



OUR WORLDWIDE PROVEN 3D C-ARMS

**1,000**   
3D C-arms sold

**60**   
countries supplied

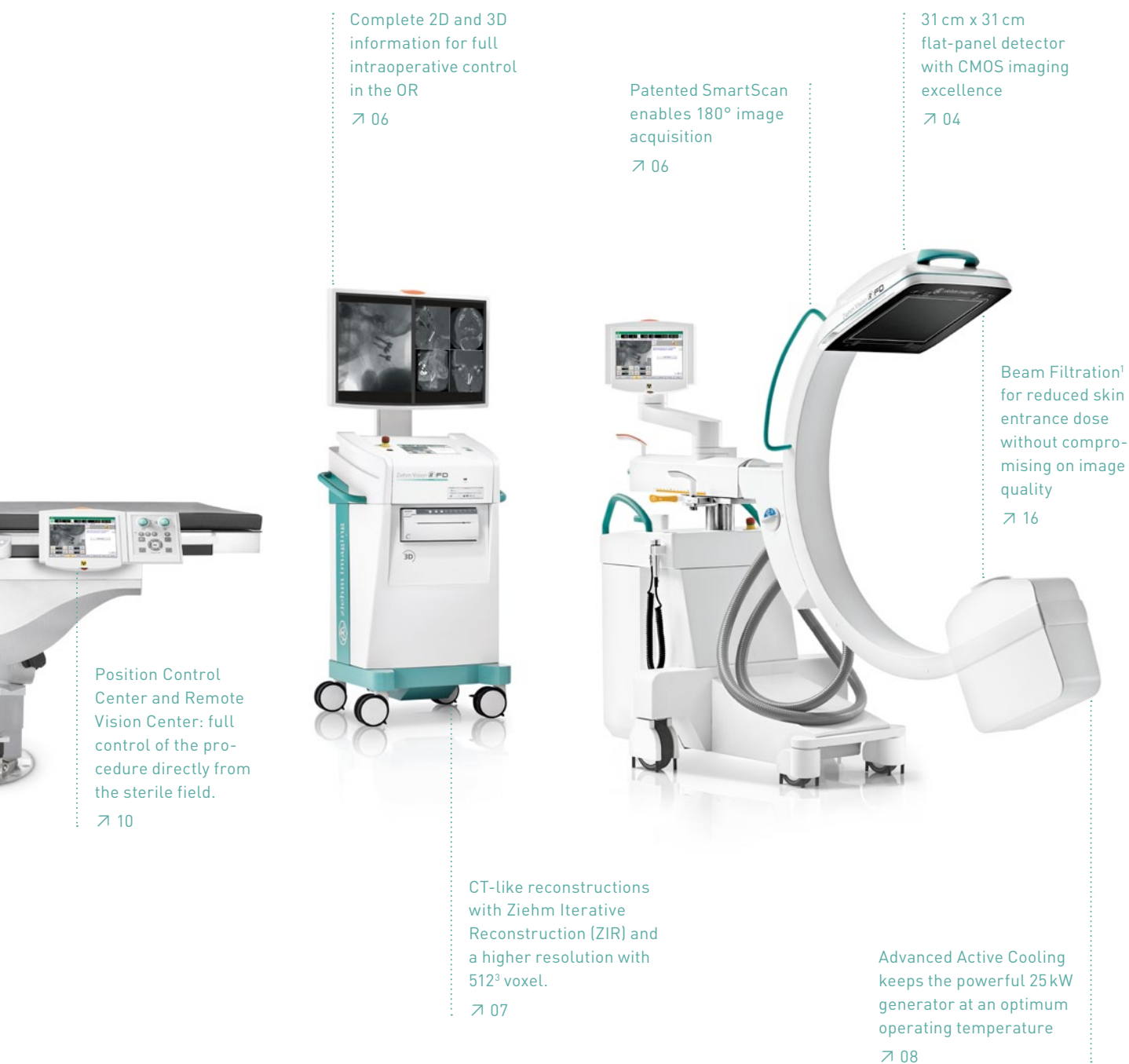
more than  
**3 million**   
surgeries conducted

**12**   
years experience



Ziehm Vision RFD 3D  
The revolution in 3D imaging

CMOSLINE



Ziehm Vision RFD 3D. Healthcare providers are challenged to cut costs, meet the needs of an aging demographic, improve the accuracy of clinical outcomes and reduce X-ray exposure during surgical procedures. The answer – led by the Ziehm Vision RFD 3D – lies in balancing cost efficiency with improved patient care, shorter hospital stays and less-invasive approaches. This groundbreaking mobile 3D C-arm helps to improve surgical outcomes and patient satisfaction while optimizing costs. Building on more than 10 years of experience in 3D imaging, the Ziehm Vision RFD 3D features cutting-edge CMOS technology, bundling 2D and 3D functionality for greater intraoperative control, reducing the need for postoperative CT scans, and costly corrective surgeries. This mobile C-arm is thus ideal for high-end orthopedic, trauma and spinal interventions as well as for highly specialized maxillo-facial and cochlear procedures, for instance.

