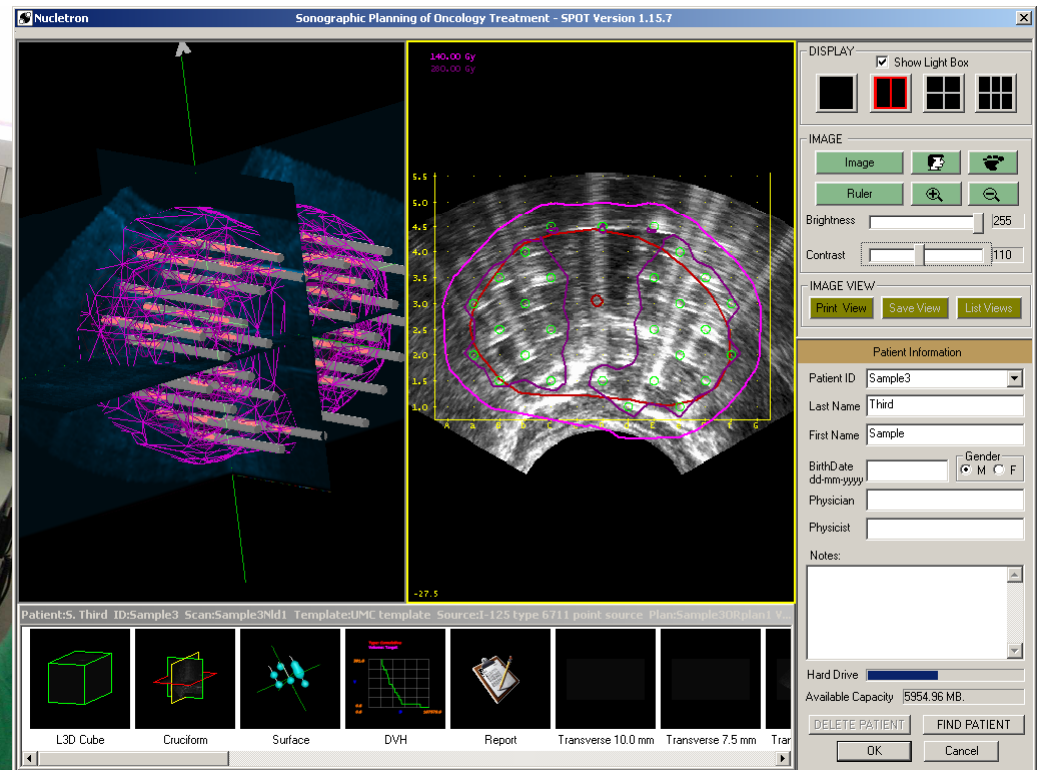
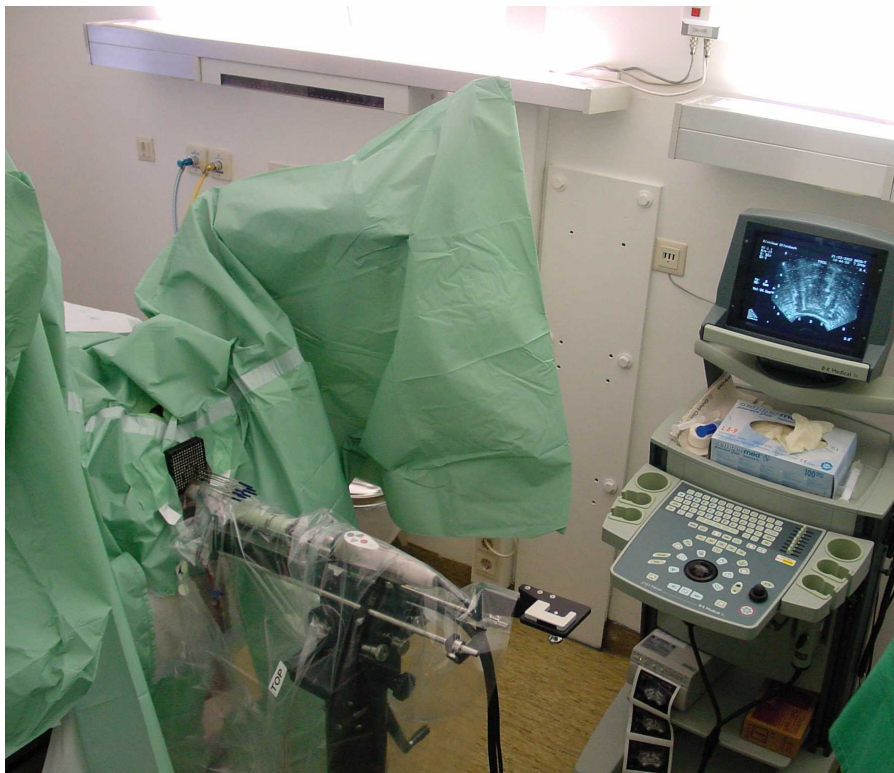


