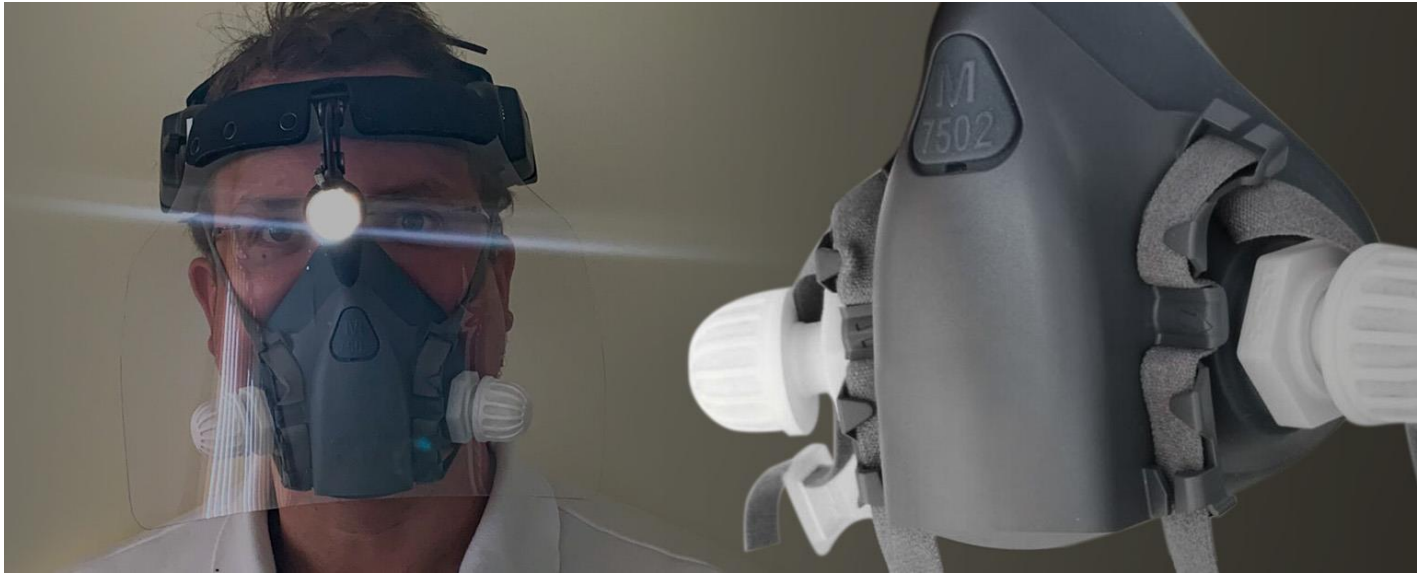


A Response Action to COVID-19 Crisis from Senior German Doctor Utilizing SLS Technology





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"As otorhinolaryngologists, we work in the very close vicinity of the patient, thus are under an increasing risk to become infected with the corona virus ourselves. This would not only result in an additional health hazard for doctors and patients, but we also lose an urgently needed medical specialist for several weeks. Moreover, without any suitable breathing protections, we are not able to carry out any operations which can have fatal consequences in an emergency."

Senior Doctor of Helios Hildesheim. Dr. med. Markus Pietsch

Company

Helios Medical Center

Industry

Medical & Healthcare

Printer Model

MfgPro230 xS

Printing Technology

SLS (Selective Laser Sintering)

Material

sPro12w

BACKGROUND

Why it happens?

How adapters for protective breathing masks help doctors & surgeons to uphold anti-virus protection to overcome deficits caused by supply bottlenecks and how a senior German doctor uses 3D printing during the crisis.

Protective Equipment

Global supply chain have been interrupted for weeks. Millions of urgently needed protective equipment for medical staff, such as FFP2/FFP3 breathing masks, have been ordered worldwide, but doctors in Germany have not received all orders.

Media reports are trying to keep up, they are updated daily, and partially revised again. Reports mention deliveries from China are intercepted on the tarmac, and as a result, large quantities of breathing masks do not reach the police and doctors in Germany.

At this point, we neither want to confirm nor deny these reports. However, these reports and forecasts certainly create insecurity among doctors, surgeons and nurses.



*Image of protective equipment

How it happened?

Will there also be supply bottlenecks here?

Will our stocks of protective equipment be sufficient?

What will happen to patients, when we are no longer able to carry out operations due to the lack of suitable breathing masks and filters?

What will the situation be like in Germany in a few weeks time?

On April 3, 2020, Dr. Markus Pietsch from Helios medical center in Hildesheim dealt with those thoughts. As the leading senior doctor at the clinic for otorhinolaryngology & head and neck surgery, his main objective is to assist patients and his employees during this crisis and to maintain high quality treatment.

CHALLENGE

The Ideas:

1. Certain filters used for patients in daily clinical practice are still available in sufficient quantities in many medical centers, or can be delivered by the manufacturer within a short time.
2. This available filter material which have been tested in the operating rooms, could be used on half masks .
3. However, there are no suitable adapters available on the market. Also, there would have to be many individual solutions, because of the wide variety of connector types. 3D printing could be of help in this matter!

