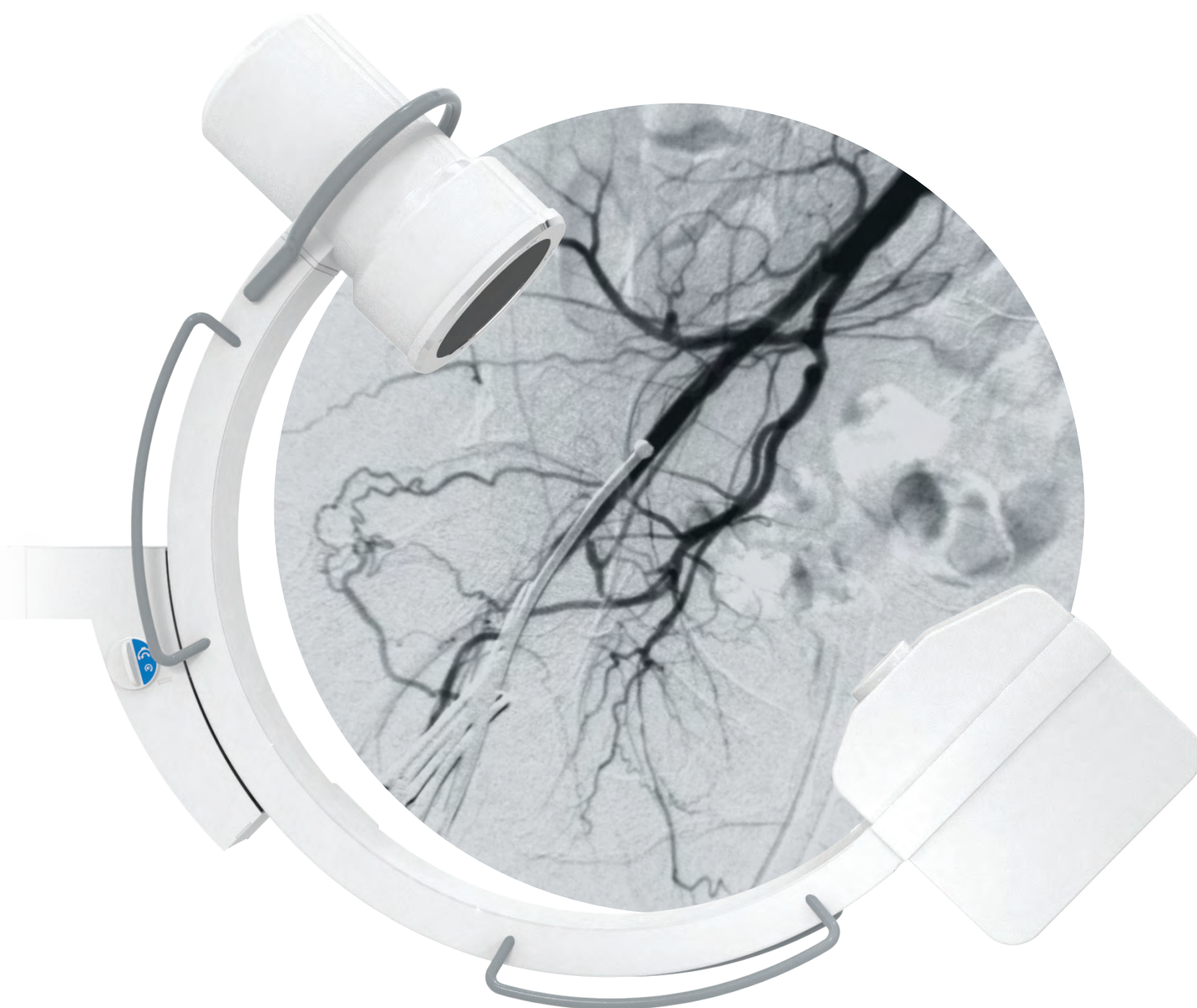


DEL MEDICAL

Vision **R**

MOBILE FLUOROSCOPY SYSTEM



# System Overview

## Real-time mobile imaging

The Vision R is a surgical, feature-rich mobile system designed to perform a wide range of fluoroscopic applications. Its refined movement capabilities, high resolution, and dose efficiency make it a smart solution for procedures in surgery, orthopedics, urology, cardiology, and pain management.

