

Monitoring of radiation and environmental parameters at GIF++

P.Iaydjiev – INRNE, Sofia

1. Status of the Radiation Sensors for Gif++ (Plamen Iaydjiev et al.
INRNE, Sofia
2. Status of the gas and environmental sensors (Stefano Bianco et al)
Laboratori Nazionali di Frascati dell'INFN , INFN Napoli

AIDA INRNE, Sofia, Bulgaria

Radiation Sensors for GIF++

AIDA meeting, 2013, LNF - Frascati

Assoc. prof. Plamen Iaydjiev – coordinator

Group members:

Prof. Ivan Vankov, assoc. prof. Liubomir Dimitrov, prof. Vladimir Genchev, scientist Stefan Piperov, Scientist Andrei Marinov, scientist Georgi Antchev, eng. Georgi Mitev

Working Program – part of WP 8.5.3

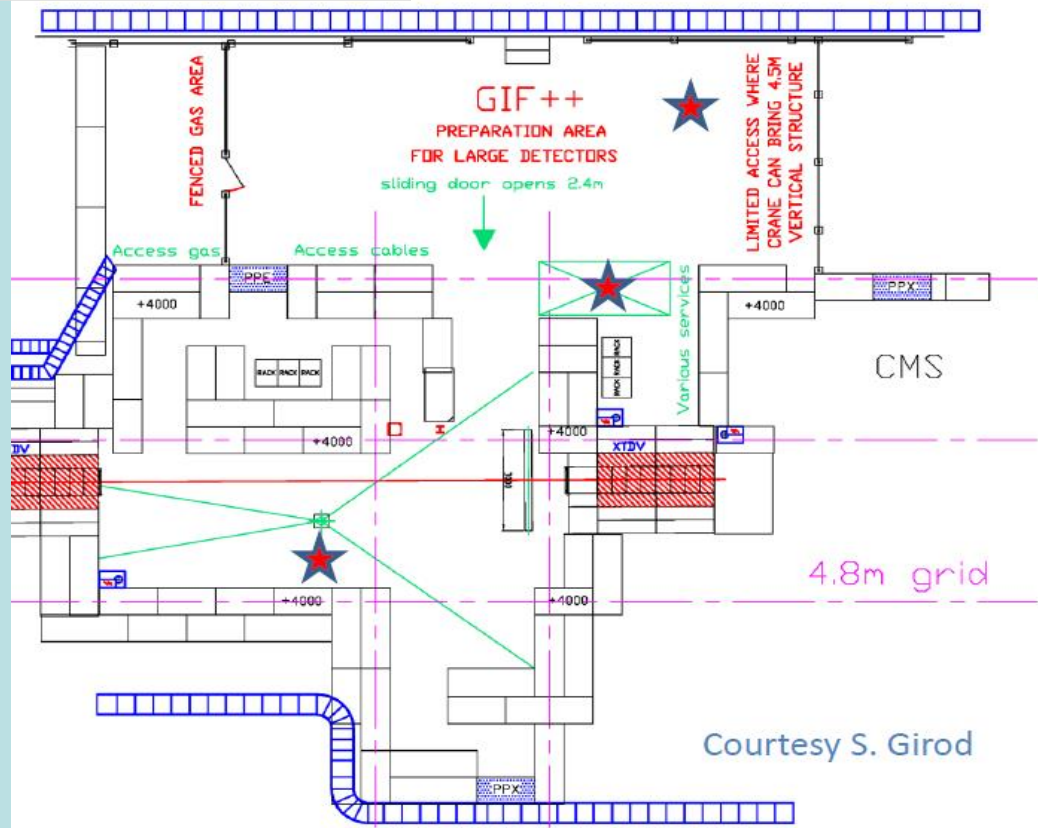
1. Assembling at INRNE and test with local Cs-137 source of 1 radiation sensor with an electronics and PC based acquisition.	M1 – M18	1 Detector with electronics and PC based acquisition
2. Test and calibration at CERN Gif	M6 – M18	Report
3. Assembling at INRNE – Sofia of 8-10 sensors for Gif++	M12 – M36	8-10 radiation sensors in 3 control modules + microcontroller and CANBUS communication with DAQ
4. Installation and commissioning of the radiation sensors at DAQ of the Gif++	M12 – M48	Report

Radiation field
 - Irradiation source: ^{137}Cs of 7 – 10 TBq, front and rear irradiation field
 Particle beam: 100 GeV muons, 10^4 muons per spill in $10 \times 10 \text{ cm}^2$

Area layout
 - Bunker (enough space for detectors 3 m wide and 4 m high)
 - Detector preparation area
 - Short term storage area
 - Control room/barracks

