



January 6, 2009

[Interview with S&S Plastics](#)

April 23, 2008

[Accurate Carriers reduces delivery times with HSMWorks](#)

March 4, 2008

[MCAD Cafe article features HSMWorks](#)

February 18, 2008

[Funder Tool and Machine Factory moves forward with HSMWorks](#)



Interview with S&S Plastics

S&S Plastics – An interview with a leading mould design and injection moulding firm who reinvented their engineering business around HSMWorks and a practice of truly integrated CAD and CAM.

"HSMWorks enabled us to completely transform our business from being just another high quality manufacturer to a technology driven manufacturing partner with [for] our customers. When people ask what the difference is I just laugh and show them a list of our customers."

This bold statement from Tony Marsh, Engineering and Production Manager at S&S Plastics, peaks anyone's interest if they have in any way been following the rapid growth of the integrated CAM market over the past few years. It is an example of the way integrated CAM is becoming the standard requirement for manufacturing engineers saddled with the responsibility of turning high quality parts around in record time, and then being asked to do better the very next day. The story of S&S Plastics and their experience with HSMWorks is not only a great story of a company serious about being the best in their industry, but about how a software program can actually play a vital role in helping them achieve their goal. We interviewed the engineering team at S&S to get the story in their words. First, some background...



S&S Plastics of Nottinghamshire, England, specializes in plastic injection moulding as well as mould design and development. Founded in 1989, S&S grew from a small firm to a respected industry leader operating out of a 20,000 sq ft state-of-the-art manufacturing facility. Much of the business S&S conducts is for the medical industry. However, S&S has customers ranging from automotive manufacturers and suppliers to well known aerospace and industrial manufacturers and suppliers.



S&S grew from a small firm to a respected industry leader operating out of a 20,000 sq ft state-of-the-art manufacturing facility. By early 2001 S&S recognized that their existing design process was becoming a bottleneck and adversely affecting their turn-around time. First, the CAD application that had served them well throughout the 90s was beginning to show its limitations. The software simply lacked the flexibility and functionality they needed when designing newer, more complex moulds. Second, they were receiving more and more customer parts in the form of SolidWorks part models. After

a thorough evaluation S&S made the determination to make a permanent switch to SolidWorks as their 3D design platform.

As the engineering department at S&S began the implementation and regular use of SolidWorks they recognized they had only addressed one bottleneck in their design-to-manufacture process. Marsh commented, "We quickly saw our design times significantly shortened through the use of SolidWorks. However, we were still fighting the CNC programming side of the equation. We could get together with our customers and quickly turn out designs but it became painfully obvious that we needed to do something about how we... data transfer – buzz word for interoperability – apparently interoperability was being very loosely defined to mean that a CAM system could "read in" or open a particular CAD format. What we needed was a CAM solution that allowed us to work directly with and take full advantage of the SolidWorks models." So began their search for an integrated CAM solution.

In 2004, fed up with an inefficient process of passing back and forth between SolidWorks and their stand-alone CAM system they began looking at CAM applications that were designed to run inside SolidWorks. "There weren't many, so we looked at them all. Unfortunately, none offered the high-end 3D tool paths we needed and lacked the integration and ease-of-use we were looking for," stated Marsh. "We had given up hope in finding something we would be happy with until the summer of 2007 when we found out about HSMWorks, this new Gold Partner CAM product we heard about in a SolidWorks forum."

Anthony Graves, Marketing Director for HSMWorks ApS, interviewed Tony Marsh, Shaun Brockley (engineer/programmer) and Brendan Fennell (toolmaker/programmer) to learn more about how S&S used technology to transform their business and what role HSMWorks played in that transformation:

Please introduce yourselves.

Tony - I am the Engineering / Production Manager at S&S Plastics. I oversee all of our engineering operations as well as manage production of all of our in-house and outside customer projects. I have worked nearly every station on the floor from tool maker to programmer to QC; you name it.

