Robot Assisted Technology for Healing Neurological Ailments (RATHNA)

Division of Remote Handling & Robotics
Bhabha Atomic Research Centre
Government Of India
RATHNA Caters to

- Patient data preparation from imaging.
- Development of SCMM
- Neuro-registration using SCMM
- Neuro-navigation using SCMM
- Visualization for surgical aid.
- Development of a high precision robot.
- Integrating Visualization & Robot for conducting high precision surgery
- Perform frameless Stereotactic Neurosurgery
DICOM is a set of standards, DICOM images is unique for a particular patient throughout the world.

Records image-related parameters like 3D position, sizes and orientations, slice thickness, radiation doses and exposures, image processing filters, modality used, information related to patient, doctor and hospital etc.
Medical Image Processing

- 3D model of the brain from the stack of Reconstructed Images
- Image Thresholding, Iso-Surface.
- Segmentation of various parts of image
- Region of Interest (ROI) Module
- Provision to change the Window Width (WW) and Window Level (WL).
- Removal of noise,
- Brightness and contrast manipulation
Surgical Coordinate Measuring Mechanism (SCMM)

• A 4 DOF SCMM to determine the coordinates of the spatial point.

• Portable, customized Measuring tool for neurosurgery.
The Prototype of SCMM

Precision of Measurement: 80 µm.
(Higher precision than Camera based Measurement)
Neuro-registration is a process of recording coordinates of an anatomical point with respect to the tool frame (i.e. SCMM in the present case)
Neuronavigation using SCMM

The movement of the tool is visualized accurately in all the views including 3D View in real time.
Visualization for surgical aid.
Concept of Using Robot in Neurosurgery
A typical robot motion biopsy pickup Lab experiment.
A typical robot lab arrangement.
THANK YOU