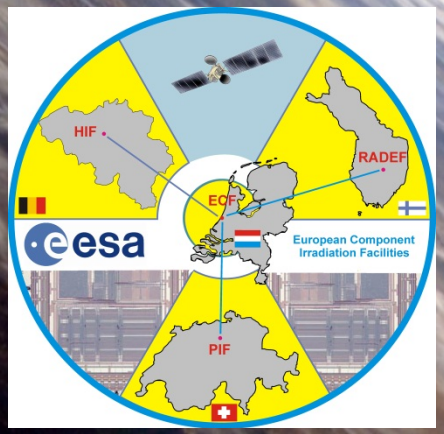


ECF ESA ESTEC 60Co Facility

ESA – CNES final presentation days

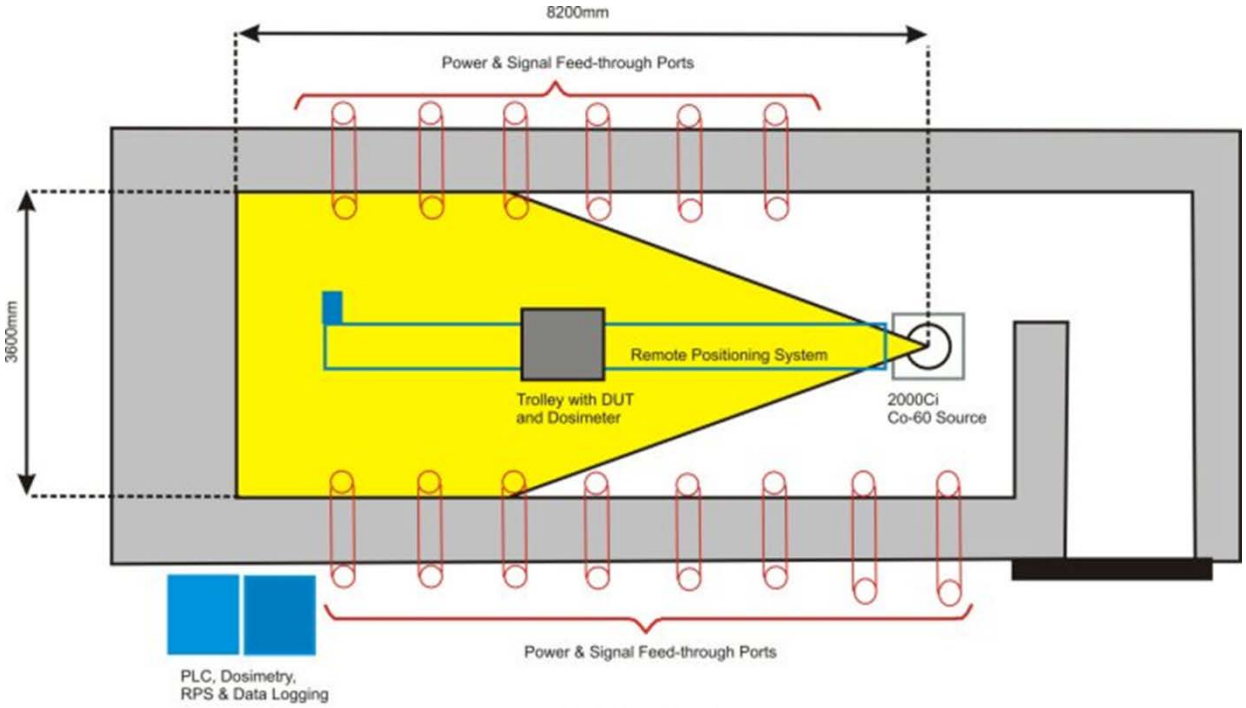
CCT Toulouse, 9-10 March 2015

Alessandra Costantino
Michele Muschitiello

Irradiation room layout

Source Activity: 53 TBq (today)

The Dose Rate can be varied from: 0.22 to 90 Gy/h (22 –9000 rad/h)



