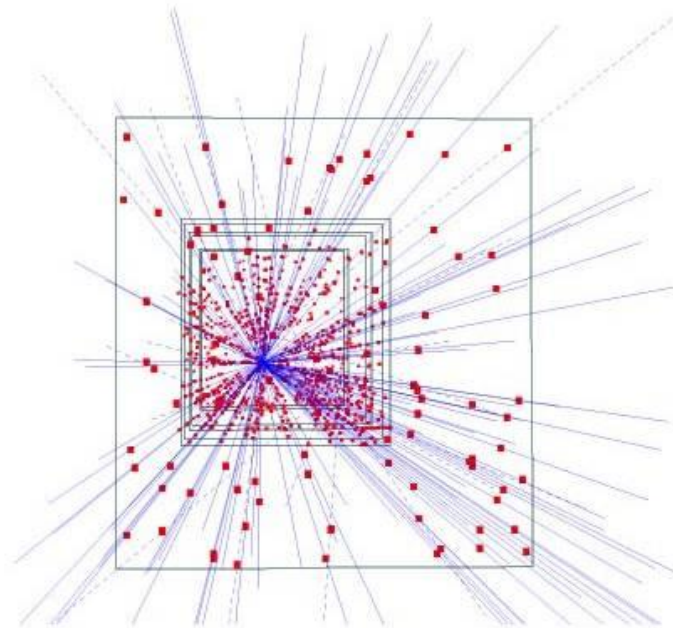


ESR 12 - ARDENT 3rd workshop



Vijayaragavan VISWANATHAN

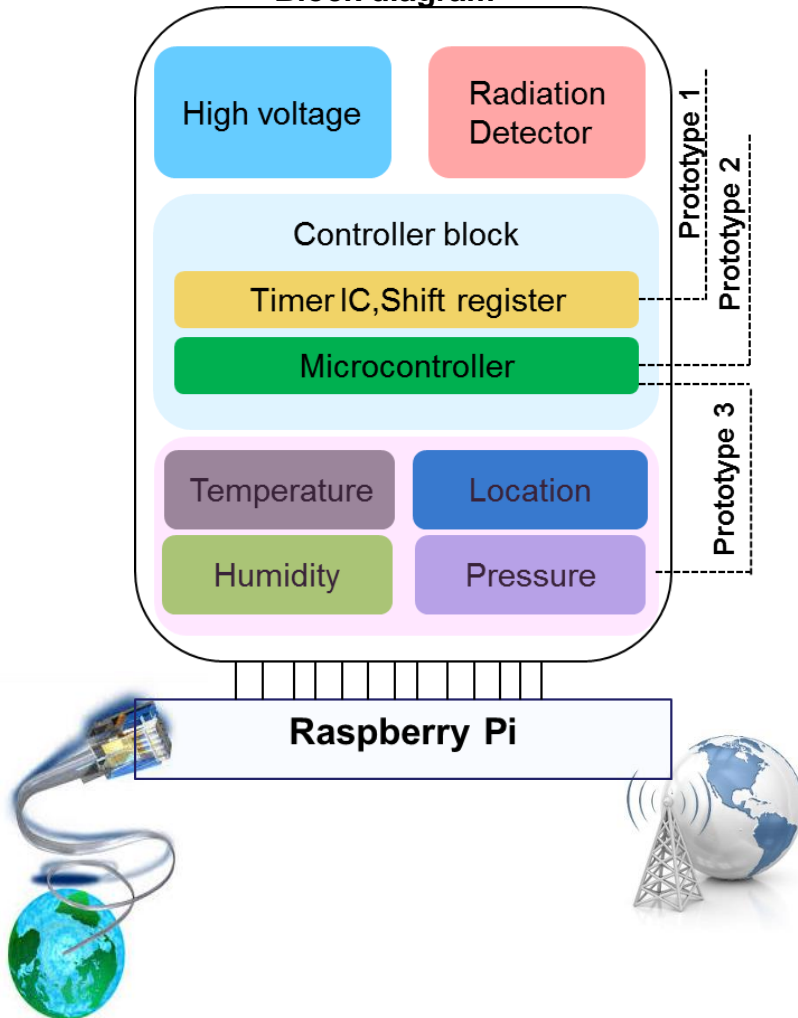


► Content

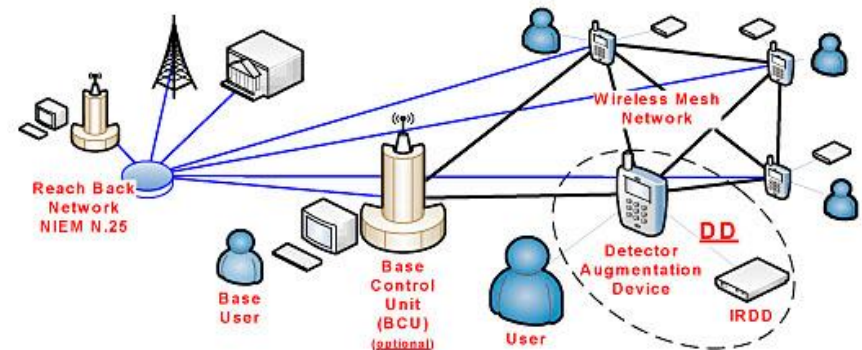
- Scientific activity
- Training
- Outreach & dissemination