# Fully Integrated Real-Time Seed Treatment (FIRST™) from Nucletron





# What We Will Cover

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- FIRST Description
- Seed Selectron Description
- Comparison Traditional / Intraoperative Planning
- Seed Implantation Procedure
- Radiation Protection Aspects
- What Do I Inspect?



# Fully Integrated Real-Time Seed Treatment (FIRST™) from Nucletron

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- Sonographic Planning Oncology Treatments (SPOT PRO™)
- Seed Selectron™ Robotic system for seed placement
- Rotating ultrasound probe for better 3D-image acquisition
- Needle Navigator™

# Seed Selectron



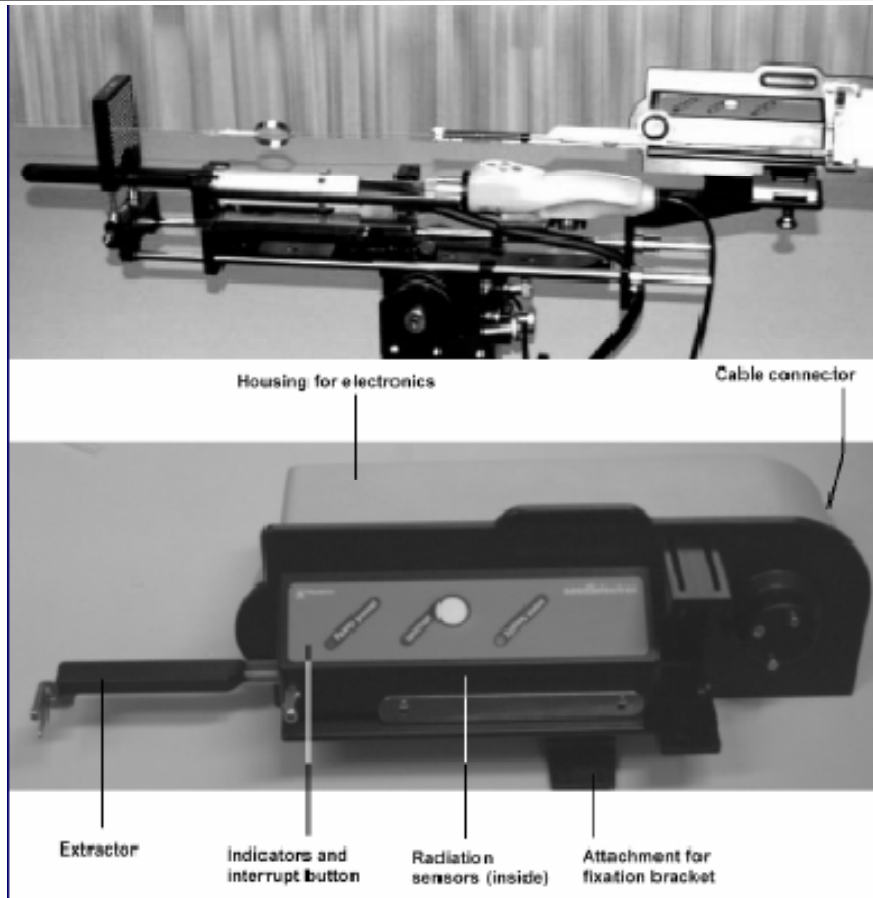
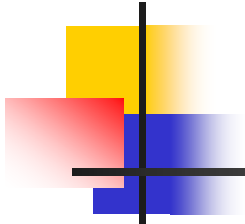
The Nucletron Seed Selectron used with FIRST System supplies the radioactive seeds in a sterile, shielded cartridge. These cartridges are inserted into the equipment. The seeds contain silver rods which enhance visibility on Ultrasound, CT, x-rays and fluoroscopic images.

