



The latest version of the Ghetto Blaster on display at the drupa show in Düsseldorf, Germany, May 31st – June 10th, 2016. It has been produced to work as an industrial production machine and is front loaded. It is also stackable and thus has a stable framework so that a number of them can be built into a 'wall of production'. On the photo Santa Buka (International Sales & Marketing Manager) and Nick Verschoor (Software & Electronics Engineer).

SDD ghetto blasts its way to the forefront of the 3D industrial printing market

About SDD

SDD (Smart Dedicated Design) manufactures and resells document finishing solutions for the graphic and digital printing market. Founded by Roland Oudsen in 1999, the company offers finishing solutions for in-line, near-line, and off-line use, in addition to a wide assortment of supplies for the binding, stapling, coating, laminating, collating, feeding, creasing, folding, cutting, and perforation of both digital and offset output. Out of the seventy staff members currently working within the organization, around twenty are engaged in the R&D development of high-quality

In the rural backwater of Emst in the middle of The Netherlands lies the headquarters of SDD B.V., a company of around seventy employees specialized in the provision of finishing solutions for the graphical and digital printing industries, and since very recently, the proud producers of the Ghetto Blaster a unique form of industrial 3D printer. 3D fab+print talked to Roland Oudsen (inventor, entrepreneur and owner) and Arnoud Kerkhof (Managing Director) about their company, the Ghetto Blaster, and the prospects that it will open up for those engaged in the production of plastic parts around the world.

By Gillian Gane and John Butterfield

finishing products using advanced technologies. Today, SDD organize the entire production of their machines – from

design and development to manufacturing, delivery, and maintenance of its document finishing solutions. Moreover, they are presently working on the development of a prototype machine for the production of 3D printed parts.

3D printing at SDD

“There was never a moment when we suddenly decided to start 3D printing at SDD,” says Mr. Oudsen. “It was more something that we gradually migrated towards because of need.”

At SDD they build a lot of different types of machinery and as such they became aware that they needed more flexibility

in the production of the plastic parts they use in their machine building. It wasn't feasible to outsource their production through molding techniques as this proved far too expensive, particularly when you consider the relatively low numbers they needed and the amount of work that went into machining and milling these, after molding, to perfect their shapes before use. Furthermore, the delivery times of the molded parts to them could sometimes be up to three weeks or longer making their production planning difficult.

As they needed to produce parts that were identical, 3D printing therefore seemed an ideal alternative solution. However, looking around at the printers available on the market that could meet their needs, they found them all very expensive to use. The printers' raw materials, for instance, were expensive because the printers could only use very special types of certified plastics from chipped cartridges. For a 3D solution to be effective for printing SDD's parts they needed to achieve a good cost price on the products they produced.

"We looked at plastics which could do exactly the same job for us at 30–50 euros per kilo on the market as opposed to the 500 euros a kilo being offered by many printer builders. Additionally, most printers we looked at were only capable of producing very limited part-shape sizes. Slowly it became obvious to us that if the printer that we needed was not on the market then the only alternative would be to go about building it ourselves," states Mr. Oudsen. "The prototype that we have produced is 5x less expensive than competitive printers (if you can call these comparable with ours since they cannot handle the shape sizes we can) and the material is 10x cheaper, which makes it already a resounding success!

The Ghetto Blaster

"When I started out to design the 'Ghetto Blaster' as we call our 3D printer," says Mr. Oudsen "I naturally had a vision of what it would look like upon completion. Conveying this idea to our group of young engineers was, nevertheless, not easy as they did not have a clear notion of what a 3D printer should resemble, let alone this particular model. However, the breakthrough came when I jokingly said

"There was never a moment when we suddenly decided to start 3D printing. It was more something we gradually migrated to because of our needs."

it had to look like a Ghetto Blaster radio because for me the placement of the spools containing filament thread in the machine would look very much like the loud speakers of a large street radio. The engineers were suddenly able to visualize the idea perfectly."