- Awards & Achievements
- Conclusion



Block diagram

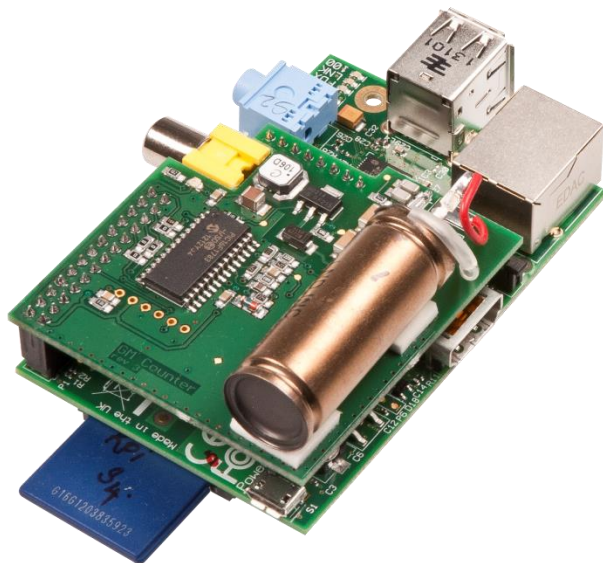


- SURO proposal & requirement
 - Mass proliferation of detecting device
 - Low cost device
 - Remote monitoring
 - Wired or wireless based
 - Portable

