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Newcomer on the Frontlines

Portable computed radiography system seizes military contract

By Mark Valentine

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Every once in a while, you come across a product that really stands out from the crowd. Imagine that you were involved with such a product from inception, and that you could see the unit develop all the way from the initial design through to its ultimate release. You can imagine that it would be an incredibly exciting experience. Imagine also taking great pride in the fact that the device is made here in the United States, by a company that continues to expand to meet the growing demand for its products, and support its growing customer base, even in a shrinking world economy.

I have been living in this product development "dream" for the past five years, as vice president and COO of iCRco, a Torrance, Calif.-based medical imaging firm. The latest iCRco product is the Vertex, a compact computed radiography (CR) system, unlike any CR before it. It would be easy for a casual observer to cast a quick look at the unit as they stroll down the aisle at a tradeshow and conclude that the Vertex is "just another CR", but that couldn't be further from the truth. The good news is that it doesn't take long for even the inexperienced person to understand the strengths and advantages of this small, but powerful, product.

The Vertex has caught the attention of the U.S. military and is now being used by the U.S. Army in portable applications around the world. It has been integrated to the GE portable X-ray unit (as a retrofit), as well as the portable X-ray systems of both Northbrook, Ill.-based MinX-ray and Arlington, Texas-based Sedecal. If we look back to the beginning of the development cycle, we can see the story unfold and realize that each aspect of the design had its own purpose and goal.

The Vertex is unique in several ways, most notably its weight and size. A major design goal was to create a CR that was truly portable. At just 55 lbs, it definitely stands out from the other firms who have not been able to bring their "nano class CR" units down below 200 lbs. The Vertex is only 6.5 inches thick, allowing it to be tucked into a corner, mounted on a wall, or integrated into portable X-ray systems with ease.

There are no image quality trade-offs with this CR due to size and portability. In side-by-side comparisons with DR technology, the Vertex matches current DR offerings in diagnostic quality, while also being much more economically viable. There are smaller details built in too, like the flipover dust cover which helps keep the unit clean while not in use, and the front cable protector, which eliminates cable damage from boot kicks or rough cart drivers.

The Vertex is a completely modular CR unit, comprised of three subsystems. Serviceability is made easier by being able to swap out a subsystem in harsh field conditions, or a busy hospital environment. The Vertex uses the patent pending Scanhead™ technology that allows for swapping the entire data capture system by removing two screws and sliding the assembly from the case. The Scanhead weighs 8 lbs, and is shipped in a small package to enable overnight swap out. The Scanhead is similar in concept to a cartridge print head on a laser printer, snapping into the case, and snapping out for quick replacement.

Another design goal of the Vertex was that it had to withstand extreme environments. To meet that goal, the unit was designed with an aluminum exoskeleton, instead of a plastic case. The exoskeleton is composed of four aircraft-grade aluminum struts that lock together to protect the precise inner drive mechanism in any environment. This design feature guarantees high-quality



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iCRco Inc. debuted its Vertex system at RSNA 2008, spotlighting its "True Flat Scan Path" software, intended to eliminate the use of rollers to transport the phosphor plate across the scan head, resulting in an artifact-free image. (iCRco)

imaging results, no matter what the conditions – mobile X-ray van, mobile cart, or directly attached to a mobile X-ray generator.

The unit was designed with multiple fans with replaceable/cleanable filters. The fans pump air into the case, keeping it pressurized and clean in dusty portable applications, or dusty hospital environments. In addition, the unit has a variable fan speed option for different conditions. For example, in the desert, a high fan speed will keep the unit pressurized even in the presence of fine dust; in a hospital setting, users would lower the fan speed to maintain a quiet unit in this more controlled environment.

Versatility is another strength with the unit. It is a true "Plug and Play" CR. The Vertx can be removed from its travel case plugged into a power source, and used immediately. This is vastly different from other machines that need to be tuned to their environment, wasting valuable time in the field. The unit is driven by touchscreen tablet or portable PC, making a one-man operation totally viable.

Another powerful aspect of the unit is the True Flat Scan Path™, which is something that iCRco has in every machine it produces, and the legacy of this design concept has crossed over into the Vertx CR. The main difference between the competitors' machines and the Vertx is that its imaging plates are embedded into a rigid carbon fiber cassette and are never touched during the X-ray imaging or scanning process. This results in more than 500,000 artifact-free images per plate, which means guaranteed uptime for the user.

The Flat Scan Path enables the cassette to be moved across the scanhead and returned without contact. Other manufacturers use rollers, vacuums, prongs, or other methods to actually remove the digital imaging plates from their cassettes. These expensive digital plates are then fed, rolled, and maneuvered through their system to enable the scanning process to take place. It doesn't take a rocket scientist to figure out how powerful it is to be able to protect this valuable digital media in your private practice or hospital – never mind in a mobile field clinic.

Another attribute that guarantees ease of use and service is that the Vertx has one moving part, a carriage that transports the cassette across the scanhead. This simple concept, coupled with solid-state electronics, translates into a reliable and rugged machine, with the added benefit that servicing can be performed by anyone who can handle a screwdriver. This one moving part principle has migrated from the other iCRco CR products – but with a key difference.

Most of our units are used in a horizontal format, and the challenge with going vertical was to overcome the obvious gravitational differences. The Vertx needed another drive system altogether, and consequently uses a precision screw drive.

An advance in portability, the unit has a DC power accessory kit that allows for operation from a 24-volt military vehicle, or from the included 24V DC power pack that provides 10 hours of continuous operation before a recharge is necessary.

As the original design specifications were really for a light, portable, rugged unit, there is an optional suspension mounting kit and folding computer mount to aid mobility and transportation. In the military version, the Vertx is transported in a lightweight, watertight case that can be deployed to any location and set up in a matter of minutes.

Software, too, is another differentiating factor, especially in a critical situation where personnel may not have had the luxury of applications training sessions. iCRco's user-friendly CR software includes the latest Intelligent Clarity Enhancement processing. This allows users to achieve optimized image processing in just one click, which makes operating the Vertx intuitive, while providing optimal image quality and workflow.

Further advances on the way include the introduction of lightweight super-rigid castings for internal components, which will reduce assembly and alignment times. iCRco also has a new super-thin lightweight cassette, which is not only space saving, but stronger and easier to use. These attributes of smaller, lighter, faster fit well with the future of CR, and iCRco intends to be



After an intense selection process, the U.S. military finally chose the Vertx CR system as its new digital imaging provider. The Vertx was chosen for its durability and exceptional image quality in the extreme environmental conditions that the systems were exposed to under the testing regimen.



A lightweight and portable CR system with automatic cassette handling, Vertx is equipped with multiple fans with replaceable/cleanable filters. The fans pump air into the case, keeping it pressurized and clean in dusty portable applications or dusty hospital environments.

providing digital imaging consumers of the future by developing the next technology today.

In my opinion, the Vertx represents a low-weight, quiet, high-resolution, robust, portable imaging device that can be wall- or stand-mounted, powered by universal AC or 24-volt DC sources. It can be connected to a laptop, or touchscreen tablet, and wirelessly send images to an archive. The Vertx represents a revolution in CR technology, keeping CR flexible in an age where CR must provide a low-cost, high-quality, flexible imaging solution to effectively compete with the DR alternatives.

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