## 01 / Move to the forefront of mobile 3D imaging with CT-like image quality

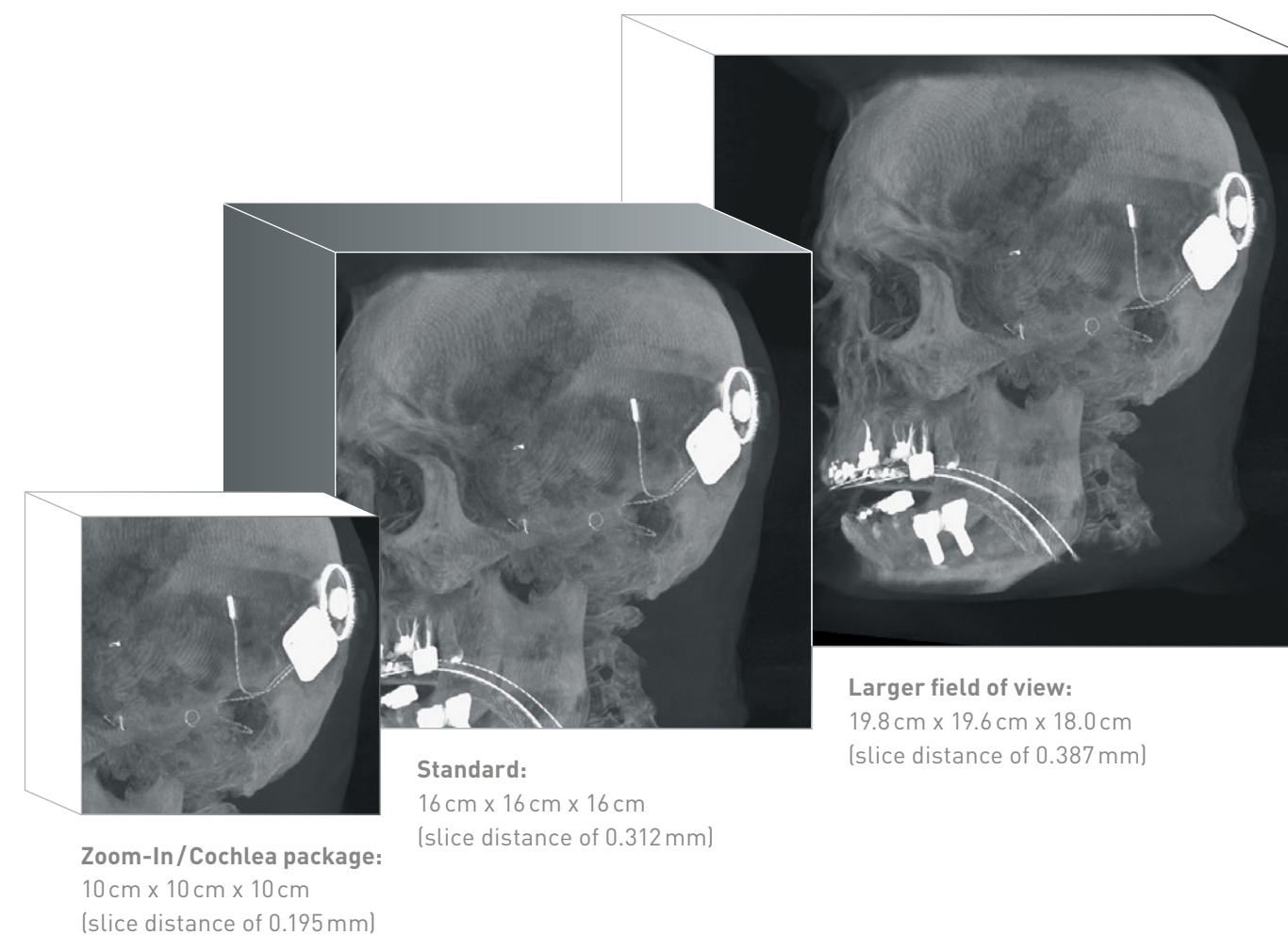
The Ziehm Vision RFD 3D is the only mobile 3D C-arm with a flat-panel detector now also featuring the latest CMOS technology for imaging excellence. The enhanced imaging chain optimizes resolution with crystal-clear visualizations of the finest anatomical structures, complemented by SmartScan functionality for the complete imaging information in real time. The powerful 25 kW C-arm propels today's surgeon to the forefront of intraoperative 3D imaging.

### → CMOS flat-panel technology

Image quality and efficiency are the most important, but also challenging, factors in daily clinical routine. In comparison with conventional C-arms, the latest CMOS flat-panel technology achieves higher spatial resolution due to smaller pixel sizes combined with lower noise levels and a higher read-out speed at full resolution. True resolution, especially in the magnification modes, makes interpolation unnecessary. Because of these features, CMOS technology enables improved overall efficiency. In addition, the Ziehm Vision RFD 3D CMOSline<sup>2</sup> now comes with an enhanced version of our comprehensive SmartDose<sup>3</sup> concept. A newly developed dose-saving technology, Beam Filtration, supports the latest improvements in our enhanced CMOS imaging chain, thus enabling an exceptional reduction in the skin entrance dose. In this way, the Ziehm Vision RFD 3D provides excellent image quality with a lower dose.

### → Different volume sizes for the ideal resolution

Ziehm Imaging offers the freedom to choose from a range of 3D volume sizes to meet diverse needs in clinical routine. In addition to the standard volume of 16 cm x 16 cm x 16 cm, the Ziehm Vision RFD 3D now also provides two further volume sizes for specialized applications. A dedicated larger field of view with 19.8 cm x 19.6 cm x 18.0 cm (axial x sagittal x coronal) covers larger anatomical regions and delivers more structure for procedures such as pelvis surgery with 512<sup>3</sup> voxel. The higher number of voxel in all volume sizes guarantees a better resolution without increasing dose levels from those used with the conventional 320<sup>3</sup> voxel. Further, with an edge length of 10 cm x 10 cm x 10 cm, the mobile 3D C-arm provides a suitable option for zoom in or intraoperative imaging in cochlear implantation.