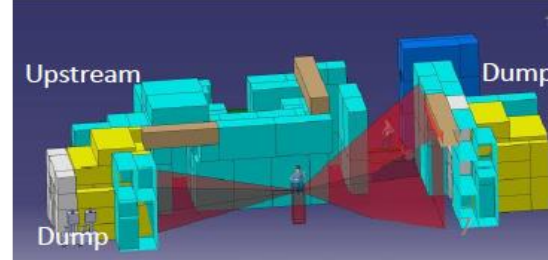
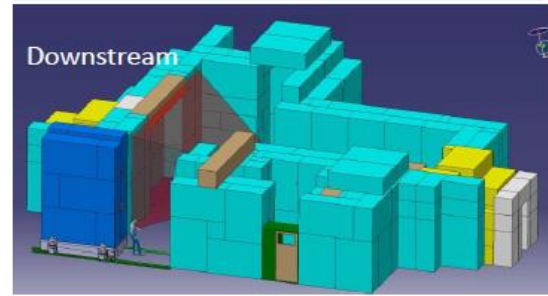
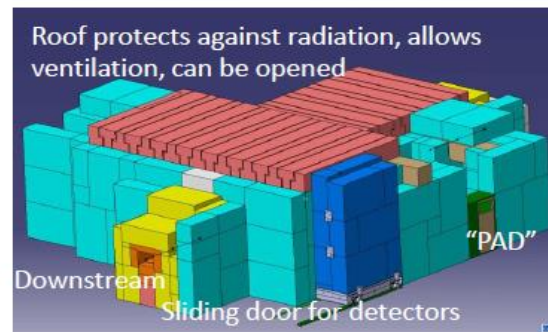
Control and logging system
 - Hard-wired common control system (source, beam, gas)
 - Web based monitoring and logging