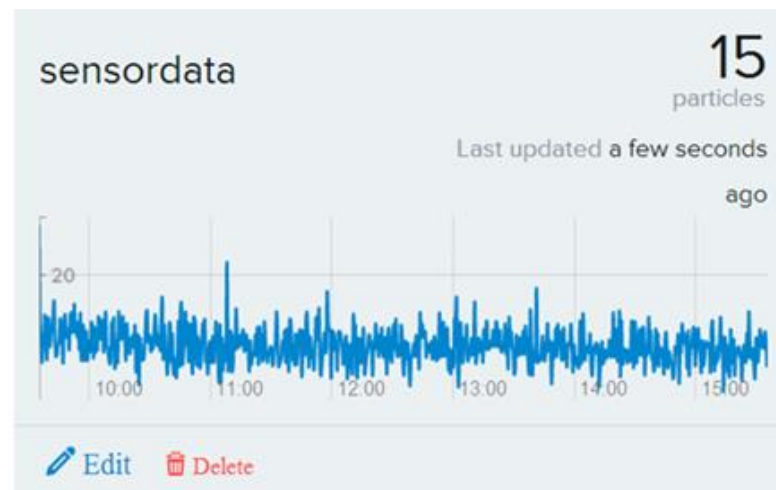


Devices connected to the cloud

▶ System design

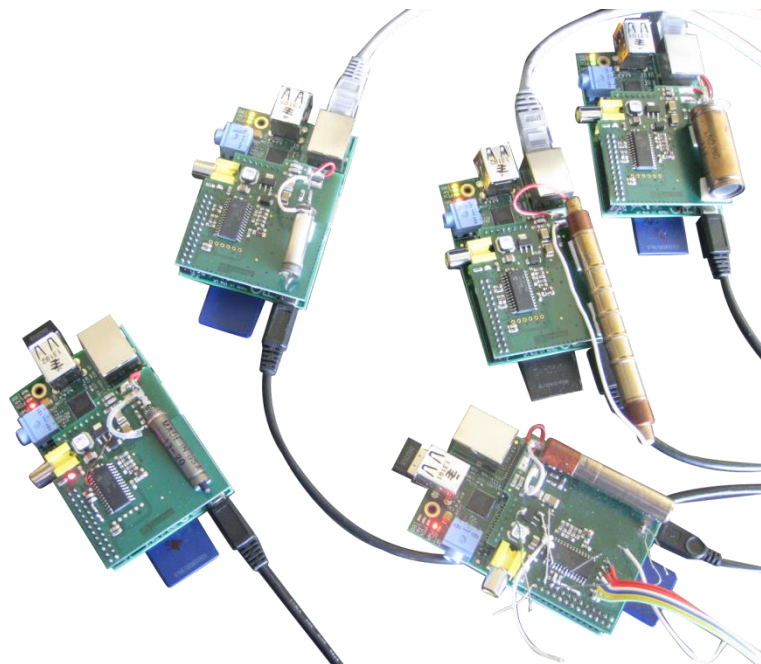


Device on Raspberry pi



Remote monitoring

▶ Cloud connectivity



GX-10 connected to cloud

Channels Last updated in a few seconds [Graphs](#)

S1_Totalparticles	281
S1_sensordata	5
S2_Totalparticles	588
S2_sensordata	4
S3_Totalparticles	594
S3_sensordata	4
S4_Totalparticles	205
S4_sensordata	1
S5_Totalparticles	292
S5_sensordata	1

Request Log [Pause](#)

200	PUT	channel S4_Totalparticles	16:00:38 +0200
200	PUT	channel S4_sensordata	16:00:37 +0200
200	PUT	channel S3_Totalparticles	16:00:35 +0200
200	PUT	channel S3_sensordata	16:00:35 +0200
200	PUT	channel S1_Totalparticles	16:00:33 +0200

API Keys

Auto-generated Cloud devices device key for feed 1749342200

alux4Zk5yb4rhbMG1quUf1xAdTFYUrznygppxEhmVFrThT

permissions READ,UPDATE,CREATE,DELETE

private access

[+ Add Key](#)

Triggers

Triggers provide 'push' capabilities by sending HTTP POST requests to a URL of your choice when a condition has been satisfied.

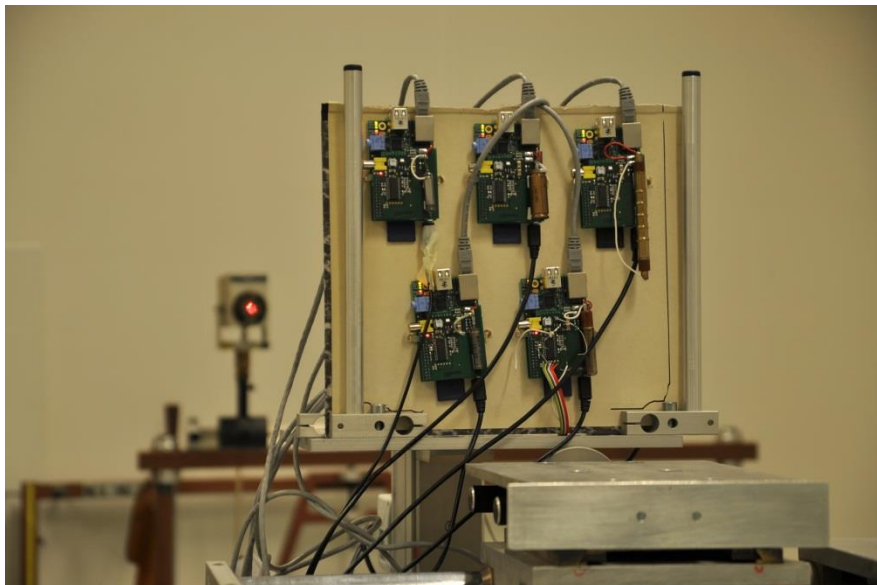
[+ Add Trigger](#)

