Low cost radiation monitor

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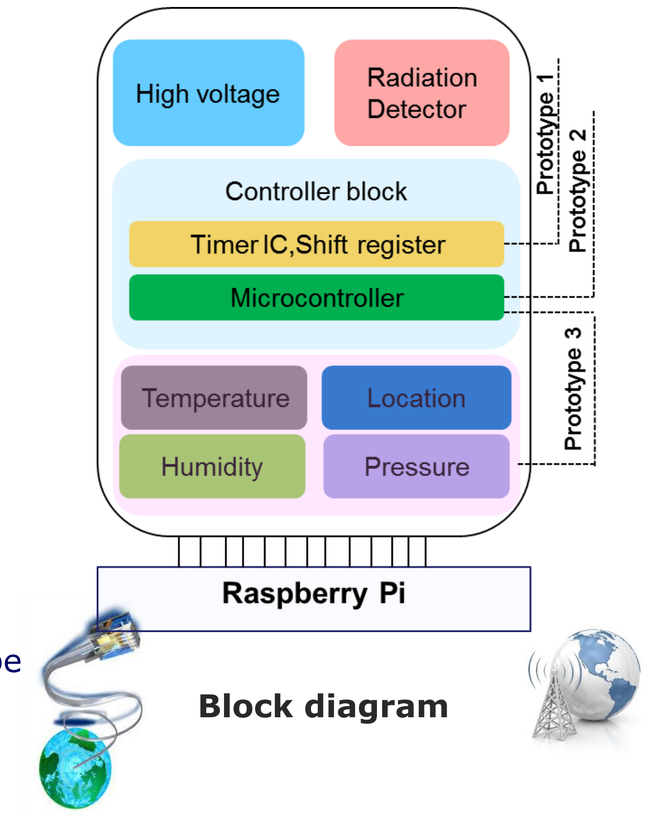
Context and objectives

CONTEXT
- Radiation monitoring device
- Environment monitoring
- Real time access

OBJECTIVES
- Develop low cost electronic interface
- Low voltage input
- Correlation between radiation data and environment data
- Reduce design time and time to market

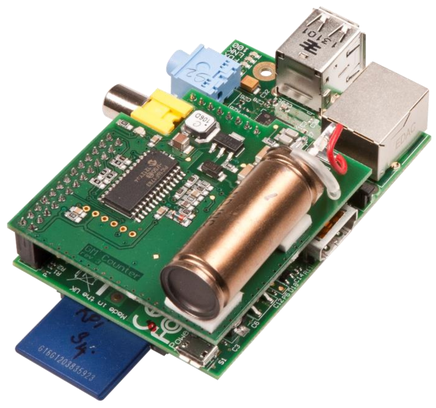
Design

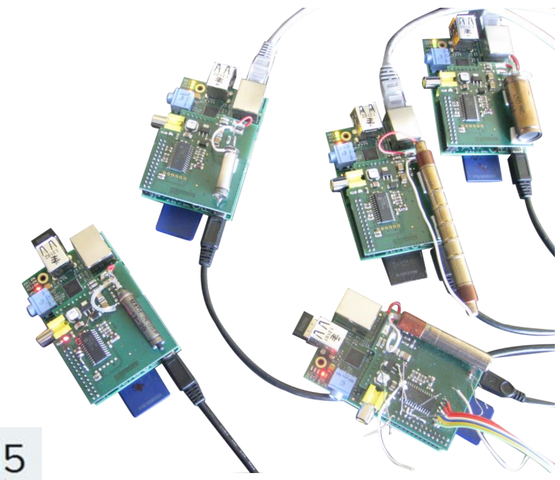
- Functionalities
  - Radiation monitoring
  - Temperature
  - Humidity
  - Atmospheric pressure
- Key modules
  - High voltage
  - Sensor interface
  - Controller
  - Communication
- Design stages
  - Timer IC - 1st prototype
  - Microcontroller -2nd prototype
  - Multiple sensors – 3rd prototype



