Article

# Advancing Orthopedic Surgery

## The Impact of CIARTIC Move on Orthopedic Trauma Surgery

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# CIARTIC Move: A self-driving mobile C-arm

In orthopedic trauma procedures, surgeons perform crucial interventions to restore patient function and mobility. These procedures can be complex and demand a meticulous approach to achieve optimal outcomes.

With the rise in patient-benefitting minimally invasive techniques and related use of intraoperative imaging, there can be challenges in workflow efficiencies and staffing availability or expertise.

## Time-consuming C-arm repositioning and changing staff availability are real challenges

**Geoffrey Marecek, MD**
Orthopedic trauma surgeon at Cedars-Sinai in Los Angeles, CA

"When we're trying to set up for a surgery, the biggest issue is image reproducibility," says Geoffrey Marecek, orthopedic trauma surgeon at Cedars-Sinai in Los Angeles, CA. "Reliably recreating the shot over the course of a surgery is really challenging. During surgery for a pelvic ring injury, for example, you're constantly moving back and forth. You start, and then you check both views, and then you advance, and then you check both views. You get a lateral, and then you come back and check both views. You could be moving back and forth as many as 100 times or more."

To try to capture the exact position of the C-arm and increase image reproducibility, Dr. Marecek relies on manual methods such as tape on the floor, tape on the C-arm, and erasable markers. These manual methods can take up valuable time and must be recreated from case to case. As a result, procedures can take longer, radiation exposure can increase due to repeated imaging, frustration between staff in the OR can boil and surgical delays can increase risk of bleeding or infection.[1]

It can also lead to higher costs associated with extra operating room time as well as scheduling and staffing challenges. "There are logistical issues too," adds Dr. Marecek. "Techs need time for lunch and bathroom breaks like everyone else. As a surgeon, sometimes you spend a long time explaining to the tech exactly what image you need, and they've got it down perfectly. But then, the techs change, and you can't get the same shot anymore. It can be very frustrating when you're right in the middle of surgery."

## Position Assist

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. “Position Assist will be incredibly helpful,” says Dr. Marecek. “It will be a huge benefit to set those positions up at the start of the surgery and not have to worry about reliably recreating them or stopping in the middle of surgery to adjust. It will be a big timesaver, reduce frustration, and save radiation dose. I foresee a lot of surgeries becoming much more efficient.”

Like many orthopedic trauma surgeons, Dr. Marecek performs several AP to lateral movements during surgery. Adapting the collimation settings between AP and lateral shots can be very cumbersome and time consuming.

With CIARTIC Move, not only can you save 12 positions, but you can also save the collimation settings with each position. “Now, I can say ‘that’s the shot, please collimate on this part that I want to see and save that position. It really frees up the tech to do their job more easily at the highest level,” says Dr. Marecek. “These tools have the potential to help reduce radiation dose to the patient. Not only are we reducing extra shots, but we’re also reducing the radiation impact of each shot. That’s really useful.”

Store and recall up to 12 procedure-specific 2D and 3D C-arm positions at the touch of a button.

Positions can be accessed from within the sterile field using the wireless Smart Control or roll-stand.

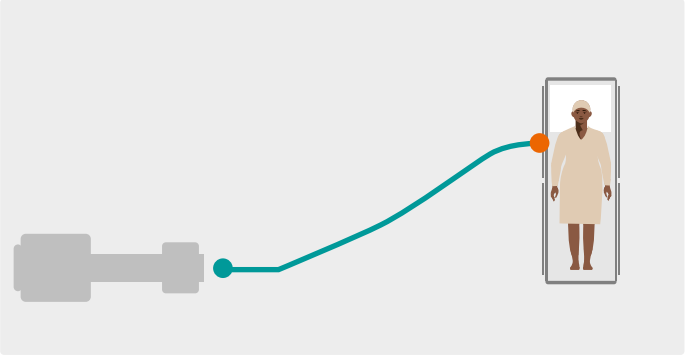

Positions Assist can be accessed by OR staff from the C-arm touch screen, the 32” 4K monitor touch screen, or from the Smart Control.

## Park Assist

Park Assist was designed to allow the operator 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 required.

With this feature, Dr. Marecek anticipates being able to bring the C-arm back in himself, as needed. "[This way,] techs can help with something else in the room. This really frees up the surgeon and tech relationship so we can focus on what's most productive for the surgery at that moment."

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.



