

## MR Imaging Software

### Introduction

The MR Imaging software offers a complete workflow solution that enables MR technologists/radiologists to easily plan, acquire and visualize images, in an easy to use software environment. The scalable and customizable software platform facilitates MR research community to extend the software features by plugging in modules. The software comes standard with a package of 22 pulse sequences and parallel image reconstruction options optimized for 1.5T scanner.

The product is being developed as part of the Indigenous MRI (IMRI) Scanner development initiated by MeitY, Govt. of India.

### Features

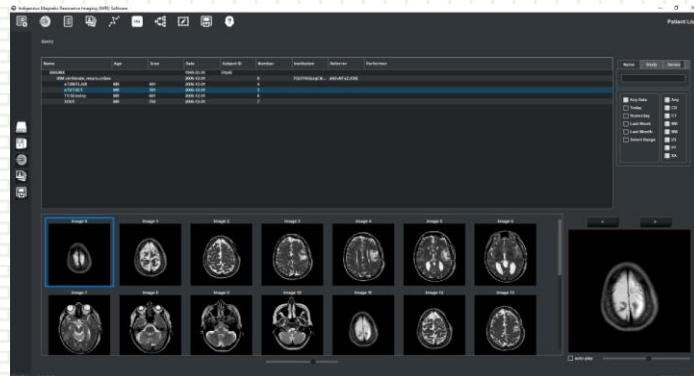
- Generic Software Platform with open interfaces
- International Standards Compliance(Pulseq, ISMRMRD, DICOM)
- Scalable/customizable modules
- Dynamic Protocol Configuration
- Dynamic Pulse sequence Configuration
- 22 Pulse sequences
- Graphical Slice planning
- Patient Work list
- Parallel Imaging Reconstruction
- PACS Browser
- DICOM Viewer
- Filming
- Calibration and Quality Analysis
- Scanner Integration support
- Advanced Visualization Modules
- Pluggable Reconstruction pipeline modules

### Image Reconstruction

- Software offers standard and parallel image reconstruction methods.
- Pipeline component modules to generate high quality images
- Auto-Calibrating parallel imaging reconstruction eliminates motion artefacts
- Data Acquisition and storage in Open source standard raw data format
- Clinical scanner interfaces (offline mode)

## PACS Browser & Work List

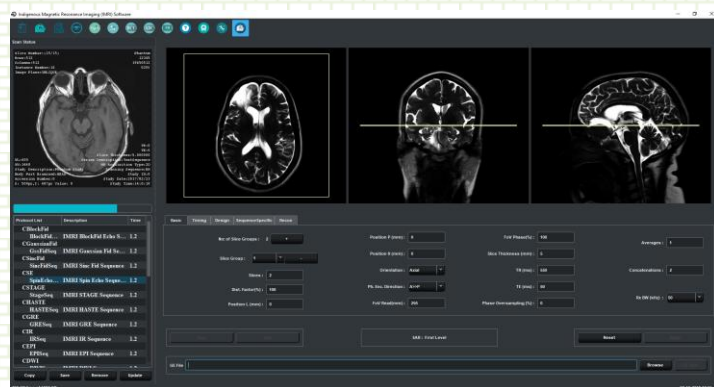
- Display images from different studies or examination
- Animated mode for displaying sequence data
- Load DICOM data directly from PACS
- Patient search to locate patient data from PACS
- Animated mode for multi slice DICOM data
- Start, stop and playback image by image



## Graphical Slice Planning

Using the Graphical Slice Planning (GSP) feature user can graphically prescribe a multi-group acquisition and acquire slices in any user defined orientation.

- The Sequence parameters of the slices can be interactively modified by user friendly Graphical slice planner.
- Oblique Slice planning feature supports slice acquisition in any user specified orientation.
- Single shot, interleaved and sequential modes for Multi slice acquisition



Courtesy: Osirix image data

## Protocol Library

- The software is pre-loaded with customizable protocol templates for each anatomy.
- User can modify the, imaging parameters of generic sequences present in the protocol library for specialized views or techniques.