The Vision R's use of a rotating anode and high-powered monoblock pulsing generator ensures clean, sharp images regardless of patient size. With variable pulse widths, the Vision R can handle all general surgery applications ranging from catheter placement to cardiac operations. Easily capture objects at up to 30 frames per second to achieve the highest quality images without missing a moment. In addition, the Vision R offers 9" or optional 12" image intensifiers to better accommodate digital subtraction angiography (DSA) procedures.



## Key Highlights



High Frequency  
Pulsing Generator



Rotating Anode  
with variable pulse width



High Resolution  
1 k x 1 k CCD Camera



9" Image Intensifier  
12" option available



Advanced Active Cooling



SmartDose Technology



ODDC Technology



\* System shown with available options including:  
12" I.I., vascular upgrade, DVD burner, and printer

# System Features

## Powerful generator and specialty specific upgrades

The Vision R features a **20kW monoblock generator with a rotating anode**. This industry-leading pulsing generator **provides short, sharp pulses at up to 30 pulses per second aimed towards minimizing dose exposure, and maximizing image quality**. The Vision R offers optional vascular and cardiac packages that provide access to DSA, MSA, and RSA functionality. Physicians specializing in TAVI (transcatheter aortic valve implantation) and advanced vascular procedures including PTCA, PTA and EVAR will greatly benefit from these efficient upgrades.

### Standard Vision R

- Cine Pulse up to 10 fps
- Real-time image processing
- Patient annotation
- Footswitch (two button)

### Vascular Upgrade Features

- Cine Pulse up to 15 fps
- DSA, MSA, RSA functionality
- Pixel Shift & Landmarking
- Anatomical Marking Tool
- Toggle Footswitch (replaces two button)

### Cardiac Upgrade Features

- Cine Pulse up to 30 fps
- DSA, MSA, RSA functionality
- Pixel Shift & Landmarking
- Anatomical Marking Tool
- Toggle Footswitch (replaces two button)



## Dynamic visualization

The high resolution CCD camera enables anatomic visualization in a high dynamic range and is a key component in the imaging chain. **With 1 k x 1 k resolution and more than 4,000 shades of gray, it visualizes even the smallest anatomical structures.**

This is extremely beneficial in demanding applications like interventional vascular or cardiac procedures. Thanks to automatic adjustment, s-shaped and pincushion distortion is minimized.



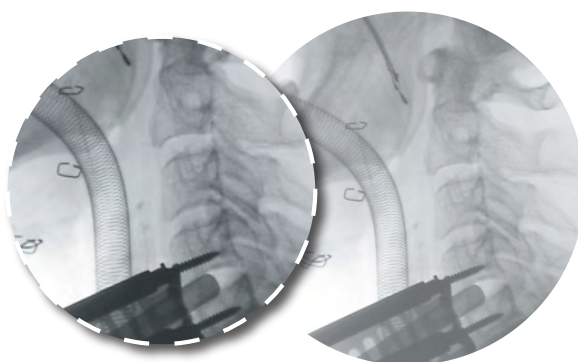
## High contrast displays

The stand-alone image cart features **dual 19" TFT color flatscreen monitors** that stand out for their outstanding brightness and contrast, even from a distance. These high resolution monitors are easily viewable for physicians and staff at angles throughout the procedure room.