# Seed Selectron Cartridges



Seed and Spacer Magazines

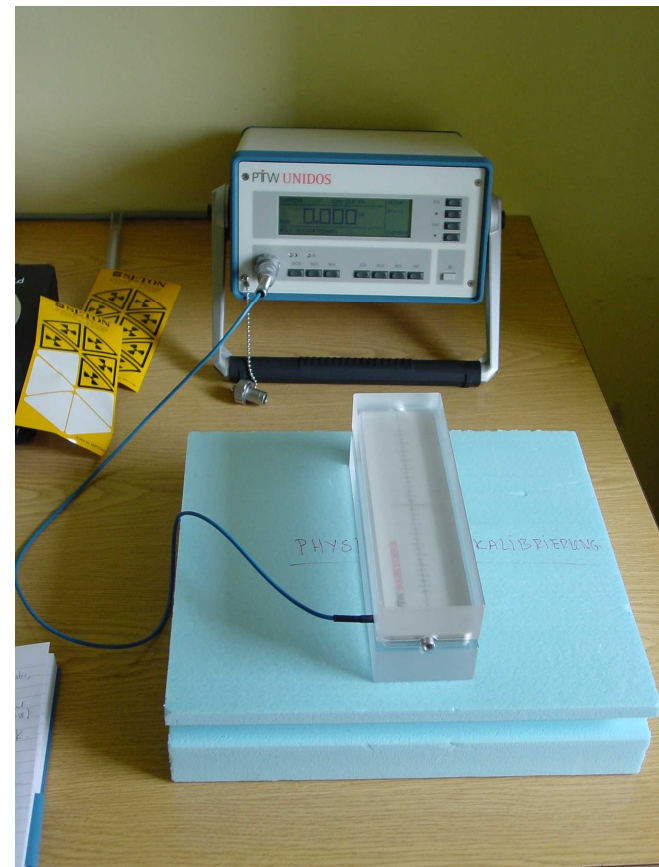
# Seed Selectron



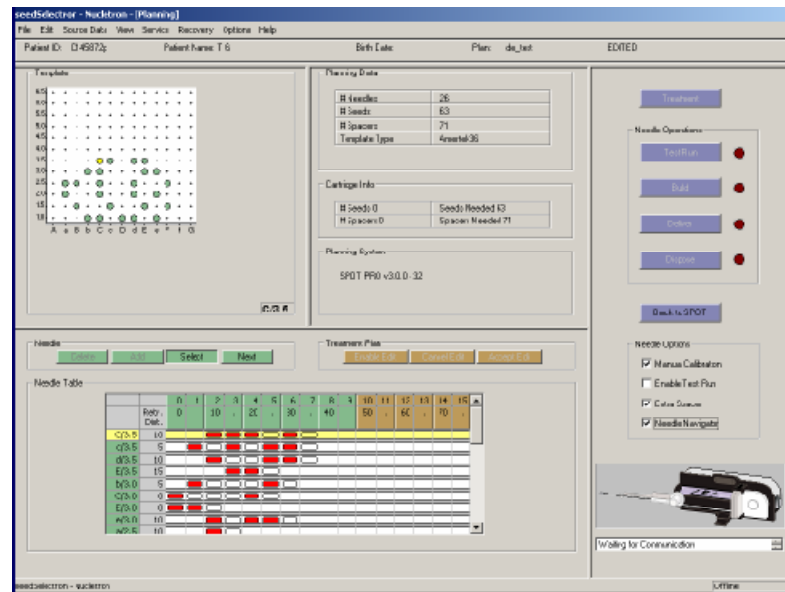
AHEC

# Seed Calibration

- Seed from the cartridge is deposited in a well chamber for absolute calibration.
- The equipment compares this reference measurement and validates each seed activity.
- User can discard a seed if not within chosen tolerance.



# Seed Selectron Planning



Direct exchange of treatment plans between Spot Pro RTP system and the Seed Selectron and automated delivery of the seeds facilitate the clinician to concentrate on the medical aspects of the procedure such as inserting the needles and treatment plan refinement.





# Traditional / Intraop Planning

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- **Traditional Method: Preplanning**

- Creation of a plan a few days or weeks before the implant procedure.