“Due to its higher resolution the Ziehm Vision RFD 3D CMOSline allows a much more precise localization of the electrode carrier for cochlear implants, especially in demanding anatomies.”

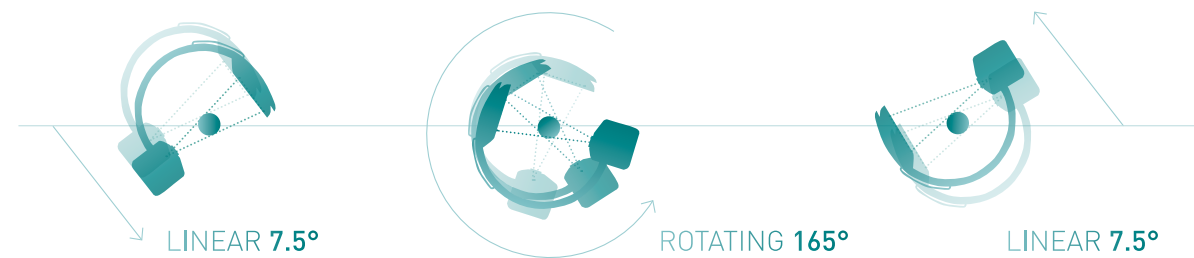
**PROF. DR. ARWEILER-HARBECK, ESSEN UNIVERSITY HOSPITAL, GERMANY**



### → 180° scan for complete 3D information

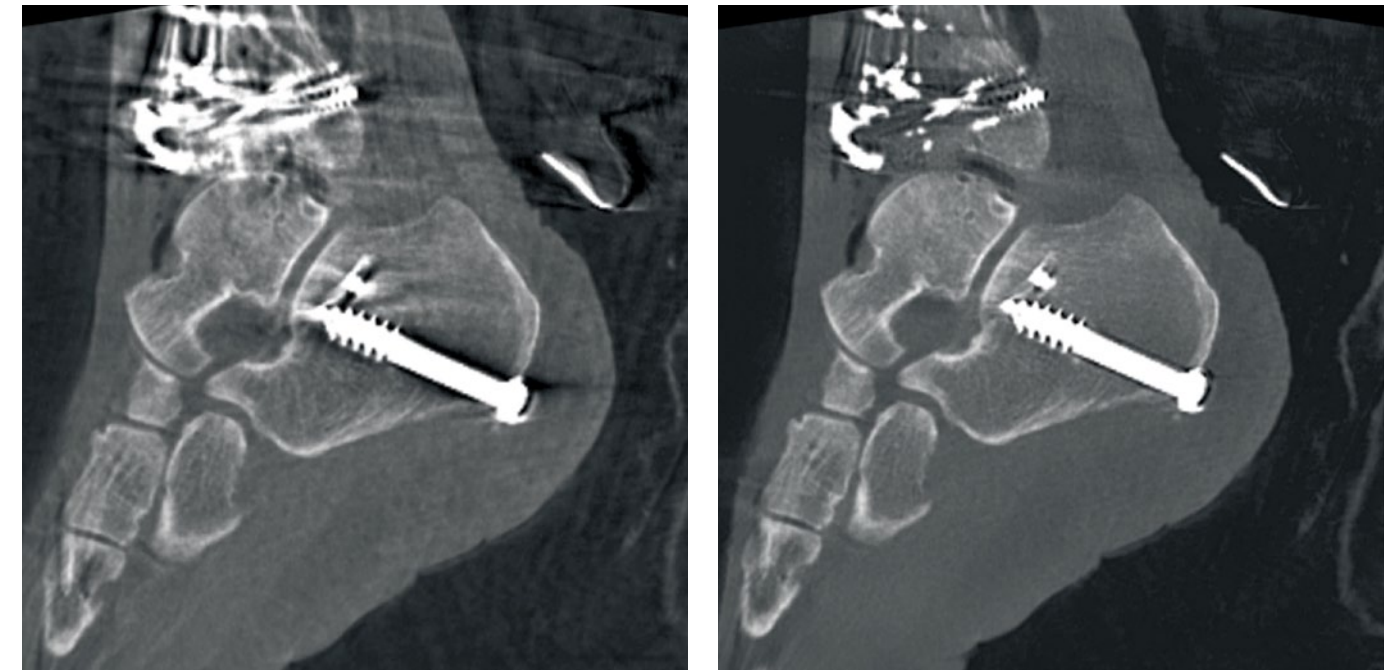
180 degree scan is required to create a complete, informative 3D dataset. Ziehm Imaging's SmartScan is a revolutionary concept that enables the Ziehm Vision RFD 3D to generate the complete 3D information of even the smallest anatomical structures while keeping the geometry of a conventional 2D C-arm. The intelligent combination of linear and rotating movements enables 180 degrees of scanned information – at every point in the field of view. With this dataset, procedures can be assessed intraoperatively: Fine details, like cortical rims, pedicle diameters or even orbital floor, are optimally visualized.

With this benchmarking enhancement, surgeons can create full 3D datasets while retaining the benefits of our C-arms: the most compact 3D devices with an up to 31 cm x 31 cm flat-panel, generous C-arm opening, and the advantages of a variable isocenter.



### → More distinguishable anatomy in 3D reconstructions

The specially developed algorithm ZIR (Ziehm Iterative Reconstruction) optimally minimizes fan and metal artifacts in 3D reconstructions. Additionally, this feature leads to significantly more distinguishable anatomy, defined bone crests and optimum slice views in the coronal, axial, sagittal and individually adjustable planes.



