Individuazione dei parametri del lettino di trattamento dal sistema di simulazione virtuale: la soluzione astigiana

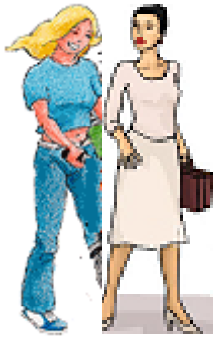
Relatori: *Antonella Ponzone*

Barbara Benedetti

SOC Radioterapia - Asti

Schema di Impostazione terapeutica presso la Radioterapia di Asti

OSPEDALE CARDINAL MASSAIA - ASTI
REGIONE PIEMONTE



TC-Simulatore

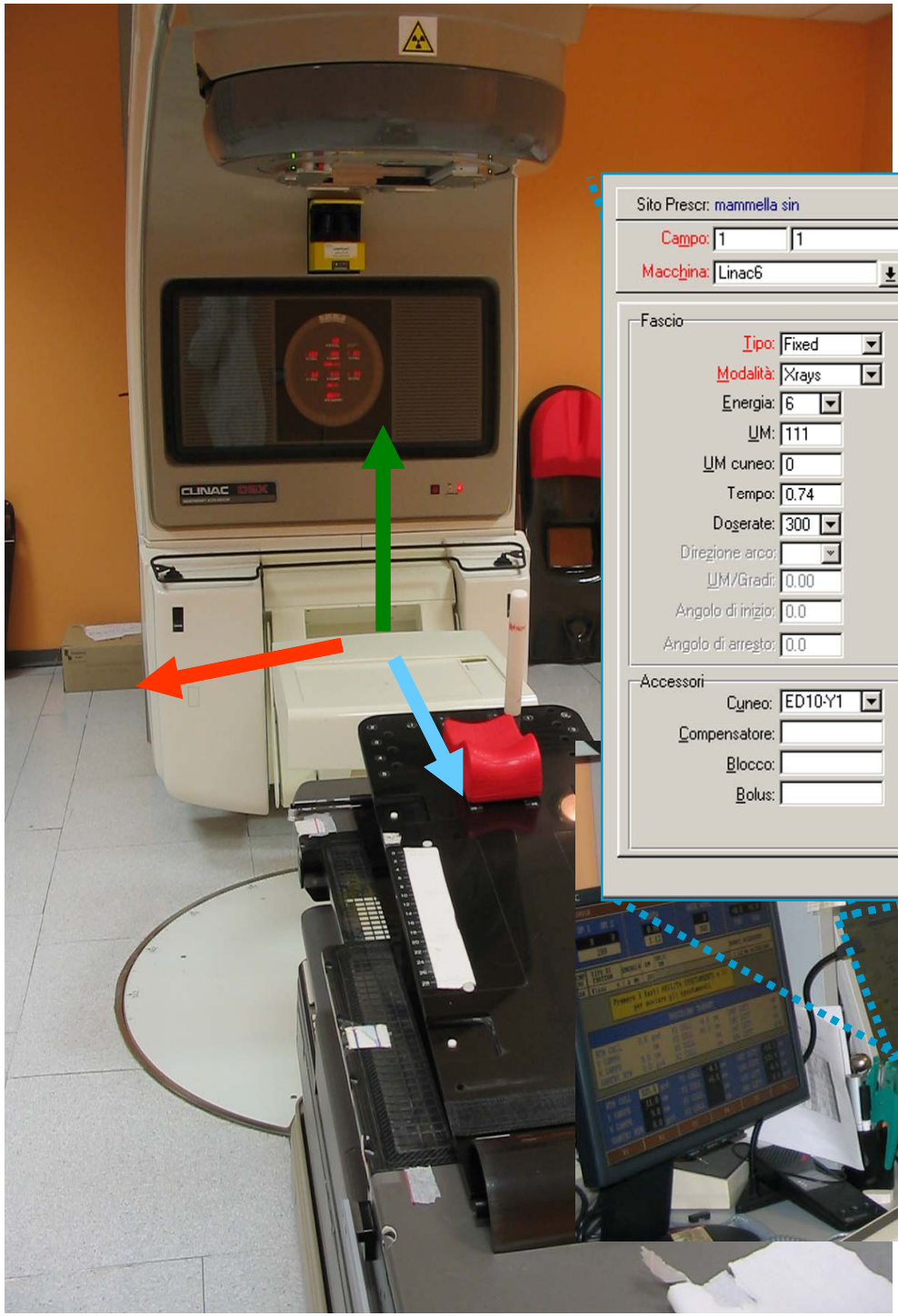
Simulazione di verifica

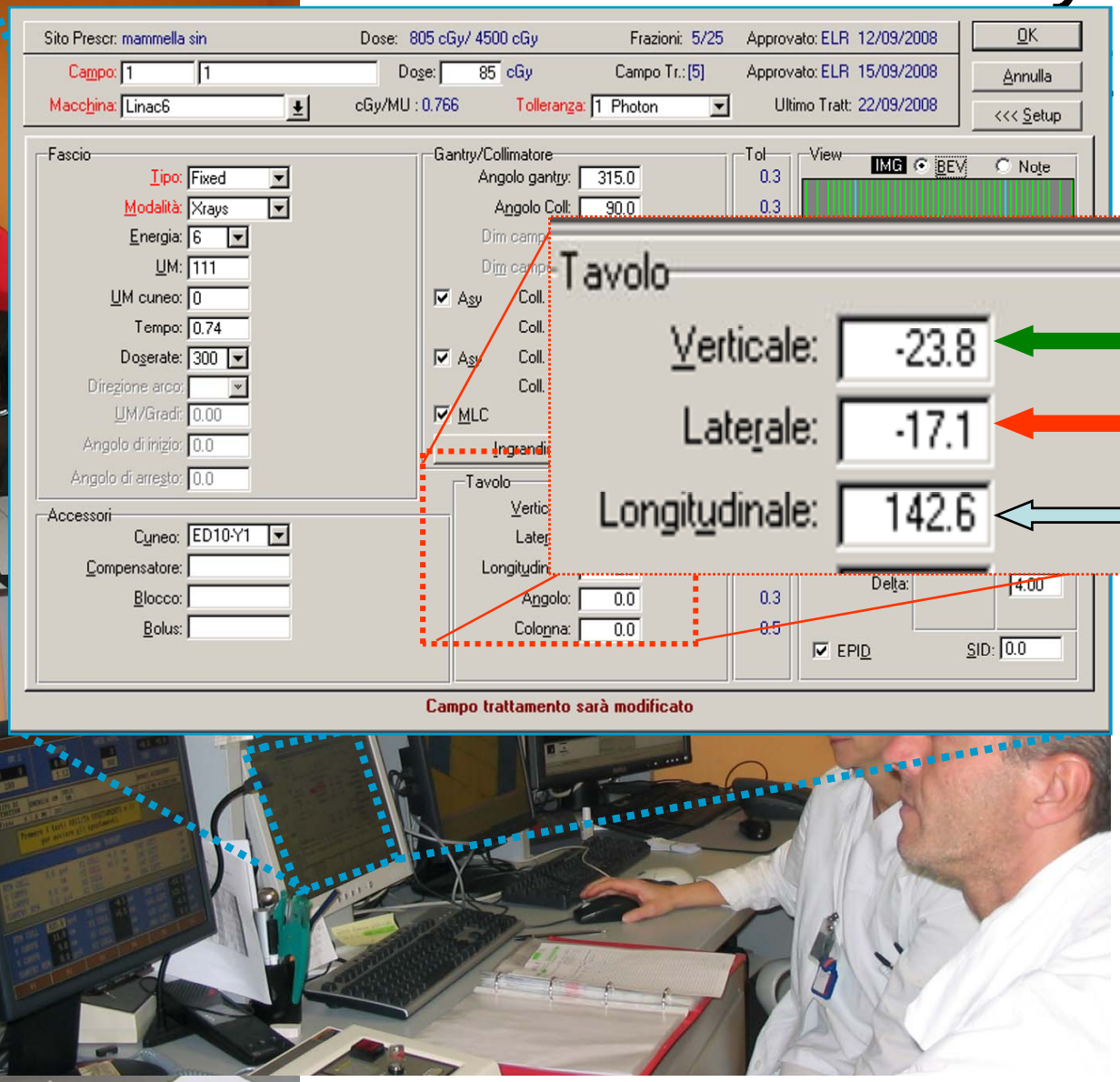
Simulazione di verifica ulteriore fonte di errore

