

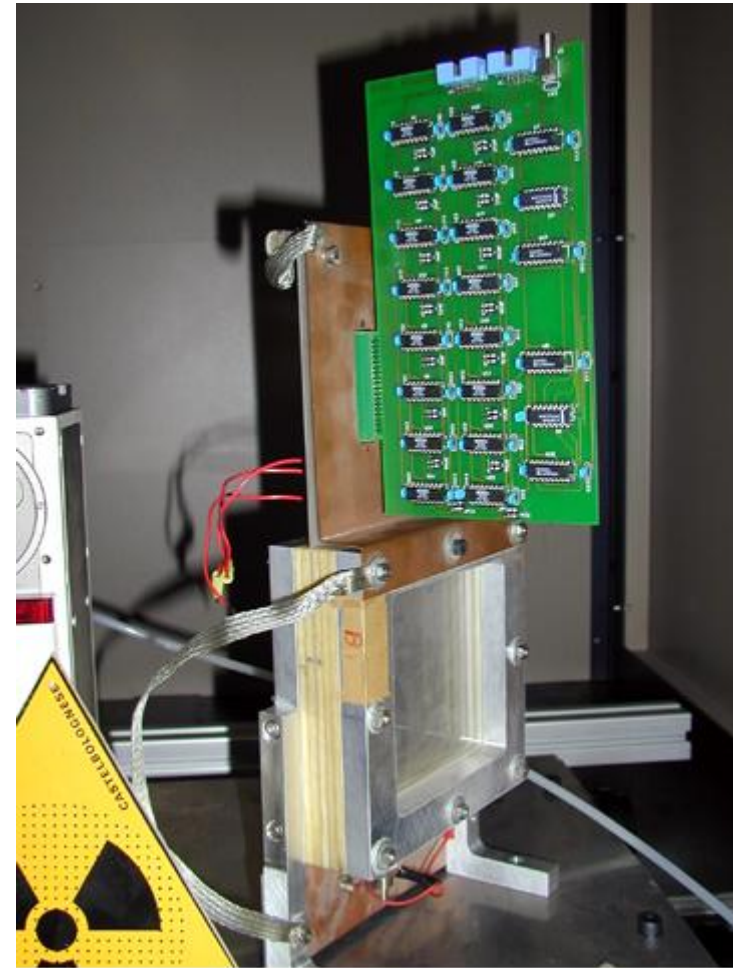
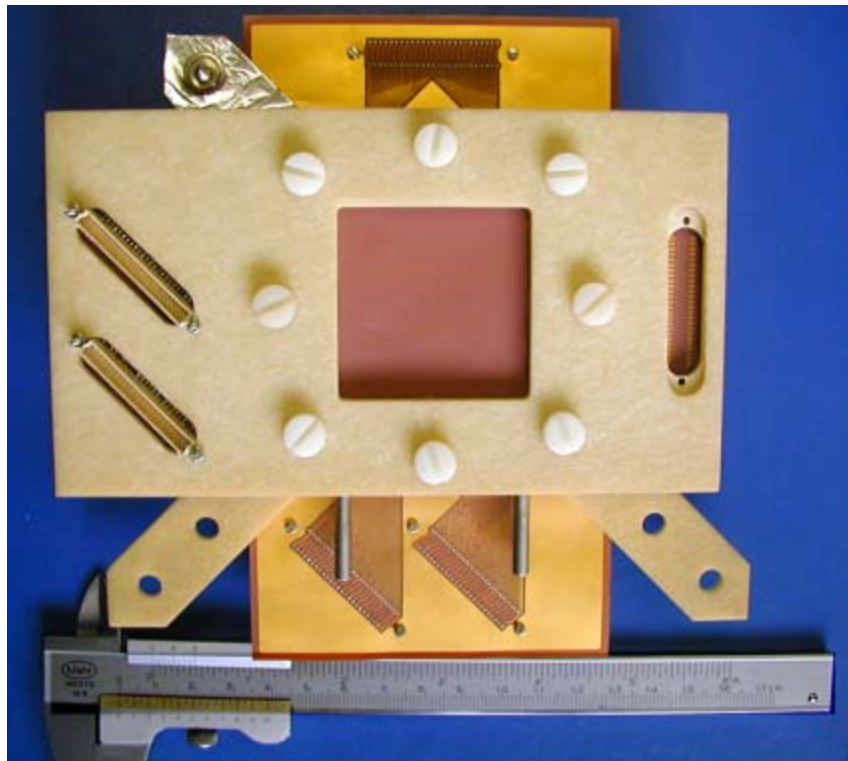
# Key Activities in ISS / E. Cisbani

*R&D of new equipments for experimental nuclear physics and **applications to the human health***

- Particle detectors (RICH, MWPC, ...)
- Aerial platform for large scale radioactive contamination
- Diagnostic chamber for proton therapy beam
- Systems for Molecular Imaging with radionuclide

