# Application of Linear Sensor & Joystick in C-arm X-ray Machine

A mobile C-arm is a medical imaging device that is based on X-ray technology and can be used flexibly in various ORs within a clinic. The name is derived from the C-shaped arm used to connect the X-ray source and X-ray detector to one another. Mobile imaging systems are an essential part of everyday hospital life: Specialists in fields such as surgery, orthopaedics, traumatology, vascular surgery and cardiology use C-arms for intra operative imaging. The devices provide high-resolution X-ray images in real time, thus allowing the physician to monitor progress at any point during the operation and immediately make any corrections that may be required. Consequently, the treatment results are better and patients recover more quickly.

Working principle :

 A C-arm comprises a generator (X-ray source) and an image intensifier or flat-panel detector. The C-shaped connecting element allows movement horizontally, vertically and around the swivel axes, so that X-ray images of the patient can be produced from almost any angle. The generator emits X-rays that penetrate the patient's body. The image intensifier or detector converts the X-rays into a visible image that is displayed on the C-arm monitor. The doctor can identify and check anatomical details on the image such as blood vessels, bones, kidney stones and the position of implants and instruments at any time. The fig below shows the use of the system with help of the sensor and the joystick.
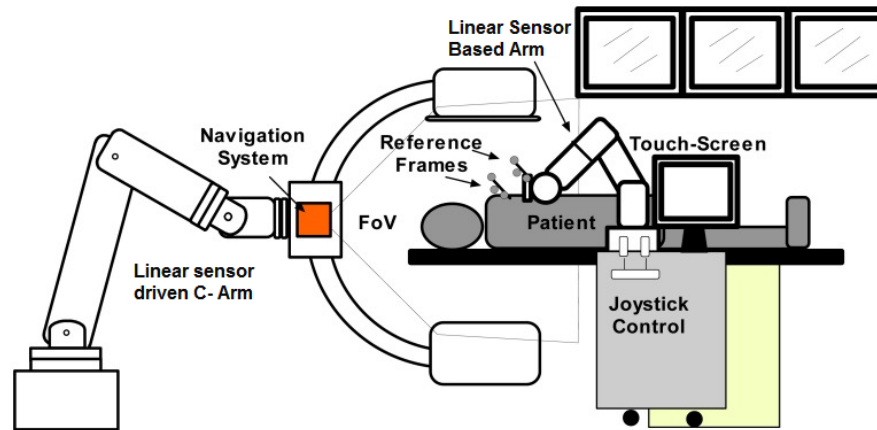
The touch screen and industrial joystick is used to control and connect the X-ray source and X-ray detector to one another. The C-arm consists of Linear sensor that helps the C-arm to move and to rotate to allow better patient access for procedures and to aid imaging angles providing full body coverage. Once a scan is taken, it sends the reconstructed 3D-images to the application controller for planning. In addition, 2D projections can be used to get a real-time target visualization. Based on the images, the surgeon can choose a target and an appropriate entry point. The other important part of the system is an optical localizer which tracks with precision the needle position by means of the reference frame that is attached to the needle holder.