



**C-arm CT with SIREMOBIL Iso-C<sup>3D</sup>**  
A New Dimension of Care in the OR

**SIEMENS**  
medical



## SIREMOBIL Iso-C<sup>3D</sup> C-arm CT brings intra-operative 3D imaging

If you are involved in trauma and orthopedic surgery you know the importance of precise control when repositioning dislocated bone fragments, placing pedicle screws in the spine, or positioning osteosynthetic material. Placing a screw too close to a joint, for example, can lead to extremely painful and debilitating complications that may require further surgical intervention. The 2D projection imaging of conventional mobile C-arms often leaves you wanting more spatial information to assess and confirm outcomes of the interventional procedure.

In the past, the search for additional information in the OR led to the use of CT or MR systems. However in practice, these units come with a high cost, large footprint, limited mobility, patient transport concerns, and many extra logistical requirements.

With SIREMOBIL<sup>®</sup> Iso-C<sup>3D</sup>, Siemens Medical Solutions offers C-arm CT, a revolutionary new solution to the problems faced everyday in today's demanding healthcare environment. You gain the full advantages of intra-operative 3D imaging without increasing space requirements, long preparation times for operations or the need to reposition the patient for better access. Furthermore, SIREMOBIL Iso-C<sup>3D</sup> also allows you direct surgical navigation based on intra-operatively generated 3D images.





SIREMOBIL Iso-C 3D



# SIREMOBIL Iso-C<sup>3D</sup>

## C-arm CT: Precisely how it works

### Isocentricity: What does it mean exactly?

The intra-operative 3D imaging capabilities of SIREMOBIL Iso-C<sup>3D</sup> are based on SIREMOBIL Iso-C, the first truly isocentric mobile C-arm. The isocentric design keeps the X-ray beam centered on the region of interest throughout the 190° scanning range of the C-arm.

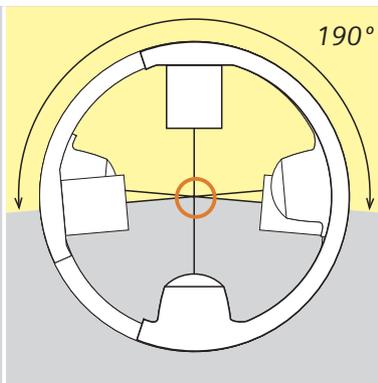
### Isocentricity: How does it affect my practice?

For applications demanding frequent changes of the projection angle, conventional C-arms require subsequent vertical and horizontal corrections. With an isocentric C-arm, such repositioning is no longer required. The results are pronounced savings in time and dose.

Furthermore, an isocentric design paves the way for 3D imaging on a C-arm ...

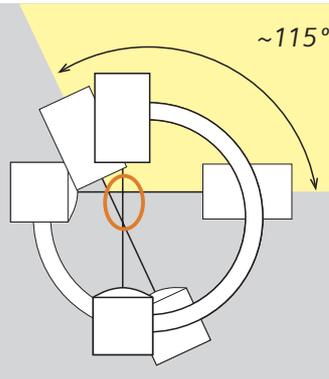
### 3D imaging with a mobile C-arm: A whole new dimension

SIREMOBIL Iso-C<sup>3D</sup> now provides the ability to generate a 3D volume dataset along with 2D imaging. The addition of a motor drive brings controlled orbital movement of the C-arm throughout the 190° scan. A powerful workstation allows 3D reconstruction of the automatically acquired isotropic data set.