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## Simulate before exposure with PreMag

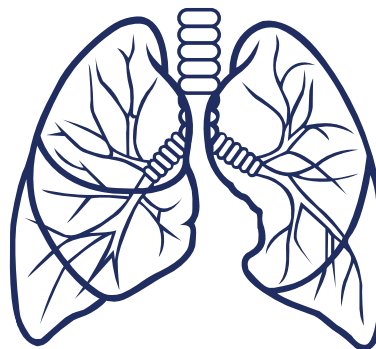
PreMag is an intelligent preview function that allows the operator to **simulate the size of a magnified image before taking a second exposure.** Based on the initial scan, a specifically defined region can be previewed through magnifier 1 or 2 without any additional exposure for the patient. After the magnification adjustments have been made, the operator can make an exposure if necessary.



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## Anatomically programmed

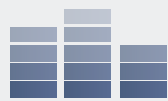
The Vision R has predefined organ programs that create less guess-work for operators and promote low dose examinations. These programs aid in **achieving optimal image quality, especially for larger patients, where dose concentration must be sufficient and precise.**





## Achieve the best image quality with the smallest dose

The Vision R features SmartDose technology in the current generation of mobile C-Arms. This comprehensive concept for dose reduction allows the physician and staff to **significantly reduce dose while optimizing image quality**. SmartDose benefits both patients and staff alike with its significant dose savings. The Vision R sets the benchmark in user-friendly adjustment of dose exposure.



### SmartDose

1

**Positioning with laser light** integrated and remotely operated

2

**Correct selection of anatomical program** anatomically adjusted and dose-optimized

3

**Low dose mode** for all anatomical programs

4

**Reduction of pulse frequency** manually or automatically

5

**Exposure-free display** with virtual collimators

6

**Automatic motion and position detection** with ODDC

7

**Automatic LPK** automatic adjustment for larger patients with no additional dose increase

8

**PreMag** for exposure-free magnification

\* In clinical practice, the use of SmartDose may reduce patient dose depending on the clinical task, patient size, anatomical location, and clinical practice. A consultation with a radiologist and a physicist should be made to determine the appropriate dose to obtain diagnostic image quality for the particular clinical task.

## Automatic adjustment of settings

The Vision R greatly simplifies patient positioning and dose control. ODDC technology (object detected dose control) creates a matrix over the entire scan field and uses 256 measurement cells to scan the region of interest in real time. **All settings, including the dose level and noise filters, are automatically adapted to the patient's position.**

ODDC's measurement cells automatically detect motion. If the patient is not moving, the pulse frequency can be lowered significantly. If, however, motion is detected in the region of interest, the pulse frequency automatically increases to the maximum frame rate based on the system configuration, a maximum of 30 frames per second (with cardiac upgrade).

ODDC reduces patient dose and improves image quality. The system detects metal parts in the scanned zone (e.g. plates, pins, instruments or implants) and automatically adjusts generator output and video levels to reduce metal distortion and improve image quality.

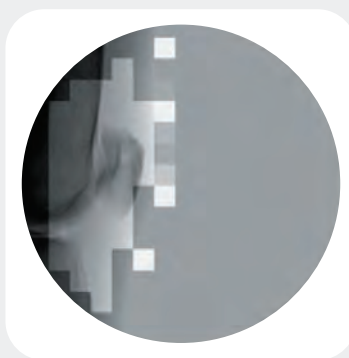
The Gosch<sup>1</sup> study for radiation exposure and image quality showed the average dose reduction when using 25 pulses / sec resulting from object detection and automatic down-pulsing was 21 %, and the maximum dose reduction was 60 %.