Last Reloaded: November 2011
Next reload: Q2 2016

Nominal Source Activity at re-load: 75 TBq
(D.R. from: 0.33 to 129 Gy/h)

contact : Co60admin@esa.int

Dosimetry at ESTEC ^{60}Co Facility

✓Three Independent Dosimetry Chains available

✓ each chain consists of a Farmer 2670 electrometer equipped with a 2571 type 0.6 cc ionization chamber

✓Dose measurements are compensated against environmental temperature/pressure fluctuations in the irradiation room

The facility management and dosimetry have been **ISO 17025** accredited by RvA (Raad voor Accreditatie) on date 25 May 2011.
The following procedures have been accredited:

- ✓Total Ionising Dose
- ✓Dose rate (in the range 0.36 – 72 Gy/hrs)

contact : Co60admin@esa.int

Some numbers

The facility has an high utilization rate with multiple irradiation tests running in parallel

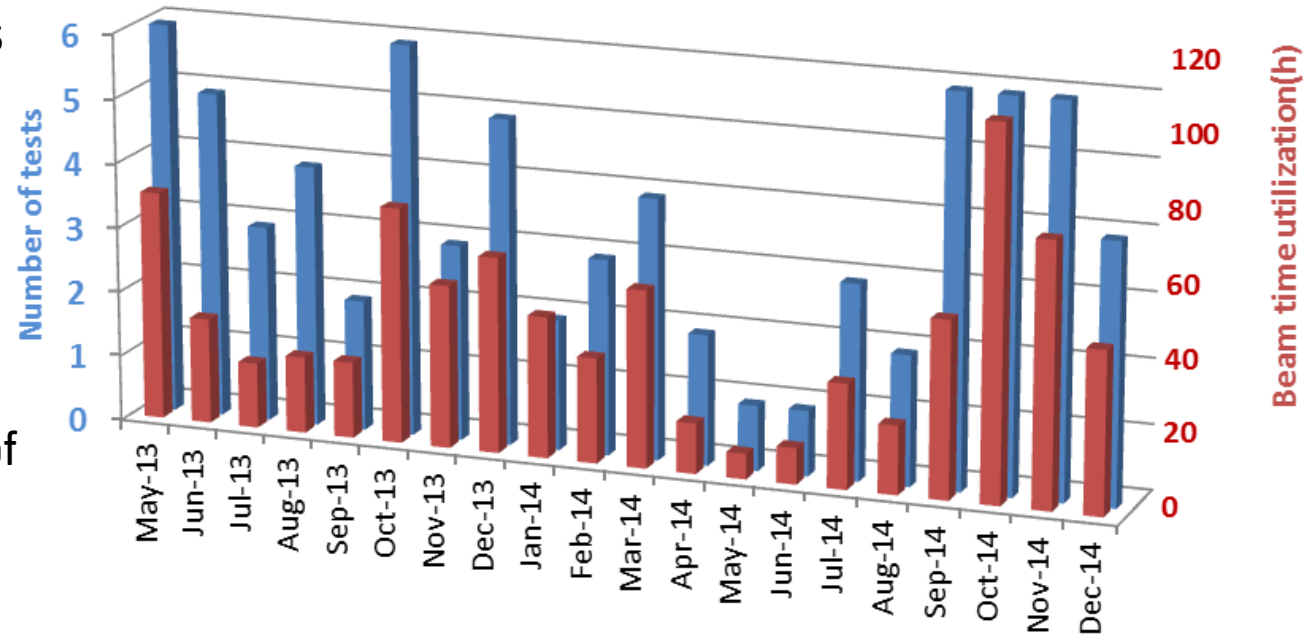
Last 2 years:

