Article

Advancing Spine Surgery

The Impact of CIARTIC Move on Spine Surgery

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SIEMENS Healthineers

CIARTIC Move
A self-driving mobile 3D C-arm

Healthcare providers across the country are working to find ways to increase efficiency in the OR, address staffing shortages, and reduce the physical burden of working in the OR. That's why we designed CIARTIC Move—a self-driving mobile C-arm.

Move Automatically

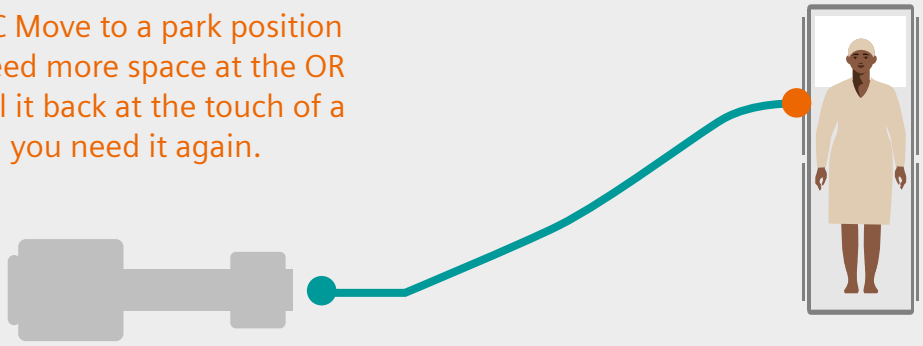
Three unique technologies designed to lessen stressful, time-consuming, and error prone manual positioning.

Position Assist & Park Assist

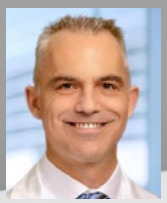
CIARTIC Move's Position Assist enables the operator to store and recall up to 12 procedure-specific 2D or 3D C-arm positions, plus the corresponding imaging parameters with the touch of a button. When the system needs to be moved away from the table, the OR staff can engage Park Assist, to autonomously park the C-arm away from the table at a designated point in the room, and bring it back to the OR table when imaging is again required.

"There's currently a lot of challenges we have in the operating room, getting the right images to identify the location for your perfect image over and over again ... to have the C-arm come in and with Position Assist, find that right position efficiently is a tremendous improvement compared to what we have now." says Dr. Kornelis Poelstra, MD, PhD orthopedic and neurological spine surgeon The Nevada Spine Clinic/Robotic Institute. "The ability to save that position, move the C-arm out of the way, and then have the system come back in automatically is second to none."

Send CIARTIC Move to a park position when you need more space at the OR table and call it back at the touch of a button when you need it again.



"Reproducible positioning and image acquisition have the potential to limit radiation exposure for staff and patients. The more pictures you take to get the image you need, the more radiation exposure there is for the patient, the surgeon, and the operative team. This is an unmet problem that this system will address."



Paul Holman, MD
Chief of Spinal Neurosurgery at Houston Medical Hospital in Houston, TX

ISO Assist

For many procedures, surgeons need to make room for devices and access to the patient during the surgery. ISO Assist allows you to adjust the distance between the detector and the patient, while maintaining the C-arm angle and preserving the anatomical focus.

"Particularly for minimally invasive procedures where we're placing pedicle screws with K wires, there are often periods of time where we need to make subtle adjustments for the position of the flat detector to avoid contact with our instruments. Being able to use the ISO Assist to move the system and bring it back to the exact position, while keeping everything in the center of our field of view is a major advantage," says Dr. Holman, Chief of Spinal Neurosurgery at Houston Medical Hospital, who has 20 years of experience in spinal surgery and a specialty in adult spinal deformity.

Motorized axes and wheels self-position to maintain trajectory while moving the detector closer to or further from the patient.

"This system adds a level of control that we haven't had before."

— Paul Holman, MD

Move Independently

Smart Control

OR departments are not immune to the staff shortages affecting many healthcare systems today. Unavailability of staff trained to operate the C-arm can cause inefficiencies and unplanned waiting times. "Surgeons like to be in control. Having the remote control sterilely draped will allow me to bring the C-arm into the position that I want. The robotic positioning of this system adds a level of control that we haven't had before," he says. "That's going to make the operation more efficient. Time in the operating room is expensive. If you're in a community hospital, you have a certain number of cases to complete and then the OR staff can leave for the day. If you have an enabling technology that makes operations more efficient, that time adds up as you work throughout the day."

Active sensing technology

CIARTIC Move offers collision detection and collision avoidance sensors. Dr. Holman considers this integrated feature important to patient safety: "The new sensor technology makes me more confident that if the C-arm senses that it's touching something, that it's going to stop and not cause any damage to the patient or damage to any of the equipment in the operating room."

Active sensing technology also helps maintain calibration with other enabling technologies. "With navigation or robotic technology, any type of mechanical disturbance of the patient positioning could potentially compromise the accuracy of the navigation system," says Dr. Poelstra.

Move Effortlessly

Working in the OR is physically demanding. Manually steering heavy imaging systems around the OR and between rooms is a major contributor to this physical burden.

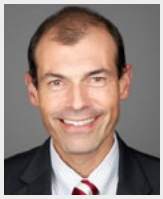
Touch-sense handles

For Dr. Holman—and surgeons across the United States—it's not uncommon for C-arms to be moved from room to room. "In most hospitals there will be multiple, complex spinal surgeries that would use this system," he says.

Yet efficiently moving a C-arm between cases and rooms can be physically demanding for staff. "A C-arm machine is very heavy," notes Dr. Poelstra, "and techs often struggle moving it into the right position, let alone getting it in and out of operating rooms."