- **FIRST Method: Intraoperative Planning**

- Intraoperative Preplanning:

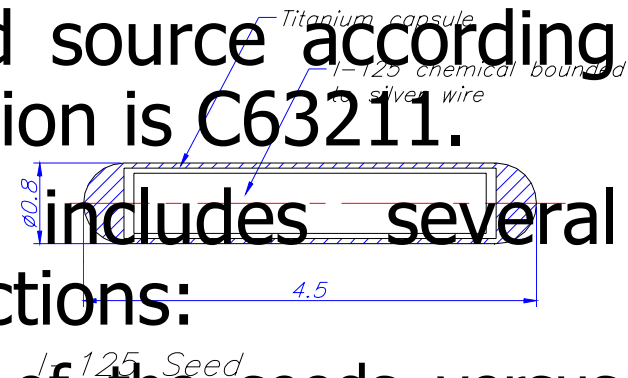
Creation of a plan in the OR just before the implant procedure, with immediate execution of the plan. Or...

- Interactive Planning:

Immediate refinement of the treatment plan via computerized dose calculations derived from image-based needle position feedback.

# Select Seed Description (1)

- Source type is a sealed source according ISO 2919 and classification is C63211.
- Production of seeds includes several highly automated inspections:
  - Activity and anisotropy of the seeds versus NIST calibrated seeds.
  - Checks on the activity of the batch and the quantity of seeds.
  - Geometric inspection.
  - Leak tests.



# Select Seed Description (2)

- Seed cartridges are double packaged and sterile.
- Labelled as package type A, with source certificates and shipping documents.
- Verification of dose rate of packaging  $< 5\mu\text{Sv/h}$ .



# Seed Ordering

- Order seeds at least one week in advance.
- Specification of number of seeds and activity.

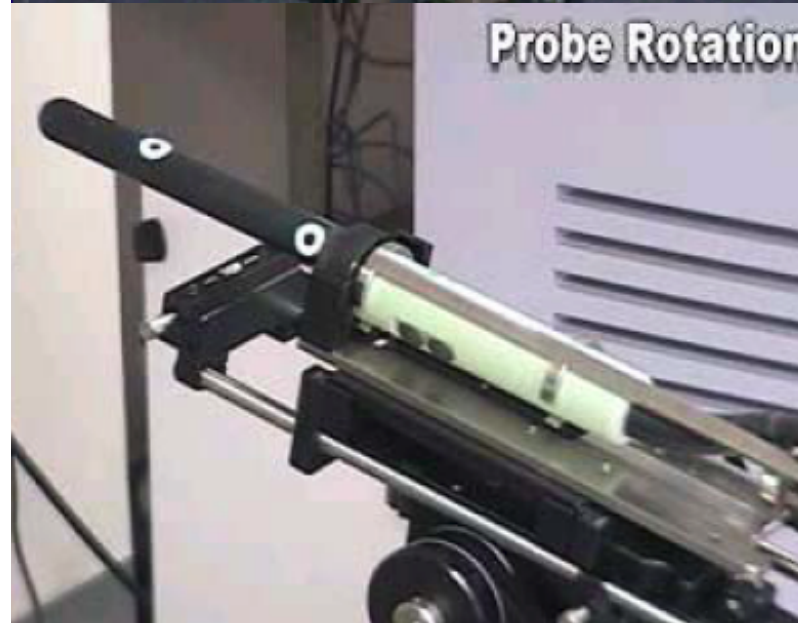
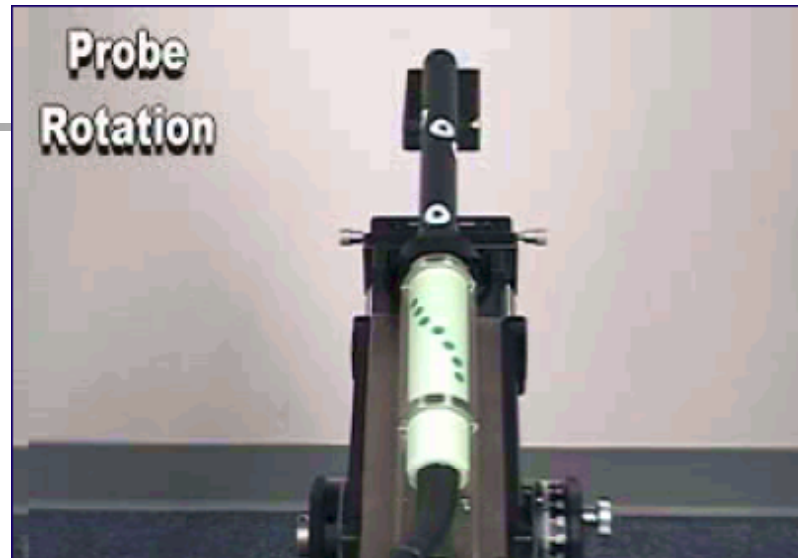
Date of Delivery (DDMMYY)				Customer code				Route/Departure			
Item		Quantity		Activity (per seed)		Class		Customer order number			
130002		x		mCi		or					
Description											
I-125 select Seed											
Item		Quantity		Unit		Customer order number					
130019		x		PCE							
Description											
Sterile Treatment Accessories											