40 different customers

90 irradiation test campaigns

10 days: average test duration

779 cumulative days of irradiation



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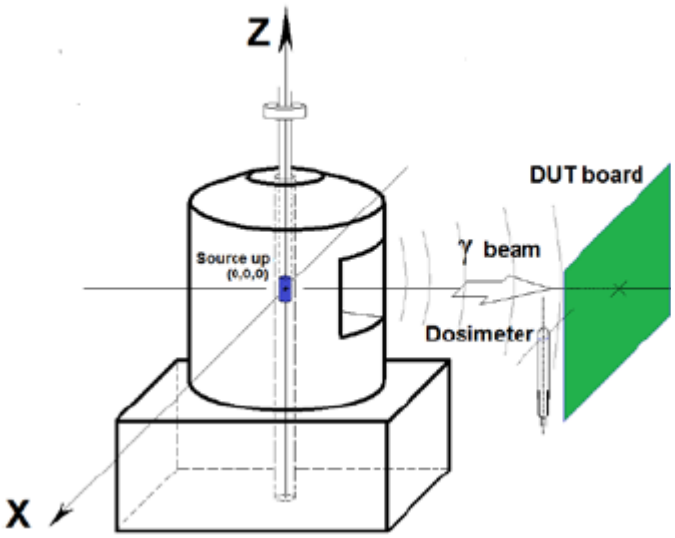
Dosimetry Uncertainties

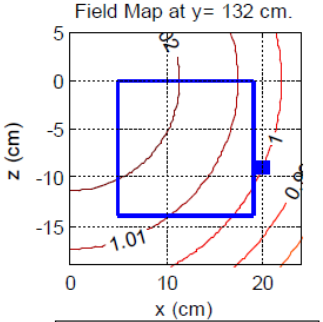
According to TEC-QEC-PR001 60Co Facility Dosimetry Procedure:

- ✓ **The uncertainty of the measured TID [Gy] is 4.2%**
- ✓ **The uncertainty of the measured D.R.[Gy/h] is 4.4%**

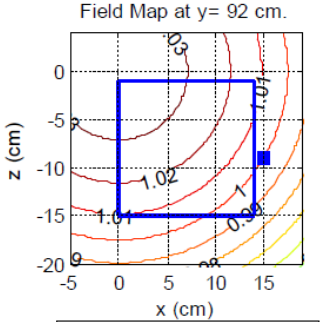
Spatial uniformity of the beam:



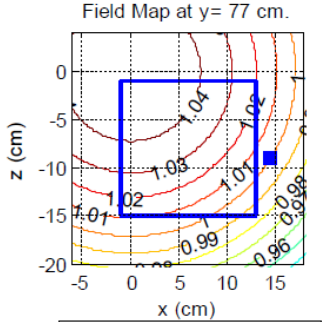
Dosimeter position relative to 60Co source		
x(cm)	y(cm)	z(cm)
20	132	-9