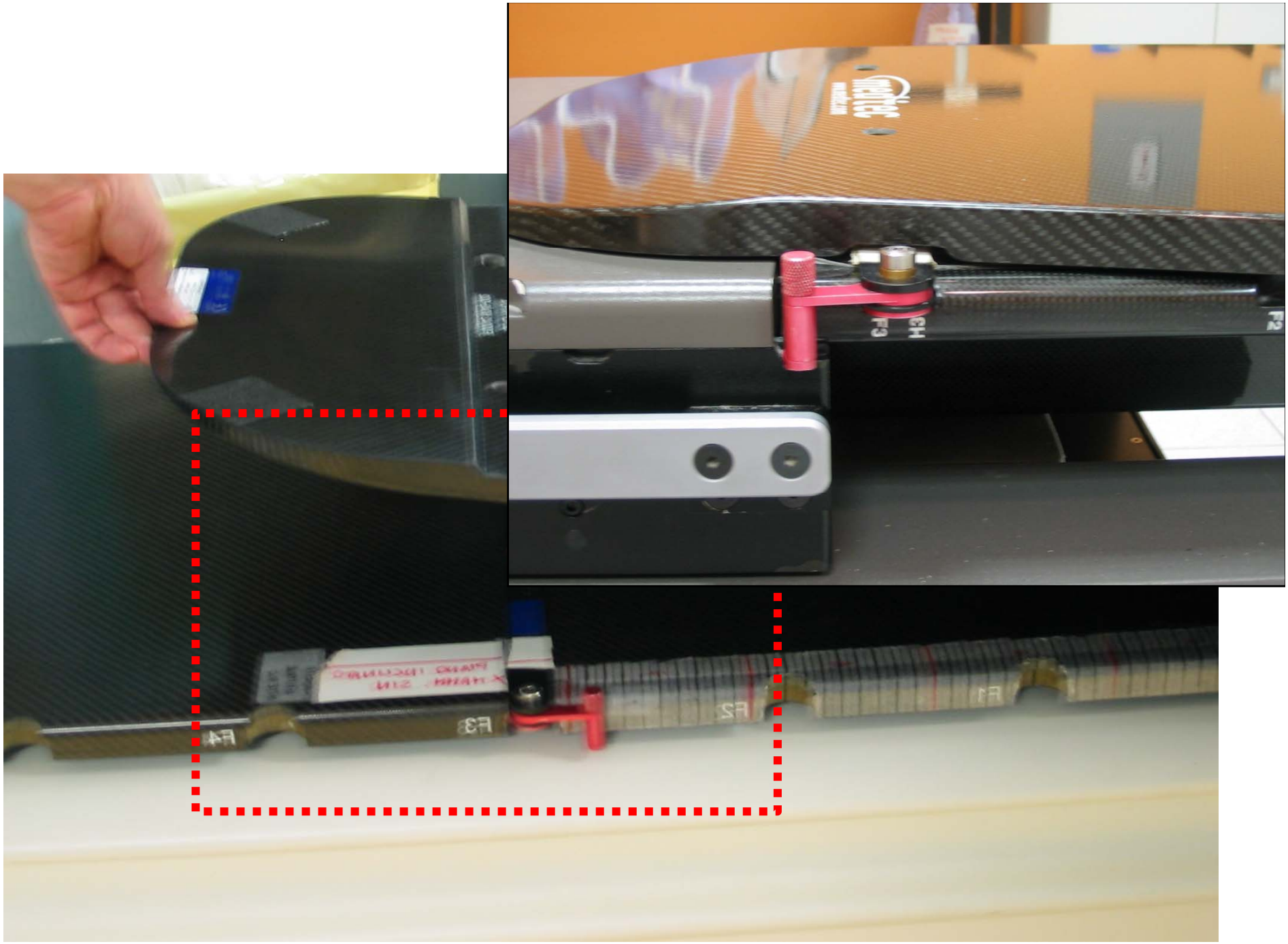
Linac

OSPEDALE CARDINAL MASSAIA - ASTI
REGIONE PIEMONTE

Record & Verify



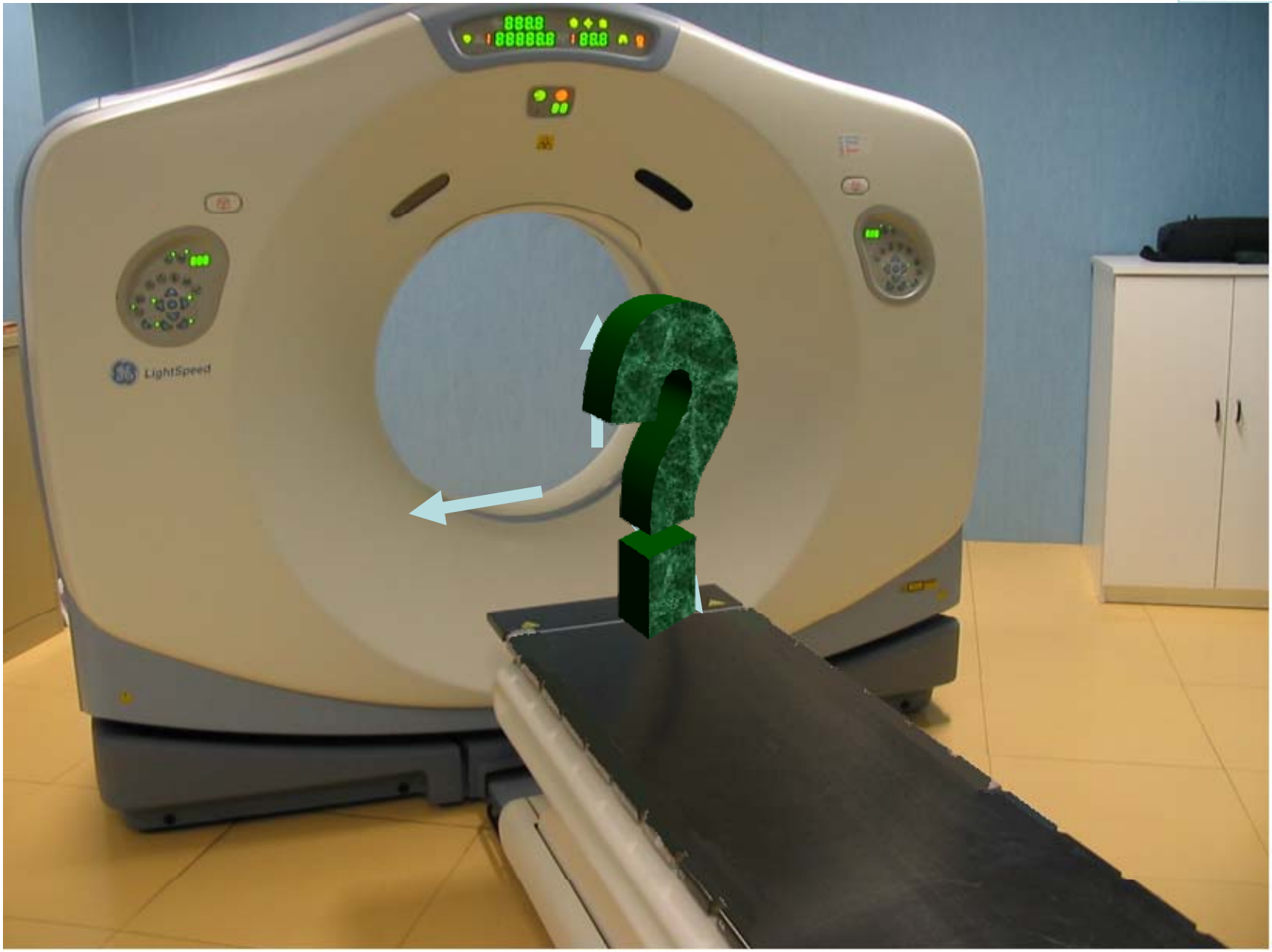




OSPEDALE CARDINAL MASSAIA - ASTI
REGIONE PIEMONTE

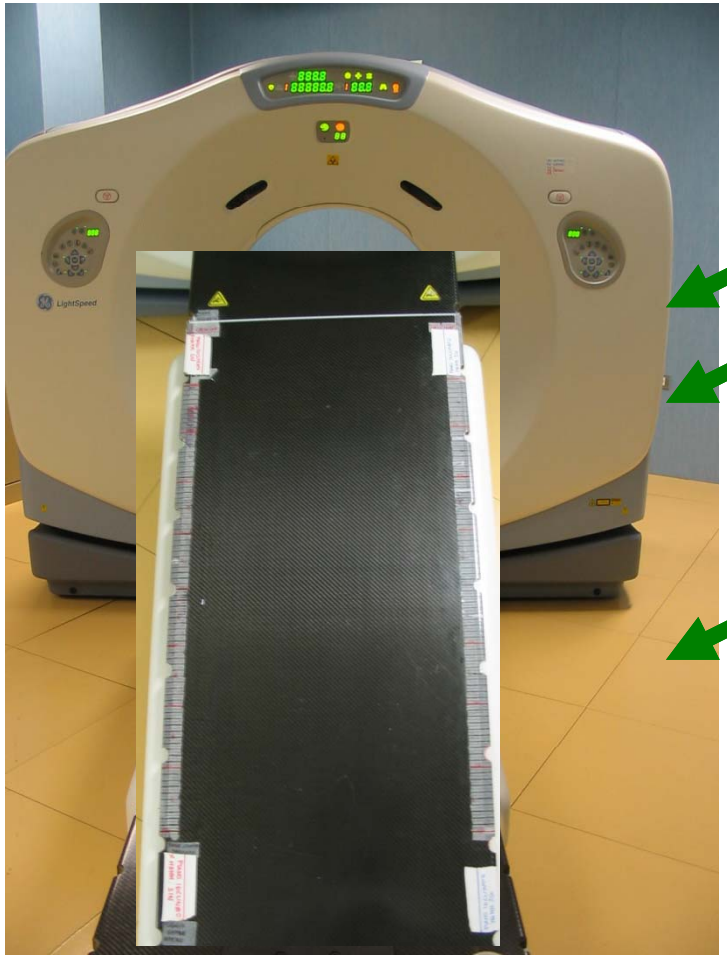
Simulatore Acuity Asti


VARIAN
Z
Y
X

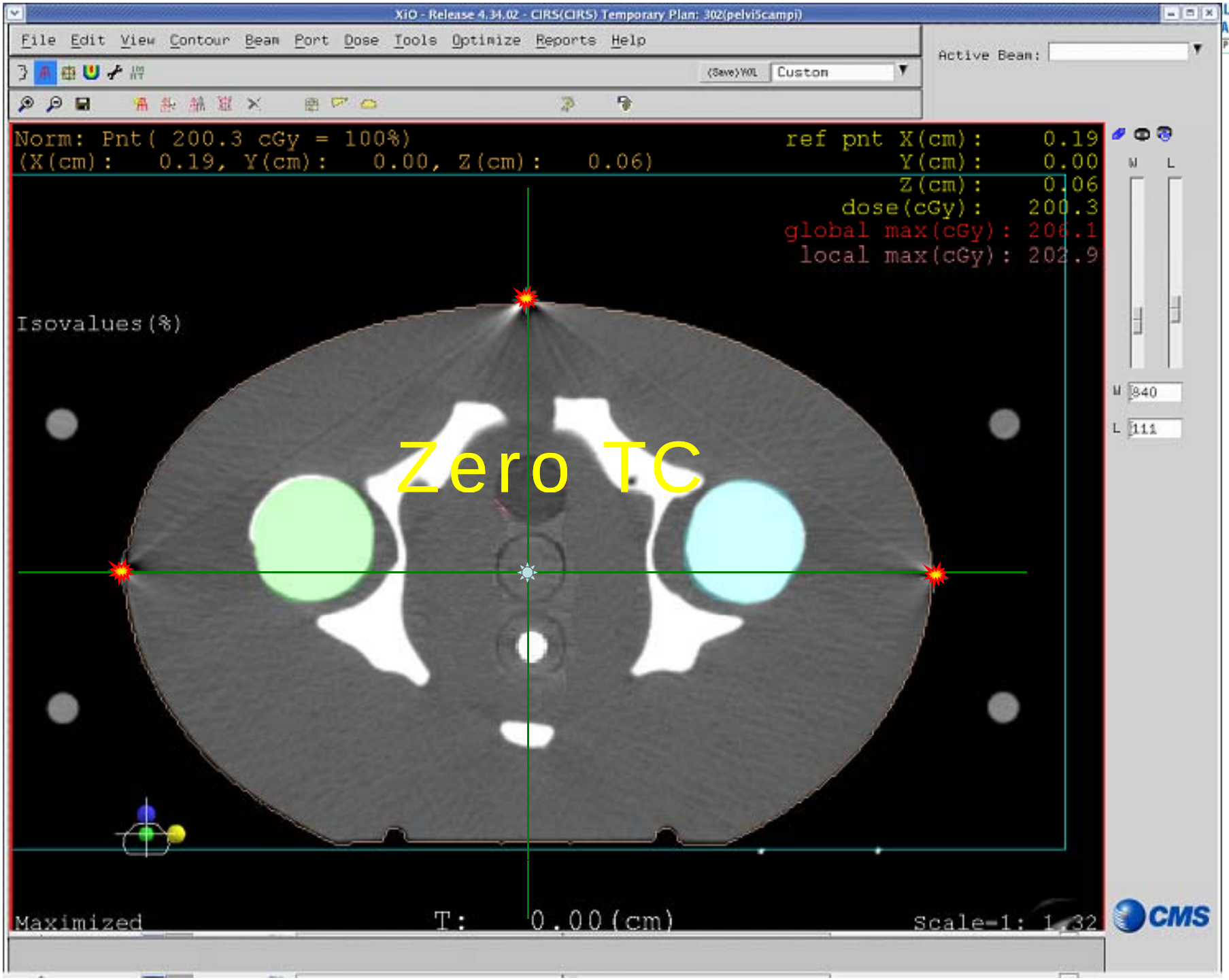

LightSpeed

TC SIMULATORE

ACCELERATORE



CIRS PHANTOM PELVIC®

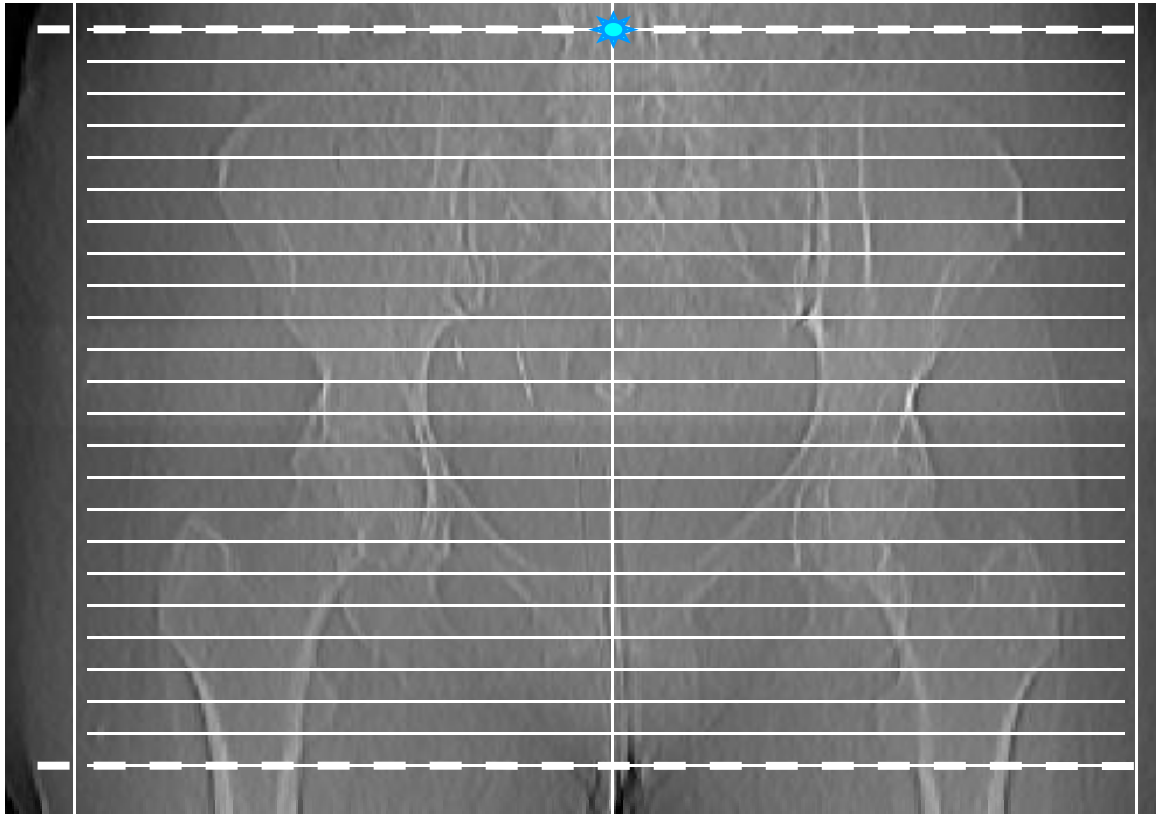

XiO - Release 4.34.02 - CIRS(CIRS) Temporary Plan: 302(pelviScampi)
File Edit View Contour Beam Port Dose Tools Optimize Reports Help
Active Beam:
Custon
Norm: Pnt(200.3 cGy = 100%)
(X(cm): 0.19, Y(cm): 0.00, Z(cm): 0.06)
ref pnt X(cm): 0.19
Y(cm): 0.00
Z(cm): 0.06
dose(cGy): 200.3
global max(cGy): 206.1
local max(cGy): 202.9
Isovalues(%)
Zero TC
W
L
840
111
Maximized
T: 0.00(cm)
Scale=1: 1.32
CMS