ZIR – Reducing artifacts

## 02 / Extend your intraoperative imaging capabilities for 2D, 3D and multidisciplinary use

The Ziehm Vision RFD 3D offers unprecedented performance across the most varied and challenging application spectrum. This versatile device combines 2D excellence with advanced 3D technology, delivering high-end multidisciplinary capabilities for hybrid room applications and specialized procedures such as cochlear and maxillofacial surgeries. Precise information from every angle during the procedure helps to avoid unnecessary postoperative CT scans and corrective surgery.

### → 2D excellence for demanding hybrid procedures

The Ziehm Vision RFD 3D generates high-quality 2D images that support not only orthopedic, trauma or spinal procedures, but also most demanding interdisciplinary hybrid applications. By configuring the unit with additional visualization tools and options, like the Interventional Package or SmartVascular Package with DSA, MSA and RSA (roadmapping), the system is also ideally prepared for hybrid room applications. The new Anatomical Marking Tool (AMT) supports aortic stent graft implantation without RSA by, for example, marking aneurysms or side branches right in the live image on the touchscreen.

### → Prolonged use of powerful generator

C-arms are in continuous use during lengthy, demanding procedures such as vascular interventions. The Ziehm Vision RFD 3D is ideal for these applications. Its Advanced Active Cooling (AAC) system keeps the powerful 25 kW generator at an optimum operating temperature. In the event of a temperature increase, the pulse frequency is automatically reduced until the generator's temperature has cooled down.

MULTI-  
DISCIPLINARY  
USE

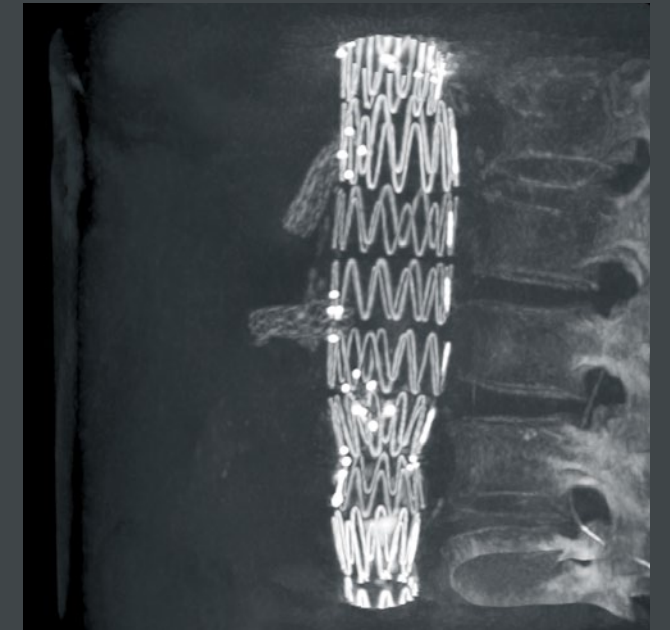




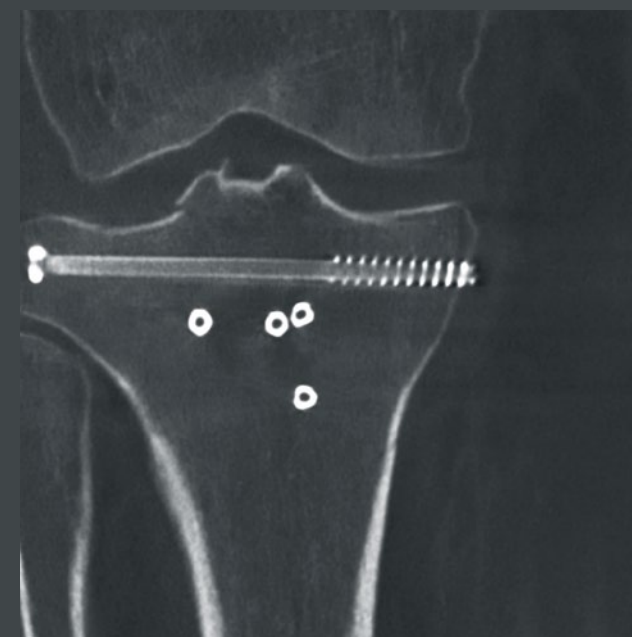
High resolution imaging with  $512^3$  voxel (volume size 16 cm x 16 cm x 16 cm)



Combined arthrodesis of tibiotalar and subtalar joints



3D reconstruction of stent placement (abdominal aortic aneurysm)



Coronal view of tibia fracture (volume size 10 cm x 10 cm x 10 cm)