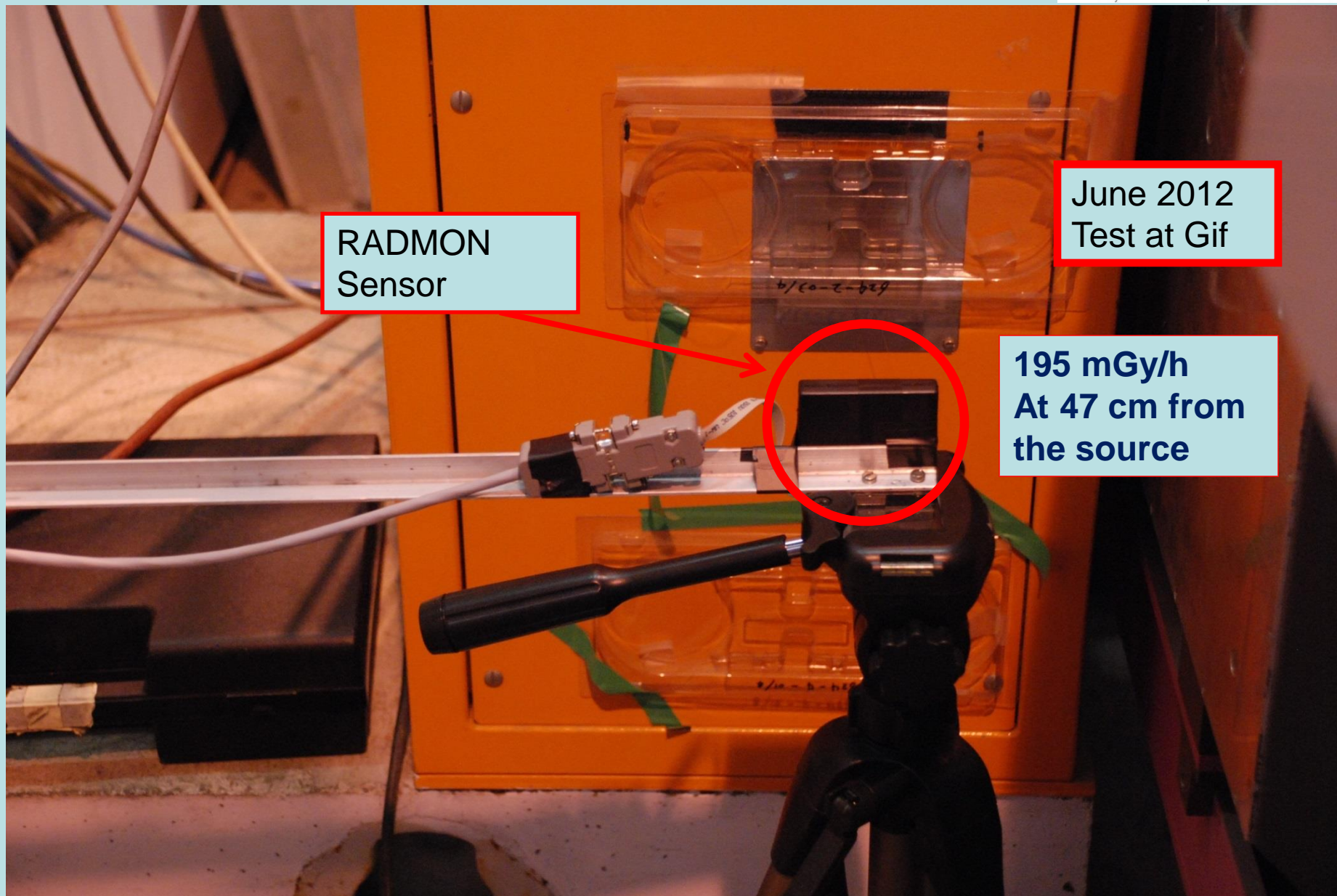
Facility Design



Dorothea Pfeiffer

Courtesy S. Girod





AIDA-NOTE-2012-004

June 2012
Test at Gif

μ CU
ATX
mega
16A4