"Then at the end of 2015 a journalist from the Graficus visited us to write a story about our 3D printer for the January 2016 edition of the magazine. The title of his article became '3D Ghetto Blaster from Gelderland' – Gelderland being the province of the Netherlands in which our premises are located. And so quite simply we realized that the words 'Ghetto Blaster' had automatically evolved from being an explanation to engineers, to a catch phrase, and so into a production title and a good one at that, albeit not one that we had ever originally intended to launch and market the product under", continues Mr. Oudsen.

"The Ghetto Blaster has been entirely produced to act as an industrial production machine," adds Mr. Kerkhof "and as such it is front loaded. It also had to be stackable and thus it had to have a stable framework so that a number of them could be built into a 'wall of production' – no mean feat when you think that each one weighs something like 600 kg."

The prototype which was built has a number of unique characteristics, which will drive its sales later on. Firstly, it can print extremely accurately and reliably. Moreover, it offers the capability to print more than one part at the same time with the same machine. At present the prototype works using four heads but already SDD are thinking ahead to the next generation, which will have eight heads. It is therefore not surprising that they have patented the idea of printing using more than one head.

To be able to detect whether products are being printed correctly, the machine also contains a sensory alarm system. If something goes wrong it goes into pause mode. The operator can then solve the problem before starting up production again. The technique is, moreover, operable from a distance in that it is connected to the internet. As such the technician does not need to watch over it 24/7. Additionally, it has an interface



Roland Oudsen (inventor, entrepreneur and owner) of SDD on the left and Arnoud Kerkhof (Managing Director) on the right.



There are a lot of machines on the market that can print 12 cm x 12 cm x 12 cm. However, when you are printing parts of 120 cm x 60 cm x 30 cm, as the Ghetto Blaster does, then the printer may have to run for 300 hours without a hitch. Producing these dimensions means that you have to raise the quality bar considerably.

displaying all system information. If the machine stops the technician knows why. At present SDD is further developing an interface that sends SMS messages when maintenance is needed, i.e. when a spool is empty or needs to be replaced.

Check, check, and double-check

These types of built-in quality check are a core competency of the company and something that staff is very proud of. Ar-noud Kerkhof: "Quality checks and control systems are built in throughout our whole production processes and into the assembling of our machines. We call this 'check, check, and double check'. It means that at least two people check every sub-assembly and every part before it gets placed into a machine. This inevitably creates a guaranteed quality. Over the past four years we haven't had one occasion when even a single piece of equipment that was shipped out failed to function on arrival at its destination. What we do is not cheap but it does bring savings since you can imagine the costs involved if we had to send a technician to the other side of the world – this is how far our exports reach today - to attend to a faulty delivery.

At the time of writing this article, SDD are building two new Ghetto Blasters. They will be second generation machines that