Scansioni TC

Inizio pacchetto

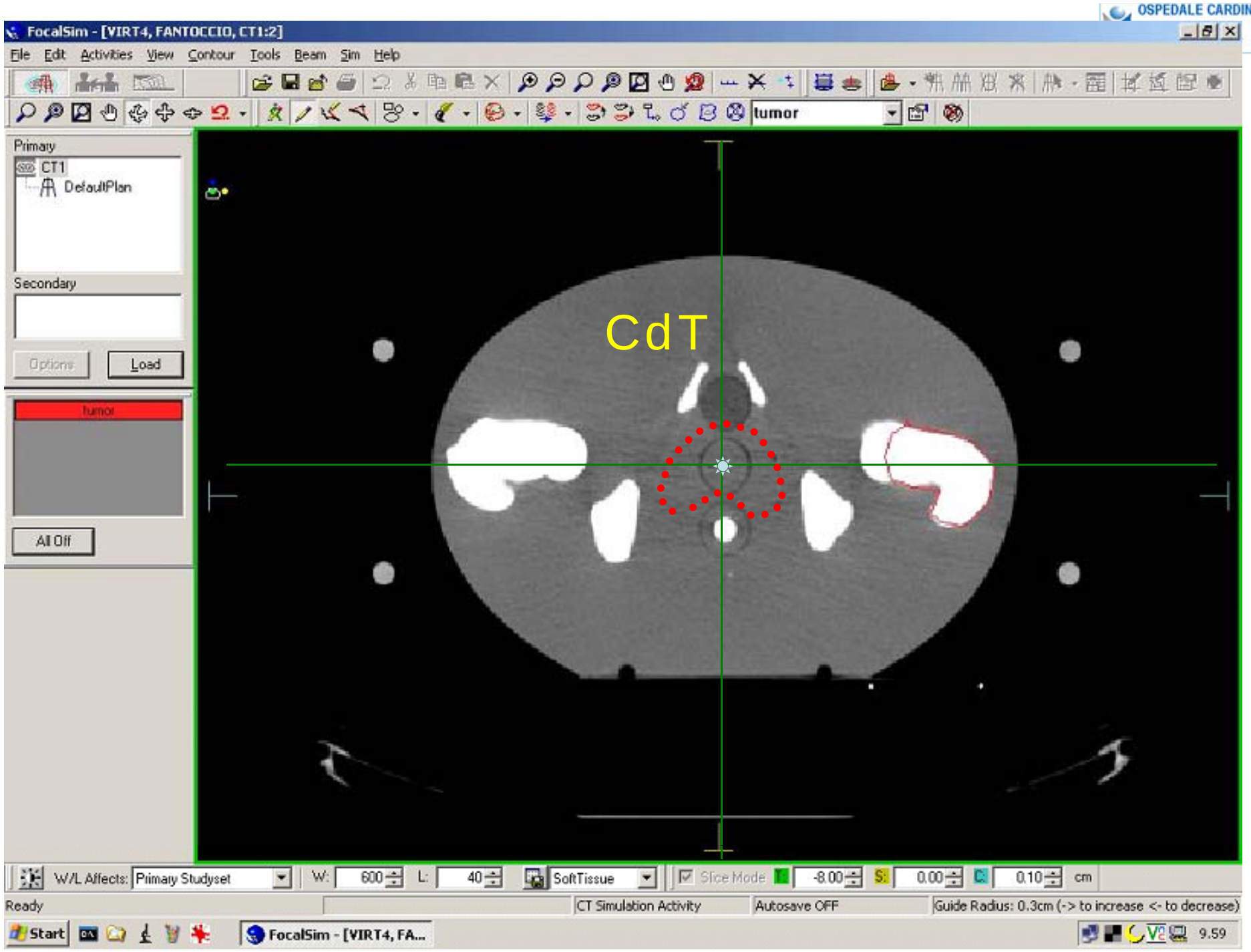
FOV

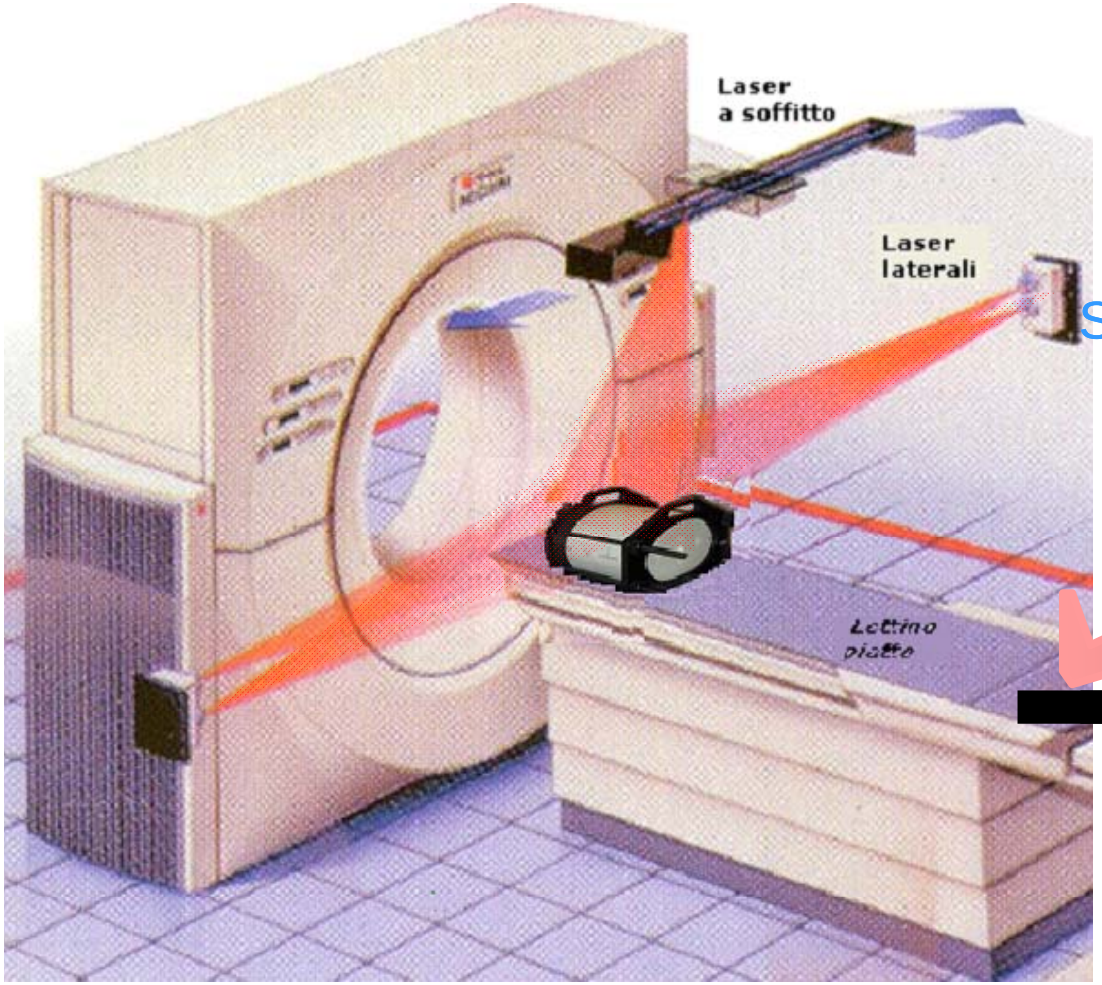
Zero TC

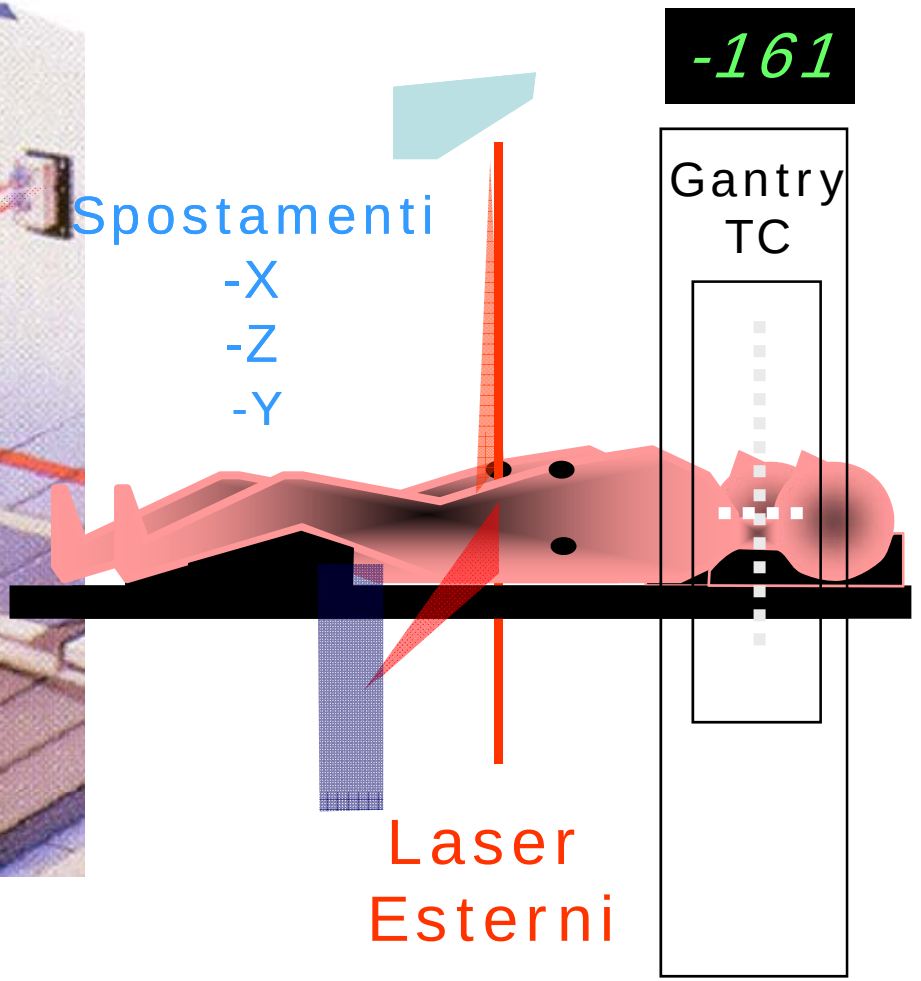


Slice = 0

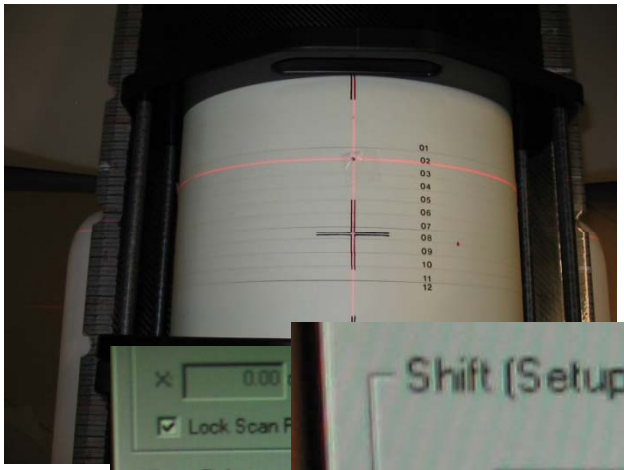
Fine pacchetto

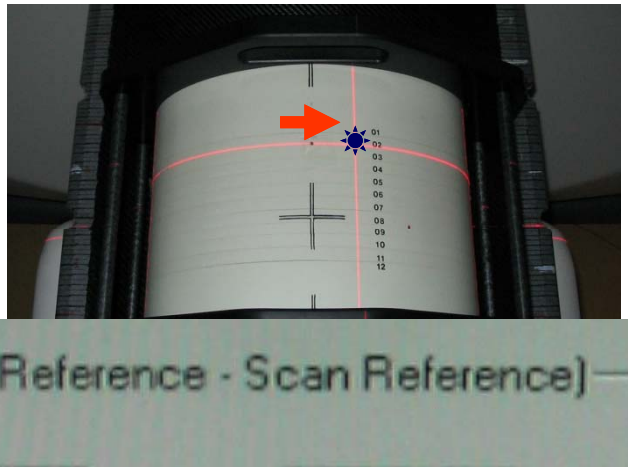

OSPEDALE CARDINAL
FocalSim - [VIRT4, FANTOCCIO, CT1:2]
File Edit Activities View Contour Tools Beam Sim Help
tumor
Primary
CT1
DefaultPlan
Secondary
Options
Load
tumor
All Off
CdT
W/L Affects: Primary Studyset
W: 600
L: 40
SoftTissue
Slice Mode
-8.00
0.00
0.10
cm
Ready
CT Simulation Activity
Autosave OFF
Guide Radius: 0.3cm (-> to increase <- to decrease)
Start
FocalSim - [VIRT4, FA...
9.59

