan White, has more than twenty-five years experience as a mechanical engineer with an in-depth working knowledge of 3D, CAD, animation, renderings, finite element analysis, injection molding and CNC machining. The firm manufactures architectural signage and a line of cable railings that are made by CNC machining, laser cutting, and molding.

Dan told me that, "In addition to the tech side of things, we also incorporate hand forged thousand-year-old processes into our work and blend the two. We first design something on a CAD platform, CNC machine it to shape, and then take the assembly to our forge where we'll add the artistic work to it. We use both our artistic and technical skills in the process which makes us stand apart from competitors who just fabricate to architect's drawings."

I asked Dan what he liked best about doing his design work on SpaceClaim and he said, "I like the graphical feed back. When I'm trying to do something, rather than having to push ten buttons to see what it does or whether it fails, I see what it's doing and this helps me quickly understand what the commands do. More importantly, I really like the whole non-history based aspect of the tool. Being able to slice and dice, and do what ever I want without having to 'play chess' with a CAD tool or think about how it operates allows me to focus on creation"

"You can really design on SpaceClaim." Dan said, "People using other systems think they're designing, but they're really just firming up their design because they have to plan everything out and do a lot of conceptual work sketching on paper and thinking outside the CAD system. And, if they don't do this 'out of the CAD' system planning they get penalized for it. In SpaceClaim there are no penalties. You just jump in and work on whatever you're thinking by chopping and manipulating geometries into whatever they evolve into. This ad hoc approach, versus trying to pre-think everything out, tends to yield better designs – they evolve into things you could never even dream of. You can be more creative by far with SpaceClaim."

Dan also told me that the CAM software he uses is ACIS based, and since SpaceClaim is also ACIS based he knows they're going to talk to each other well. "In the old days," he said, "I used IGES and spent more time trying to figure out how to get good files to my supplier than I actually did designing the part."

In summary Dan said, "Everyone who is not currently a CAD user can become one quickly with SpaceClaim. But what's ultimately going to happen is that people who are CAD users, the guys using the big CAD systems, are going to watch as little rogue guys around their company make changes to their models faster than they can on their native systems and they're going to say 'I want that too!' And then, they're going to get SpaceClaim and say 'why the heck would I ever use my big CAD system, this thing's so much better.'"

**Nicholas Talesfore & Joseph McArdle – 1D3D Design ( [www.ID-3D.com](http://www.ID-3D.com) )**

ID3D Design is one of the nation's premier industrial design companies. They designed the original Mac Classic and have gone on to provide ergonomic and attractive product designs to many of the world's leading companies.



Figure 4: **A few design examples from ID3D's Online Portfolio**

Nicholas does the bulk of the creative design work at ID3D while Joseph primarily does more of the form development design work or makes modifications to designs based on the actual surface form of a particular product as opposed to looking at the functional aspects of a model.

I asked Joseph what features and benefits he was looking for when he decided to evaluate and use SpaceClaim. Joe told me that, "Just from the initial information the tool seemed very promising from the point of view of its intuitiveness its tool set, command structure and how easily it allows you to manipulate objects."

The "really big" thing that Joseph mentioned was SpaceClaim's ability to bring in models from different sources and then allow full manipulation of these models. "You can add and change model features even though it came in from a different source," Joe said, "and I thought that this was a really nice feature."

Now that Joe is using the tool, I asked him if it lived up to his expectations. Joe said that, "It absolutely did! In fact the idea of being able to manipulate solids from other applications was extremely impressive. This is very nice because now we can bring in

models from tooling shops and such, add and delete features and pretty much use it as if it were a native file." Joe also told me that, "I use Solidworks, and I don't see us throwing this away, but I do see the two of them working hand in hand, complementing each other."

Both Joseph and Nicholas were able to be productive with SpaceClaim in short order, and told me that the GUI was laid out very simply. Nicholas, who is the less experienced CAD user of the two, is picking up the tool fast, and Joseph said that as an experienced power user, "I quickly learned and changed to the new paradigm and was using it in a day."

## **Learning the Tool**

The reason I was able to get up to speed so fast was by attending a SpaceClaim hands-on webinar, open to all comers, and by watching many of the more than seventy video tutorials available for download from their site. These tutorials take you from beginner through advanced operation and include large project design. The support team was always immediately available to assist me, and the users I interviewed during the learning process, and then during the life of the product.

The tool comes with context based help, roll-over pop-up usage instructions and excellent context based help that includes videos. The tool itself is virtually self learning, very ergonomic, and is designed to get designers productive in the shortest possible time.

## **Data Exchange**

3D Data Exchange capabilities include both industry standard formats, included with SpaceClaim Professional, and native CAD file formats. Here's a complete list of supported formats and versions:

- **Data Import:** CATIA® V5 R6 – R17 SP1 and V4 4.1.9 – 4.2.4, NX® versions NX1 – NX4 and UG v11 – 18, Pro/ENGINEER® 16 - Wildfire 3, SolidWorks® version 98 - , Inventor® 6-11, ACIS®, Parasolid® v10.0 – 18.0.141, IGES up to v5.3, STEP AP203, AP214 (geometry), VDA FS 1.0, 2.0 and JT Open.

- **Data Export:** CATIA V5 R17 SP1, ACIS, Parasolid v18.0, IGES v5.3, STEP AP203, AP214 (geometry), VDA FS 2.0 and JT Open.

**Note:** IGES, STEP, VDA, DWG and DXF data exchanges are included with SpaceClaim Professional. Support for vendor-specific file formats, ACIS and Parasolid, and JT Open require a separately purchased add-on product.

## **Summary**

This tool's short learning curve is bolstered by a user interface that needs few commands to allow users to quickly create and modify models, and that features full creation, editing, and design commands that give you the ability to edit any design in context.

Design re-use (The ability to directly manipulate, edit and combine imported data with your models.) and its wysiwyg operation are the two features I found most compelling, but you might find that its 2D/3D capabilities or sheet metal design

features are at the top of your list. Whether or not this tool can save you time and money, or help you become even more creative is something you can quickly assess by visiting [www.spaceclaim.com](http://www.spaceclaim.com) and downloading their trial software. You might also want to view a few of their video tutorials, starting with the basic ones, to gauge if this tool is right for you. [Download the SpaceClaim 30 Day Trial here.](#)

-----  
By: David Heller

David Heller has written more than twelve technical and fiction books published by Addison-Wesely, Simon-Schuster, Prentice-Hall, McGraw Hill, and more, was a technical writer and professional columnist, and has devoted the past fourteen years to the Internet business primarily focused on MCAD/CAM, Electronic Design Automation, Architectural Engineering & Construction, and Geographical Information Systems.

*PTC Pro/Engineer®, Dassault CATIA®, Seimens (UGS) SolidEdge®, SolidWorks®, and Autodesk Inventor® are registered trademarks of their respective owners.*