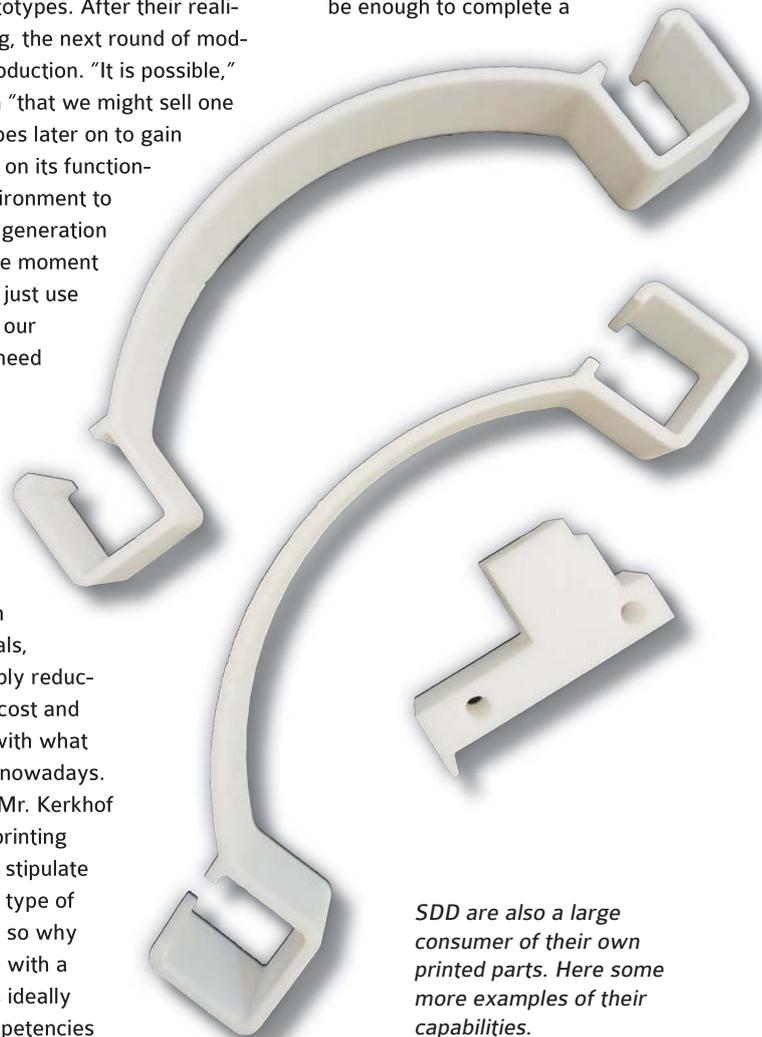
will incorporate the experience of building the first two prototypes. After their realization and testing, the next round of models will be for production. "It is possible," says Mr. Oudsen "that we might sell one of these prototypes later on to gain further feedback on its functioning in a user environment to build into a third generation model, but for the moment we will probably just use them to produce our own parts – we need so many.

A special quality of the Ghetto Blaster is that the customer can print his own choice of materials, which considerably reduces their printing cost and fits in precisely with what customers want nowadays. "After all," says Mr. Kerkhof "when selling a printing press you do not stipulate what quality and type of paper to be used so why should you do so with a 3D printer?" This ideally fits the core competencies

of SDD as machine builders rather than a printer material developer. The focus of sales will be a matrix of industries in the professional production market. Roland Oudsen: "We believe that there are many companies like us out there who produce machines and need plastic parts to help build them. When mass production is not an option then 3D printing provides a very lucrative alternative. We have calculated that using the Ghetto Blaster solely for our own production needs, we have had a return on investment within three months. This is not an exaggeration."

Future developments of the Ghetto Blaster

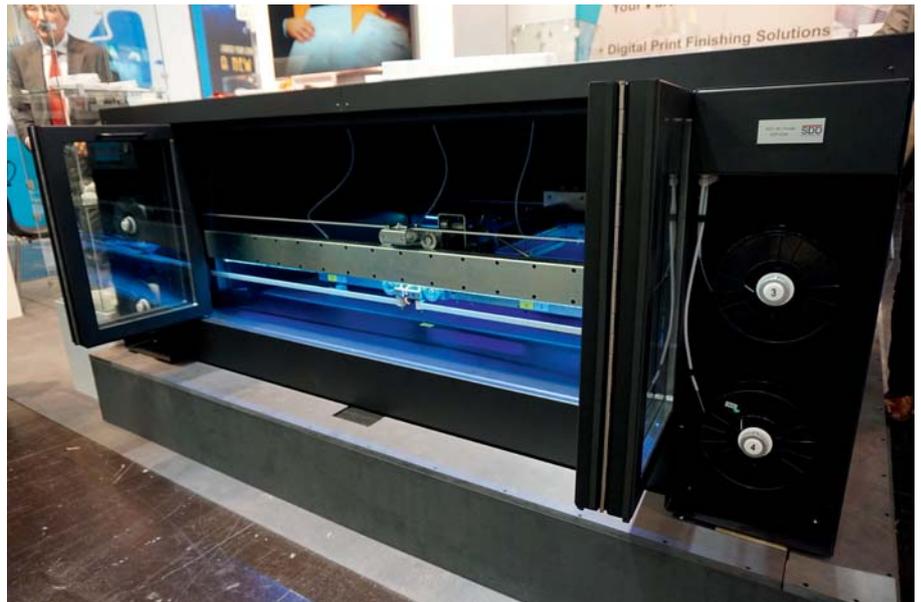
In 2017 SDD plan to start printing parts using granulated material from a silo attached to the printer. This will increase tremendously the quantity of material available to print parts in any production run. The reason behind this is that producing parts uses a lot of filament. Even a spool of 2.5 kilos may not be enough to complete a



