

*Circular Shapes, Fine Details & Accurate Dimensions are capabilities of Blueprinter M3*

# Blueprinter: affordable 3D print

**Blueprinter is a young additive manufacturing company with vision, drive, and ambition. The approach of its founders was simple but effective: to provide all businesses – manufacturers, architects, engineers, and educational institutions all around the world with the capability to print professional 3D prototypes quickly, efficiently, and in almost any shape. This from the various companies' own offices at an affordable price with easy to understand technology. We talked to Niels Appel, Blueprinter's CEO, about the company's plans both for now and in the future with regard to their unique technology and practical ideas.**

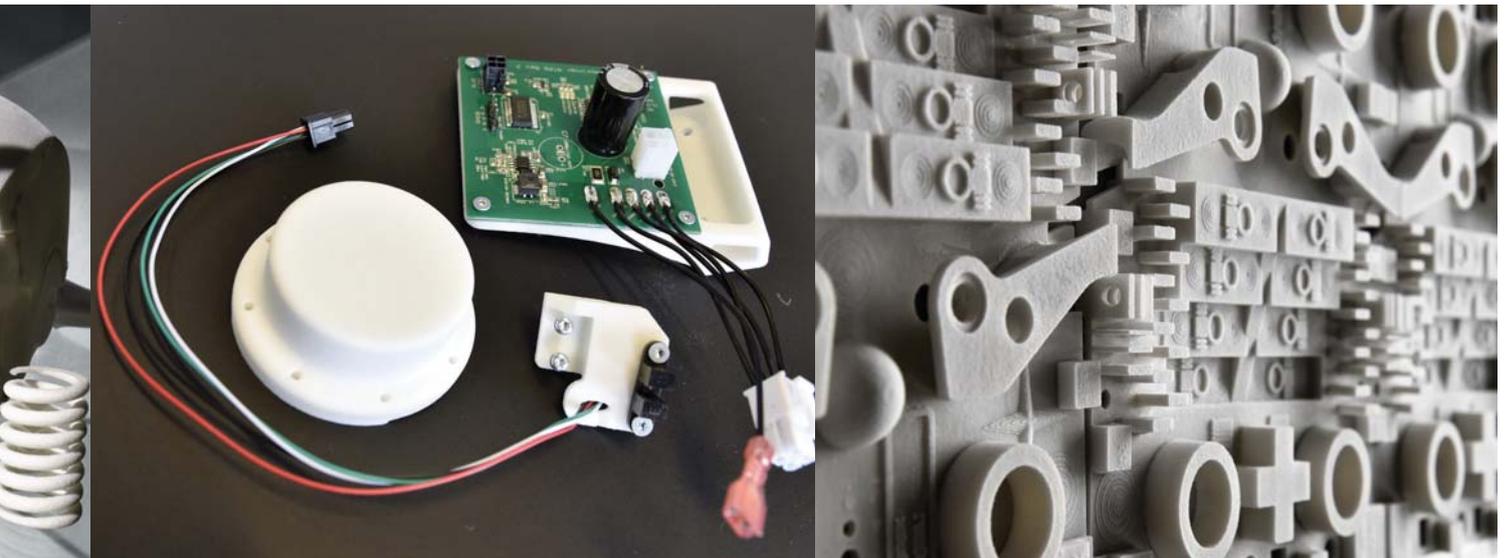
*By John Butterfield*

## A short history of Blueprinter

Blueprinter, a company with headquarters in Copenhagen, Denmark, is bubbling with enthusiasm, expertise, and strong commercial ideas. It was founded in 2008 when two mechanical engineers, Frederik Tjellesen and Anders Hartmann, were even inspired to develop an easy-to-use 3D printer that was affordable for very small businesses. Whilst they had been students at the Technical University of Denmark, Frederik and Anders had been using 3D printing in some of their jobs and they found it difficult to accept that such machines had to be expensive and complex. Their approach was uncomplicated: very few companies can justify, or even afford, paying upwards of €150,000 for the capability of printing 3D prototypes so they set out to make this technology widely accessible to small manufacturers everywhere, and Blueprinter came into being.

As a team they had the idea of using a low-cost thermal print head instead of a traditional expensive laser and this quickly proved to be a viable solution, resulting in their first printer being built in 2009. In the years immediately following, they combined their efforts between research work and looking for funding, leading up to 2012 when

the Blueprinter team was introduced to potential customers in Birmingham, UK. The client became their first partners in Europe and Blueprinter's European Sales Office was established. Only a year further down the track and an improved model of the Blueprinter was launched, which not only speeded up printing time but also virtually eliminated the loss of any time between prints. 2014 saw them set up their first deal in Asia and a brand new Blueprinter M2 was brought on to the market, whilst 2015 resulted in them covering all the countries of Europe businesswise, and starting to expand in Asia. This short journey brings us up to date in their milestone chronology, and early 2016 sees the company consisting of a group of around twenty highly skilled and dedicated engineers, programmers, and sales people with their headquarters in Copenhagen, Denmark, sales in Denmark and the UK, and dealers all over Europe and Asia. They are very much a di-centric company having outsourced all their production to FLEX who manufacture their machine parts – even their sales activities are outsourced to a certain extent. "Effectively," says Niels Appel "we only work and sell for our partners and the sales that we primarily do is servicing our partners and helping them to become more efficient in the marketplace."