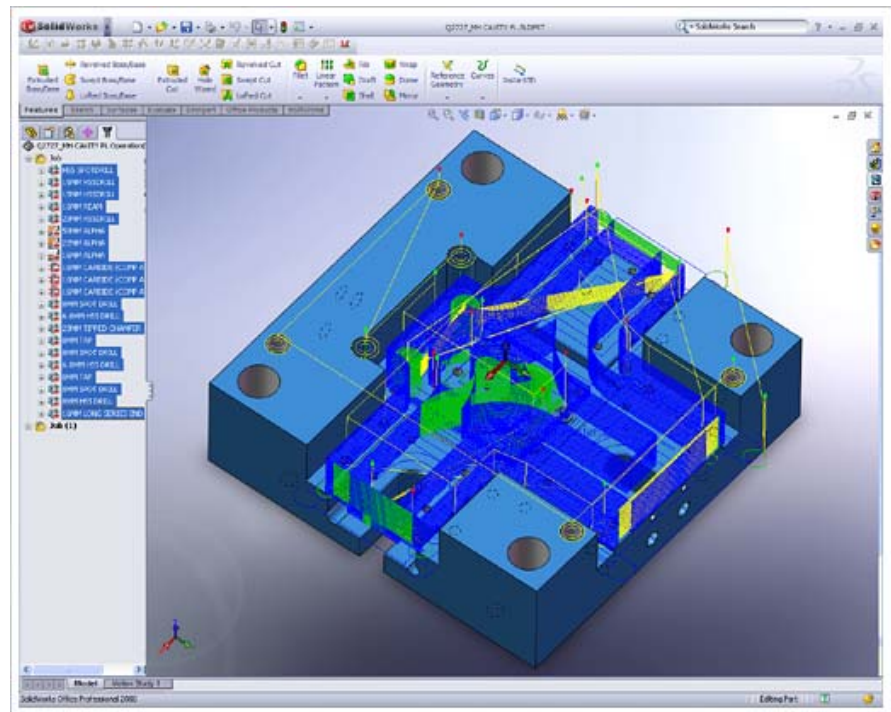
Shaun - I came onboard with S&S as a programmer. My experience in the mould or tool and die business includes design and programming [CNC programming]. My primary responsibilities are turning SolidWorks models into actual mould assemblies using HSMWorks, but my experience with CAM started back before I joined S&S as a programmer for a job shop doing a wide variety of machining work.

Brendan – I started out as a toolmaker here at S&S about eleven years ago. Initially I started in tool maintenance. For the next nine years I machined plate work for tools and dies including turning, grinding, and spark [wire] erosion. During that time I began and ultimately became one of the primary mould builders which included final assembly and finishing of the mould tools, electrodes, and inserts.

Ok. first question – Tony, you state that S&S has undergone a transformation from just another mould manufacture, albeit a very successful one, to a technology-driven manufacturing partner for your customers. Could you elaborate, and what do you (Shaun and Brendan) think about the statement?

Tony – There are hundreds, if not thousands, of job shops and manufacturers out there with the CNC equipment capable of making parts for people. The low entry cost of CNC equipment, software, and PCs today means almost anyone can "get into business." What our customers are looking for is high quality, of course, and quick turn-around, but they want more than just the "parts". They are looking for a partner, or collaborator, who can help them not only understand the manufacturing process, but show them how to "design for manufacturability". This means designing parts so they can be produced as efficiently as possible while maintaining the strict quality and functional or physical requirements necessary for the application they will be used in.

Shaun – I guess a good example of what Tony is saying is, previously, when we were given a model to create toolpaths for, we might recognize where a design change could reduce manufacturing time (cycle times) or maximize use of raw material, the time it took to implement the change would be so prohibitive we just waited until the next time the project was brought in to say anything about it. With our new system in place, implementing changes takes little to no time. Therefore, we readily offer suggestions on how we can manufacture the part better, and see those recommendations being accommodated more and more frequently. That is one area, I see, that has changed significantly. No pun intended.



S&S Plastics using HSMWorks inside Solidworks to lay out high quality toolpaths.

Brendan – Even though many of the changes occurred before I was moved into programming I can definitely see a big difference between the way we used to do things and the way we interact now and are more involved in the design process.

Shaun, you said that changes are quickly implemented. How does HSMWorks play a part in that process?