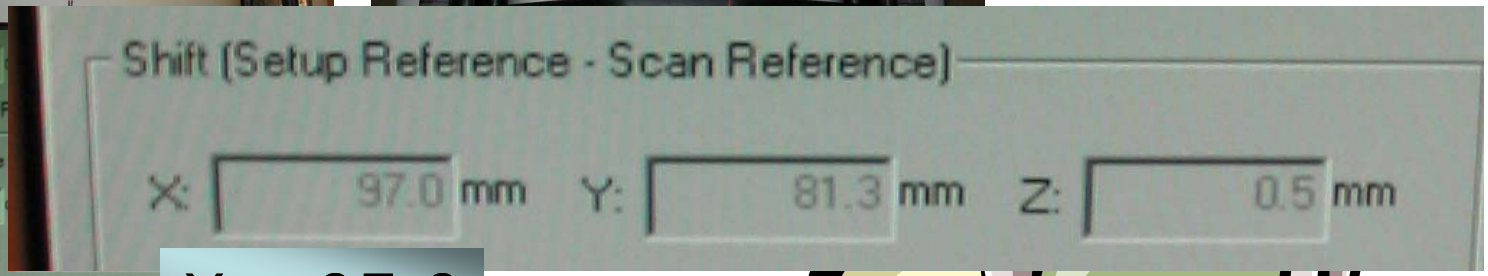

Laser
a soffitto
Laser
laterali
Lettino
piatto


-161
Gantry
TC
Spostamenti
-X
-Z
-Y
Laser
Esterni

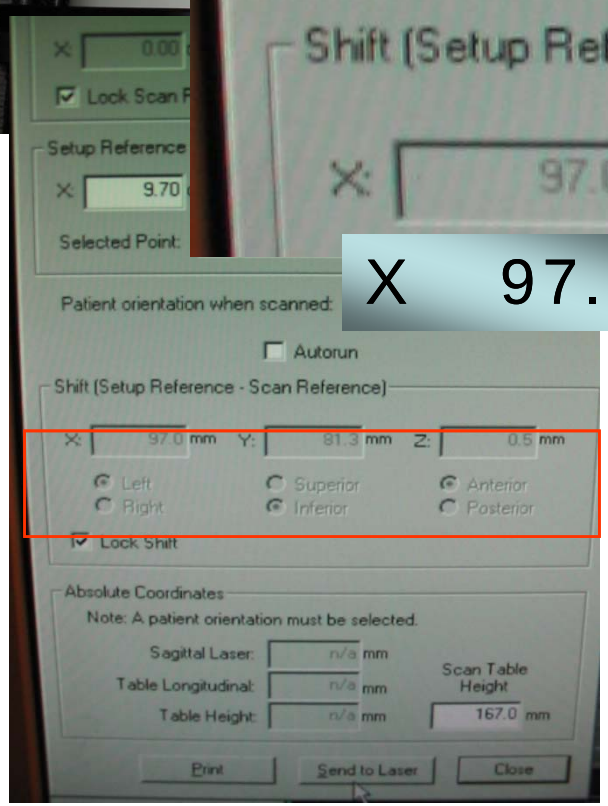
Asse X
(Laterale lettino)



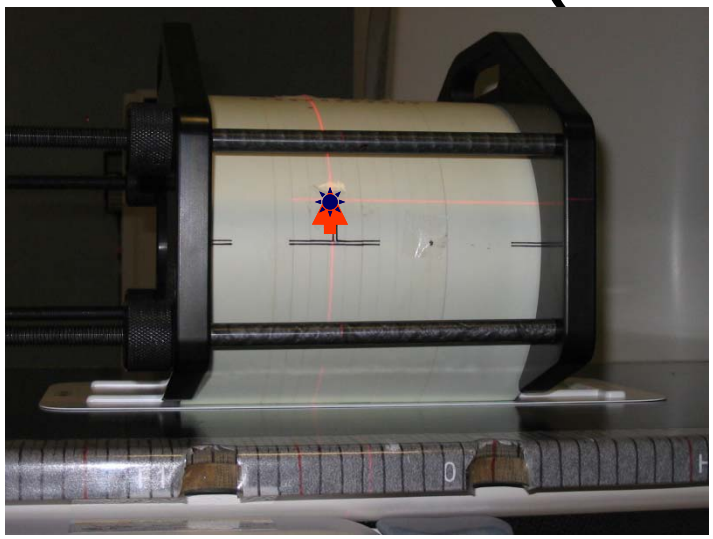


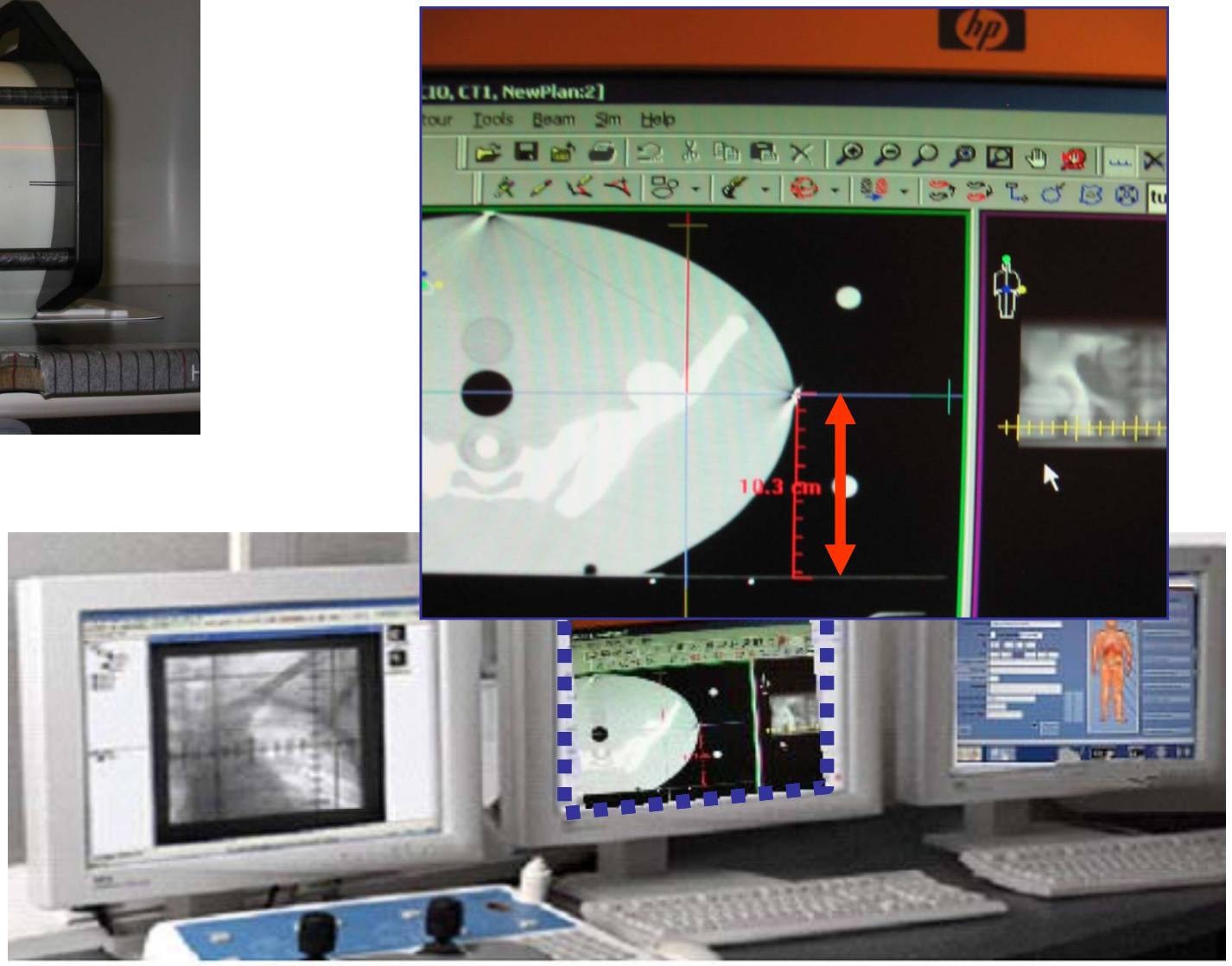


X 97.0

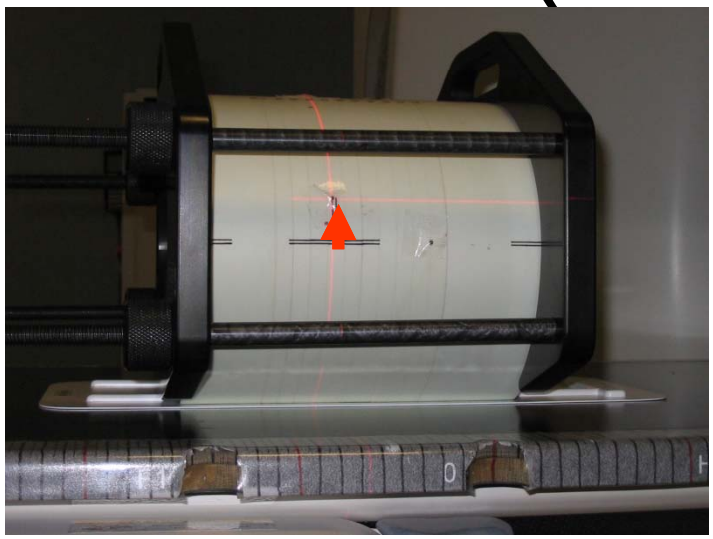


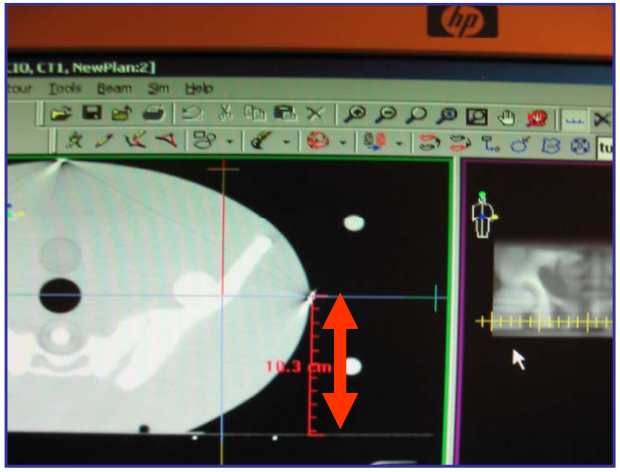
Asse Z
(Verticale lettino)