# ting on a worldwide basis

## Industries being served

“As a company we serve three main industries,” continues Niels Appel. “The first is manufacturing/engineering, where we service companies who are busy developing new industrial products. For example, the Blueprinter printer can be used to easily create fully functional samples for designs in progress and for making prototypes which can vary from anything from hearing aids to security devices, and smoke alarms. As such, it is possible to make tough and strong finished prints available for testing and these can be used in practice and tried out before the final product is taken into production.

Additionally, the Blueprinter company collaborates intensively with the medical industry and similar types of institutions. Niels Appel: “Our printer can provide the ideal output for printing bone structures for complex reconstructive surgery, or for the production of medical models which are further used in medical schools and hospitals. They are produced using .stl files from CT or MR Scan data, and the resulting printed parts provide solid models, which can be drilled or metal-work fitted prior to surgery. Printing part of a bone or part of a brain, for example, enables the surgeon to see a true copy of what he/she will come across when surgery commenc-

es so that he/she is far better prepared for the operation – particularly when this involves difficult procedures.” Moreover, Blueprinter regularly provides printers to companies who make implants, the implants being used when broken bones need to be joined together or bone parts need to be replaced, for instance. As such, not only models of the bone, but also prototypes of the implant can be made so that the surgeon can be certain that they fit together precisely before surgical use.

Having this facility available can save a hospital hours in planning, and costs, not to mention operating theatre time, meaning the patient spends less time under anesthetic and in recovery before being able to go home. “One example of the type of relationship we have is with a customer in Turkey that prints the foresides of implants. This company works for Turkish hospitals and designs titanium implants for them using Blueprinter technology,” remarks Mr. Appel.



Niels Appel, the CEO of Blueprinter ApS.

The third segment that Blueprinter services are those dealing with design and education. For the design market, Blueprinter provides finished, high-quality parts for presentations or fully formed designs, to scale or otherwise. "As a tool it is an easy-to-use model creator for designs in progress," adds Mr. Appel. Blueprinter therefore works in close cooperation with a number of technical universities that educate students in the latest technologies – one of these techniques happening to be powder-based sintering technology. "There are a large number of universities currently building or setting up 3D printing laboratories and we sell them our equipment and materials and also train the university teachers. We have worked with a number of universities in this way – the very first one being the Technical University of Denmark and from there we moved to Loughborough and Nottingham Universities in the UK, and then on to universities in Russia, so that today we are cooperating with universities throughout Europe. Our technology is ideally suited to this work." Additionally, the company also has close ties with education in design schools. One of the advantages of powder-based systems is that the products they produce are self-supporting structures in a true free form. Educational designers particularly like this as by using this technology, it is possible to push back design boundaries. "Fitting also into our design segment is architecture," adds Mr. Appel. "With Blueprinter it is possible to create 3D prints of buildings, and sculptures. Importantly, they can be created to any scale using web-based software. The solid prints and practically limitless possibilities for creating shapes are perfect for presentations."

### A new M3 printer

"At present, we are particularly excited about our latest printer which we started to supply to markets as of October 2015", points out Mr. Appel. "As its name suggests, it is a third generation of Blueprinter, which has been purposely built to service the future. We believe that in the coming years the key to success will be in the development of the properties of the materials you are printing rather than in the hardware used for printing and what makes the Blueprinter M3 stand out is that it is capable of handling multiple materials."