Help

Real time sensor data

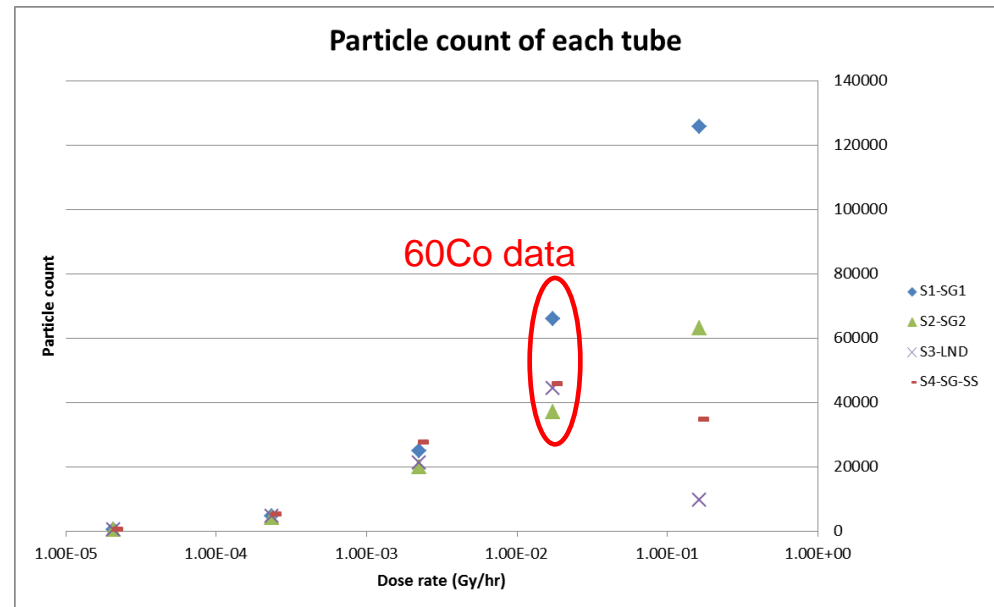
▶ Experiments at SURO

- ▶ Experiments –
 - ▶ To select the appropriate GM tube
 - ▶ Calibrated radiation source (Cesium- 661keV, Cobalt – 1.25MeV)
 - ▶ X-Ray tube for varied energies (33keV to 300keV)
 - ▶ Back ground experiments



▶ Linearity

- Experiment with
 - Detector at ~1m
 - To identify performance of detector
- Inference
 - Saint gobain tubes (S1, S2, S4) performances (smoothness of curve) are similar to LND
 - SS window & LND tubes saturates before mica window tubes – Saturation performance upto 2.5mGy/hr is OK for our application

