



# EXPRESS HEALTHCARE

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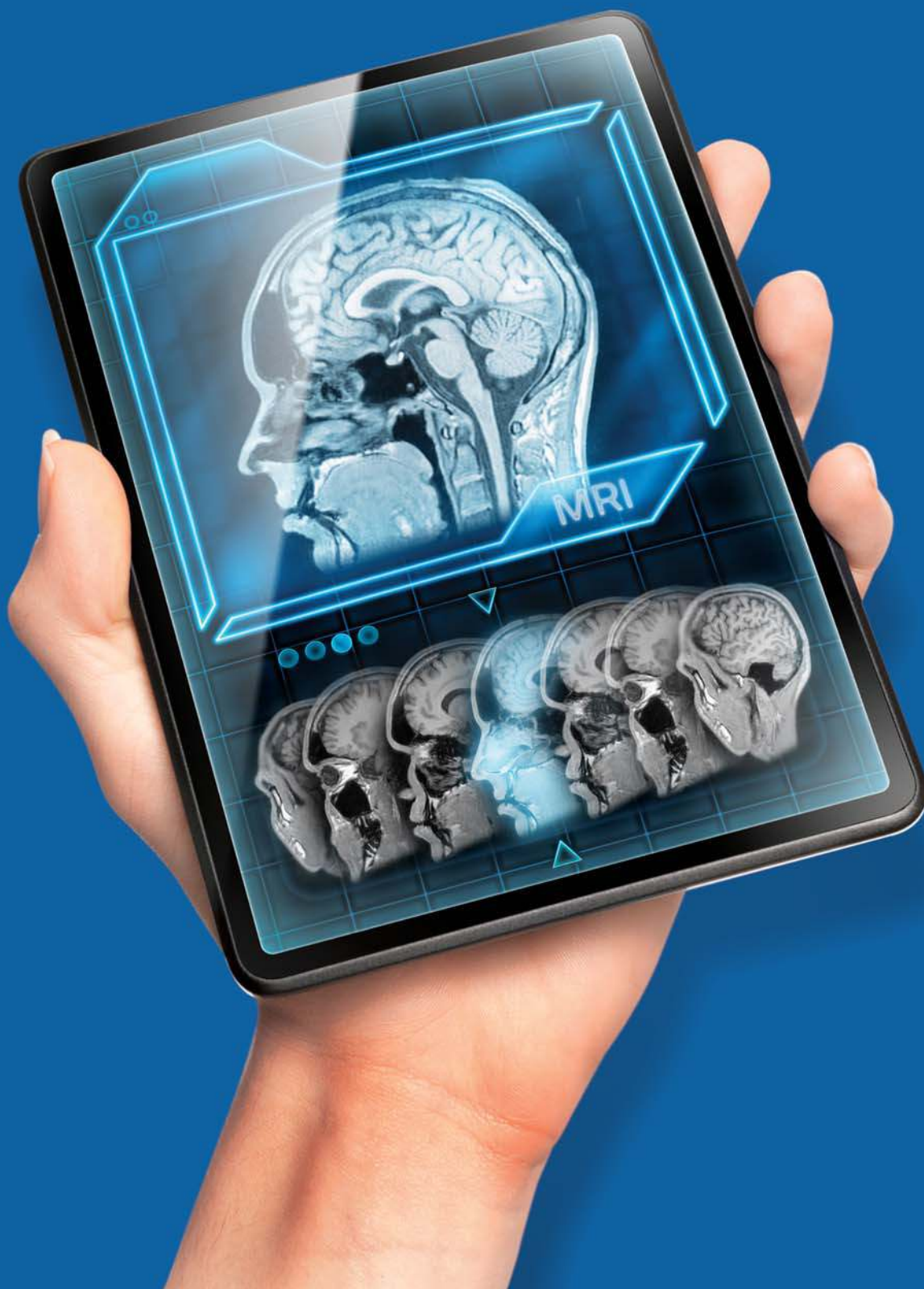


## Strategy

Hope in troubled times:  
Ayushman Bharat and  
healthcare innovations in  
Madhya Pradesh

## Diagnostics

Interview  
IVD solutions have  
effectively altered  
the healthcare approach  
to evidence-based  
treatment from  
syndromic-based  
treatment