#### Truly isocentric design:

- Object remains centered, no readjustments
- Image displayed in the same scale for all projections
- Unparalleled positioning flexibility of 190° (+/-95°)
- Required for 3D imaging in an orbital movement
- Dose- and time-savings



#### Non-isocentric design

- X-ray beam moves off center, making readjustments necessary
- Image changes in scale when projection is modified
- Limited positioning flexibility of ~115° (+90°, -25°)



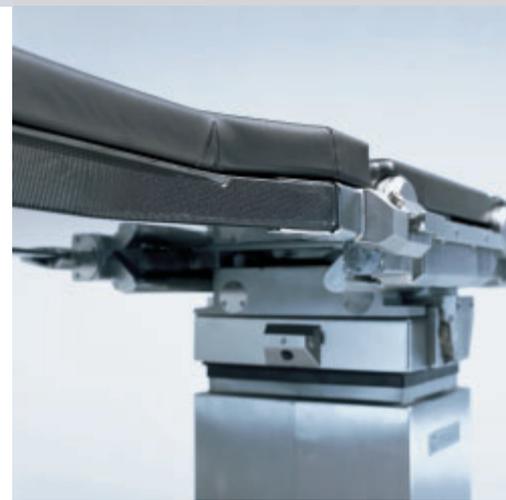
### C-arm CT: The scanning process

Using SIREMOBIL Iso-C<sup>3D</sup> in your clinical routine is remarkably simple:

- The anatomic region of interest is centered within the isocenter of the C-arm with laser localizers
- A manual non X-ray collision avoidance test follows to ensure that objects do not block the path of the C-arm during the automated scan
- The integrated electric motor automatically drives SIREMOBIL Iso-C<sup>3D</sup> through a 190° scan
- During this automated scan, SIREMOBIL Iso-C<sup>3D</sup> acquires 50 or 100 2D frames in one or two minutes
- The 3D dataset, a cube of 12<sup>3</sup> cm<sup>3</sup>, is generated simultaneously to the automated scan

- The 3D images are immediately available after the scan
- The 3D images are displayed in the form of multiplanar reconstructions (MPR's) which depict the scanned bony anatomy in the coronal, sagittal, and axial planes

Immediately following the scan, you can view, and manipulate the 2D fluoroscopic images and CT-like sectional images. All three spatial planes are simultaneously displayed on the image monitor of the monitor trolley, and it is also possible to view the images in a SSD (Surface Shaded Display) format. Thanks to a special sterile mouse, the system can be controlled directly from the operating table.



### C-arm CT: What else is required?

Because of the CT-like reconstruction principle of SIREMOBIL Iso-C<sup>3D</sup>, the operating table and the positioning accessories must be metal-free. Metal parts would be visualized in the individual frames and cause corresponding artifacts in the reconstructed 3D dataset. Nearly all well-known manufacturers offer carbon fiber and standard operating tables with metal-free positioning accessories.

# SIREMOBIL Iso-C<sup>3D</sup>

## Delivering uncompromised safety in the OR

### A broad range of applications

SIREMOBIL Iso-C<sup>3D</sup> has been developed for intra-operative use in the radiographic imaging of the following anatomical regions:

- **bones and joints of the upper and lower extremities**
- **cervical, thoracic and lumbar spine**

SIREMOBIL Iso-C<sup>3D</sup> will support and optimize clinical procedures involving other anatomical regions. Together with our customers we are currently working in clinical trials for approving further applications.

### Maximum safety for minimally invasive procedures

The system's intra-operative 3D imaging capabilities are ideally suited for minimally invasive interventions, that now account for a significant percent of all operations. Higher patient comfort, shorter recovery times and cost effectiveness can be improved with the use of SIREMOBIL Iso-C<sup>3D</sup>.