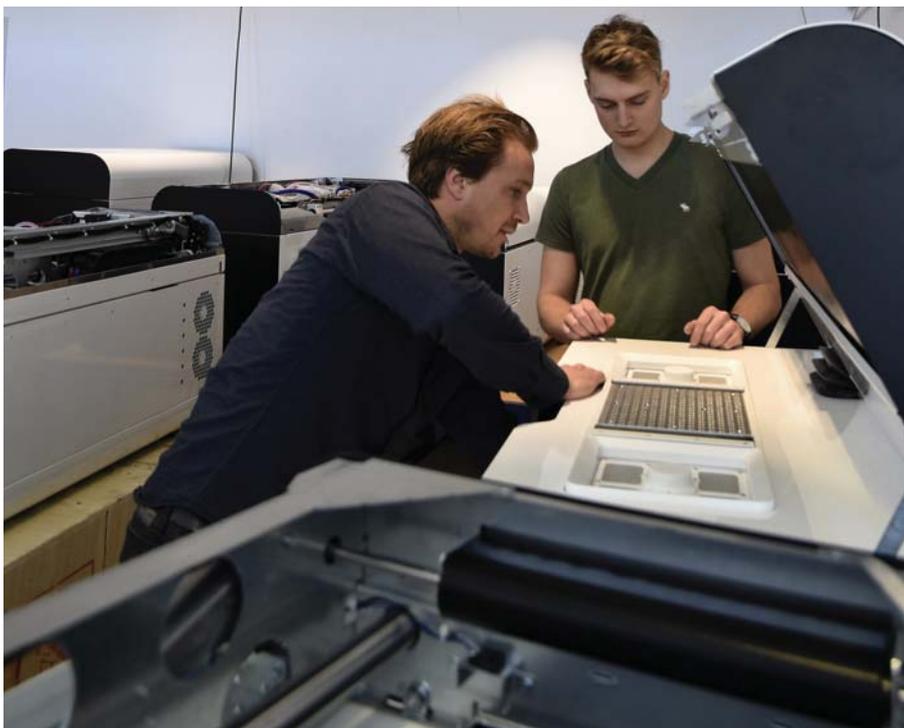


Inside the Quality Lab.

### Developing materials

To date, Blueprinter has developed two different materials – one being fairly flexible and soft, the other being sturdier and significantly stronger. Both materials were developed specifically for producing different production parts. The flexible and softer material, whilst not exactly an elastomer, can be considerably twisted and bent through 90 degrees without tearing or breaking. It can be used to put around and protect sharp edges or blades during transportation, for example. The other Blueprinter material can be used to make snap-fit assembly parts, where the design features need to be sufficiently strong so that the parts can be locked together.

**SHS®-COPA60:** At the time of writing this article Blueprinter has just launched a third, new material, SHS®-COPA60. It prints as a relatively strong and stiff material and will be targeted for use in the manufacturing and product design markets. "The new material represents a major opportunity for us," says Mr. Appel "in that it enables Blueprinter to now print much finer details, and with a higher strength. What is especially important is that it will enable our clients to print exactly the same things as with a 300,000 US dollar laser sintering (LS) printer at only a fraction of the price and, as such, will open up a bigger part of the functional testing market to us."



One of the Founders of Blueprinter, Frederik Tjellesen, and Quality Engineer Dines O. Jepsen, looking into the Blueprinter M3.

### Cleaning Station Cy-Clean

Blueprinter team has gone about improving the situation and ensuring that practically no powder gets outside their equipment so that it is now possible to carry out your printing process completely cleanly, even in your office.

### Future Markets, Partners and Strategy

Up till now, Blueprinter has primarily operated in Europe. The last two years, however, has seen them beginning to expand into Asian countries. This fits in well with their vision and strategy since right from the outset they had a dream to 'conquer the world'. "We wanted to start close to

our home in Denmark when we began in business so that we why we commenced doing business in Europe," Niels Appels states. "However, late last year we moved in to the fast growing Asian markets and our plan is to even move into the US market towards the end of 2016. We are actually very excited about the opportunities in Asia – particularly in China and Japan. Besides having all the advantages that we see in Europe, there are many Asian countries where the physical footprint of the printer is important. If you go to Japan many of the companies do not have a lot of space, especially if they are located in the vicinity of Tokyo area. Here, we can therefore differentiate ourselves in that

our printer can be located in a relatively small room. Equally important is that the Asians also appear to be very enthusiastic about our technology and its capabilities."

### Vision for the Future

"Our ambition for the future is that every design engineer should have access to a Blueprinter," says Niels Appel "so that they can print out their own work". This contrasts sharply with the current situation where most printing is carried out by a 3D design specialist and not the design engineer himself/herself – the 3D design specialist being either an extra service provider or an internal 3D printing service department. To understand the importance of Mr. Appel's analogy you have to go a few years back and compare the situation to 2D printing when most of the bigger companies would have an internal printing shop. Then everyone had access to a printer to produce their documents. "So instead of the 3D design engineer sending his part to a service provider or an internal specialist," says Mr. Appel "we want him/her to just be able to press 'print' and the part will be produced. This naturally also requires that the printer is easy to use, for an engineer does not want to have to spend two weeks in school learning how to print out in the material that he wants. We have developed something quite exceptional in that I can teach you to print in about five minutes."

Another area that Blueprinter will continue to concentrate on is the development of new printing materials to meet the needs of a market that necessitates ever more specific material qualities for the rapidly increasing diversification of application fields in which 3D printing can have an impact. With the announcement of SHS COPA60, Blueprinter has taken a first step along this path. Another step is the development of their new M3 printer capable of handling multiple materials.

### In conclusion

"With the Blueprinter, we have set out to produce an office friendly, 3D printer that will enable millions of CAD users and university engineering seats around the world to produce their own prototypes – fast, easily, practically in any shape, and at an affordable price. The world is our oyster and we aim to keep expanding and spreading our technology towards these ends," concludes Mr. Appel.



The headquarters of Blueprinter Aps at Esromgade in Copenhagen, Denmark.