Board
made at INRNE
Sofia, Bulgaria

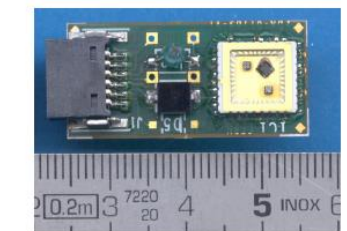
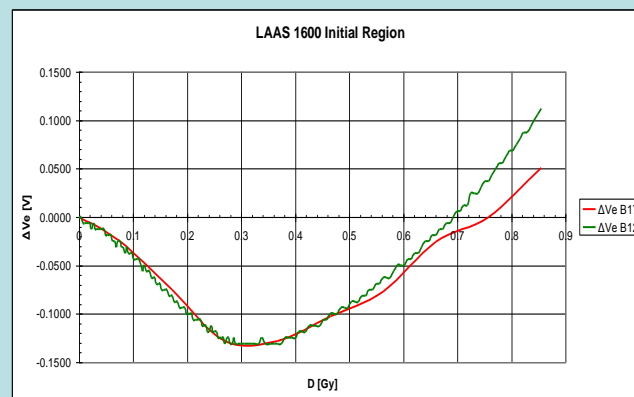
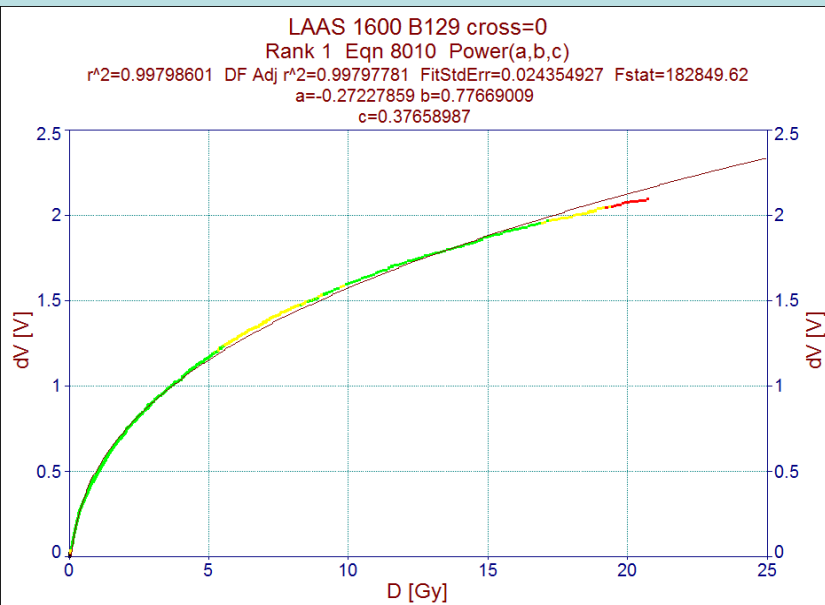