Dosimeter position relative to 60Co source		
x(cm)	y(cm)	z(cm)
15	92	-9



Dosimeter position relative to 60Co source		
x(cm)	y(cm)	z(cm)
14.5	77	-9



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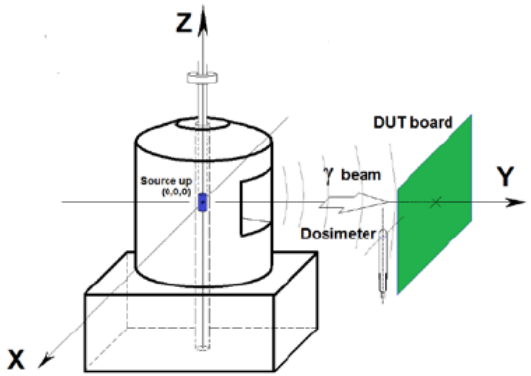
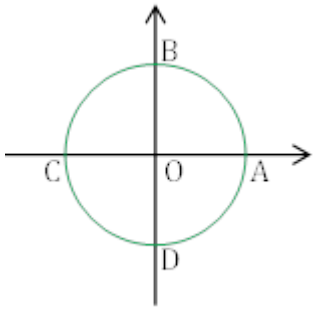
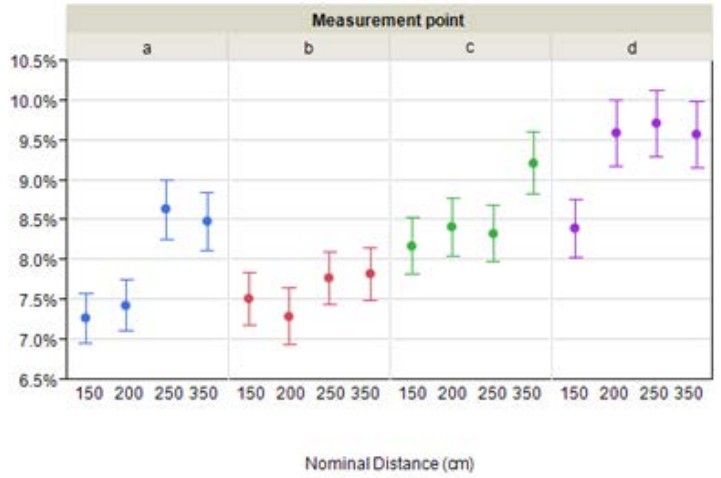
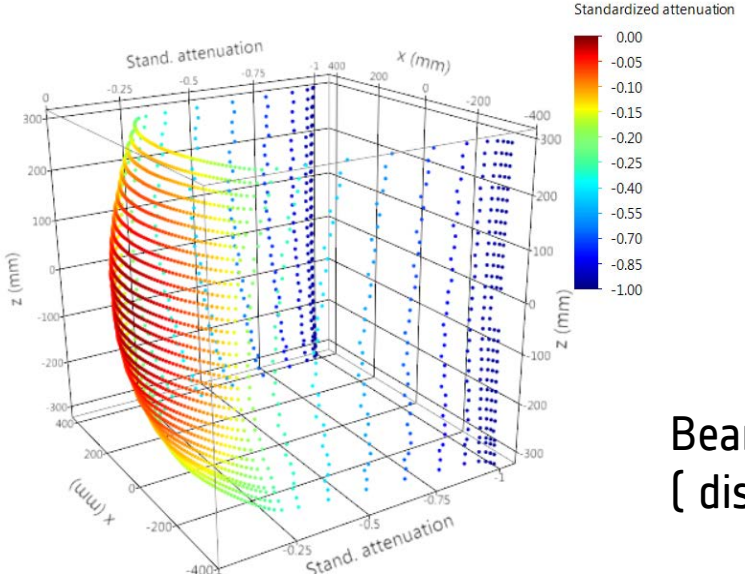
Field uniformity check









Attenuation with respect to the y axis on 4 points (A,B,C,D) at increasing distances (150cm-350cm)

Beam profile, dose rate intensity (distance 1m, 80cm x 80cm)

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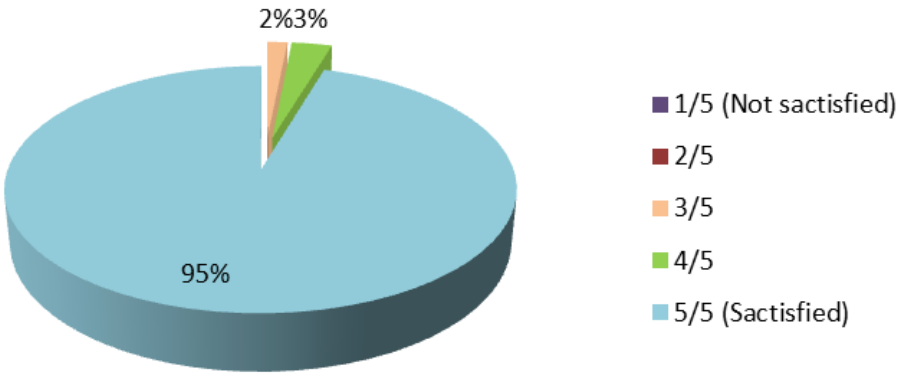
Facility Continuous Improvement

Continuous improvement triggered by customer feedbacks via systematic survey after each test campaign

2014 - ESTEC Co60 Facility Customer Sactisfaction Survey



We highly appreciate the dedicated support that we have gotten: After the test items have showed heavy degradation, we have on the spot changed the complete campaign (to learn as much as possible). The lab has been very supportive and flexible. Thanks!