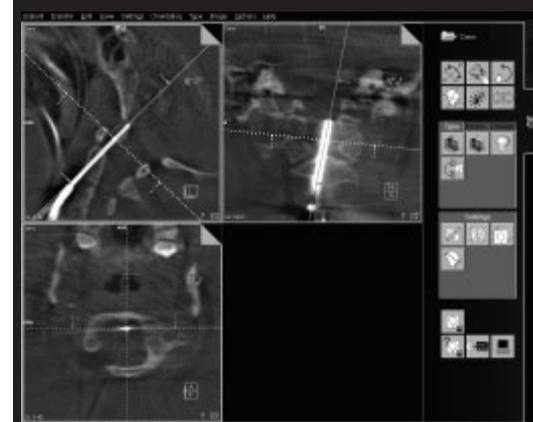
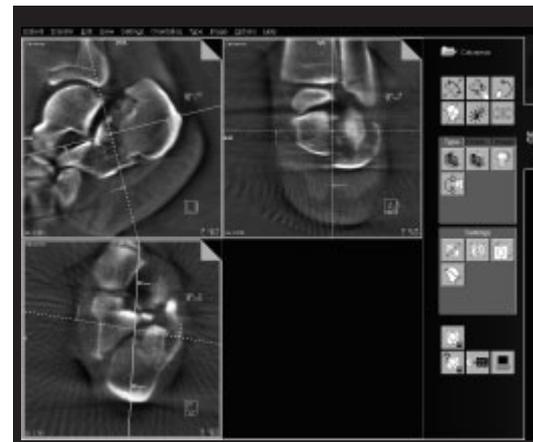
### Bringing peace of mind to the surgeon and patient

SIREMOBIL Iso-C<sup>3D</sup> brings additional radiographic information that has the potential to significantly improve quality and safety levels when reconstructing joint surfaces or positioning screws or implants.

If the surgical intervention requires new data, you can use SIREMOBIL Iso-C<sup>3D</sup> to obtain the most recent anatomic imaging for higher quality and safety of the intervention. Repeat procedures can be largely avoided, yielding potential time savings and reduced liability and risk.

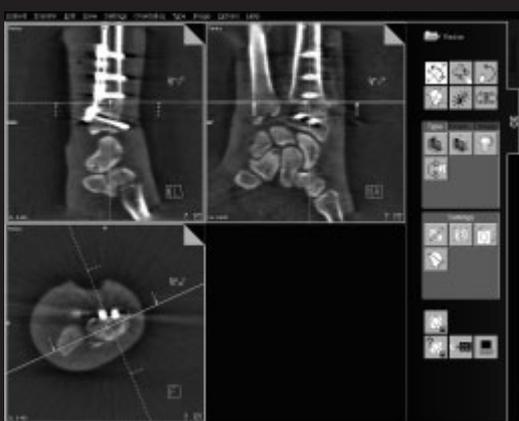
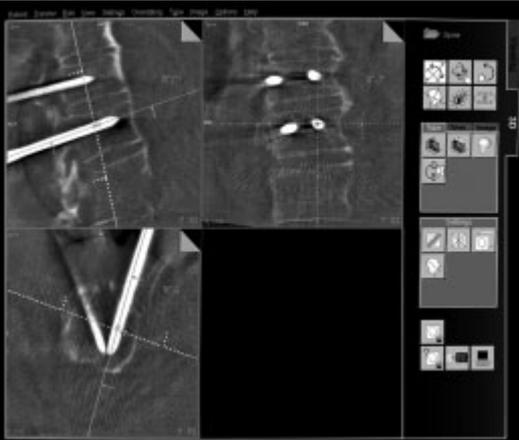
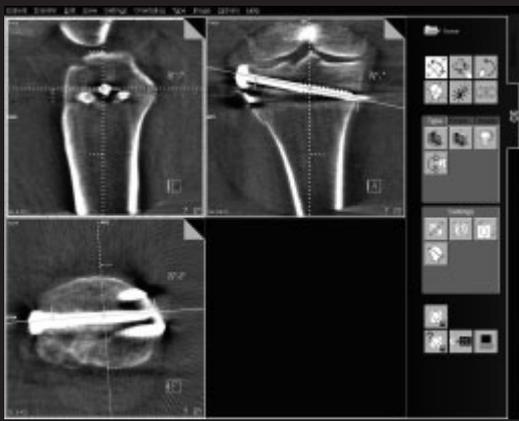
Furthermore, you can use SIREMOBIL Iso-C<sup>3D</sup> as a post-operative control within the OR to confirm and document the proper placement of anatomy and any related hardware. Thus, there is a reduced reliance on busy radiology departments for post-operative confirmation and documentation.