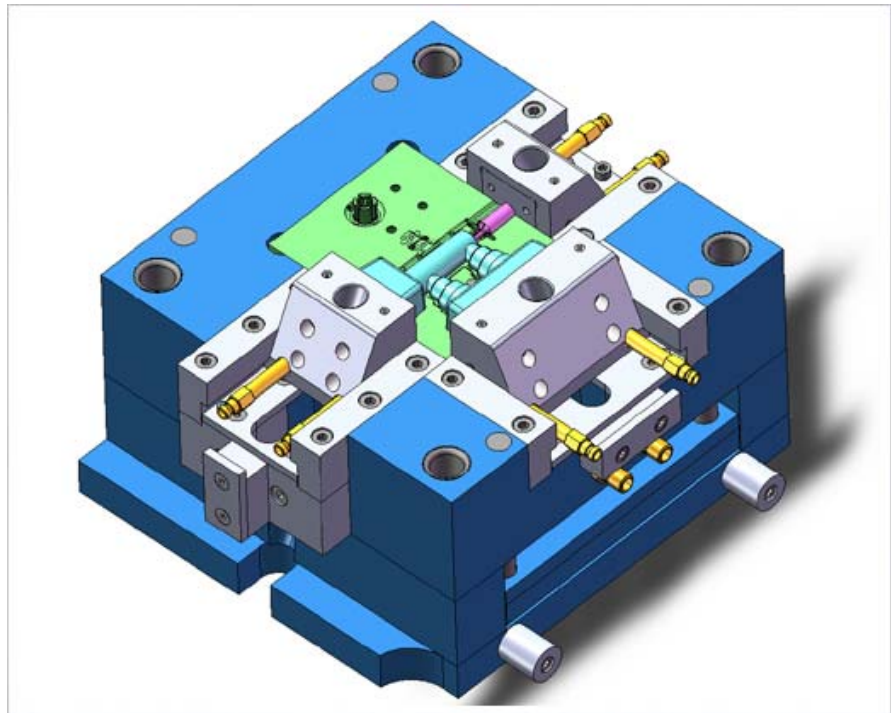
Shaun – It is very easy to make the changes in SolidWorks, assuming the designers sign off. The real time savings is in the toolpath creation. With the SolidWorks model open, HSMWorks immediately alerts us to all affected toolpaths. That is, toolpaths that need to be regenerated. The toolpaths can be updated with the click of a button. And, HSMWorks is fast. Even the largest finishing toolpaths are done in less than a few minutes. So, the entire change process can be completed in fifteen to twenty minutes at the most. In the mould making business that is very fast.

Tony – That is an important point. When we evaluated HSMWorks that was one of the criteria we used to make our decision. How fast could HSMWorks update when changes were made. It [HSMWorks] passed that test without question.

Speed is one of the areas our developers spend a lot of time focusing on. What about the quality of toolpaths you are getting from HSMWorks? How do they compare with what you previously used?

Shaun – I was responsible for the initial evaluation of HSMWorks and reported directly to Tony. What impressed me, as much as how quickly I was able to produce toolpaths with HSMWorks, was the quality of the toolpaths that were produced. 3D is a big part of what we do, so the 3D finishing toolpaths had to be efficient and give us the surface finish we wanted. We also needed all the various toolpaths one would use for machining in 3D such as radial and spiral in addition to the traditional 3D finishing toolpaths like parallel and horizontal. In every case the toolpath motion was very smooth. Progression from one part of an area being machined to another was efficient and retracts were kept to a logical minimum. And, although each toolpath was ideal with the default settings, I still had the flexibility and option to change all the necessary aspects of the toolpath that I might want to change. Again, I rarely had to change any of the defaults, but it is better to have the option and not use it than not have it. As far as how the toolpaths compare to what we were used to, or what I was used to, I would say that they were as good or better in every instance. But, the fact that I could create them so quickly and with such little effort really made HSMWorks stand out.