The laboratory offers an excellent service and the staff are always very helpful.

Very friendly working environment.

Buy an UPS/continuity group!
Very good organization anyway, flexible and working.
I appreciated the people and their support was perfect.

Very good facilities and personnel (very professonal and helpful)

More than happy with the assistance provided during the test campaign. The staff were professional and knowledgeable providing an excellent level of service.

Laboratory inter-comparison performed every 2/3 years

contact : Co60admin@esa.int

Recent facility upgrades

Dosimetry improvements:

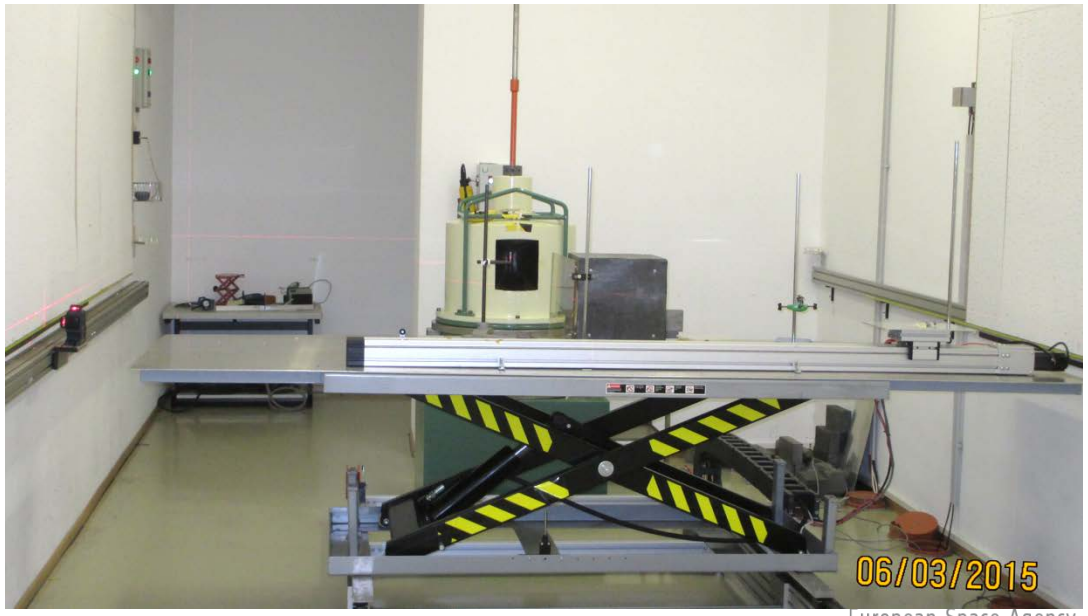
New Dosimetry Chain based on a PTW 30012 ionization chamber and PTW Unidos webline

Positioning improvements:

-New (wider!) table for positioning

-remote positioning of the table (x,y,z)