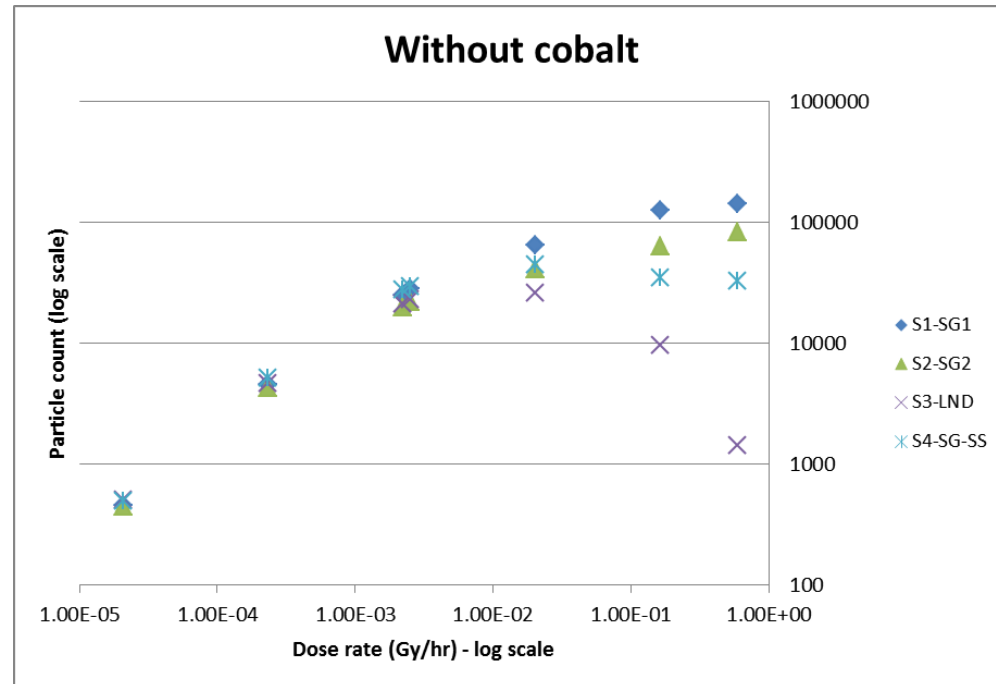


S1 & S2 – Samples with mica window
S3 – LND tube
S4- Sample with stainless steel window

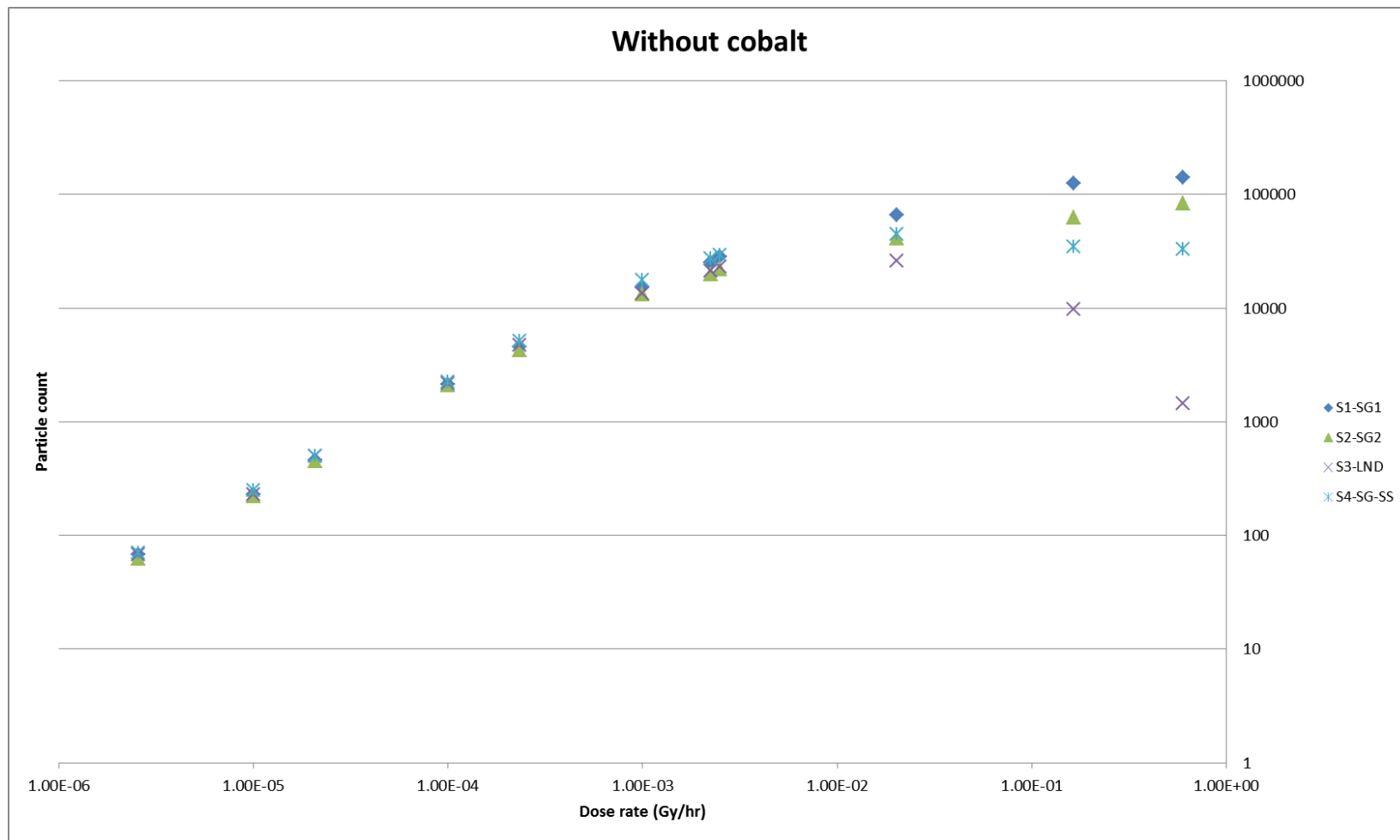
Note: Data collected in 10second interval