*Intra-operative*





Post-operative



## SIREMOBIL Iso-C<sup>3D</sup> Advanced user and patient comfort

### Sterile conditions

With 190° of orbital rotation for 3D data acquisition, parts of the C-arm will travel from underneath the OR table to above the table. Two possible methods to help maintain sterility:

- Creating a sterile tunnel with drapes. The C-arm, covered by a sterile drape, rotates through the tunnel.
- Covering the patient with two additional overlapping sterile drapes before the scan. The C-arm is used without sterile draping and the potentially contaminated drapes are rolled down with sterile towel clips after the scan.

### Excellent results at minimum dose

SIREMOBIL Iso-C<sup>3D</sup> is optimized for maximum image quality at minimum dose. Thanks to the CARE\* initiative, product features like laser localizers, pulsed fluoroscopy and Last Image Hold functionality guarantee low dose treatment.

The SIREMOBIL Iso-C<sup>3D</sup> design requires the physician to apply radiation only when necessary. Unit-specific adjustments like lens aperture or camera positioning can be accomplished without radiation. The applied dose is optimized accordingly – a 3D scan with 50 or 100 projections corresponds to a 2D fluoroscopy of 20 or 40 seconds.

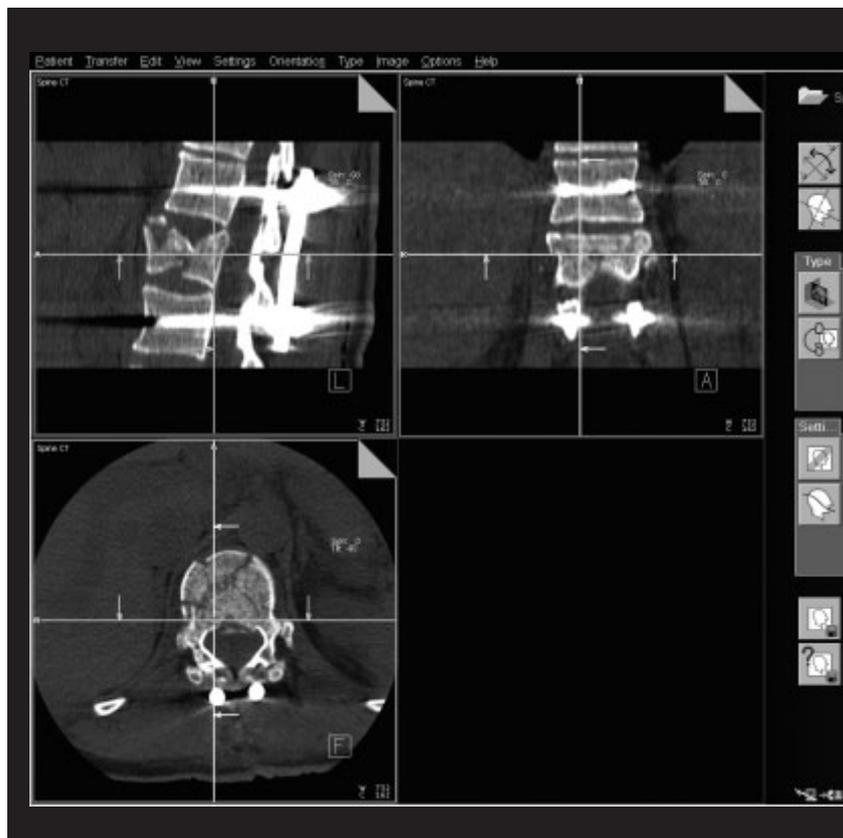
\* Combined Applications to Reduce Exposure



## SIREMOBIL Iso-C<sup>3D</sup> New dimensions in networking

SIREMOBIL Iso-C<sup>3D</sup> speaks *syngo*<sup>®</sup> – the comprehensive software from Siemens Medical Solutions for medical imaging with intuitive user interface and integrated networking. The unique software solution for virtually all medical tasks provides a uniform working environment throughout clinical networks and can be easily upgraded to the current state-of-art software versions.