-laser reference system



UPS for back up biasing in case of power dip

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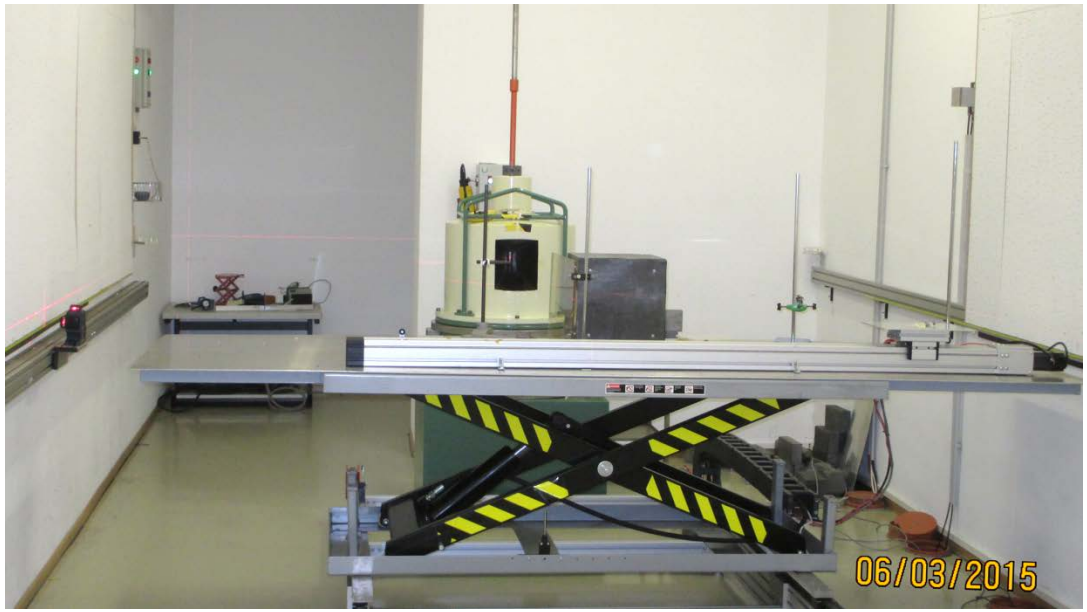
Future facility upgrades

- Installation of fix power distribution board in the irradiation room, and power supplies in the control room (automatic logging of I, V during test)

- Clean earth connection

- Beam spectrum



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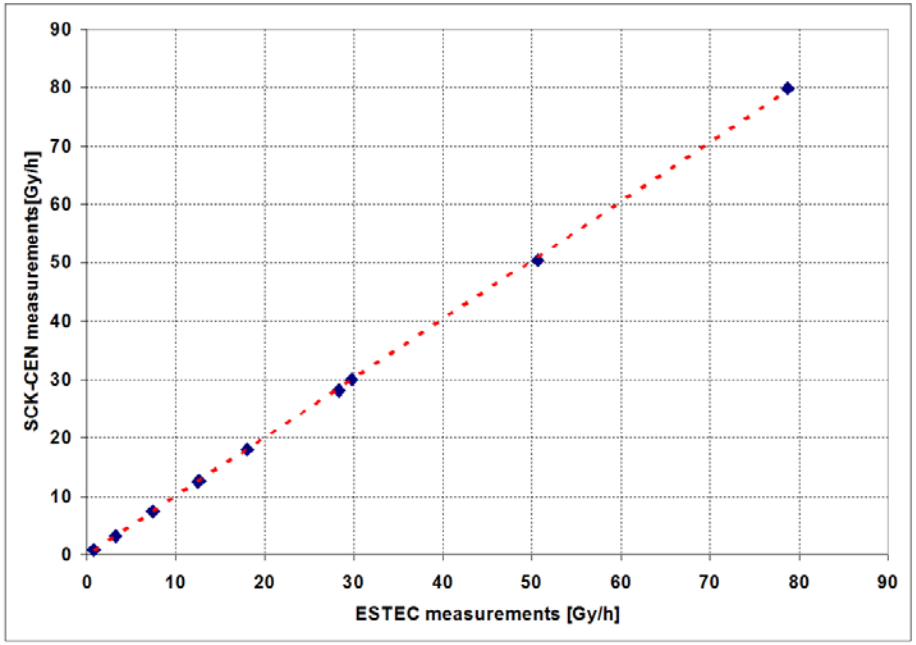
Laboratory intercomparison (I)

Laboratory Inter-comparison experiments, conducted in conjunction with **SCK·CEN** (Belgian Nuclear Research Centre), showed excellent agreement between dose rate figures.