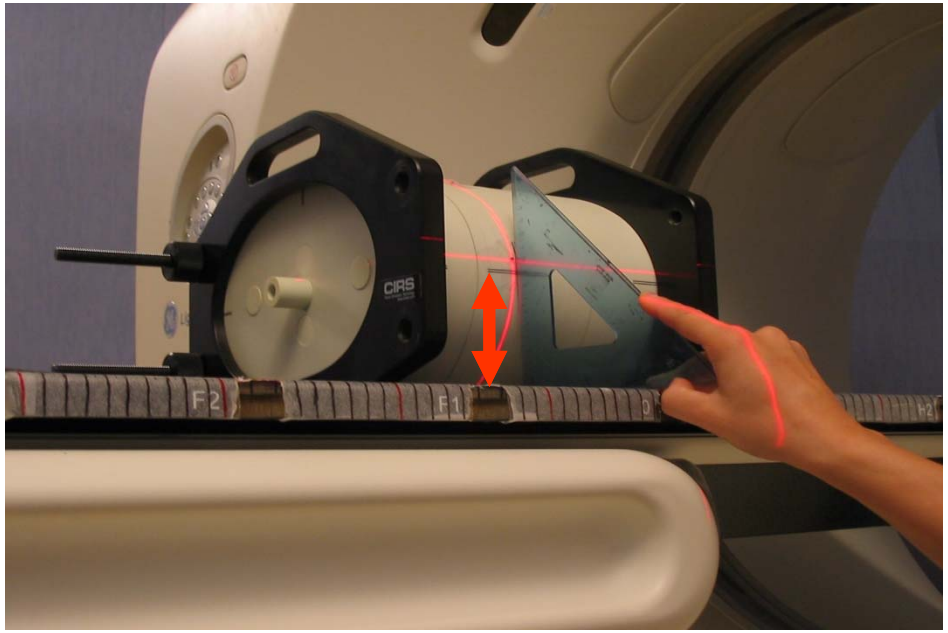


Asse Z
(Verticale lettino)