The intuitive user interface has the same look and feel at virtually all clinical workstations, whether it's an MR, CT, Ultrasound, etc. offering easy data exchange without limitations. Your clinical routine benefits from increased staff flexibility, improved efficiency across all modalities and enhanced productivity.



CT-imaging of an internal spine fixator



SIREMOBIL Iso-C<sup>3D</sup> provides the following DICOM 3.0 functionalities:

- **DICOM Send**  
It is possible to transfer images to the hospital network or the central digital patient image archive.
- **DICOM Print**  
Images can be printed out on the network printers via laser cameras.
- **DICOM Query & Retrieve**  
Allows the physician to call up, display, and even post-process pre-operative images from other modalities directly at the SIREMOBIL Iso-C<sup>3D</sup> monitor trolley.

Your workflow is further simplified by an integrated CD writer, which allows direct storage of images acquired by the C-arm or from other imaging modalities.



*Lateral X-ray imaging of a lumbar spine*

# SIREMOBIL Iso-C<sup>3D</sup>

Finishing touches that complement your needs



*CD writer*

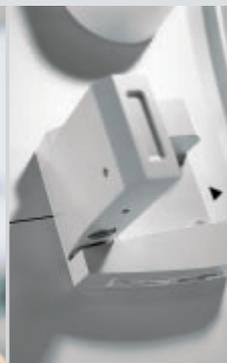
*Keyboard*

*Motor drive*

*Sterile mouse*

*Horizontal laserlight localizer*

*Monitor trolley with 3D components*



The surgical environment demands quick and accurate decisions.

That's why it's crucial that your C-arm comes equipped with features that support your individual needs:

- *syngo* – the revolutionary software for medical imaging with intuitive operator's interface
- Ergonomic control panel with intuitive symbolic
- Special sterile OR mouse for central operation
- Compact monitor trolley that accommodates printer, video recorder and workstation with integrated CD writer
- Electromagnetic brakes and cable deflectors for streamlined workflow
- Integrated cabling for simple cleaning and unobstructed orbital movement



Hand-held fluoro switch



Rotable operator's panel



Electromagnetic brakes



Monitors: 2D/3D mode



# SIREMOBIL Iso-C<sup>3D</sup>

## C-arm CT convinces experts worldwide

From the first clinical tests in Germany to numerous successful installations worldwide, SIREMOBIL Iso-C<sup>3D</sup> has proven to be a real innovation for clinical outcome and workflow optimization.

Some of our enthusiastic customers explain why C-arm CT revolutionizes their daily work:

### **More predictable screw & implant placement**

"We have found that image-guided 3D navigation with SIREMOBIL Iso-C<sup>3D</sup> provides more predictable screw-placement and allows for immediate verification of the construct, anatomy, and decompression. We believe that this will provide benefits to the patients, treating physicians, and hospitals with regards to improved safety, efficacy, accuracy, and cost."

*Larry T. Khoo, MD,  
UCLA Comprehensive Spine Center,  
Los Angeles, USA*





"We have found that SIREMOBIL Iso-C<sup>3D</sup> gives excellent fluoroscopic images and the 3D images are very useful in the percutaneous fixation of intra-articular fractures. Currently we are using this C-arm in the development of fluoro-navigation procedures and combining 3D images in the fluoro-navigation."

*Professor Kwok-Sui Leung,  
Department of Orthopedics  
and Traumatology,  
The Chinese University  
of Hong Kong, China*

**Intra-operative "revision" –  
second surgery not necessary**

"SIREMOBIL Iso-C<sup>3D</sup> allows intra-operative three-dimensional imaging of osseous structures without significantly increasing costs. This enables a direct check of the procedure and results of the reconstructive surgery, which allows the physician to react intra-operatively."