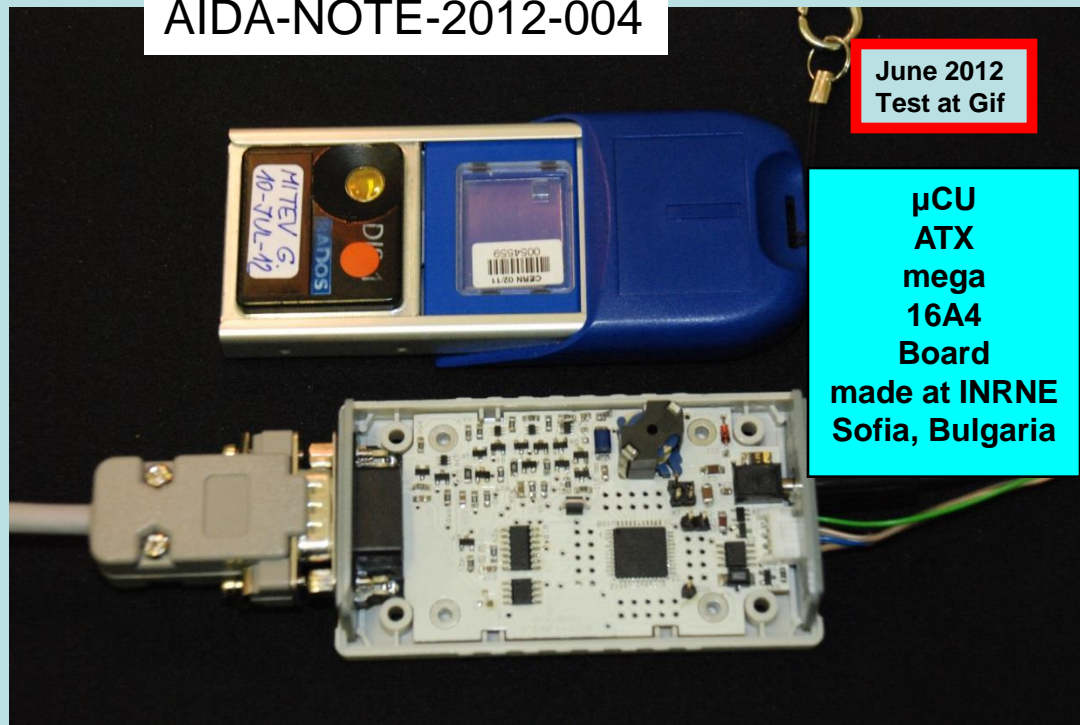
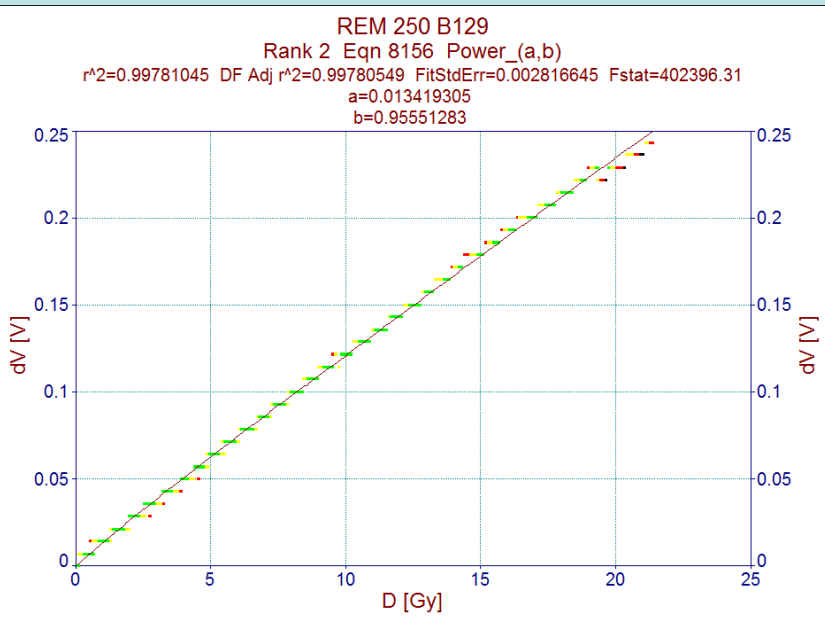
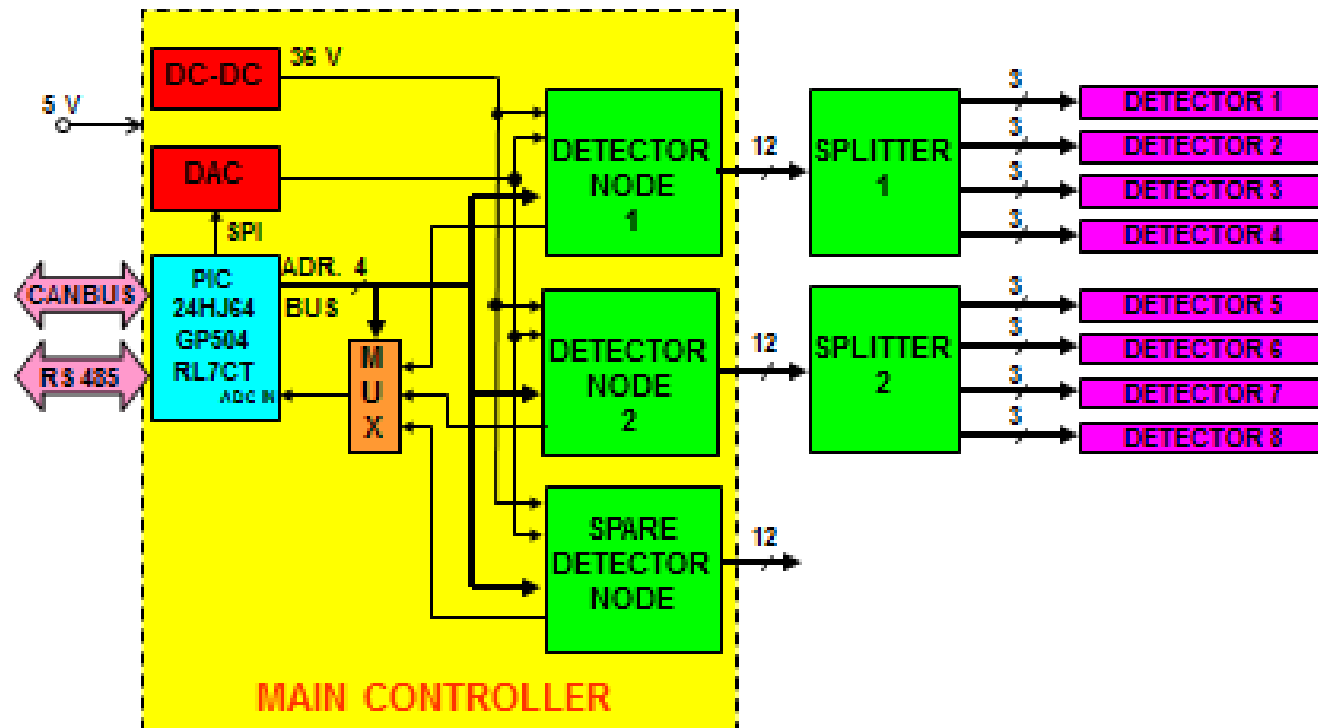
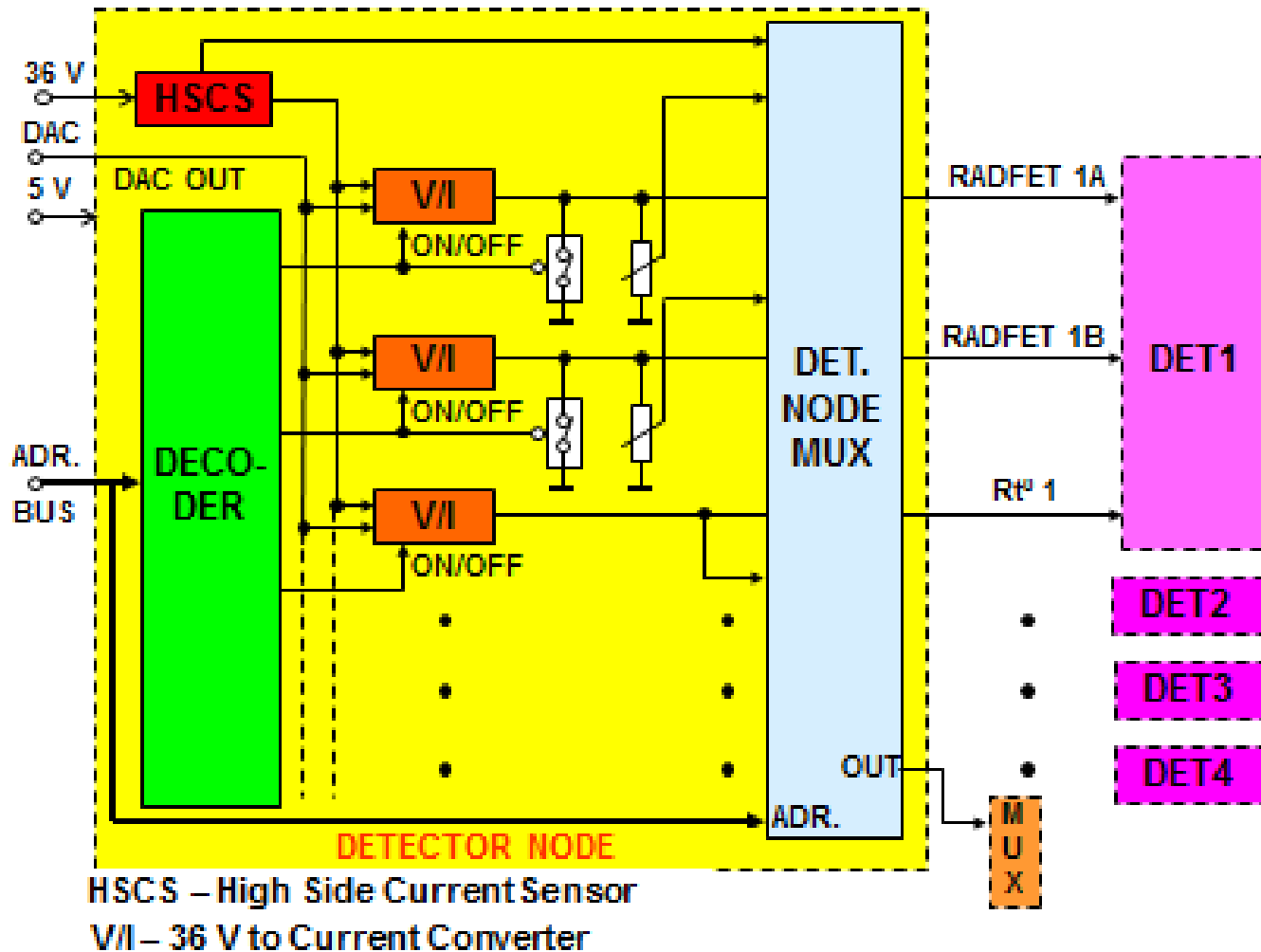