▶ Saturation performance

- Experiment with
 - Detector at 352mm from source
 - To identify saturation point of each detector
 - All detector experimented with ^{137}Cs source to have common reference
- Inference
 - S1 & S2 outperforms S3 & S4

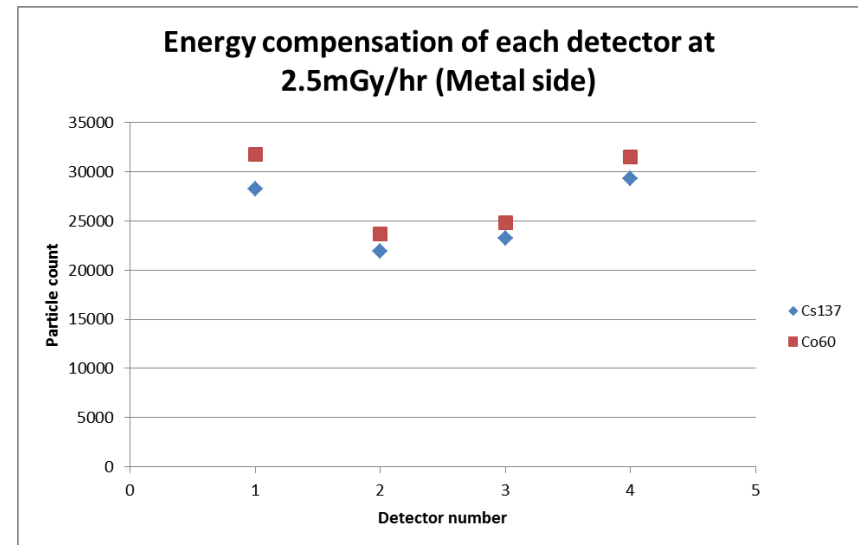


▶ Background to nuclear fall out



▶ Energy compensation

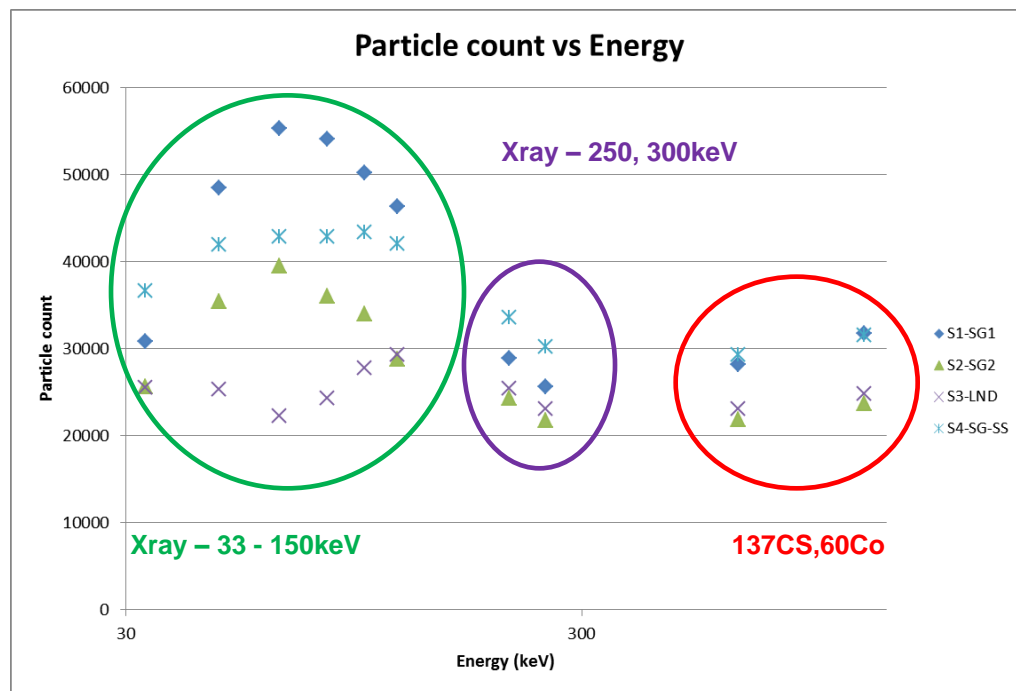