Brendan – It was obvious that when HSMWorks was designed the programmers had the input of people with a lot of 3D experience. For example, when I was a tool maker operating a machine cutting a complex core or cavity I would watch in amazement when the cutter would retract for no apparent reason or re-machine areas that were already cut. With HSMWorks I



HSMWorks supports machining directly on both parts and assemblies, eliminating the need to split up complex designs.

don't see that. I don't see any wasted movement. I was worried when I started programming that it would take a lot of effort to get the toolpaths I would like to see. With HSMWorks it is so easy it is almost automatic. I know a lot of work went into making it look automatic, but isn't that what the software is supposed to do?

Shaun – I forgot to mention the 2D toolpaths. One of the things that I have found over the years with 3D CAM systems is their 2D is usually weak. I mean, you might be able to do some complex 3D work but when you get to doing simple contours or profiles the software falls flat. HSMWorks has great 2D contouring and pocketing. The 2D pocketing is even designed for high speed machining. If you look at the motion of the tool you see the same types of movement as you see with the 3D strategies. That is a great feature.

Brendan – I agree. The 2D is nice.

Let's stay on the evaluation process for a minute. Describe the evaluation process you used and what you found.

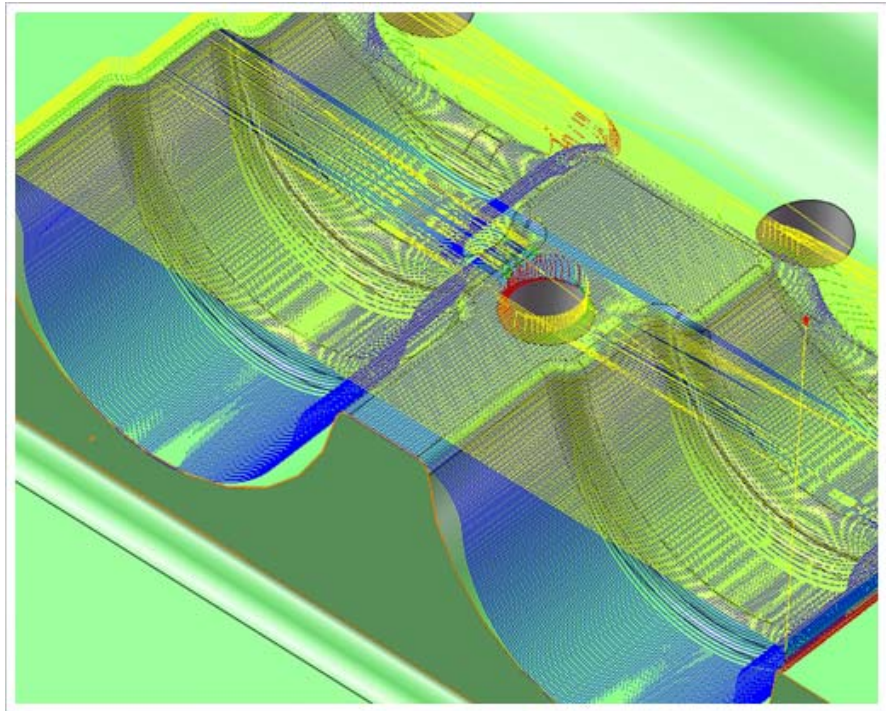
Shaun – When Tony asked me to check out HSMWorks there were three areas that were critical for me. These were ease-of-use, flexibility, and toolpath quality.

Prior to coming to S&S I had been using Edgecam from Pathtrace here in the UK. The product was easy to use and very flexible. I really liked how the software worked. It was very logical, how you created operations and built the toolpaths. S&S used Powermill from Delcam, a well known milling CAM system that is considered by many to be a high-end product. While the 3D strategies were strong, I found the application very awkward and cumbersome to use. I was also disappointed that Delcam lacked the 2D capabilities I was used to with Edgecam. With programming, especially in the mould and die business, you have to deal with a lot of changes. With the previous setup, it was painful.

My first impression of HSMWorks was that it was very easy to use and very flexible. The only way I can describe it was like putting on a well worn pair of slippers. It worked the way I wanted to work. It reminded me of what I liked about Edgecam. What I really liked though, was the integration with SolidWorks. I attribute much of HSMWorks' ease-of-use to the really tight integration with SolidWorks. I was very comfortable with SolidWorks and if the word HSMWorks hadn't been in the menu I would have sworn I was doing everything with SolidWorks itself.

