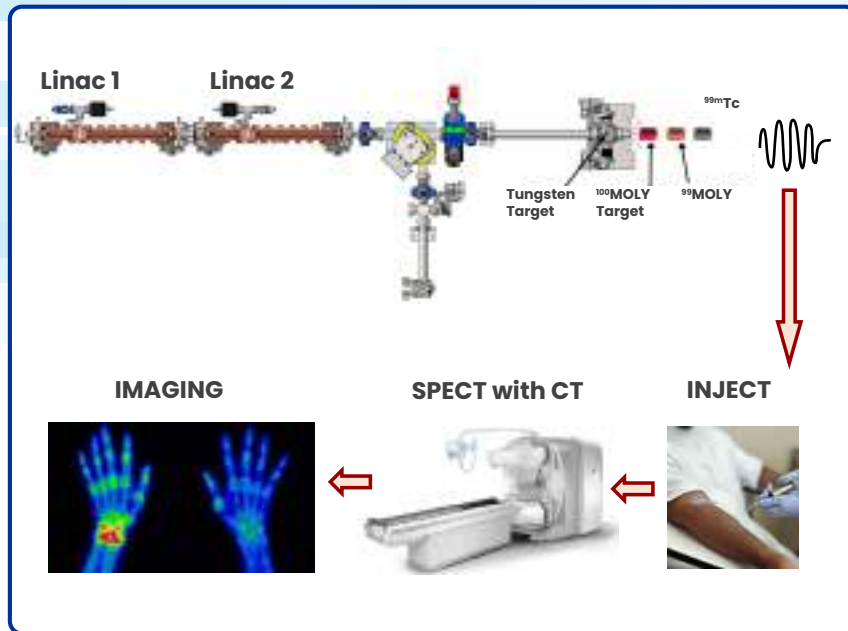




## High Energy Linac For Radio Isotope Generation

### Clean Technology for Medical Isotope Generation



- Development of High Energy Linac with high power beam for the first time in country
- Two linac in series will be powered by high repetition rate klystrons with solid state modulators to generate up to 30 MeV energy
- Automated target will be inserted to convert electrons to photons
- Secondary target will be  $^{100}\text{Mo}$  which will convert to  $^{99}\text{Mo}$  via  $(\gamma, n)$  reaction  
 $^{99\text{m}}\text{Tc}$  will be eluted from  $^{99}\text{Mo}$



#### Specifications

|                  |                                    |
|------------------|------------------------------------|
| Electron Energy  | 15 to 30 MeV                       |
| Average Current  | 150 to 300 $\mu\text{A}$           |
| Primary Target   | Tungsten and Copper                |
| Secondary Target | $^{100}\text{Mo}$ or other targets |
| Electron Gun     | Diode and Triode                   |
| RF Source        | Klystron with Pulse Modulator      |
| Console          | FPGA based computerized console    |



## Radiation Shielding and Target Loading

### Modular Shielding

- Contents - Lead, High Density Polypropylene (HDPE), Borated-HDPE, Boron rubber
- Movable door for target access
- Leakage < 0.1 %
- Ensures safe radiation environment for operators and other workers in the vicinity



### Retractable Target Assembly

- Retractable target for target selection viz. W, Cu,  $^{100}\text{Mo}$
- Remotely controlled target motion
- Low Z exit window
- Option of direct target irradiation with electron beam



### Secondary Target Loading

- 6 Degrees of freedom robotic arm
- Maximum pay load 5 kg
- Automated Guided Vehicle (AGV) for remote operated motion
- Speed 25 m/min



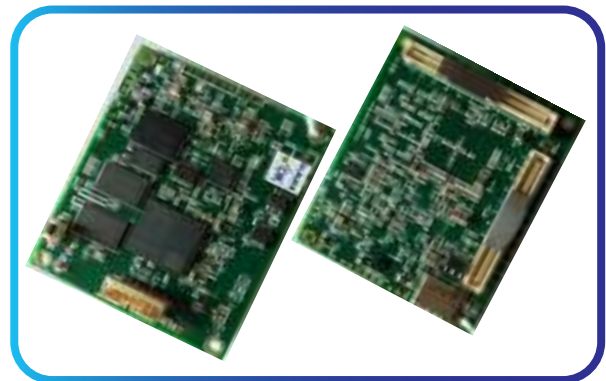


## Control & Monitoring System

- Interface communication interfaces like MODBUS, TCP/IP, RS485, RS232
- High priority critical systems are handled in Programmable Logic (PL)
- External interfaces are handled using the Processing System (PS) over the ethernet
- Various motion based subsystems and power supplies can be controlled & monitored
- All the parameters can be logged and plotted in the User Interface (UI)



Designed and Developed Data Acquisition Card



System on Modules (SOM) using Zynq 7020



UI designed and developed using QTQML



Master Control Display



## High Energy Linac For Medical Radioisotopes

### Beam Line At Navi Mumbai Campus



### Pictorial Graphical User Interface (GUI)