- Experiment
 - At fixed dose rate of 2.5mGy/hr
 - Experiment to analyze whether the tubes are energy compensated for ¹³⁷Cs and ⁶⁰Co
- Inference
 - All the detectors compensated well for Cs and Co source



1 – S1
2 - S2
3 – S3 - LND
4 – S4 -SS

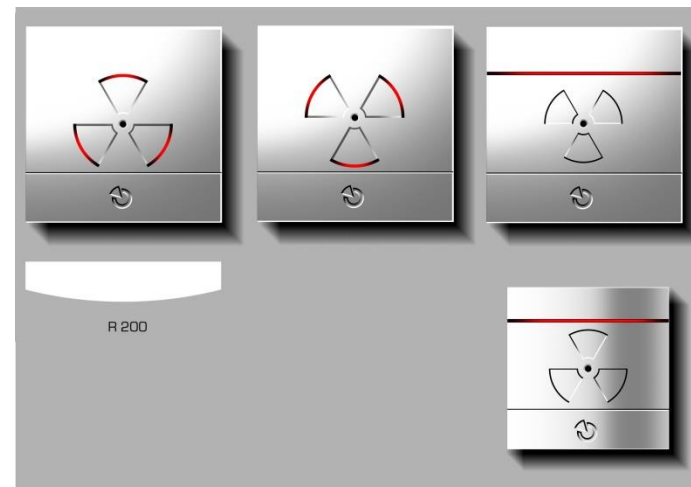
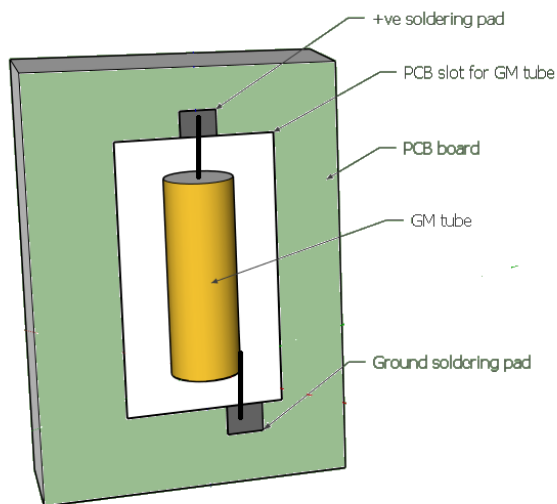
▶ Energy compensation using Xray