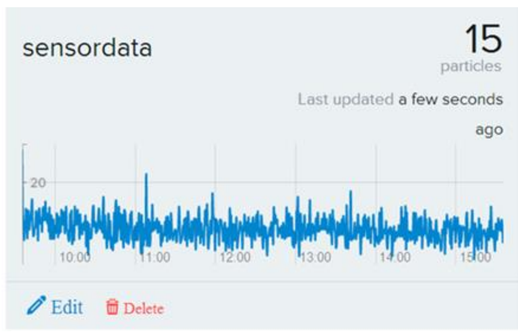
Block diagram

Concept showcase





Devices on the Cloud



Remote monitoring

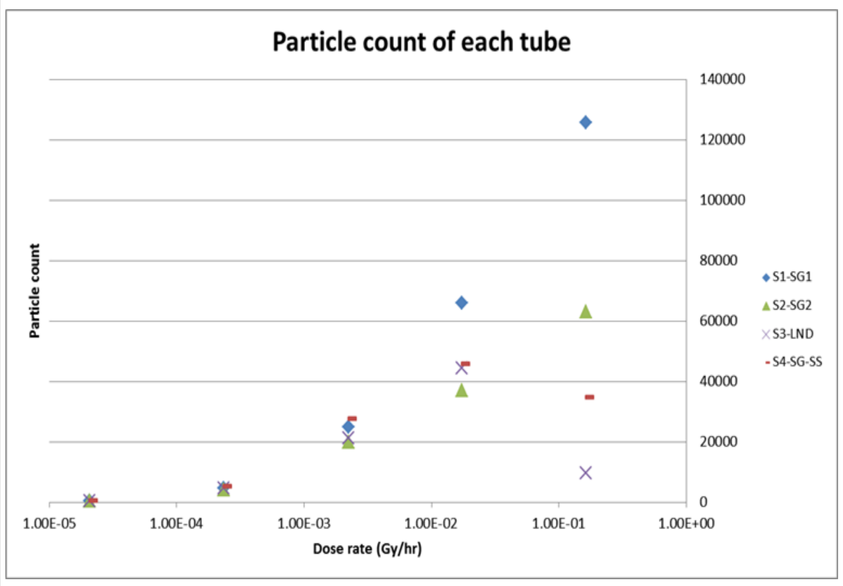
Focus areas

- Problems to address
  - Geiger Muller(GM) tube selection/procurement
  - Avoid over estimation/under estimation of particles
- Deployment scenario
  - Normal background radiation monitoring
  - Nuclear accident scenarios

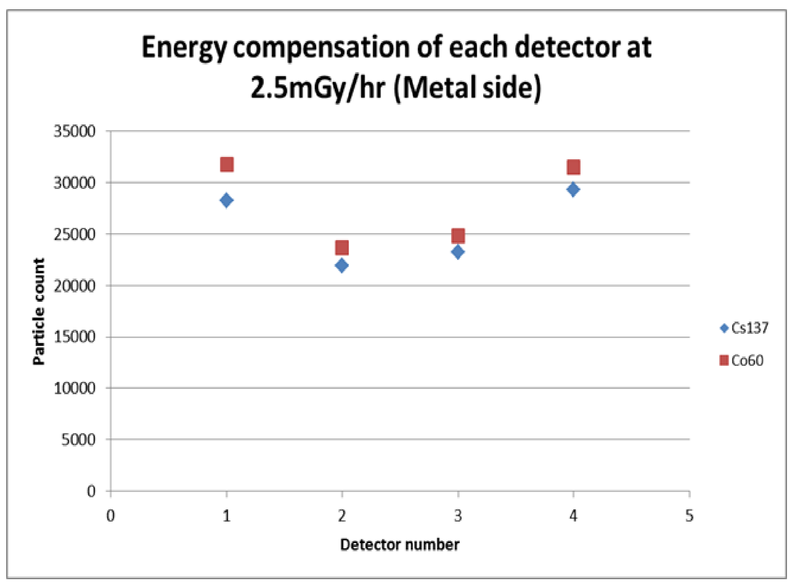
Experiments

- Saturation performance
- Linearity
- Energy compensation for Cobalt and Cesium
- Energy compensation for low energy (33keV to 300keV)

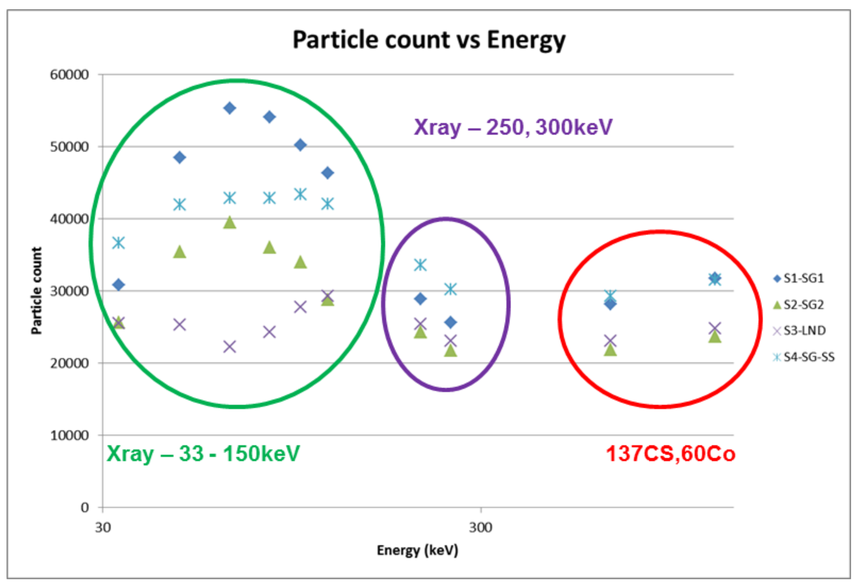
Results



Saturation performance



Energy compensation



Detector performance (Fixed dose rate : 2.5mGy/hr)

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Conclusion and future work

- Experiments on-going to
  - Fine tune the performance (linearity, saturation, aging) of tube
- Hardware/software developments
  - Further more reduce cost of device
  - In-house cloud connectivity platform