1 Gosch D. et al. "Influence of Grid and Object Detection on Radiation Exposure and Image Quality using Mobile C-Arms – First Results", RöFo, 09 / 2007, page 896 onwards

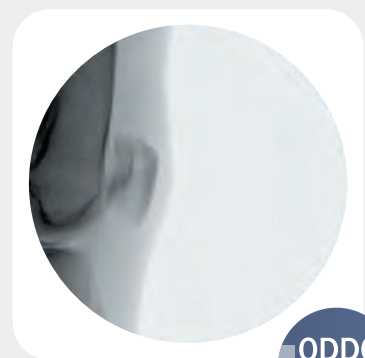
## ODDC Technology



Conventional image quality



ODDC: Grid-controlled adjustment of radiation levels, filters and pulse frequency



Crystal-clear images achieved with minimized doses





## Intuitive user interface

The Vision Center is a highly adjustable touchscreen control panel mounted to the mobile stand as well as on the monitor cart. These touchscreens provide users with access to the same, synchronized system controls found on both units. **Vision R's intelligent and easy-to-follow user interface makes operation of the imaging system simple and intuitive.** Operators can simply choose a desired anatomical program from a comprehensive list which will automatically adjust the imaging parameters to the region of interest. This ensures the best image quality and lowest dose levels.

## Full control with SmartEye

**SmartEye image mirroring** conveniently displays the monitor image on the touchscreen. This provides the user with a live replica to keep track of orientation and object positioning. Faster than ever, images can be transferred from left or right monitor utilizing drag and drop gestures. **SmartControl functionality** allows operators to make adjustments to brightness, contrast, image mirroring and rotation with just a swipe of a finger. The virtual iris and slot collimator are equally intuitive, allowing users to easily preselect collimator settings for the upcoming image.



## Precise positioning

All steering and brake functions are controlled by a single lever providing optimal maneuverability and convenience, especially in tight spaces. The compact footprint and easy-drive system of the Vision R allows for effortless movement on carpeted and tiled surfaces. All C-Arm movements are fully counterbalanced in every position. **The wide C-Arm opening of 29.9" (76cm) provides an ideal work space with few restrictions.**

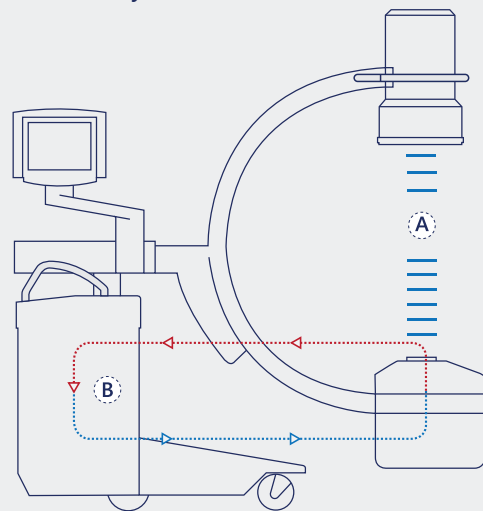
Color-coded movement identification handles



## Unique reliability

C-Arms need to be in continuous use during lengthy, demanding procedures such as vascular and cardiac interventions. The unique liquid cooling system, Advanced Active Cooling (AAC), standard on the Vision R, is more effective than cooling systems of conventional C-Arms and keeps the generator at an ideal operating temperature. **This provides uninterrupted usage even during long and difficult procedures where reliability is crucial.**

Advanced Active Cooling keeps generator temperatures down while the heat management software automatically adapts the pulse rate

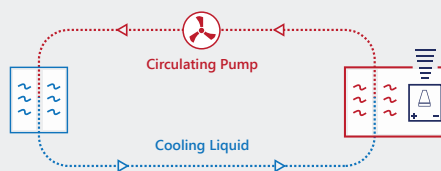


**A** Automatic pulse regulation ensures continuous imaging

**B** Cooling cycle, heat radiator

Built-in heat radiator

Pulsed monoblock generator: Heat is transferred via a heat exchanger into the cooling liquid



## Seamless integration

The Vision R features an open interface which enables **easy integration into existing IT networks**. Patient data saved in DICOM 3.0 format can be transferred to a PACS or HIS / RIS system. Data can be retrieved from the monitor cart at any time. Data can also be backed up to DVD or USB and printed on transparencies or paper. (DVD burner and printer are available as optional features)