Fig. 3: Integrated Sensor Carrier (ISC)

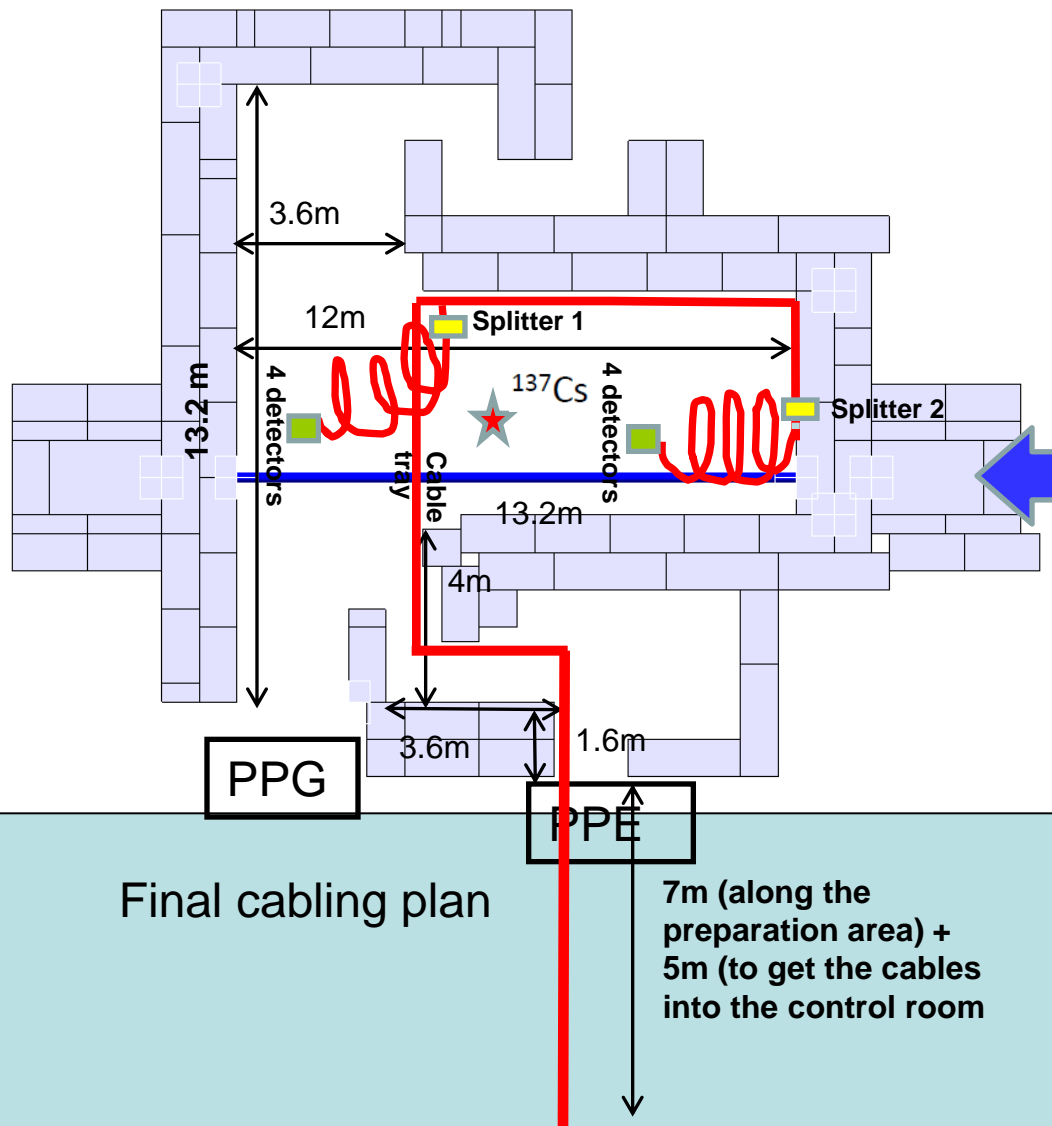
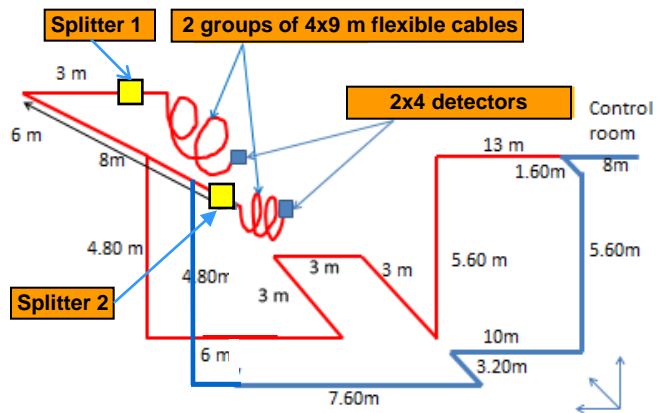
DOSIMETRIC SYSTEM BLOCK DIAGRAM