# Proton Beam Diagnostics

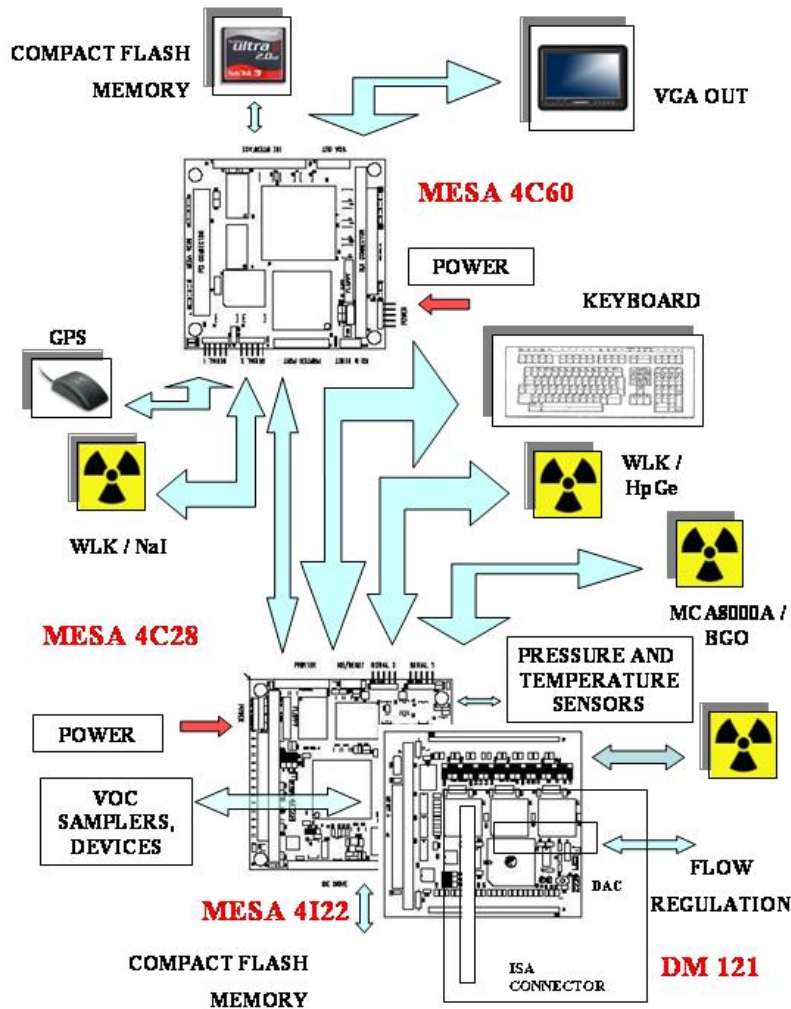
**Beam position and intensity detector**  
**Large dynamic range**  
**uStrip chamber in ionization regime**



# Environmental Monitor from aerial platform

Large scale monitoring of radioactive contamination and air pollution

Isokinetic sampling for in-plume quantitative measurements



# Molecular Imaging with Radionuclides for clinical applications

## Early diagnosis of breast cancer

- mammography is sensible but not specific:
  - ⇒ False positive: biopsy should be avoided
  - ⇒ True positive: delayed therapy
- **scintimammography** (functional imaging) gives info on the type of lesion

- Optimization of spatial resolution and sensitivity ... and costs
- Spot compression with 4D location
- Dedicated individual channel electronics

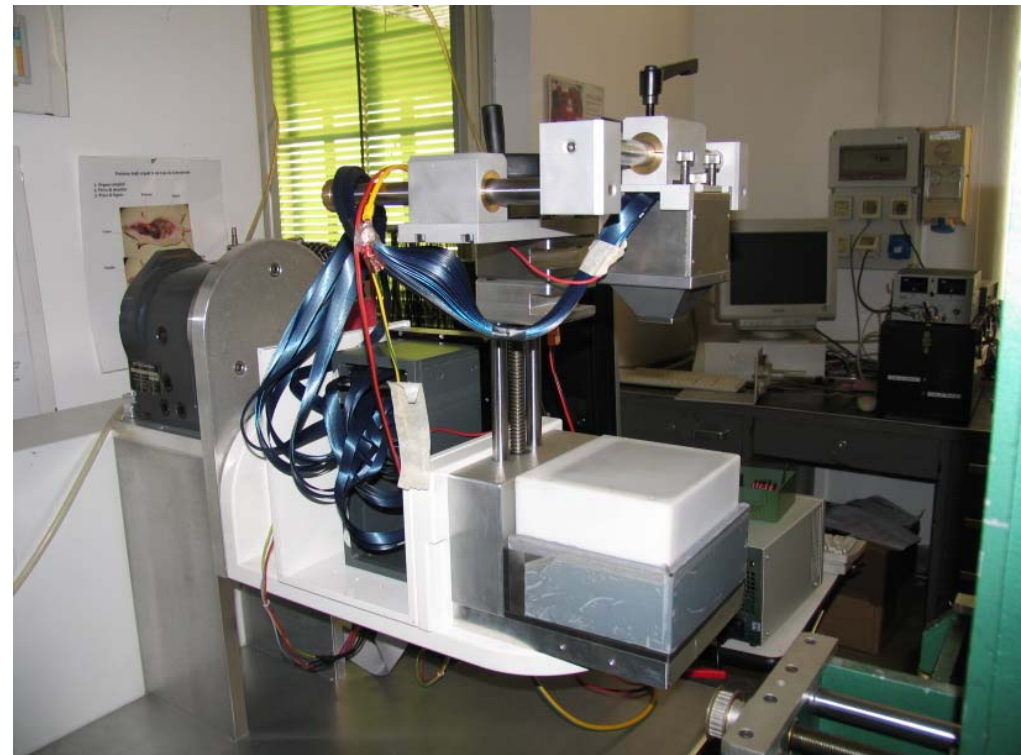
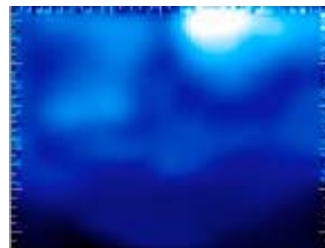
## Dual Head systems

## Asymmetric parallel-pin hole system

### Parallel Hole Collimators



False positive (up),  
True positive (bot)



# ISS expertise

- Simulation (GEANT4) for components selection and configuration
- Development of the readout electronics (in collaboration with INFN/BA and GE)
- Implementation of the control system (HW and SW)
- Development of the acquisition software
- Development of the processing algorithms