Benchmark

Implementation of an active filtering technique into a medical mouth mask concept

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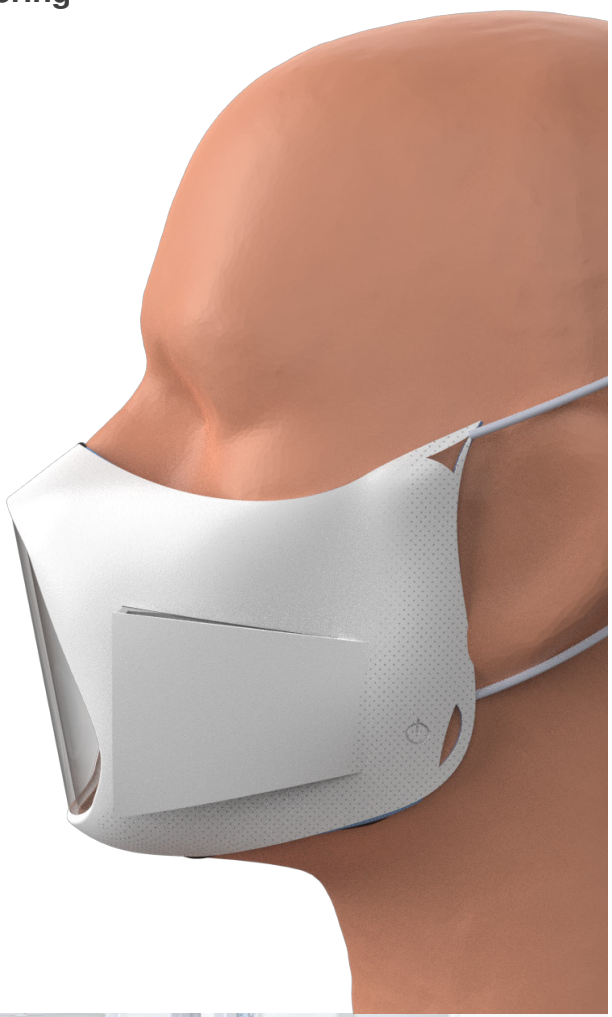
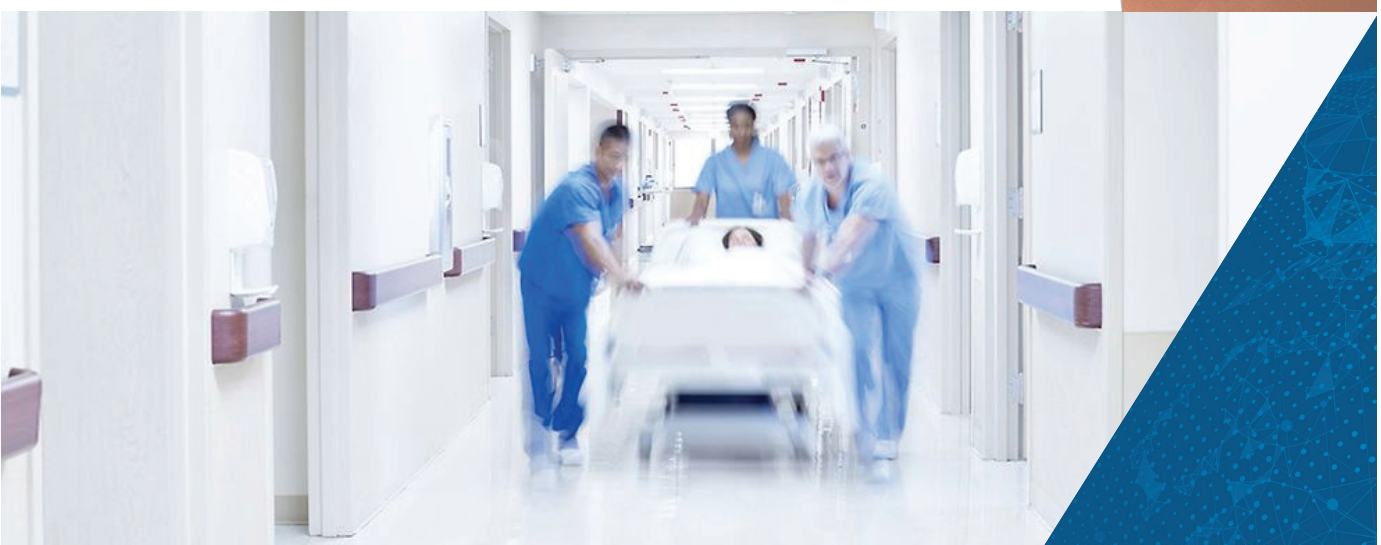
The world is currently recovering more and more from the Covid-19 pan¬demic. During this pandemic, medical professionals had to operate at the most risk-full locations to help the sick. To lower the chance of get¬ting infected themselves, they all had to wear a medical mouth mask and a full protective suit. This equipment leads to many different ergonomic problems, like problems with recognition, problems with breathing during intense exercise and sore-ness on the face. Furthermore, the mask often failed to protect the wearer and the people around him, which lead to high¬er infection rates in the hospital.



One of the main reasons that infection still takes place when wearing a mouth mask, is because of contamination of the mask itself. When the mask filters the virus particles from the air, they stay behind in the mask and could remain viable for multiple days. During this time, the contaminated face mask could be the source of new infections for the wearer and other people around the wearer.



To prevent this, I developed an innovative filter technique at Benchmark Electronics Almelo. Benchmark Electronics Almelo is one of the 23 branches of the multinational electronics manufacturer Benchmark. This location offers engineering services to original equipment manufacturers (OEMs). One of these services is the development of a new innovative filtering technique. To show the potential of this newly developed technique, I developed a mouth mask concept that implements this technique while combating some important ergonomic bottlenecks.

The final concept features a Dynaflex outer body with a rubber fitting to the face. To keep the mask on the head, an ergonomic headband was developed that takes away pressure from key areas of the face. One of the ergonomic bottlenecks in current masks is the lack of facial visibility, which leads to bad recognition and nonverbal communication between the medical professional and the patient. To solve this problem, the mask concept incorporates a transparent front which shows the mouth and large parts of the nose of the wearer. Secondly, the effort required to breathe through current masks is quite high. This holds especially true for nurses in intense operations, like carrying heavy weight. To combat this comfort problem, an active air exchange system was developed that helps the user breathe while protecting the vulnerable parts of the system.

The developed medical mouth mask will be used by medical professionals operating at high-risk locations. This will not only protect the medical staff, but also the vulnerable patients inside the medical facility. Besides a lower health risk, this also lowers the change of staff shortage in hospitals and decreases the high demand for protection equipment, since the mouth masks can be used for an extended time.

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