

Portable High Performance Medical Image Generator with Touch Screen

When a medical equipment company wanted to offer a mobile version of their image-guided surgery device, they needed to introduce the new product with as little timeline risk as possible while ensuring that they met challenging technical, regulatory and ergonomic requirements. The existing device featured proprietary control and power systems, so the company sought a partner that could achieve their desired aesthetic and performance. EmbedTek's established portfolio of portable, high performance image generators and its certifications in medical device manufacturing made it a strong partner for the challenge.

Critical performance requirements

The portable image generator would be used for image-guided surgery, where a camera tracks instruments during an operation and a processor controls some of the surgical instruments itself. Image-guided surgery aids in operating on hard-to-see areas of the body and for minimally-invasive procedures, increasing accuracy while drastically reducing patient recovery time.

Often times, the surgeon is looking at the display screen instead of the patient, so the combination of high performance computing and high quality graphics are critical for image-guided surgical devices to work. Our customer needed to make their existing image generator portable, durable, and medically-rated in a short period of time.

EmbedTek has designed and manufactured many portable image systems like this, for example the Burke BD67, which was originally created for mobile medical imaging and diagnostic applications. It accommodates a large image acquisition card, can process incoming data at high speed, and can display data for immediate review. Or the Burke G456, originally created for mobile military simulation markets but has the protection from heavy shock and vibration needed in the medical device industry.

System Requirements

-  High performance computing
-  High resolution real-time 3D graphics
-  Commercial off the shelf (COTS) computing components
-  Proprietary control and power systems
-  Medically-rated for safety and regulatory compliance
-  Lightweight, sleek and ergonomic

We've also developed a variety of integrated touch screen displays such as the Kopis 1117, made to withstand medical wipe down and comply with 60601 EMC and 1PX1 standards for dripping water.

Results

Products like these could be used as building blocks to design and manufacture the customer's mobile solution affordably in a short timeframe. In fact, our non-recurring engineering (NRE) costs were so affordable that we

needed to prove they were possible. Our FDA registration as a Contract Manufacturer of Medical Devices, and our ISO 13485 certification meant the customer could follow its normal supply chain and minimize the risk of bringing the new device to market.

Low risk to market

In just under 4 months, EmbedTek produced a functional first article for a high performance mobile image generator with touch screen. We developed a prototype within

8 weeks, a production prototype in 16 weeks, were ready for regulatory in 20 weeks, and produced the first article in 24 weeks.

Our electrical, mechanical, and software engineers met this timeline by modifying proven technologies and manufacturing processes of existing EmbedTek products – both mobile and stationary – to meet the customer's standards and requirements. Our in-house team validated for thermal, shock and vibration, electromagnetic compatibility (EMC), electrostatic discharge (ESD) and overall reliability.

The image generator features a full HD touch screen display that can be used with a gloved surgical hand and is biocompatible for easy cleaning. The multi-touch projected capacitive (PCAP) screen has an extended area below that can be used for custom touch controls and/or LED indicators and branding. The processor uses an NVidia GTX 1080 graphics card.

A robust design helps the system survive in a mobile and surgical environment. Its chemically strengthened glass overlay and outer band enclosure protect from front impact if dropped. The portable IG also has sealed front ingress protection with options to be further protected on the sides and rear.



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Results

The portable image generator is medically rated with the high performance our customer needs for image-guided surgery. EmbedTek's proven expertise in mobile imaging technology and medical device manufacturing made it possible for our customer to create the high performance portable solution they wanted, built to ISO and FDA standards, and following a normal supply chain with long-term consistent revision control.

EmbedTek designs, invents, and manufactures computers, software, sensors, cameras, and displays for original equipment manufacturers. Our systems improve the quality of imaging in healthcare, simulation programs in the military, video analytics in security, and much more. Throw any challenge at us, from demanding environment and ergonomic requirements to High Level Assembly and nonstandard I/O. We'll evaluate it, carefully attack it, and solve it.