- Experiment
 - At fixed dose rate of 2.5mGy/hr
 - With ^{137}Cs , ^{60}Co and X-ray tube to see whether devices are energy compensated
- Inference
 - S2-LND712 has better compensation at all energies
 - S1, S2, S3 has over estimation in low energies
 - S2 has under estimation of particle count at higher energies



▶ Parallel ongoing work

- Mechanical housing design
- GM tube mounting
 - Better manufacturability
- Cloud service
- MX-10
 - Inventory, Procurement, preparation
 - Outreach



External trainings

- Radiation detection and measurement course
- Physics and design of detector
- Experiment and calibration training at SURO
- Wireless motes training

Internal trainings

- Cloud service training
- Logistics
- Wireless communication
- M2M communication

External visits

- VTT & Advacam facility, Finland
- Saint-Gobain, India

Other training

- Driving – European driving license 😊



ESR representative

- Organizing & coordinating things

Universities & colleges India

- SRM university
- University of Delhi
- Amrita University
- PSG college of Engineering
- Info Engineering college

Europe

- ETH, Switzerland
- EPFL, Switzerland
- University of Kassel, Germany
- TU Darmstadt, Germany
- IEEE-NSS, S.Korea

கல்வி உதவித் தொகையுடன் வெளிநாடுகளில் படிப்பது எப்படி?

உலகமெங்கும் உள்ள பல்கலைக்கழகங்களில் படிப்பது என்பது ஒரு பெரிய செலவு. ஆனால், கல்வி உதவித் தொகைகள் மூலமாக இந்த செலவை குறைக்க முடியும். இது மூலமாக பல்கலைக்கழகங்களில் படிப்பது சாத்தியமாகிறது. இது மூலமாக பல்கலைக்கழகங்களில் படிப்பது சாத்தியமாகிறது. இது மூலமாக பல்கலைக்கழகங்களில் படிப்பது சாத்தியமாகிறது.

பிளாட்ரான் இல் கல்வி உதவித் தொகை

பிளாட்ரான் இல் கல்வி உதவித் தொகை மூலமாக பல்கலைக்கழகங்களில் படிப்பது சாத்தியமாகிறது. இது மூலமாக பல்கலைக்கழகங்களில் படிப்பது சாத்தியமாகிறது. இது மூலமாக பல்கலைக்கழகங்களில் படிப்பது சாத்தியமாகிறது.

Regional media interview – India

Ongoing secondment:
CERN- Knowledge Transfer
- 2months (Sept to Nov 2014)

Climate-KIC

- Competitive selection – Winner
- 5 weeks program
 - 1 week – TU Darmstadt, Germany
 - 1 week – University of Kassel, Germany
 - 2 weeks – ETH, Zurich
 - 1 week – Wageningen University, Netherland
- Industrial visits
 - Veissmann – Boiler manufacturer, SMA – Solar inverter, EMPA, EAWAG
- Courses
 - Business management
 - Financial management
 - Entrepreneurship
 - Business plan
 - Business canvas
 - Pitch training
 - Technology transfer
 -



▶ Awards & Achievements

Competition

- 17 teams, 40 countries, 200 members
- 5 member international jury
- Winner
- Cum-laude for the course
- Lot of new friends and network
- Thanks to Climate-KIC



Special thanks to

- Simon, Julia, Nies
- Bram, Veronica
- Climate-KIC



► Conclusion

Outcomes

- Electronics design, testing
- Experiments
- Cloud services etc etc
- Several outreach activities

Planned activities

- Outreach in at least 10 universities in December
- IEEE-NSS exhibition
- Business training
- Launch of GX-10



► Acknowledgement

- Vladimir, Pavel, Martin, Stepan, Stefan
- CEO - Mr.Dedek
- SURO
- IEAP
- Dr.Marco Silari
- Blandine, Ornella
- ARDENT
- Wife, baby & parents