SDD are also a large consumer of their own printed parts. Here some more examples of their capabilities.

part. By coupling the Ghetto Blaster to a granule feed from a silo an unlimited supply of printing material will be available. Another interesting aspect is that the price of granules is ten times cheaper than other currently marketed material. Oudsen: "We now pay 30-50 euros for one kilo of plastic but granules only cost 3 – 5 euros per kilo, which will really make industrial printing competitive." The company is already working with extruders but they will wait until the process has been entirely perfected before combining it in their printers.

When building the Ghetto Blaster, SDD decided that the surface where the part is printed would be stationary. Not many printers have this. Most have a moving table where the part is built up. However, when producing high or thin parts a moving table is not suitable because the weight of the surface will change all the time and a bigger part will become heavier as it is built so the accuracy of the build will be less. In the Ghetto Blaster the printed parts do not move. Instead the printing heads move in three directions.



The Ghetto Blaster clearly showing its front loading capacity.

you are printing parts of 120 cm x 60 cm x 30 cm, which we do, your printer may have to run for 300 hours without a hitch. Producing these dimensions means that you have to raise the quality bar considerably. You have to not only completely

to learn from, and supply to, a number of multi-national partners such as Canon, HP, Konica, and Xerox. Because we work for so many printer vendors around the world we have come to understand each one's need for quality and as such the importance of the different international standards like TÜV GS (Germany) and UL (USA) in providing this. This makes it easier for us to service them individually. As such we will see that all our machinery meets the necessary international standards and we will look to independent quality programs to get UL printer approval to provide us with any needed credentials.

"The prototype we have produced is 5x less expensive than 'competitive' printers and the material it uses is 5x cheaper."

The weight of the printing heads is therefore always the same. This improves the accuracy of the print independent of how big it is. At present they are striving to achieve an accuracy of 0.04 millimeters.

Unique print sizes

Apart from the accuracy of printing, the prototype has already proven itself capable of running for long unattended periods. On many occasions it has run 24/7 for 60 hours without needing to stop printing. It has also already clocked up 5000 hours of trouble-free printing. And trouble free printing is something that SDD take as having to be a given. Roland Oudsen: "When you want to print large parts the reliability of the printer has to be exceptional. There are a lot of machines on the market that can print 12 cm x 12 cm x 12 cm. However, when

understand the 3D printing process but also the workings of the equipment and how it is affected by heat. For example, you cannot buy linear guides that have to deal with temperatures above 80°C you have to develop them yourself, which we have done to ensure that our processes are completely under control.

Worldwide dealer network

"Once we have gone into production with the Ghetto Blaster," says Arnoud Kerkhof "we intend to look for some medium-sized dealers around the world to support us with sales and maintenance. These dealers, who excel in their job, will be those selling for more than one big brand name. By securing a quality dealer we will be able to concentrate on what we do best, which is machinery development and building. Other than this we will continue

Reflections on drupa

"The Ghetto Blaster was displayed at drupa 2016 in Düsseldorf, Germany. It is a place where we are well known as a company. Interestingly, for the first time this year drupa looked seriously at possible integrations of 3D printing into the 2D graphical printing and packaging industries. There we bumped into colleagues and friends and all the other graphical machine builders," says Arnoud Kerkhof. "It provided some very interesting sales opportunities for the Ghetto Blaster, not to mention the chance to check out the whole consortium of other excellent products and services there."