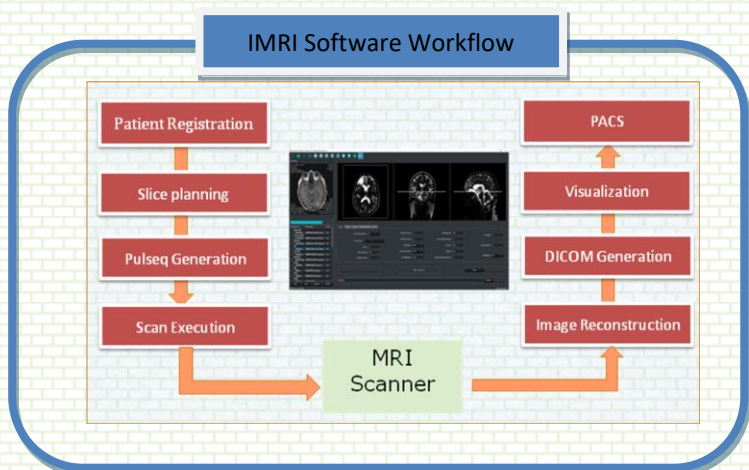
- The technologist can make use of the pre-loaded protocol templates from the library to initiate the scan.
- The software automates the image acquisition and processing without manual intervention, which dramatically reduces the workload of technologists.

## DICOM Viewer

The system generates images in DICOM format .The reconstructed images in DICOM format can be archived to PACS server

- Zoom/Rotate/Scroll/Translate
- Image Measurement Tools
- Orientation & Pixel display
- Image Annotations
- Multiple layout options
- Windowing /Contrast/Brightness control

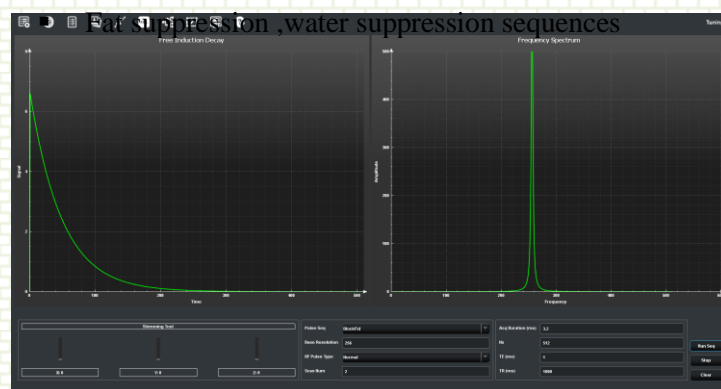
## Software Workflow



Recon Engine Specifications	
Number of slices per second	150 (256x256 matrix)
Measuring matrix (IMAGING)	32x32 - 512x512
Display matrix (IMAGE DISPLAY)	1024x1024
Minimum slice thickness 2D	5mm
Maximum Reconstruction FOV	50 cm
Reconstruction time - Single Slice (@ 256x256)	4000 2D FFTs per second (256x256, full FOV) with Intel . Quad Core I7 4790 CPU @ 3.6GHz
DICOM compatibility	Version 3
Image Viewer	Basic Viewer, DICOM Viewer
Parallel/Fast Imaging	Yes
Image Storage Capacity	5,00,000 images in 256X256 matrix (500GB storage )
Scan orientations	Transverse, coronal, sagittal, oblique

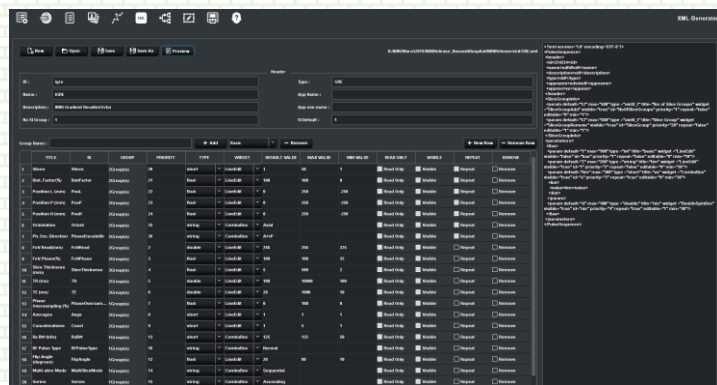
## Pulse sequences

- 22 pulse sequences
- Oblique Multi Slice Acquisition
- Interleaved, Sequential and single shot acquisition modes
- Tuning/Calibration sequences
- Dynamic pulse sequence configuration
- Open source standard pulse sequence format
- Fast Imaging options
- Diffusion weighted imaging
- Cardiac sequences
- Spectroscopy sequences



## Plug and Play

The MR research/technical community can customize/enhance the software by adding new pulse sequences and reconstruction algorithms dynamically without affecting normal software workflow.



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