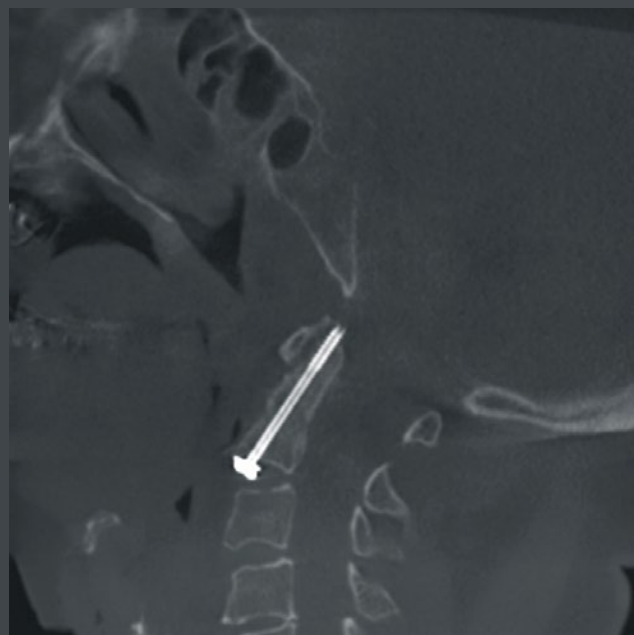


Kyphoplasty surgery – high resolution imaging with  $512^3$  voxel

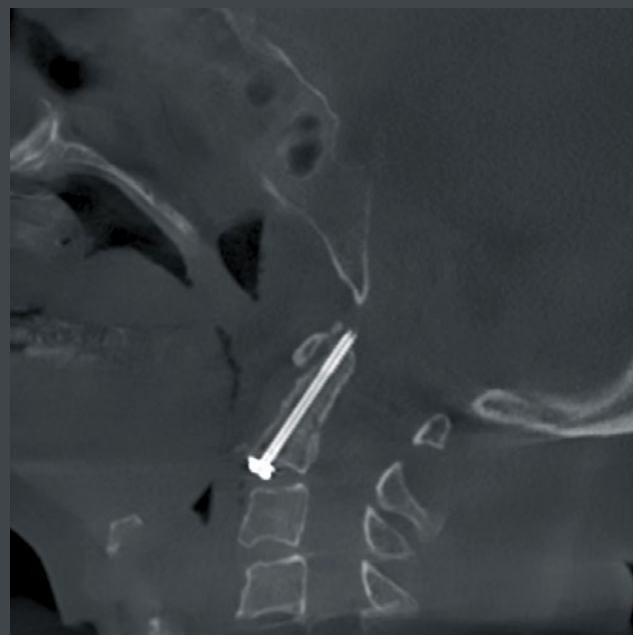


"We have seen significant dose savings in comparison to CT examinations in clinical applications like the cervical spine. With the Low Dose mode I can achieve even less dose. And what's more: the image quality remains as exceptional as usual."

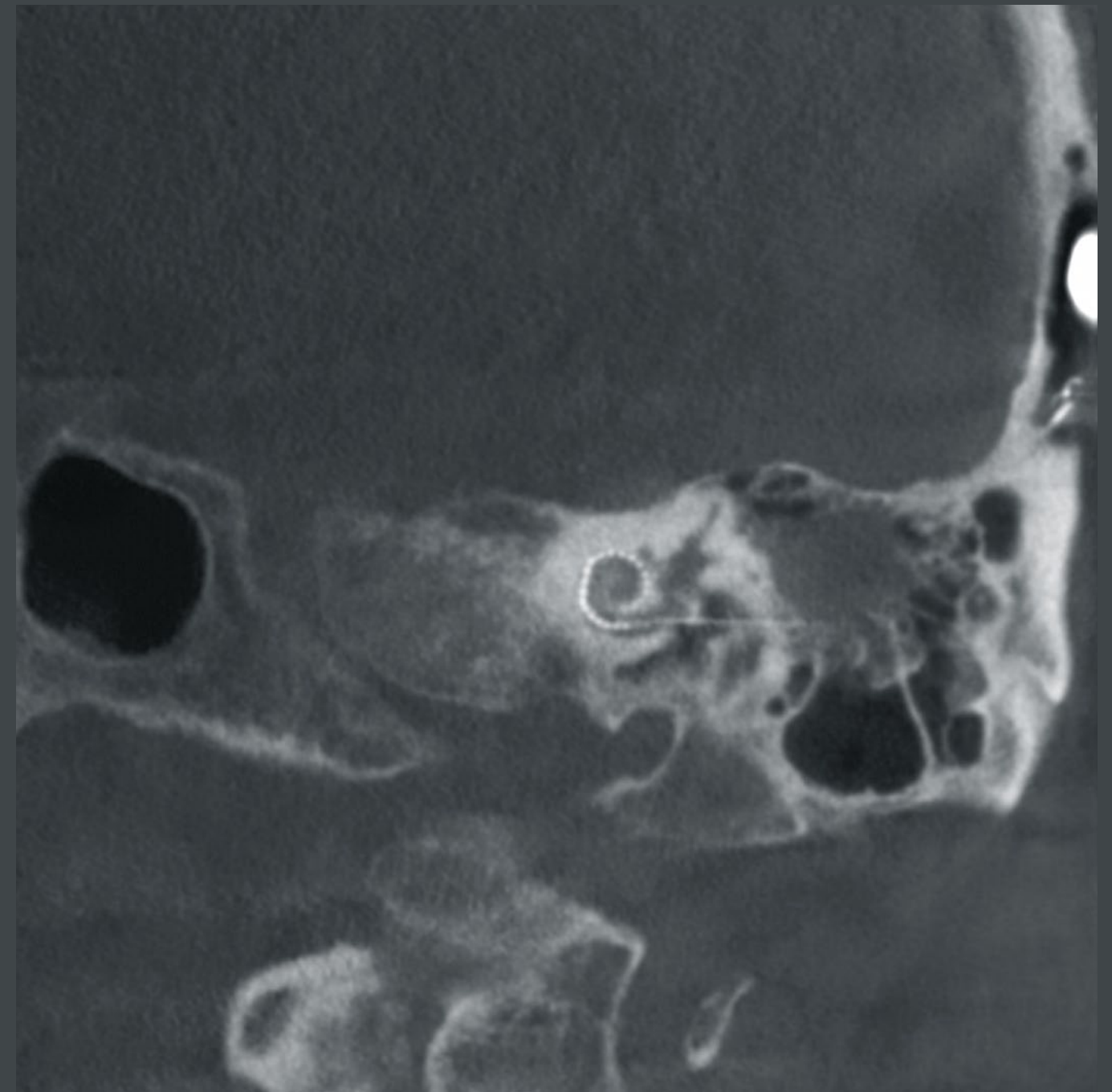
**PROF. DR. JOSTEN, UNIVERSITY HOSPITAL LEIPZIG, LEIPZIG, GERMANY**



Cervical spine – Low Dose mode



Cervical spine – Standard mode



Cochlear implant (width of electrode: 0.3 mm)