*Paul Alfred Gruetzner, MD,  
BGU Ludwigshafen, Germany*

**No post-operative CT-scan required**

"C-arm CT with SIREMOBIL Iso-C<sup>3D</sup> promises routinely performed intra-operative 3D imaging at considerably greater cost-savings than was the case with the previous post-operative CT procedures."

*Ekkehard Euler, MD, et al.,  
Clinic of the University of Munich,  
Germany*

**Highly increased accuracy  
in complex surgery**

"SIREMOBIL Iso-C<sup>3D</sup> provides the neurological and spinal surgeon an unprecedented ability to easily acquire and view multi-planar 3D images of intra-operative anatomy. This technology coupled with an intra-operative navigation system ushers in a true paradigm shift in our ability to perform complex surgery with a high degree of accuracy and safety."

*Stephen M. Papadopoulos, MD,  
Barrows Neurological Institute,  
Phoenix, USA*

## SIREMOBIL Iso-C<sup>3D</sup>

### A safe investment in the future

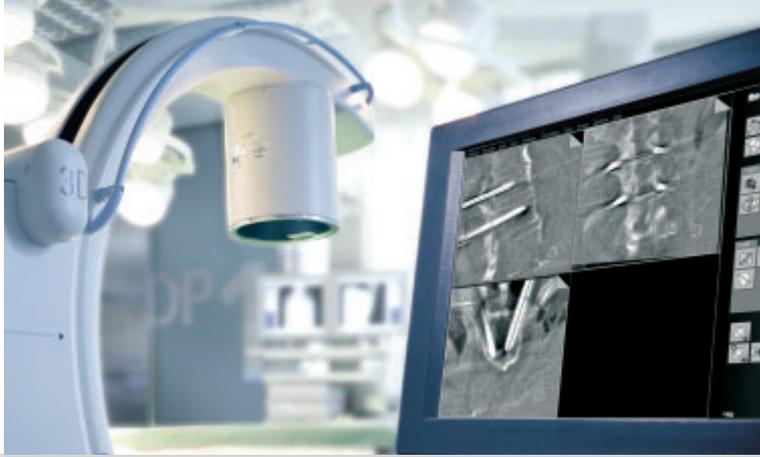
The C-arm CT capabilities of intra-operative 3D imaging with SIREMOBIL Iso-C<sup>3D</sup> bring added assurance during interventions in trauma and orthopedic surgery and have the potential to significantly raise your standard of care.

The improved quality of care can potentially result in better patient outcomes, reduced need for repeat procedures, and reduced risk and liability.

Since post-operative assessment of the intervention is possible right in the OR, the need for controls in the radiology department is virtually eliminated, leading to additional time and cost advantages. Furthermore, SIREMOBIL Iso-C<sup>3D</sup> functions as an OR workstation, allowing pre-operative images from other modalities to be called up, displayed, and post-processed directly at the monitor trolley.

Digital networking together with revolutionary 3D C-arm CT directly in the OR offer you significant time and personnel savings, cost optimization and a streamlined clinical workflow.





### **The perfect partners: C-arm CT & Surgical 3D Navigation**

And there is still more to revolutionize your clinical routine: With SIREMOBIL Iso-C<sup>3D</sup> the direct 3D surgical navigation has become reality. NaviLink™, the direct interface for 3D navigation, has been especially developed for SIREMOBIL Iso-C<sup>3D</sup> and is compatible with navigation systems of leading manufacturers.

The 3D information generated in the OR by SIREMOBIL Iso-C<sup>3D</sup>, including all spatial coordinates, is directly transferred to the connected navigation system that can immediately start the navigation procedure.

For more information about this fascinating surgical technique please consult our brochure "NaviLink – Direct 3D Navigation Interface for SIREMOBIL Iso-C<sup>3D</sup>" or have a look at the Internet:  
**[www.SiemensMedical.com/surgery](http://www.SiemensMedical.com/surgery)**.

The information in this document contains general descriptions of the technical options available, which do not always have to be present in individual cases. The required features should therefore be specified in each individual case at the time of closing the contract.

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