Requirements:

1. It was important to Dr. Pietsch that medically certified filter material is used for this purpose. The optimal situation is to unpack directly sealed filter modules and connect them to the protective mask.
2. Half masks are reusable, and they are recycled according to manufacturer's specifications after use, in order to kill bacteria and viruses (cleaning, disinfection). The same should also apply to the adapter modules. Therefore, multi-cycle solutions had to withstand higher material requirements.
3. For obvious reasons, adapters have to be sealed tightly to prevent any leakage.

Letter Received from Dr. Pietsch

Dear Sir or Madam,

I am urgently looking for someone who can assist us in producing an adapter for our protective breathing masks.

Please contact me, if you can help, or know someone who can help.

With best regards,

Helios Klinikum Hildesheim GmbH

Dr. med. Markus Pietsch

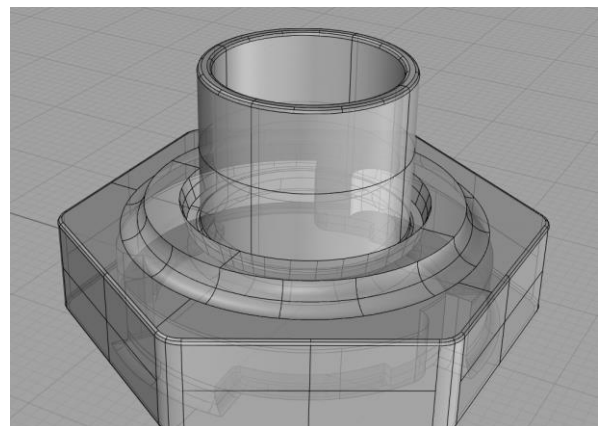


*Dr. med. Markus Pietsch, the leading senior doctor, clinic for otorhinolaryngology, head and neck surgery Helios Hildesheim

SOLUTION

We used the 3D printer MfgPro230 xS SLS produced by XYZprinting for the first 260 pieces of the small series.

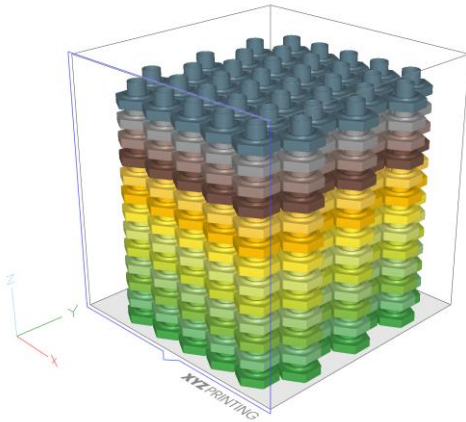
Advantages here are the use of a CO₂ laser, instead of a diode laser, and the use of a galvanometer for internal laser beam deflection. This makes this system significantly faster than the compact systems. Moreover, this printer has a larger build space than a compact system. The build space accommodates almost up to 496 components during roughly 26 hours of printing time, including cooling down.



Production Process :

STEP 1.

Nesting: Packing the build space



STEP 2.

Using powder to fill the build space, start printing & removing powder cake



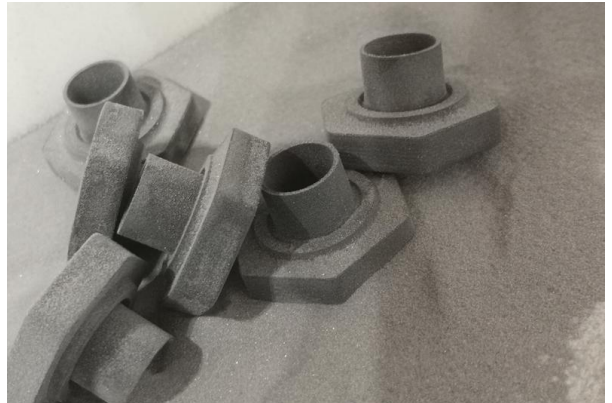
STEP 3.

Unpacking components, collecting & removing powder manually



STEP 4.

Sandblasting parts



STEP 5.

The final small batch series



RESULT / LOOKING AHEAD

An Individual Adapter for Protective Mask and FFP3 Filter Solution

We received the filter adapters starting from the first contact until delivery within an unbelievable time (12 days, despite Easter holidays in between). These adapters are now used every day and are a huge help for us, because we now no longer have to rely on the very difficult procurement of original particle filters from 3M.

Handling is very easy, the adapters fit perfectly and are manufactured extremely clean. The whole process works without any problems – long-term experience is of course still pending. Breathing resistance is very low, the compact design makes the protective breathing mask light and can be worn over an extended period of time.

All in all, we are very glad that the company SLS3D could help us so quickly and without any problems. We are very grateful for this!



***Important notice:**

The manufactured products do not correspond to any official medical approval and were not explicitly developed according to standards applicable to medical devices. This measure is a temporary bridging solution, in case breathing masks or filter modules are difficult to obtain, or are not available to medical services on short notice.





CREATE THE FUTURE

XYZprinting, Inc.

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