With respect to 3D machining, or more specifically, machining of moulds, what features or capabilities of HSMWorks stood out.

Tony – When we bought SolidWorks we also purchased PDMWorks. The goal was to implement



Reduced machining time, improved surface quality and less tool wear with high-quality toolpaths.

a system that would allow us to quickly and easily manage all of our data. It wasn't until we bought HSMWorks that we were able to implement PDMWorks. I should say, we wouldn't implement PDMWorks until we started using HSMWorks. The reason was, before HSMWorks we were still working with a number of different files for each SolidWorks model we received or created. This was very inefficient and we didn't want to build a system around a hodge-podge of files. Once we started using HSMWorks all of our work, from MoldWorks, SplitWorks, ElectrodeWorks and HSMWorks, was stored in the SolidWorks model. This greatly reduced the number of files we had to manage and made the whole concept of PDMWorks or a PDM system make sense.

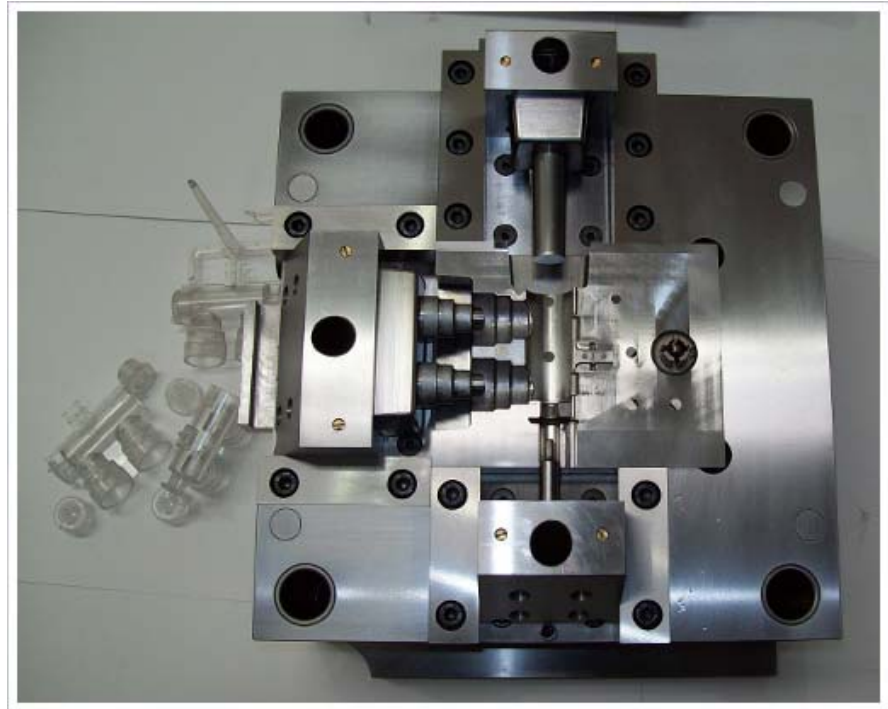
Shaun – I'll give you a quick list; first, the ability to quickly sketch a boundary for restraints or borders; second, flexibility and speed when editing existing strategies; next, editing and updating strategies is very fast; and last but not least, the number of options you have to address unique features and challenges you normally find with complex moulds or electrodes. I'll give you an example.

Let's say I have a shut-out face that I need to put some 2D borders around. I just select my strategy, sketch my borders and generate the toolpath. When I generate the path I realize that I haven't gone far enough or I've gone too far. All I have to do is modify the sketch or change a cutting variable like step-over or depth of cut to for the desired change, and with a single click the toolpath is updated. So, the time it takes to generate each toolpath and get it to the floor is very quick.