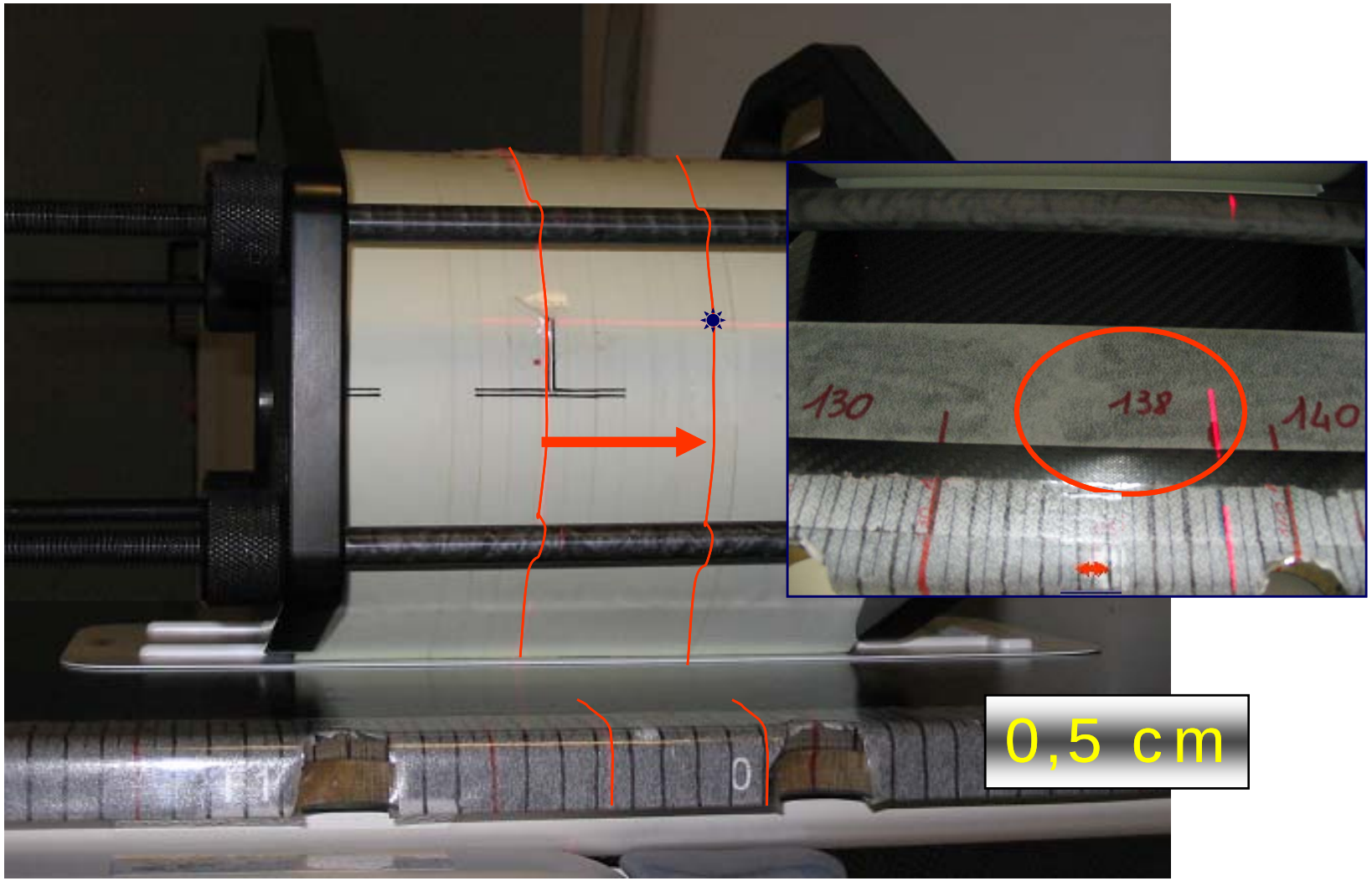




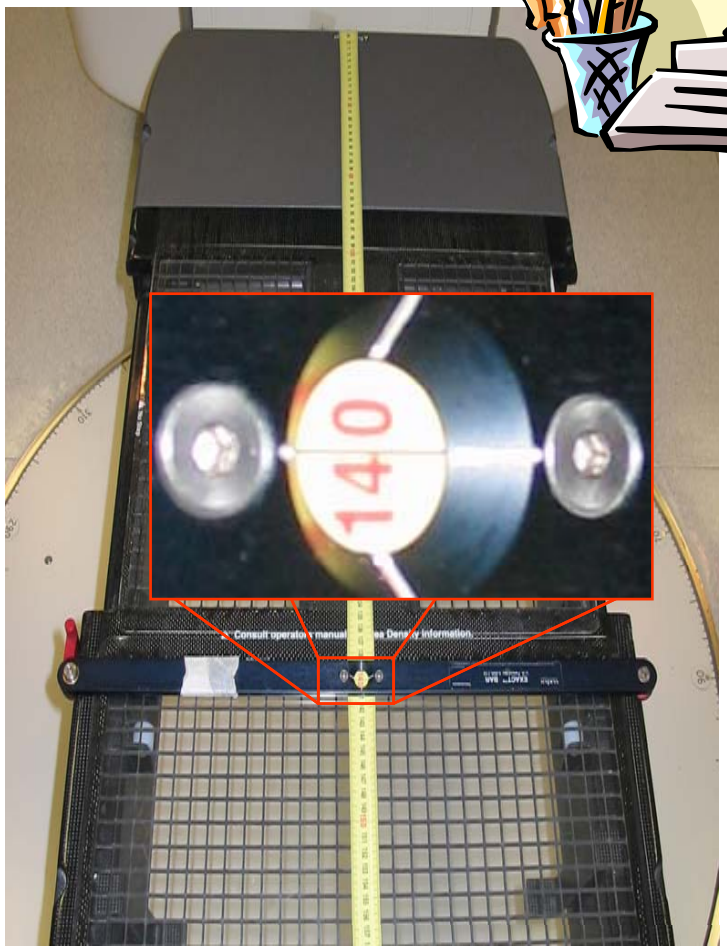
Verifica

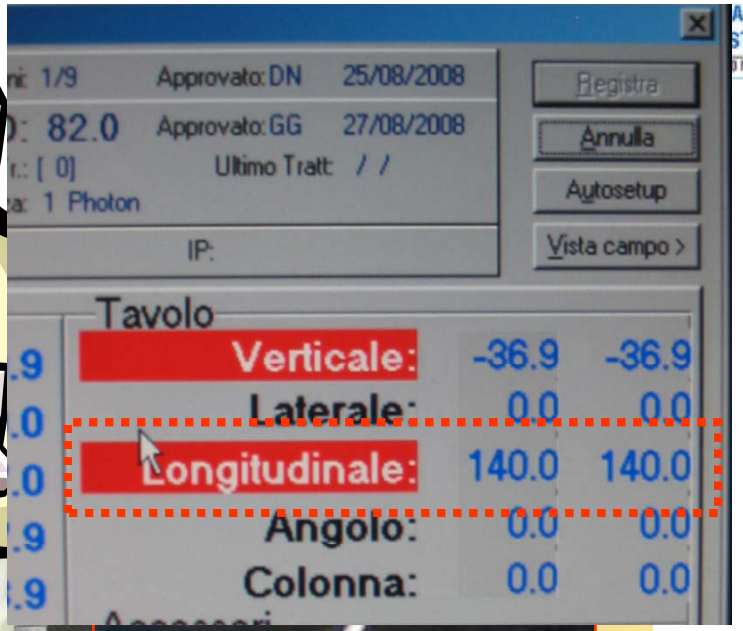


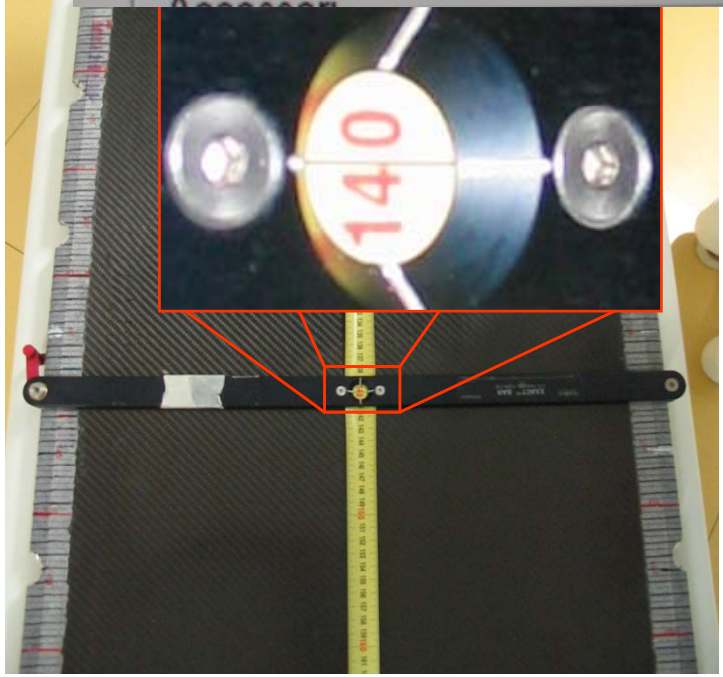
Asse Y
Longitudinale lettino



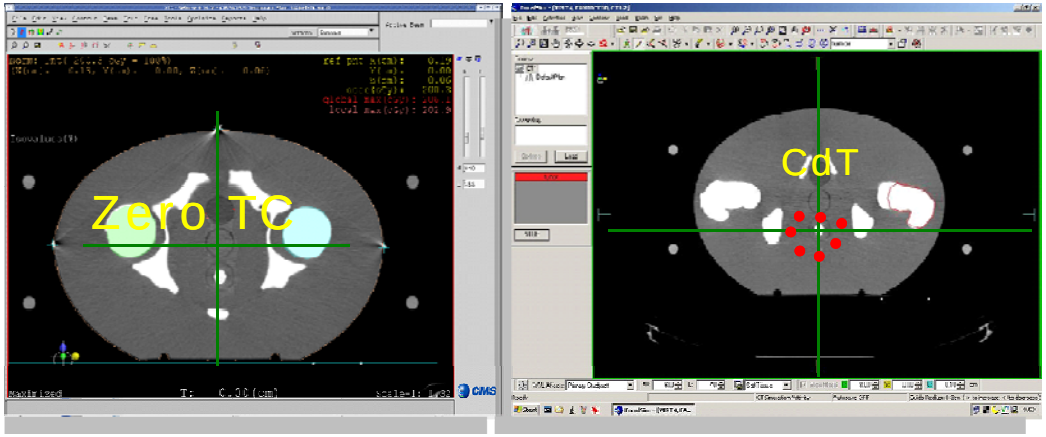
LINAC

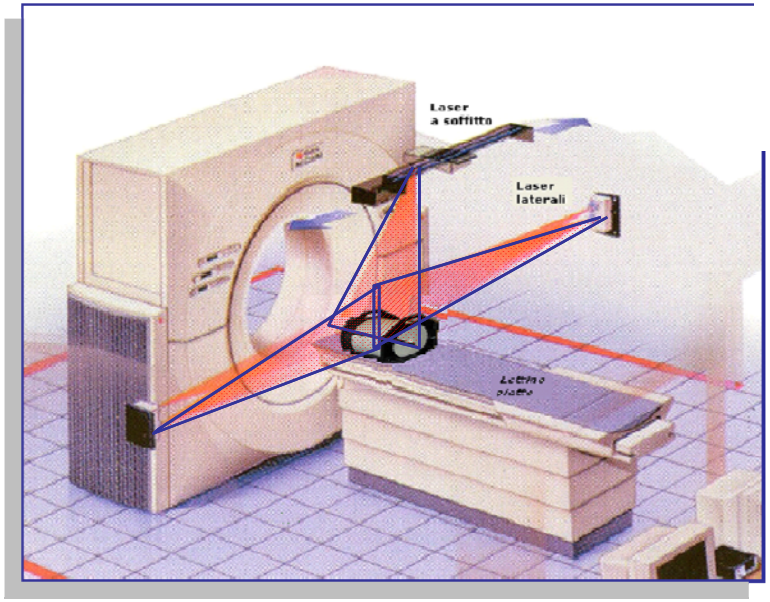

140


Approvato: DN 25/08/2008
82.0 Approvato: GG 27/08/2008
Ultimo Tratt: / /
1 Photon
IP:
Registra
Annulla
Autosetup
Vista campo >
Tavolo
Verticale: -36.9 -36.9
Laterale: 0.0 0.0
Longitudinale: 140.0 140.0
Angolo: 0.0 0.0
Colonna: 0.0 0.0


140

Rilevati parametri di 10 target simulati





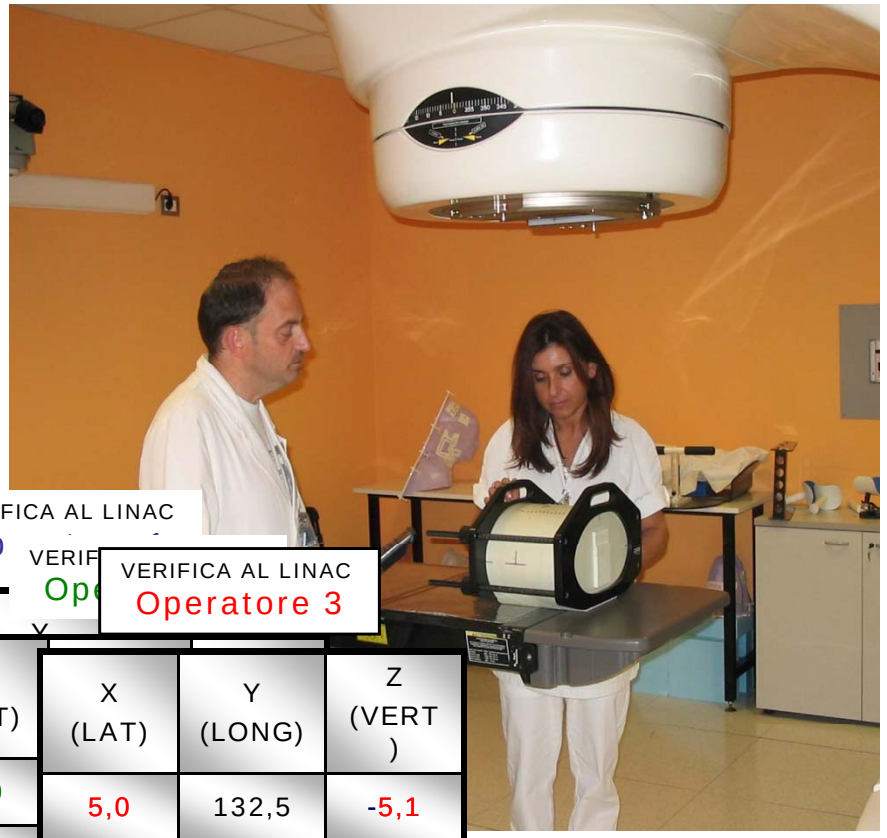
10

Target	X (LAT)	Y (LONG)	Z (VERT)
A	5,2	132,5	-5,4
B	1,1	141,5	-6,5
C	0,5	132,5	-4,5
D	-0,2	159,5	-9,0
E	0,6	152,0	-9,0
F	1,1	143,0	-7,5
G	-4,9	132,5	-6,1
H	0,8	106,5	-13,2
I	0,4	136,0	10,6
L	0,5	156,5	-8,2