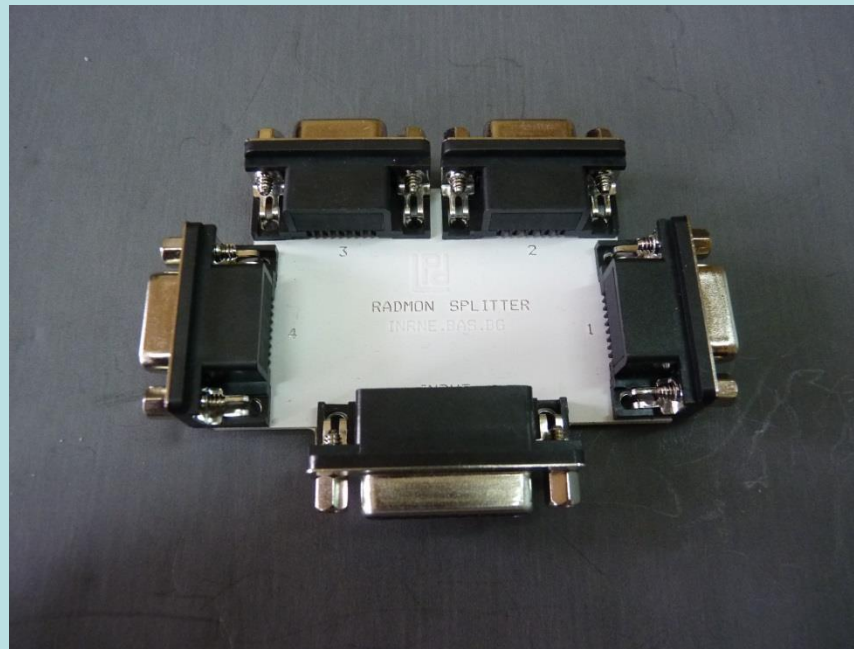
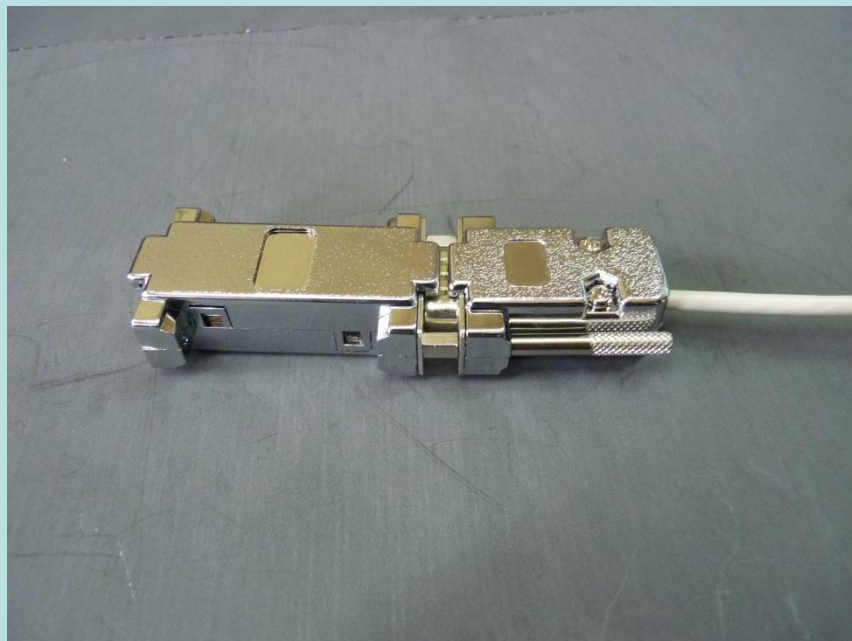
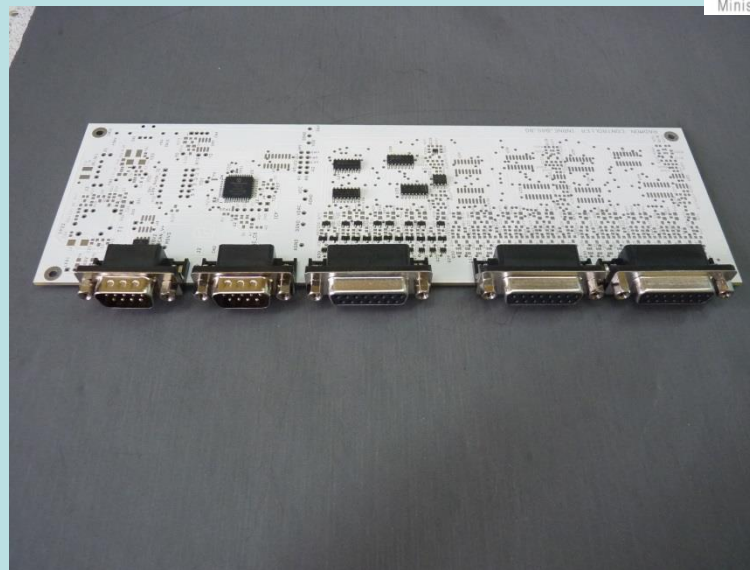
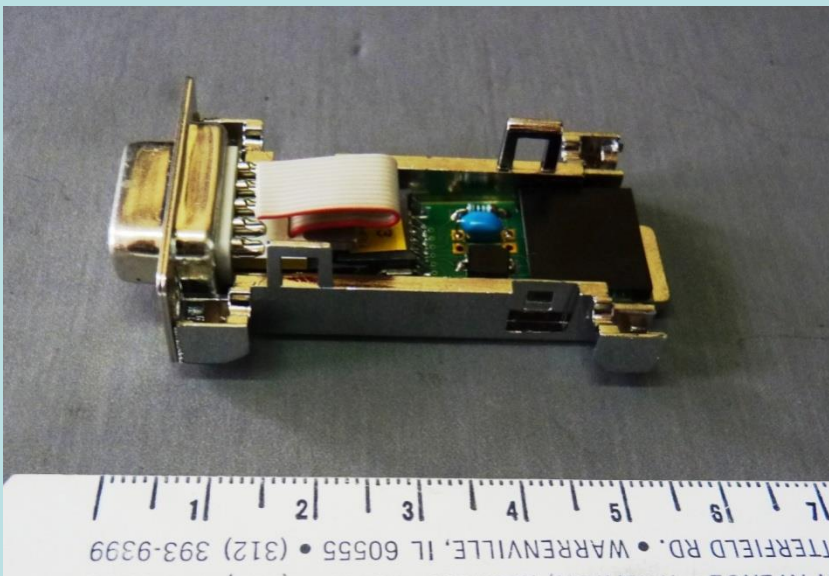