## 03/ Master your quality outcome with image-guided surgery and workflow wizards

Designed to help surgeons meet their quality demands quickly and efficiently, the Ziehm Vision RFD 3D redefines daily clinical OR routines with image-guided surgery and workflow wizards. The Ziehm Vision RFD 3D builds confidence by enhancing intraoperative control and by pulling the postoperative CT scan forward to the OR. This translates into better patient outcomes and unprecedented usability for massive efficiency gains.

### → Precise and time saving

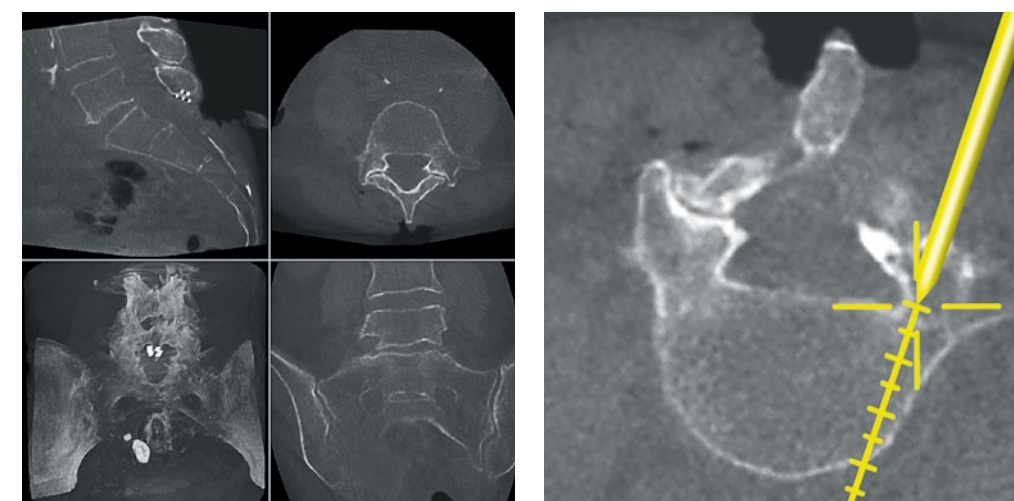
Our 3D C-arms are significantly smaller than fixed C-arms and around 60% lighter than mobile CTs. Thus, the Ziehm Vision RFD 3D can be easily positioned during all kinds of procedures. The surgeon can operate the C-arm entirely from the sterile field: Due to the motorization of all 4 axes combined with the Position Control Center or the Remote Vision Center, the C-arm can be moved into the exact position desired. The operator can easily save and recall up to 3 positions, for example switching between AP, lateral, and oblique positions saving time and increasing precision.

### → Patient safety

Patient safety is top priority. The Ziehm Vision RFD 3D is configured with Distance Control – an assistance system supporting non-contact collision protection. In the patient’s proximity, the motorized movement is slowed down. The movement stops immediately before entering a defined safety zone.

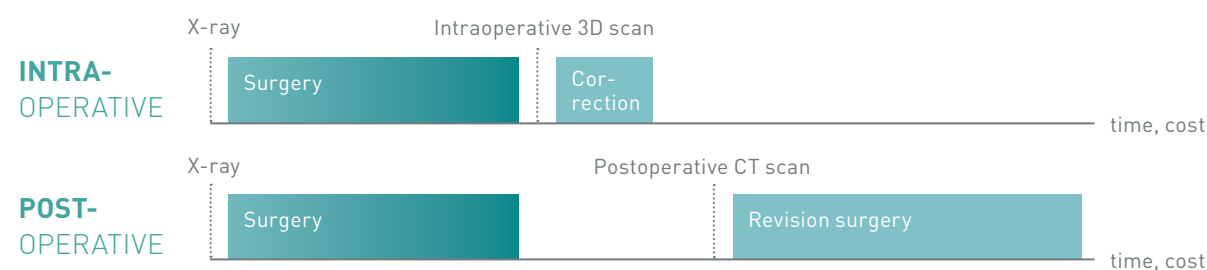
### → Image-guided surgery

During complex minimally invasive procedures, high-resolution intraoperative 3D imaging improves confidence and precision during the interventions and reduces the need for revision surgeries. The proven Ziehm NaviPort interface connects the Ziehm Vision RFD 3D to the navigation systems of leading providers. The high-resolution 3D data set is transferred seamlessly from the C-arm through Ziehm NaviPort to the navigation system. The real-time navigation guide eliminates the need to re-register the 3D data record. The navigation software automatically aligns the intraoperatively obtained image data with the patient’s anatomy while visualizing surgical instruments on the monitor. As a result, the surgeon can quickly and reliably check and document the results of the intervention.