Brendan – For me I would say it isn't just one feature. I am relatively new at programming, compared with Shaun and other programmers in this field, but you wouldn't know that from the parts we cut. After forty-eight hours sitting down with Shaun I was turned loose and my first toolpaths were being cut on the floor. The toolpaths are exactly, or almost exactly, how I would want to see them on the floor when I was cutting the parts and assembling the moulds. If I need to make a change the options are there. I verify all my toolpaths before I send them out so I know what to expect when they are machined. Because I haven't worked with other CAM systems I can't say one feature stands out. All I can say is that I haven't found the software lacking in any area.

Tony - I think that is an important point, about how little training it took before Brendan could be left on his own. His experience as a tool maker and machinist was very important when it came to "seeing" and understanding or appreciating what toolpaths HSMWorks was creating. Having designed and programmed with our previous tools, I can honestly say that it would have taken six months, minimum, for Brendan to be proficient enough with just the programming [CAM] side of the process. Realistically, we would have needed to check his work for a year before Shaun or I would have been comfortable allowing him to send programs to the floor without review. This isn't an issue with his knowledge as a toolmaker, it is the fact that completed mould assemblies have so many components and may have many complex features

that an incorrect toolpath could possibly scrape a very large portion of the mould. This would severely impact our delivery times and all the schedules that depend on the finished assembly being ready on time. With HSMWorks we avoided all this. We could have justified purchasing HSMWorks on this point alone.



Finished mould and sample run parts.

The fact you have to deal with a large number of changes on a regular basis and HSMWorks allows you to address these changes quickly has been emphasized several times. Can you explain how HSMWorks helps your process with respect to change?

Tony – Because so much of our business involves collaboration we constantly deal with change. This was, I might add, one of the primary reasons we invested in SolidWorks back in 2001. Changes have to be accommodated quickly, but efficiently too. When I say quickly and efficiently I mean quickly as it relates to the specific process of making the change in the software, and efficiently as it relates to the overall process – how the change is accommodated from engineering to the shop floor. Shaun touched on one example earlier when he spoke about editing existing toolpaths. With our old system it took hours, in the best case scenario, to make changes to toolpaths. The software process was cumbersome and the possibility of missing something was always present. And, there were so many steps you had to check and double-check each change you made before you could be confident that the toolpath you were sending out was good. This affected everyone in the process chain. With HSMWorks the changes, like Shaun and Brendan mentioned earlier, are so quick to make people downstream on the floor really have no idea of how many changes we had to make before they saw a toolpath. Our customers, on the other hand, see the direct result of the effectiveness of HSMWorks because they see how fast we make the changes and maintain the fast turnaround times we are known for.

Shaun – I agree. It is common to have changes introduced throughout the design process. Sometimes these changes are minor and only require updating a single toolpath, but often they can affect a lot of toolpaths. The ease-of-use and speed of HSMWorks cannot be overstated.

HSMWorks claims the ease-of-use is directly tied to the level of integration with SolidWorks. How would you describe the integration?

Brendan – I may have mentioned this before, but if I hadn't seen the word HSMWorks in the menu or been told that the machining was a different software application I would have assumed it was just part of SolidWorks. Like SolidWorks, commands are logical and just a right mouse-click away.

Shaun – Exactly. That was my first impression when I first loaded HSMWorks and started using it. I have looked at other SolidWorks Gold Partner products and none come close to the level of the HSMWorks integration. All you have to do is install the software and look at how HSMWorks

integrates with the Command Manager and Feature Manager or Property Manager to see what I'm talking about. If there is a weakness in the integration I haven't found it.

Tony – I agree. HSMWorks really sets the standard for integration with SolidWorks. I'll tell you a quick story. Earlier this year before Brendan became part of our programming team Shaun had to leave for a week unexpected, and unplanned. I hadn't programmed a toolpath in six years but I didn't have a choice, I was the only other person with the background to get the toolpaths done and we had some urgent projects that needed to be machined as soon as possible. I launched SolidWorks and in twenty minutes I was posting programs. There is no way I could have done that with any other CAM system. We never missed a beat. (Sorry Shaun.)

So now every part of your engineering and manufacturing process, from design to production, is managed with and around SolidWorks?