## Fit for the future

The user interface is a touchscreen with an open, modular software architecture, ensuring maximum flexibility. **The Vision R user interface can be easily upgraded and expanded with software modules.**

# Technical Specifications

## Dimensions, Weight, and Mechanics

**Motor-driven vertical travel:** 17" (43 cm)  
**Horizontal travel:** 9" (22 cm)  
**Orbital rotation:** -90° / +45° ( 9" (23 cm) i.i.) / +25° (12" (31 cm) i.i.)  
**Angulation:** ±225°  
**Swiveling (panning):** ±10°  
**Source/image receptor distance:** 38" (97 cm)  
**C-Arm vertical free space:** 30" (76 cm)  
**C-Arm depth:** 27" (68 cm)  
**Width:** 32" (80 cm)  
**Length:** 74-83" (188-210 cm)  
**Height:** 70-87" (179-222 cm)  
**C-Arm mobile stand weight:**  
- 9" I.I.: 838 lbs. (380 kg)  
- 12" I.I.: 877 lbs. (398 kg)  
**Monitor cart weight:** 353 lbs. (160 kg)

### Brakes

Patented steering and breaking lever, with parallel movement of the mobile stand in all directions

## X-ray Generator

**X-ray tube:** rotating anode  
**Dual focus (IEC):** 0.3 mm/0.6 mm  
**Target angle:** 10°  
**Anode speed:** 3450 RPM  
**Max. anode heat content:** 300 kHU/ 222 kJ  
**Max. anode heat dissipation:** 870 W  
**Generator type:**  
- Monoblock  
- 20kHz high frequency  
- microprocessor-controlled  
**Digital radiography (snapshot):**  
- kV range: 40-120kV  
- mA: up to 75 mA  
**Pulsed fluoroscopy:** up to 75 mA

## Image Intensifier

**Type:** Cesium Iodide  
**DQE (IEC):** 65%  
**9 inch (23 cm) I.I.:**  
- Central resolution: 9-6-4" (23-15-10 cm): 52-58-68 lp/cm  
- Contrast ratio: 30:1  
**12 inch (30.5 cm) I.I.:**  
- Central resolution: 12-9-6" (31-23-15 cm): 44-50-56 lp/cm  
- Contrast ratio: 22:1

## Digital Video Camera

**Active pixels:** 1,048,578  
**Camera matrix:** 1024 x 1024 pixels  
**Bandwidth of video signal:** 20 MHz  
**Bandwidth of video amplifier:** 50 MHz  
**Video (monitor):** 1,125 lines  
**Signal-to-noise ratio:** 68 dB  
**Control:** ADR / AVR

## Monitor Cart

**Monitors:**  
- Screen size: 18.1" (46 cm)  
- Native resolution: 1280 x 1024 pixels  
- Viewing angle (horizontal/vertical): 170°  
- Contrast ratio: 600:1  
- Dimensions: 16 x 13 x 3" (41 x 34 x 7 cm)  
**User interface:**  
- TFT touchscreens on C-Arm and monitor cart  
- synchronized  
- intuitive icons for easy use  
- multi-lingual

## Digital Image Processing

**Processing functions:**  
- Recursive filter: 4 levels (out of 16)  
- Stack filter (last image hold): 5 levels  
- Edge enhancement filter: 5 levels  
- Zoom: 3 levels  
- Windowing and step windowing  
- Digital image rotation and reversal without radiation  
- Grayscale inversion  
- Image cropping  
**Cine Loop:**  
- Sequential image storage and display 1, 2, 5, 10, 15, 30 frames/sec  
- Cine loop start, stop and replay rate controls

## Digital Memory

**Storage capacity:** 4 levels (out of 16)  
**Memory matrix:** 1024 x 1024 pixels  
**Image matrix:** 1024 x 1024 pixels  
**Digital image processing:** up to 32 bit  
**Grayscale:** 4096 shades of gray (12 bit)