Ziehm Vision RFD 3D

Image-guided navigation



“The Ziehm RFD 3D and the Brainlab navigation has shown to be an ideal combination for our daily spine and trauma cases. It allows switching seamlessly between intraoperative navigation, CT-like 3D imaging and excellent 2D fluoroscopy with a 31 cm x 31 cm field of view.”

**DR. SIMON WEIDERT, UNIVERSITY HOSPITAL MUNICH, MUNICH, GERMANY**

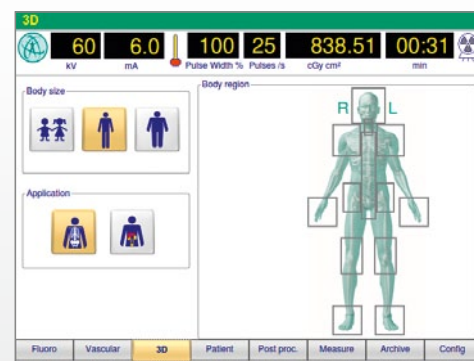


### → Accelerating your clinical procedures

The Ziehm Vision RFD 3D enhances daily OR routine. With the wizard-guided workflow and the intuitive user interface, the system will easily lead through imaging procedures and help to save valuable OR time. The Ziehm Vision RFD 3D performs a complete 3D scan in less than three minutes, which translates into reduced surgery time for clinical work.

approx.

**2**  
min.



PREPARATION

The workflow wizards assist in setting up the scan and guiding to the right anatomical program with the ideal dose settings. After positioning the 3D C-arm, and performing a collision check in a period of approximately 2 minutes, the system is ready to scan.

**48**  
sec.



180° SCAN FOR  
COMPLETE 3D INFORMATION

The refined motorization of the system and the intelligent combination of linear and rotating movements allow for 180 degrees of scanned information in only 48 seconds.

**8**  
sec.



RECONSTRUCTION AND  
DISPLAY OF 3D DATASET

Our iterative reconstruction techniques – most commonly seen in CT imaging – create crystal-clear images in only 8 seconds (standard volume). Even with the highest resolution of 512<sup>3</sup> voxel, the system needs only 18 seconds of reconstruction time.

→ Ziehm Usability Concept

Heavy case loads and a large number of different users call for OR equipment with a highly standardized and ergonomic design. Ziehm Imaging supports this need with the unique Ziehm Usability Concept<sup>4</sup>. Seamlessly integrated workflows offer unmatched levels of usability – anytime, anyplace.

As the innovation and technology leader, Ziehm Imaging has developed the sophisticated, yet intuitive Ziehm Usability Concept that combines a unique and finely tuned set of hardware features with seamlessly integrated software functionalities. In a challenging clinical environment, the entire concept is geared toward increasing ease of use in daily tasks. It improves process efficiency and ensures standardized quality levels in the OR for optimized patient outcomes.



**COLOR-CODED SCALES AND HANDLES** to ensure clear communication in the OR



**WIRELESS DUAL-PLUS FOOTSWITCH** to control all imaging functionalities without any disturbing cables



**MOST COMPACT FOOTPRINT WITH 0.8M<sup>2</sup>** to fit in even the smallest treatment scenarios



**ZIEHM NETPORT** with WLAN enables easy integration into IT networks



**UP TO 165° OF ORBITAL MOVEMENT** to support easier patient coverage



**WIRELESS VIDEO** transmitting live X-ray images to external monitors



**ZIEHM VISION CENTER** featuring an intuitive touchscreen user interface



**CONTROL MODULES** for a fast and flexible setup in the sterile field



**SMARTEYE** enabling users to keep track of orientation and object position



**VERSATILE VIEWING OPTIONS** to offer maximum flexibility in the OR



**ANATOMICAL MARKING TOOL** to easily apply markings and labels to fluoroscopic images

## 04/Reduce exposure significantly with benchmark dose settings and hardware improvements

The Ziehm Vision RFD 3D is designed to meet growing demand among surgeons and their staff for minimized dose exposure without compromising on image quality. Revolutionary dose settings and enhanced SmartDose<sup>3</sup> features cut exposure during 3D imaging significantly. The Ziehm Vision RFD 3D thus improves quality of care for patients, staff and surgeons.

### → Best image quality. Minimized dose.

The comprehensive concept consists of a broad, clinically proven application portfolio to address daily challenges of low dose and high image quality. With significant dose savings, Ziehm Imaging sets the benchmark in user-friendly adjustment of dose exposure. Our latest improvements in SmartDose help to display even the smallest details of complex anatomical areas and reduce dose with intelligent pulse regulation and optimized anatomical programs.

### → Beam Filtration for reduced skin entrance dose

Our feature-rich SmartDose concept now comes in a further developed version with the groundbreaking Beam Filtration<sup>1</sup> technology. The new dose reduction technique for an optimized X-ray spectrum supports our enhanced CMOS imaging chain. This combination enables an exceptional reduction in the skin entrance dose for all CMOSline systems in comparison with systems with conventional filtration technology. In a nutshell, the premium line of Ziehm Imaging C-arms provides excellent image quality with a lower dose.