Tony – That is correct. We have a fully integrated system utilizing one common application interface. I think SolidWorks calls that their design environment. I call it a single engineering user environment. Either way, this system we assembled with all SolidWorks Gold Partner products is the type of system I suppose SolidWorks envisioned when they came up with the idea for Gold Partners. At least, that is what I expected to be able to do. Have different applications from different vendors all using the same interface and work flow based around the SolidWorks model. With HSMWorks we are proof that such a system is possible.

Do you think you have given away any trade secrets in this interview? Are you worried that your competition may try to emulate what you have done?

Tony – We're not worried. Most people get into a set way of doing things and any thought of changing is too much to handle. Assuming, even, that the company they work for would make the investment to change. Plus, even though we have a great system it is the people who helped design the system and use the system on a daily basis, and their experience and expertise, that makes S&S the success that we are. Like the old saying, it's not the clothes who make the man, but the man who makes the clothes. But, it always helps to start with nice clothes.

Well said. Any last thoughts?

Tony – I can only say that we are very happy with HSMWorks and recommend to anyone using SolidWorks that needs a great integrated CAM solution to take a look serious look at HSMWorks.

Brendan – I agree. When are you guys going to come out with some hats or shirts?
(All three laughing)

We're working on that. Thank you guys for taking the time to share with us about S&S and your experience and thoughts on HSMWorks. We appreciate it very much.

Tony – It's our pleasure.

About HSMWorks ApS

HSMWorks ApS, headquartered in Copenhagen, Denmark, is the developer of next generation integrated CAM solution HSMWorks and the HSMWorks Add-in for SolidWorks. HSMWorks is a SolidWorks Gold Partner. For additional information on HSMWorks ApS and the HSMWorks product line please visit www.hsmworks.com.

About SolidWorks Corporation

SolidWorks Corporation, a Dassault Systemes S.A. (Nasdaq: DASTY, Euronext Paris: #13065, DSY.PA) company, develops and markets software for design, analysis, and product data management. It is the leading supplier of 3D CAD technology, giving teams intuitive, high-performing software that helps them design better products. For the latest news, information, or a live online demonstration, visit the company's Web site (www.solidworks.com) or call 1-800-693-9000 (outside of North America, call +1-978-371-5000).

About S&S Plastics

Plastic injection moulding company, S & S Plastics was formed in 1989. From its original base in Ilkeston, Derbyshire the company has expanded several times to meet customer demand. It

now occupies a custom built 21,000 square feet site at its state of the art head offices in Kirkby-in-Ashfield, Nottinghamshire. S & S Plastics have the whole range of facilities and experience to take your ideas through from design and rapid proto-types, to the complete finished product. Our cutting edge in-house tool room facility ensures quality tooling, on time, every time. S & S Plastics also offer specialist services to the double glazing industry and hold in stock over 600 hundred components that can be delivered at short notice. For more information visit the company's Web site (www.ssplastics.co.uk).

About 42 Technology Ltd

NOTE: The product images contained in this case study are that of a mould set designed by S&S Plastics for a part designed by 42 Technology Ltd, a highly innovative and in-demand design firm in the UK focused on the Energy, Packaging, Healthcare and Medical, Food & Drink, Consumer, and Industrial markets.

Located in St. Ives, UK, 42 Technology has been developing products for clients since 1998. Their industry experienced engineers have a track record covering the full range of the product development life cycle. They have a reputation for delivering innovative product developments to time, budget and requirements.

Their facilities and skills mean they can effectively develop products designed for manufacture to be made at your manufacturing site, off-shore, or they can find manufacturing partners for you. Their engineers' skills cover technology strategy and management, mechanical design, quality systems, structural analysis, physics, sensors, instrumentation and mechatronic devices. For more information visit the company's Web site (www.42technology.com)

HSMWorks is a trademark of HSMWorks ApS. All rights reserved. Copyright 2008 HSMWorks ApS.

SolidWorks is a trademark of SolidWorks Corporation. All rights reserved.

S&S Plastics is a trademark of S&S Plastics. Mould design and images property of S&S Plastics. All images copyright S&S Plastics, used with permission. All rights reserved.

42 Technology is a trademark of 42 Technology Ltd. Product design is copyright and property of 42 Technology, images used with permission. All rights reserved.