Air Kerma Strenght [ $\mu\text{Gy/hr m}^2$ ]			
Class	Nominal	AKS from	AKS to
0	0,375	0,360	0,390
1	0,407	0,390	0,423
2	0,441	0,423	0,458
3	0,478	0,458	0,498
4	0,519	0,498	0,540
5	0,563	0,540	0,585
6	0,611	0,585	0,636
7	0,663	0,636	0,690
8	0,719	0,690	0,748
9	0,780	0,748	0,812
10	0,847	0,812	0,881
11	0,919	0,881	0,956
12	0,997	0,956	1,038
13	1,082	1,038	1,126
14	1,174	1,126	1,222
15	1,274	1,222	1,325

# Transrectal Ultrasound (TRUS)

## Biplane Probe

- Minimize movement of prostate during image acquisition
- Excellent visualization base & apex
- Calibrated w SpotPro
- Motorized Scanning 100-140 deg

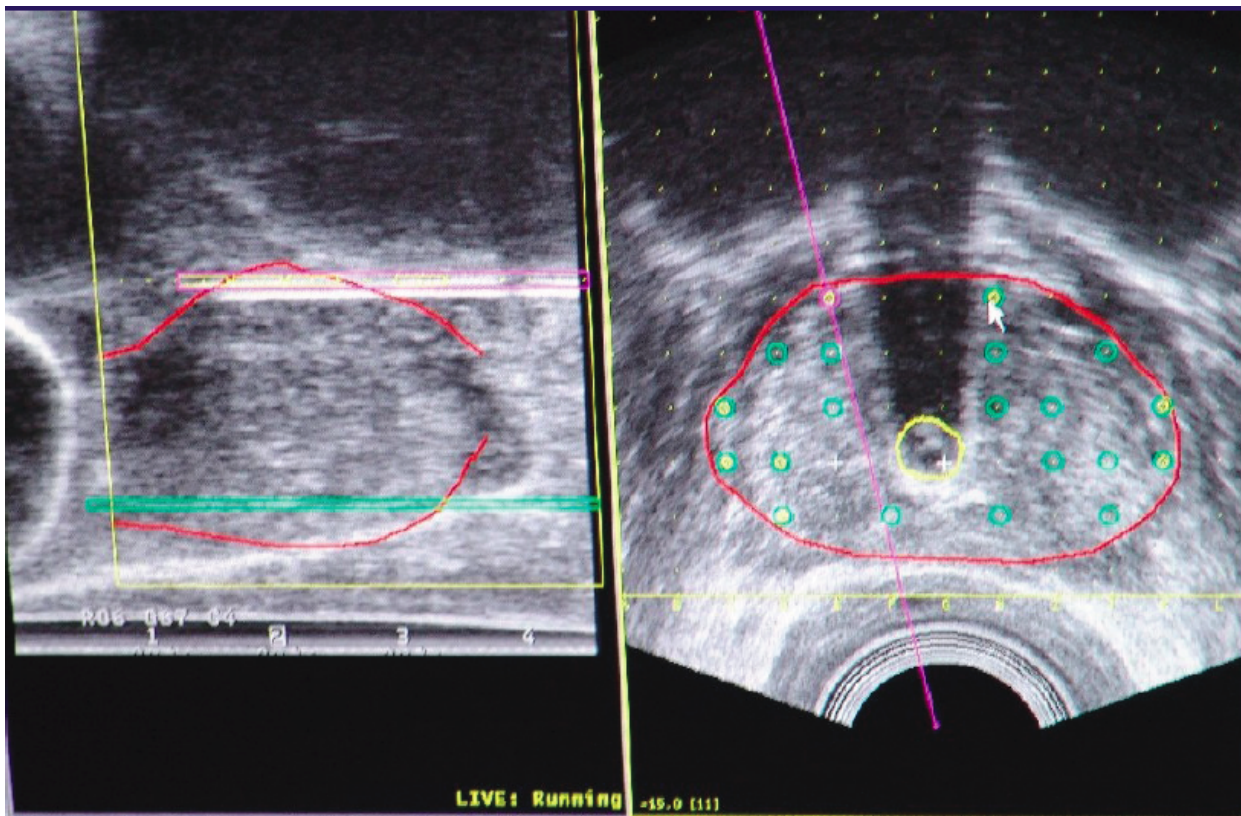


# Needle Insertion

- Needles are implanted according to intraoperative preplanning.



# Needle Navigator







# Export to Seed Selectron

seedSelectron - Nucletron - [Planning]

File Edit Source Data View Service Recovery Options Help