DETECTOR NODE BLOCK DIAGRAM



Planning for cables





AIDA 8.5.3

ENVIRONMENTAL SENSORS STATUS REPORT

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April 10th, 2013

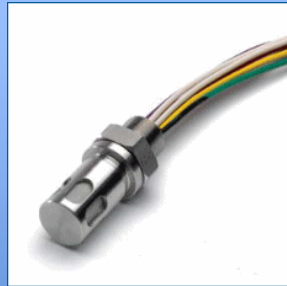
Contact: stefano.bianco@Inf.infn.it

- Monitoring (for both atmospheric and gases)
 - Pressure **p**
 - Temperature **T**
 - Relative humidity **H**
- Modular architecture
 - baseline
 - Four gas sampling points
 - Six atmospheric sampling points
- Integrated in PVSS/DCS monitoring system
- Simple Pb shielding for irradiated areas

Range	Precision
$5^{\circ}\text{C} < \mathbf{T} < 40^{\circ}\text{C}$	$\Delta\mathbf{T} = \pm 0.2^{\circ}\text{C}$
$0\% < \mathbf{H} < 100\%$	$\Delta\mathbf{H} = \pm 2\%$
$900\text{mbar} < \mathbf{p}_a < 1050\text{mbar}$	$\Delta\mathbf{p}_a = \pm 2\text{mbar}$
$-2\text{mbar} < \mathbf{p}_{g(\text{detector})} < 5\text{mbar}$	$\Delta\mathbf{p}_{g(\text{detector})} = \pm 0.1\text{mbar}$
$0\text{mbar} < \mathbf{p}_{g(\text{off-detector})} < 100\text{mbar}$	$\Delta\mathbf{p}_{g(\text{off-detector})} = \pm 2\text{mbar}$



CAEN ADC 3801



T, H sensor
PCMini 70 Michell



p sensor
TSA Gefran

Status

- Test system operational at Frascati
- Sensors are being coupled to A 3801
- Study long-term stability and experimental precision
- Freeze design and validate within a couple of months
- Design of mechanical assembly in progress