## ISO Assist

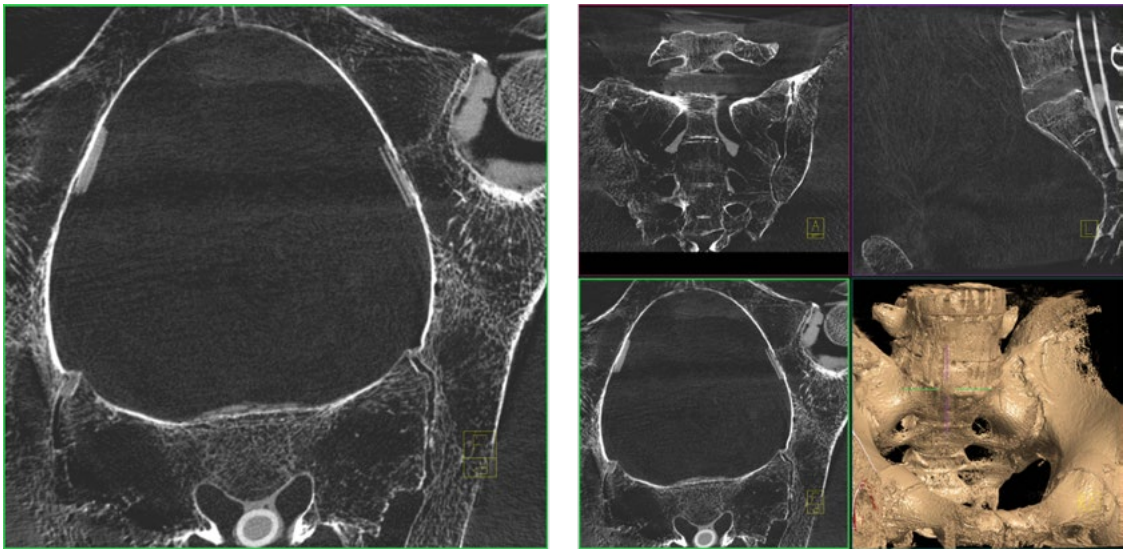
ISO Assist allows you to adjust the distance of the detector to the patient without losing your anatomical field of view.

"There are a lot of different circumstances when you've taken a lot of time to get a particular view, but you need room to work." Dr. Marecek explains. "ISO assist is something that I think will be used a lot. It's incredibly common in orthopedic trauma surgery that you need to make changes along an unusual axis."

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

## State-of-the-art 3D for intraoperative confirmation

With its 3D capabilities, the CIARTIC Move mobile C-arm can be used for intraoperative imaging to confirm device positioning and implant placement while the patient is still under anesthesia. "The other benefit is a reduction in post-operative scans to check our implant positions and reduction quality," Dr. Marecek continues. "If you can image at the time of surgery, you can fix anything that may be wrong while the patient is still asleep. It doesn't count on your safety record, it's not a complication, and it's one less expense after surgery for the hospital."

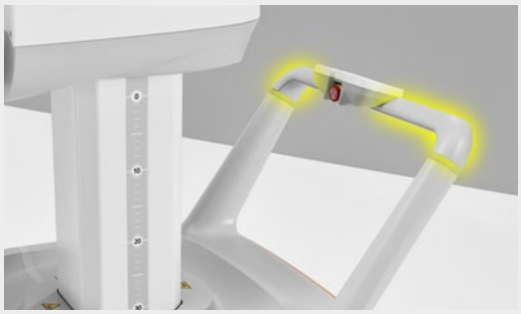


Images were generated by CIARTIC Move using a phantom with human bones.

## CIARTIC Move has usability features including:

**Holonomic wheels**
Designed to allow precise automated position recall through free movement of C-arm in any direction.

**Touch-sense handles**
Enables effortless motor-assisted movement for easy system maneuvering.



**Active sensing technology**
Collision detection and prevention technology for increased safety, whenever the system is in motion.

**32” 4K touch monitor**
Intuitive touch screen interface and 4K monitor to display x-ray images in native resolution for clear visualization of anatomical structures.

**Smart Control**
Operate the system independently, even from within the sterile field.

## Remote operation to empower staff and minimize delays

Dr. Marecek believes the CIARTIC Move could provide significant savings for providers. “There can be many intraoperative delays and staffing issues in fluoroscopy. Time is lost waiting for staff to bring in and set up the C-arm. With the remote control, I don’t have to wait. That’s going to make surgeries more efficient, which could mean more surgeries a day or a reduced need to pay overtime to staff to finish the day’s last cases,” he says.

*“This system is a big step forward in terms of helping protect our patients and giving surgeons more autonomy and control over their intraoperative fluoroscopy needs.”*



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*1. Wade SM, Fredericks DR Jr, Elsenbeck MJ, Morrissey PB, Sebastian AS, Kaye ID, Butler JS, Wagner SC. The Incidence, Risk Factors, and Complications Associated With Surgical Delay in Multilevel Fusion for Adult Spinal Deformity. Global Spine J. 2022 Apr;12(3):441-446. doi: 10.1177/2192568220954395. Epub 2020 Sep 25. PMID: 32975455; PMCID: PMC9121150.*

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