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 maxillofacial 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 now comes with an enhanced version of our comprehensive SmartDose concept. A newly developed dose-saving technology, Beam Filtration, supports the latest improvements in our enhanced CMOS imaging chain, enabling an exceptional reduction in the skin entrance 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 5123 voxel. The higher number of voxel in all volume sizes guarantees a better resolution without increasing dose levels from those used with the conventional 3203 voxel. Additionally, 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 during 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 key benefits of Ziehm Imaging’s C-arms: the most compact 3D devices with a flat-panel up to 31 cm x 31 cm, generous C-arm opening, and 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](image)
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 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 directly 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 25kW 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.
"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. Jo Sten, University Hospital Leipzig, Germany
Cochlear implant (width of electrode: 0.3 mm)

High resolution imaging with 512³ voxel (volume size 16 cm x 16 cm x 16 cm)

Kyphoplasty surgery – high resolution imaging with 512³ voxel

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

Combined arthrodesis of tibiotalar and subtalar joints

3D reconstruction of stent placement (abdominal aortic aneurism)

Cervical spine – Standard mode

Cervical spine – Low Dose mode

“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. Jo Sten, University Hospital Leipzig, Leipzig, Germany
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. The Ziehm Vision RFD 3D can easily be positioned during many different procedures and the surgeon can operate the C-arm entirely from the sterile field. Due to the motorization of all 4 axes, and 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 register the 3D data record again. 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.

"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
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.

**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.

**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.

**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 5123 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. Seamlessly integrated workflows offer unmatched levels of usability – anytime, anywhere.

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.
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® features cut exposure during 3D imaging significantly. The Ziehm Vision RFD 3D 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 Filtration¹ for reduced skin entrance dose
Our next-generation SmartDose® concept now includes Ziehm Imaging’s groundbreaking Beam Filtration® 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 CMOSline² systems.¹,³ This innovative technology, included in the premium line of Ziehm Imaging C-arms, provides excellent image quality with a lower dose.¹,³
**Features**

<table>
<thead>
<tr>
<th>Ziehm Vision RFD 3D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imaging technology</td>
</tr>
<tr>
<td>CMOS, 31 cm x 31 cm</td>
</tr>
<tr>
<td>Power generator</td>
</tr>
<tr>
<td>Motorization</td>
</tr>
<tr>
<td>Scanned information</td>
</tr>
<tr>
<td>3D volume size</td>
</tr>
<tr>
<td>Further options:</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

**Clinical Applications**

| Spine     | *** |
| Lower extremities | *** |
| Upper extremities | *** |
| Pelvis    | *** |
| Shoulder  | *** |
| Maxillofacial/ENT | *** |
| Interventional/Hybrid | *** |

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  - Parts inventory in the USA delivered in 24 hrs in 98% of requests
  - Comprehensive service programs from our direct service organization

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