**SmartDose**  
Best image quality. Minimized dose.



#### LASER POSITIONING DEVICE

integrated in flat-panel or I.I. and generator housing for accurate and dose-free positioning of C-arm



#### REDUCTION OF PULSE FREQUENCY

manually or fully automatically to lower the accumulated dose



#### OBJECT DETECTED DOSE CONTROL (ODDC)

to automatically analyze the area of interest and minimize dose while optimizing image quality



#### ANATOMICAL PROGRAMS

with automatic optimization of dose and image quality for best results



#### HIGH-SPEED ADR

for intelligent, fast regulation of pulse rate to lower the dose level



#### ZAIIP ALGORITHM AND FILTERS

to display fast-moving objects like guide wires and even the smallest vessels in razor-sharp image quality



#### LOW DOSE MODE

in all anatomical programs for particularly dose-sensitive procedures, e.g. in pediatrics



#### PREMAG

for exposure-free magnification of X-ray images



#### AUTOMATIC ADJUSTMENT

for large patients – with no additional increase in dose



#### REMOVABLE GRID

to reduce dose in pediatric and other dose-sensitive procedures



#### VIRTUAL COLLIMATORS

for exposure-free positioning of collimators








#### BEAM FILTRATION

for reduced skin entrance dose without compromising on image quality












FEATURES

	ZIEHM VISION FD VARIO 3D	ZIEHM VISION RFD 3D
 Imaging technology	a-Si, 20 cm x 20 cm	a-Si, 30 cm x 30 cm CMOS, 31 cm x 31 cm
 Power generator	2 kW, pulsed monoblock generator	25 kW, pulsed monoblock generator
 Motorization	3 axes	4 axes
 Scanned information	135°	180°
 3D volume size	12.8 cm x 12.8 cm x 12.8 cm; 256 <sup>3</sup> /512 <sup>3</sup> voxel	16 cm x 16 cm x 16 cm; 320 <sup>3</sup> /512 <sup>3</sup> voxel Further options: 10 cm x 10 cm x 10 cm; 320 <sup>3</sup> /512 <sup>3</sup> voxel 19.8 cm x 19.6 cm x 18.0 cm; 320 <sup>3</sup> /512 <sup>3</sup> voxel

CLINICAL APPLICATIONS

 Spine	••	•••
 Lower extremities	•	•••
 Upper extremities	••	•••
 Pelvis	•	•••
 Shoulder	••	•••
 Maxillofacial/ENT	•	•••
 Interventional/Hybrid	–	•••

available ■ | not available – | good • | very good •• | ideal •••



WORLDWIDE SERVICE

Offices

- 1 Nuremberg (Germany)
- 2 Orlando, FL (USA)
- 3 Scottsdale, AZ (USA)
- 4 São Paulo (Brazil)
- 5 Paris (France)
- 6 Reggio Emilia (Italy)
- 7 Kerava (Finland)
- 8 Midrand (South Africa)
- 9 Singapore (Singapore)
- 10 Shanghai (China)

MAXIMIZE YOUR UPTIME



Make sure to get the best service for your daily business.

Rely on Ziehm Imaging for flexible and fast service to stay at the cutting edge of technology. Tailored service packages, remote service and individual upgrade paths keep you competitive in your daily hospital routine.



- <sup>1</sup> The technology Beam Filtration reduces dose exposure for all CMOSline systems in comparison with conventional filtration techniques (Status before September 2017). Data on file. Results may vary.
- <sup>2</sup> CMOSline represents a system configuration that is based on a Ziehm Imaging CMOS flat-panel detector.
- <sup>3</sup> The SmartDose concept includes all mentioned features on page 17. Due to regulatory reasons the availability of each feature may vary. Please contact your local Ziehm Imaging partner for detailed information.
- <sup>4</sup> The Ziehm Usability Concept includes all mentioned features on page 15. Due to regulatory reasons the availability of each feature may vary. Please contact your local Ziehm Imaging partner for detailed information.

#### Headquarters Germany

Ziehm Imaging GmbH  
Donaustrasse 31  
90451 Nuremberg, Germany  
Phone +49 911 2172 0  
Fax +49 911 2172 390  
info@ziehm.com

#### Italy

Ziehm Imaging Srl  
Via Paolo Borsellino, 22/24  
42100 Reggio Emilia, Italy  
Phone +39 05 22 61 08 94  
Fax +39 05 22 61 24 77  
italy@ziehm.com

#### Finland

Ziehm Imaging Oy  
Kumitehtaankatu 5  
04260 Kerava, Finland  
Phone +358 4 49 75 75 37  
finland@ziehm.com

#### USA

Ziehm Imaging Inc.  
6280 Hazeltine National Dr.  
Orlando, FL 32822, USA  
Toll Free +1 800 503 4952  
Phone +1 407 6 15 8560  
Fax +1 407 6 15 8561  
mail@ziehm.com

#### Brazil

Ziehm Medical do Brasil  
Av. Roque Petroni Jr.,  
1089 cj 904  
04707-000 São Paulo, Brazil  
Phone +55 11 30 33 59 99  
Fax +55 11 30 33 59 97  
brazil@ziehm.com

#### France

Ziehm Imaging S.A.R.L.  
1, Allée de Londres  
91140 Villejust, France  
Phone +33 1 69 07 16 65  
Fax +33 1 69 07 16 96  
france@ziehm.com

#### China

Ziehm Medical Shanghai Co., Ltd.  
Hongqiao New Tower Centre  
Rm 02-06, 29/F  
83 Loushanguan Road  
Shanghai, P.R. China; 200336  
Phone +86 21 62 36 99 03  
Fax +86 0 21 62 36 99 16  
china@ziehm.net.cn

#### Singapore

Ziehm Imaging Singapore Pte. Ltd.  
7030 Ang Mo Kio Ave 5  
#08-53 Northstar@AMK  
Singapore 569880, Singapore  
Phone +65 6 39 1 86 00  
Fax +65 6 39 6 30 09  
singapore@ziehm.com