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Sound Advice for Redesigning a Small Series Brain Scanner

Challenged to redesign SonoWand's real-time brain scanning system, Creo Development sought the expert advice of Materialise engineers for manufacturing solutions that would work for this small series.

Additive Manufacturing gives Sonowand access to small series of high quality components while limiting costs and risks of conventional moulding technologies.

Creo Development understands that good design fulfils a purpose -- especially when that purpose is a high-end medical device used to save lives. That's why it was crucial for them to find the best manufacturing technologies to produce 50 units per year of SonoWand's new real-time brain scanner which allows surgeons to monitor the progress of brain movement during surgery, as well as giving them the opportunity to navigate in 2D and 3D images of the wanted areas of the brain. Sporting a much more fluent and free-form design, the innovative system integrated all controls onto one 24" touch screen monitor (replacing the three conventional small monitors in the previous model).

A cocktail of technologies and expertise

"Working with Materialise in the past on rapid prototyping, Creo trusted us to advise them during the design phase on which technologies were best suited to meet their structural and design requirements," explains Stijn De Rijck, Low Volume Manufacturing Specialist at Materialise. *"Having a number of manufacturing technologies in-house allowed us to suggest many possibilities that other manufacturers can't. For a young company bringing a new product to market, this is an ideal way to produce a small series and avoid large investment costs and risks."*

What were some of the recommendations we proposed? This project involved a number of different parts -- top and monitor covers, probe holders, bumpers and pedals – that needed to be extremely durable given the fast-paced, emergency environment. Taking this into account, Materialise suggested a combination of technologies depending on the purpose, location and structural requirement of each part. Always keeping in mind it was for a limited series with a limited budget.

Small suggestions make huge differences

The monitor and top covers were made from RIM, perfect when producing a small number. It wouldn't be cost-effective to spend a lot of money on an expensive tool. Also RIM components can be finished smoothly and painted with a high gloss, which was the look the client was after. The handles of the top cover had to resist the impact of hitting doors while entering the surgery room and there was even the possibility the surgeon may sit on it.

"To ensure the handle's durability, we advised placing a metal insert inside the handle. Since the cover was quite heavy due to its thick material, we suggested building ribs, a honey-comb like structure that maintained rigidity but weighed far less," recalls Stijn.

Similarly, the bumpers had to withstand banging into walls and doors as it moved through the corridors so we advocated a stiff TPE material produced through injection moulding. Probe holders were made in vacuum casting in a UV-resistant soft polyurethane rubber material. But to be sure the connection of the holders to the system was strong enough, we made a harder plastic laser sintering insert in alumide to secure it.

"As well as having a wide range of technologies in-house, Materialise also has the expertise and knowledge to pass onto their clients. Their project managers gather information and offer advice on a variety of technologies, not just one or two. This objective advice is invaluable to us, especially during the design stage because it gives us options."
Geir Øyvind Sjømæling, Sonowand