ESTEC	SCK-CEN	Δ[%]
78.680	**79.936**	**+1.57%**
50.628	50.379	- 0.49%
29.797	29.937	+0.47%
28.309	28.227	- 0.29%
18.000	18.026	+0.15%
12.651	12.629	- 0.18%
12.475	12.447	- 0.22%
7.442	7.434	- 0.40%
3.186	3.175	- 0.35%
0.812	0.811	- 0.10%



Test campaigns held in April 2011

contact : Co60admin@esa.int

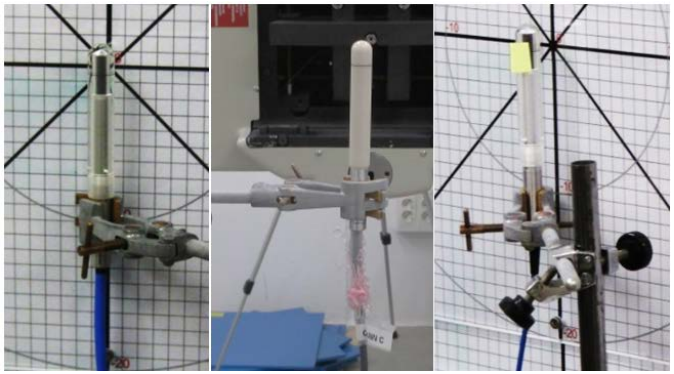
Laboratory intercomparison (II)

Dosimetry inter-laboratory comparison between ESTEC, CNA -ALTER/RADLAB and UCL.

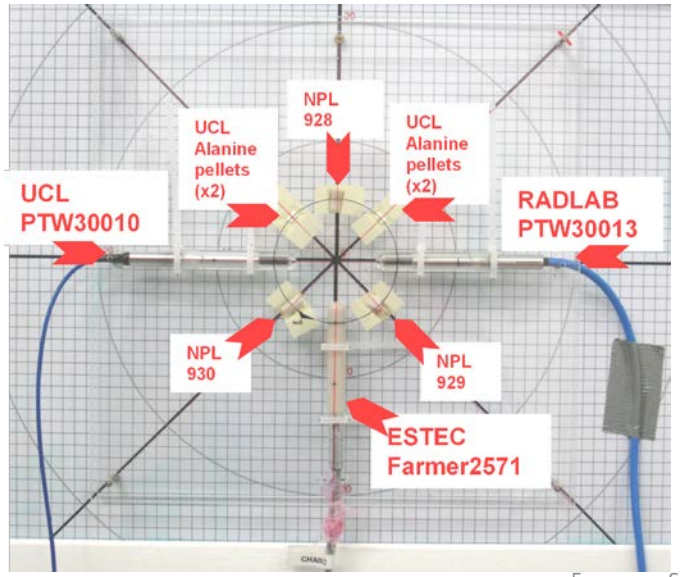
The performed laboratory inter-comparison has provided quantitative data on the currently achieved precision of the measurements of the three laboratories at the three different irradiation facilities.

The percentage difference between the obtained data has shown small differences in dosimetry

Dose rate covering a range spanning from 0.2 Gy (Si)/h to 90 Gy(Si)/h,



TID between 100 Gy (Si) and 550 Gy (Si)



How to contact the ESTEC 60Co Facility

e-mail for irradiation test planning: **Co60admin@esa.int**

www.escies.org

Alessandra Costantino – Radiation Effects Engineer
alessandra.costantino@esa.int +31-(0)71-565 6244 office room: eg012

Michele Muschitiello – Component Engineer
michele.muschitiello@esa.int +31-(0)71-565 4388 office room: eg012

Thank you for your attention!

See you at your next irradiation testing campaign

contact : Co60admin@esa.int