# UPPING THE TECH EDGE IN MEDICAL IMAGING

Express Healthcare  
reviews the potential  
of technology to  
revolutionise radiology  
and medical imaging,  
giving better patient  
outcomes and  
efficiencies



# Transition from analogue to digital imaging for image guided surgeries

**Satyaki Banerjee**, CEO-Medical Imaging, Trivitron Healthcare highlights the advantages of digital technology for image guided surgeries

**C**-Arms and Cath-Labs are sophisticated medical imaging equipment that find extensive use in various operating room settings for image guided surgeries. Cath-Labs are generally used for Cardio-vascular procedures like angiography and angioplasty as well as complex neurosurgeries. Mobile C-Arms finds usage in predominantly Orthopedic, Urology, Spine and General Surgeries.

C-Arms and Cath-Labs are based on X-ray technology and provide high-resolution X-ray images in real time during the surgery to allow medical professionals precisely carry out complex surgical procedures in a minimally invasive manner. This makes the surgical procedure less painful for the patient and leads to a much quicker recovery.

The C-Arm gets its name from the C shaped arm that holds an X-ray tube at one end and an Image Intensifier or a Flat Panel Detector at the other end. The patient is positioned between the X-ray tube and the Image Intensifier / Flat Panel Detector. The Arm can



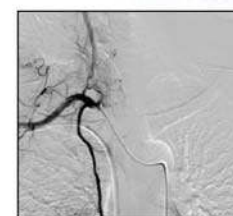
be moved horizontally, vertically and can be rotated around the swivel axis to properly position the patient in the X-ray field and acquire the desired images. The console of C-Arm would generally house the high voltage power electronics needed for the X-ray tube, control electronics for managing the C-Arm movement and embedded computer systems for image acquisition and processing.

C-Arm technology has evolved continuously since its introduction in 1955; and most

recent technology trend is migration from Image Intensifier based Analogue technology to Flat Panel Detector based Digital Technology.

In Analogue Image Intensifier C-Arms; the X-ray beam after penetrating the patient's body hits the Input Phosphor end of the Image Intensifier; the Input Phosphor converts the X-ray to light photons which passes through a vacuum tube with an arrangement of PhotoCathode, Electrostatic Focusing Lens, PhotoAnode finally reaching the Output Phosphor end of the Image Intensifier and forms a visible image of the X-rayed body parts. This image is then captured by a CCD camera and gets transmitted to the display monitors.

In case of Analogue C-Arms, the image conversion happens in two steps; Step 1 X-ray to Visible Light Image conversion by the Image Intensifier; Step 2 Capture of Visible Light Image by CCD camera and further processing using Analogue means. Due to the curved surface of the Image Intensifier tube the accuracy of the image is diminished near



the edges leading to distortion. Furthermore due to multiple steps and electron optics involved in the imaging chain; the field of vision is reduced with every step of magnification.

Flat Panel Digital Technology directly converts the X-Ray to an electrical charge which gets digitized in the detectors readout matrix. An Image Processing software converts the digital input from the detector to a digital image with a plethora of image processing options leading to high contrast and high resolution images that help visualize very minute anatomical structures. Digital C-Arms provide distortion free accurate images edge to edge of

the entire viewing field.

Trivitron Healthcare is at the forefront of innovation in Medical Imaging using Digital Technology, having launched Digital Radiography, Digital Mammography and now being the leader in Digital C-Arms.

Trivitron Healthcare offers a wide range of Digital C-Arm options; the Infinity series with 3.5 KW stationary anode and the Elite series with 5 KW rotating anode X-ray Monoblocs. Trivitron Healthcare C-Arms feature advanced software with Digital Subtraction Angiography, Road-mapping features along with dual panel or wide screen single panel display options.



Image Intensifier based C-Arm



Flat Panel Digital C-Arm

# FOCUSED ON DELIVERING PRECISION IMAGING



## See More

Edge-to-edge Visibility



## Efficient Imaging

Advanced Flat Panel Detector



## Clinical Versatility

Vascular, Cardiac, Orthopedic, Gastrointestinal,  
Endoscopic, Urologic, Critical Care, Pain Management  
and Emergency Procedures



## Kiran Flat Panel Digital C-Arm



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