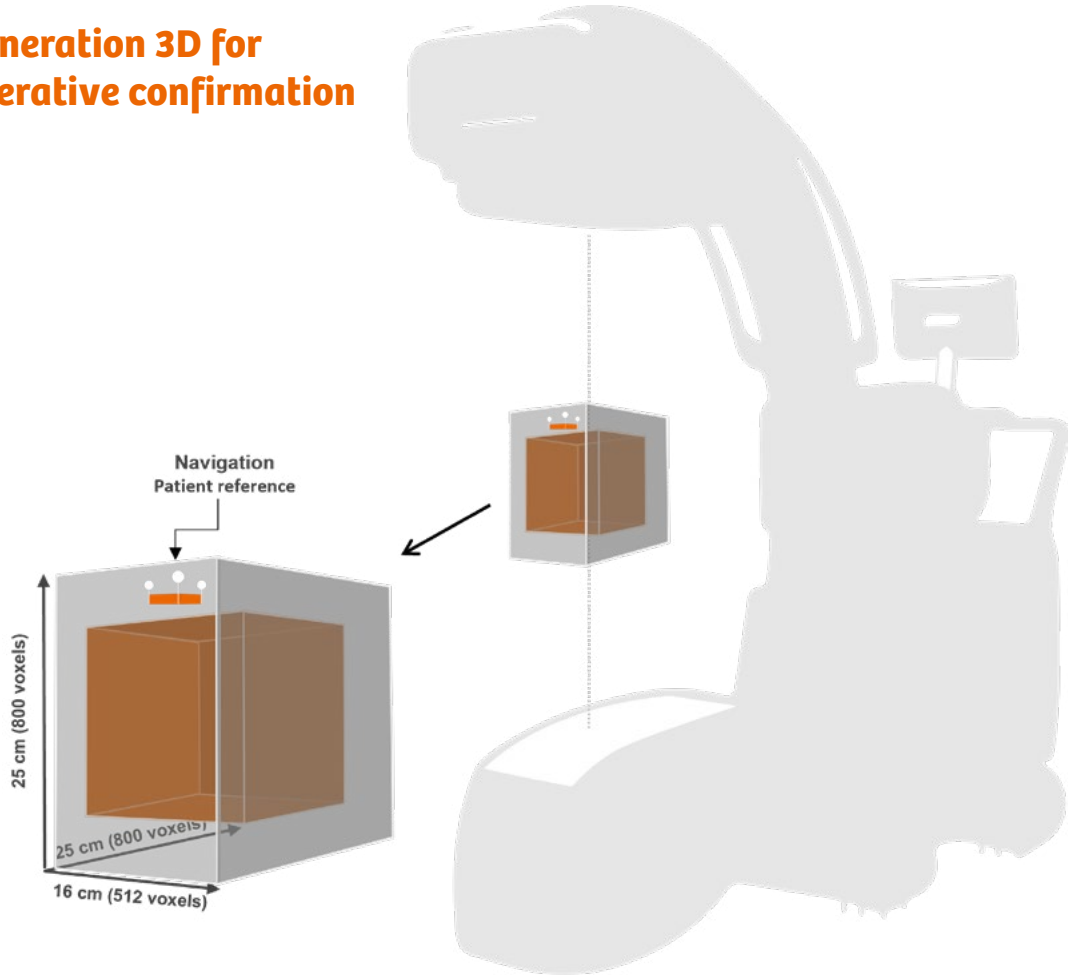
CIARTIC Move incorporates touch-sense handles that, when grasped, activate a near gravity-defying effect. "The touch sensitive handles give you the assist to steer the system appropriately in all directions. They're wonderful," says Dr. Poelstra, "and to travel down the hall at a higher transport speed is a tremendous advantage over currently having to push these machines along."

"The touch sensitive handles give you the assist to steer the system."



Kornelis Poelstra, MD, PhD
Orthopedic and neurological spine surgeon from the
The Nevada Spine Clinic/Robotic Institute of Las Vegas
Las Vegas, Nevada

Next generation 3D for intraoperative confirmation



CIARTIC Move is equipped with cone-beam CT technology for 3D imaging. Conventional 2D imaging may not always provide enough information to ensure correct placement of screw and implants. While some findings may go unnoticed with only 2D imaging, intraoperative 3D imaging can be used to confirm device positioning and implant placement during the procedure, enabling opportunity for intraoperative corrections.

CIARTIC Move's Retina 3D technology achieves a large core 16 cm x 16 cm x 16 cm 3D volume with excellent resolution of 512^3 voxels. To support integration with navigation systems where navigation trackers (patient arrays, etc.) must be within the 3D volume, CIARTIC Move offers an enlarged 3D volume of 25 cm x 25 cm x 16 cm.

The enlarged 3D volume allows the core volume to be used for unobstructed visualization of the target anatomy and the expanded volume to be used for navigation tracker placement. "Without the larger volume image, the registration was sometimes hampered because the fiducial was outside of the viewing area. With this larger volume,we can still capture the fiducials while keeping the spine in the ISO-center of the system," said Dr. Poelstra.

CIARTIC Move further supports interplay with navigation systems through NaviLink 3D, which enables a seamless integration between CIARTIC Move and navigation systems through automatic 3D dataset transfer to navigation systems. This simple connection enables smooth interplay for image-guided navigated surgery.

Prepare for the future of intraoperative spine imaging

"This is truly the future of intraoperative imaging with both 3D and optimized 2D visualization. This is light years ahead of what we're currently using in the operating room. It's going to pave the way for the future of enabling surgery."

— Dr. Poelstra

Move like never before

Explore CIARTIC Move

↗ Learn more

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