From computer screen to 3D model

By Jessica Twentyman
Published: March 18 2010 16:30 | Last updated: March 18 2010 16:30

The average householder may not pay much attention to the modem tucked away in their living room or home office – but Eskild Hansen certainly does.

As head of Cisco's European Design Centre in Denmark, it is his job to make sure that the company's networking products for consumer markets are not clunky pieces of IT equipment, but eye-catching objects of desire.

He brings his passion for Scandinavian design to the task – he peppers his conversation with references to Arne Jacobsen's Ant Chair and Poul Henningsen's classic lamps for Louis Poulsen Lighting; and he learned a vital lesson working for David Lewis, now chief designer of Bang & Olufsen's distinctive range of audio products, televisions and telephones.

"It was working with David that I learned the importance of making models in the design process," he says. "You can achieve amazing designs using software tools, but they are no substitute for having a lifesize, 3D model in your hands.

"If you're sensitive to the shape and proportions and physicality of the product you're designing, you can't evaluate what you've achieved – or refine your ideas effectively – from a computer file," he says.

At one time, the Design Centre employed a professional model-maker to painstakingly sculpt prototypes of technical equipment – such as routers or remote control units – from foam.

Today, Cisco's designers simply send files from their computer-aided design package, SolidWorks, to a specialised 3D printer. Over a number of hours, the printer builds a replica of the design out of gypsum and glue, one thin layer at a time, at a rate of about one inch of vertical height per hour.

Cisco's designers can then pass around the resulting mock-up, mark it up with pencil, revise their designs in the software and print out new models – repeating the cycle as often as necessary to achieve the desired result. Towards the end of the design process, 3D models are often "printed" in full colour.

"3D printing is also known as 'additive manufacturing', because you start from nothing and build up layer by layer," explains John Kawola, chief executive of ZCorp, the company that makes the machines used by Cisco.

The machines are not cheap – the model used by Cisco costs just under $40,000 – but they offer engineers and designers the chance radically to accelerate design-cycle times, says Mr Kawola, "whether they're designing a new running shoe or components for a nuclear submarine."

The company's 3D printers have also been used by architects working on Antoni Gaudi's unfinished La Sagrada Familia church in Barcelona.

The machines use a modified form of inkjet printing, where the printer heads squirt a liquid binder on to a bed of white powder, but only in the areas where the layer needs to be solid, Mr Kawola explains.

The bed is then lowered by a fraction of a millimetre and a new layer of powder is applied. The process is repeated until the model is ready and the material has set, at which stage any loose powder is blown away by airjets.

The market for additive manufacturing was worth $1.2bn in 2008 and could double by 2012, according to Terry Wohlers of Wohlers Associates, a Colorado-based consulting firm that works closely with manufacturing organisations to identify the best approaches to rapid product development.

He estimates that 3D printers account for around three-quarters of that spend and high-performance industrial machines the remainder.

Along with ZCorp, other companies in the 3D printer market include Israeli company Objet Geometries and US-based Stratasys and 3D Systems. Approaches vary, but what these machines have in common is that, instead of paper and ink, they are loaded with glue and modelling materials.

For Mr Hansen and Cisco, 3D printing has given his team a faster way to apply its exacting design standards, increasing the pace of product development. Models are created in hours instead of weeks and for approximately one-fifth of the cost, he says.

It has also helped his team to share their design concepts with colleagues in the US, because CAD files can be sent directly from Denmark to 3D printers in the company's design centre based in Irvine, California.

"We get prototypes quickly, we refine them quickly and we create new ones. The elite designs that we produce can't be created on computer screens alone. In fact, you could take me to an electronics shop and I could instantly spot the products that are created that way, because they're no match for the end results that we're achieving," says Mr Hansen.

Print article | Email article | Clip this article | Order reprints

Twitter | Digg | LinkedIn | Yahoo! Buzz | Delicious

reddit | BX | Facebook | stumbleupon | Viadeo

MORE IN THIS SECTION

Sorting out the printing device 'zoo'
Options open up for the minimialist business
IT seeks to speed up product recalls
News & reviews: Wikipedia rules
View recent article archive