Verifica dei parametri dalla Tc al LINAC

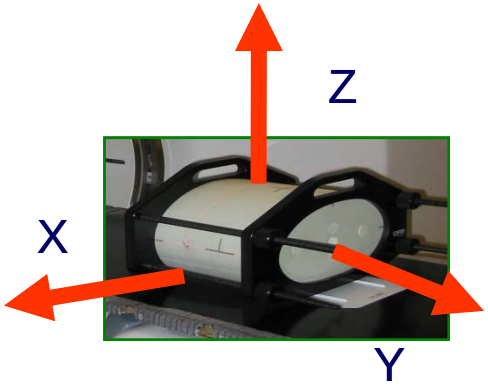
COORDINATE DI 10 TARGET SIMULATI

Target	X (LAT)	Y (LONG)	Z (VERT)
A	5,2	132,5	-5,4
B	1,1	141,5	-6,5
C	0,5	132,5	-4,5
D	-0,2	159,5	-9,0
E	0,6	152,0	-9,0
F	1,1	143,0	-7,5
G	-4,9	132,5	-6,1
H	0,8	106,5	-13,2
I	0,4	136,0	10,6
L	0,5	156,5	-8,2



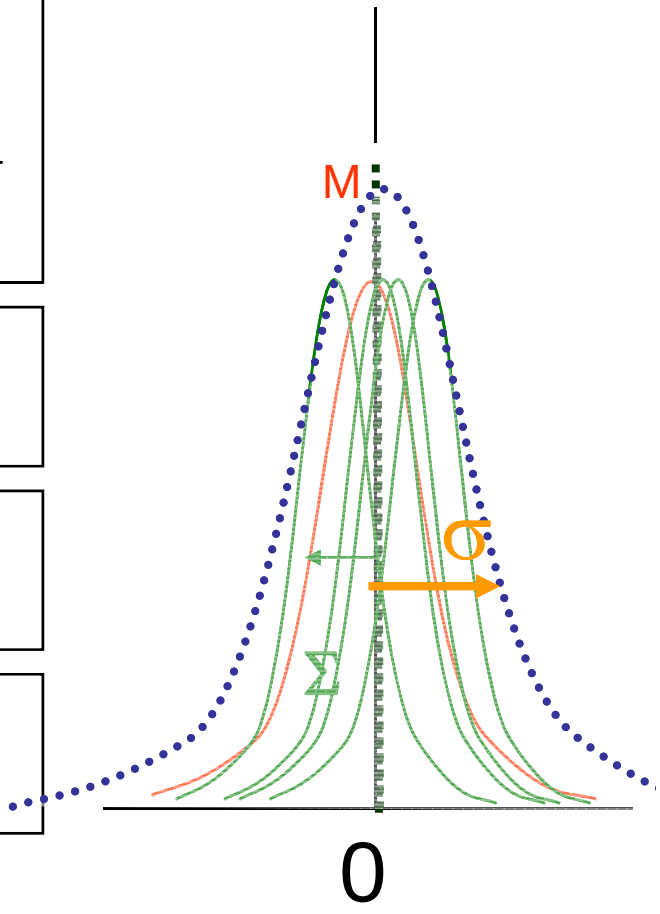
VERIFICA AL LINAC
Operatore 3

X (LAT)	X (LAT)	Y (LONG)	Z (VERT)
5,0	5,0	132,5	-5,1
1,3	1,3	141,2	-6,5
0,7	0,7	132,5	-4,3
-0,3	-0,3	159,3	-8,6
0,4	0,4	152,0	-8,8
1,4	1,4	143,1	-7,3
-4,6	-4,6	132,7	-6,2
0,5	0,5	106,8	-13,1
0,4	0,4	136,0	10,6
0,3	0,3	156,6	-8,2

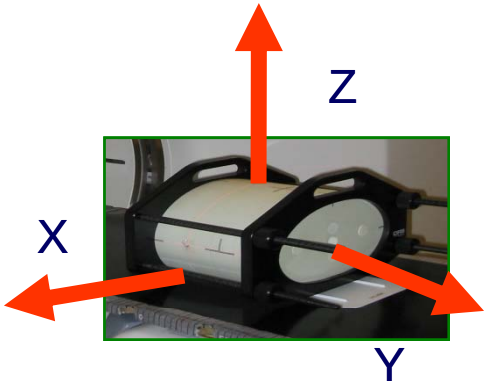


Risultati

Para-metro	M Media errore sistematico	Σ Dev. St. errore sistematico	σ Media quadratica errore casuale
Y	-0,2	0,2	0,3
Z	0,0	0,2	0,2
X	0,0	0,2	0,2

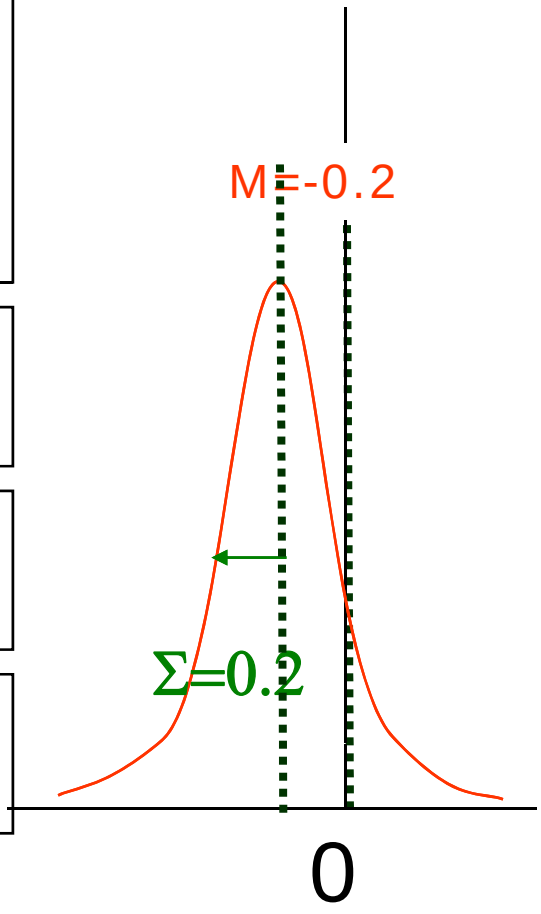


Marcel van Herk. Errors and Margins in Radiotherapy *Seminars in Radiation Oncology, Vol 14, No 1 (January), 2004: pp 52-64*

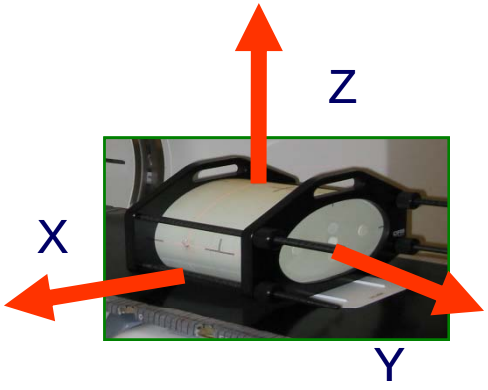


Risultati

Para-metro	M Media errore sistematico	Σ Dev. St. errore sistematico	σ Media quadratica errore casuale
Y	-0,2	0,2	0,3
Z	0,0	0,2	0,2
X	0,0	0,2	0,2

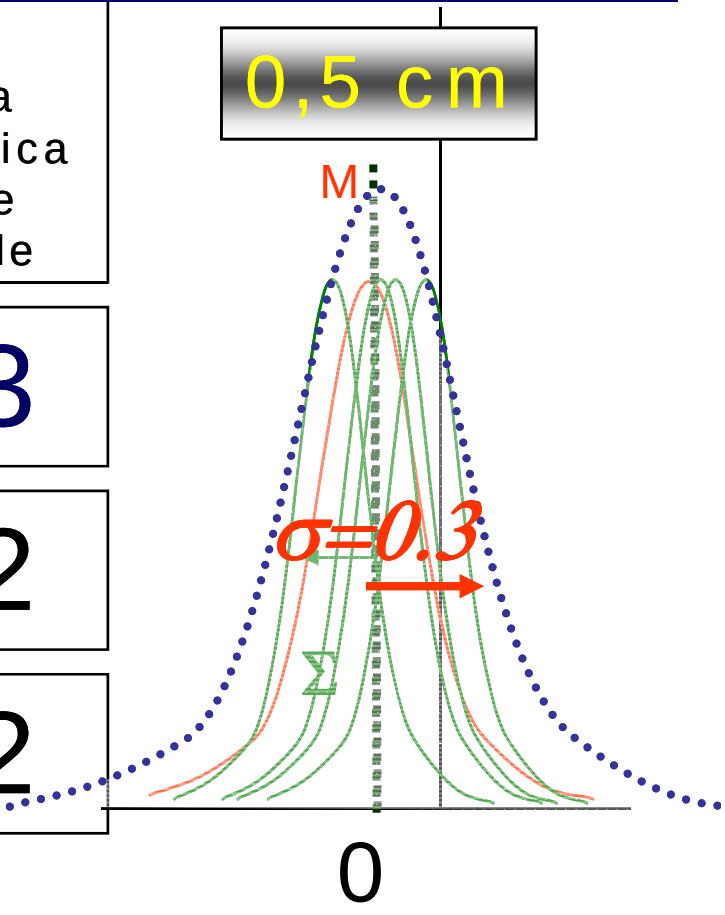


Marcel van Herk. Errors and Margins in Radiotherapy *Seminars in Radiation Oncology, Vol 14, No 1 (January), 2004: pp 52-64*



Ris

Para-metro	M Media errore sistematico	Σ Dev. St. errore sistematico	σ Media quadratica errore casuale
Y	-0,2	0,2	0,3
Z	0,0	0,2	0,2
X	0,0	0,2	0,2



Marcel van Herk. Errors and Margins in Radiotherapy *Seminars in Radiation Oncology, Vol 14, No 1 (January), 2004: pp 52-64*

Conclusioni

- I risultati conseguiti ci fanno ritenere il sistema adottato affidabile .
- Al momento l'impiego routinario della simulazione virtuale è limitato ai casi di palliazione in attesa di uno studio di verifica clinica su un campione di casi radicali.

OSPEDALE CARDINAL MASSAIA - ASTI
REGIONE PIEMONTE

GRAZIE!