Patient ID: C145872p Patient Name: T G Birth Date: Plan: de\_test EDITED

Template

C/3.5

Planning Data

# Needles	26
# Seeds	63
# Spacers	71
Template Type	Ametek36

Cartridge Info

# Seeds 0	Seeds Needed 63
# Spacers 0	Spacers Needed 71

Planning System

SPOT PRO v3.0.0 - 32

Treatment

Needle Operations

Test Run ●

Build ●

Deliver ●

Dispose ●

Back to SPOT

Needle Options

Manual Calibration

Enable Test Run

Extra Spacer

Needle Navigator

Waiting for Communication

Offline

Needle

Delete Add Select Next

Treatment Plan

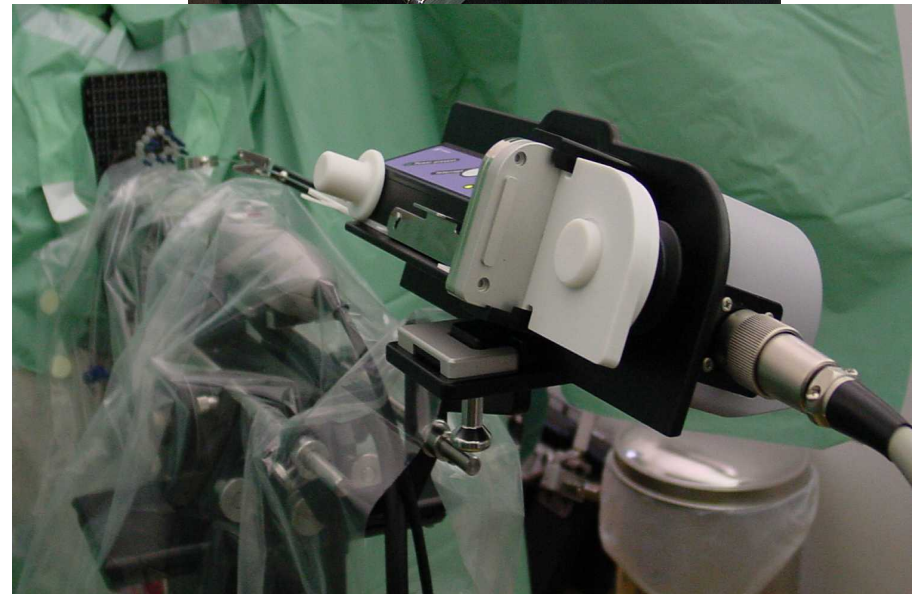
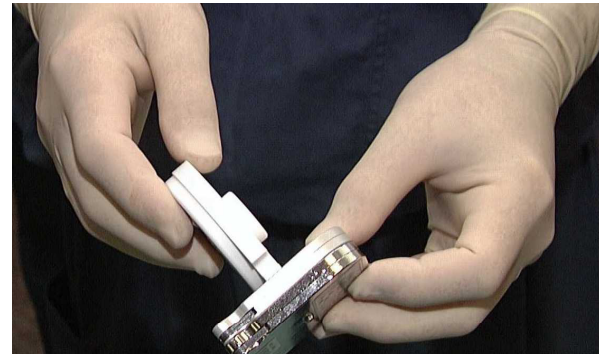
Enable Edit Cancel Edit Accept Edit

Needle Table

	Rebr. Dist.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
C/3.5	10																
c/3.5	5																
d/3.5	10																
E/3.5	15																
b/3.0	5																
C/3.0	0																
E/3.0	0																
e/3.0	10																
a/2.5	10																

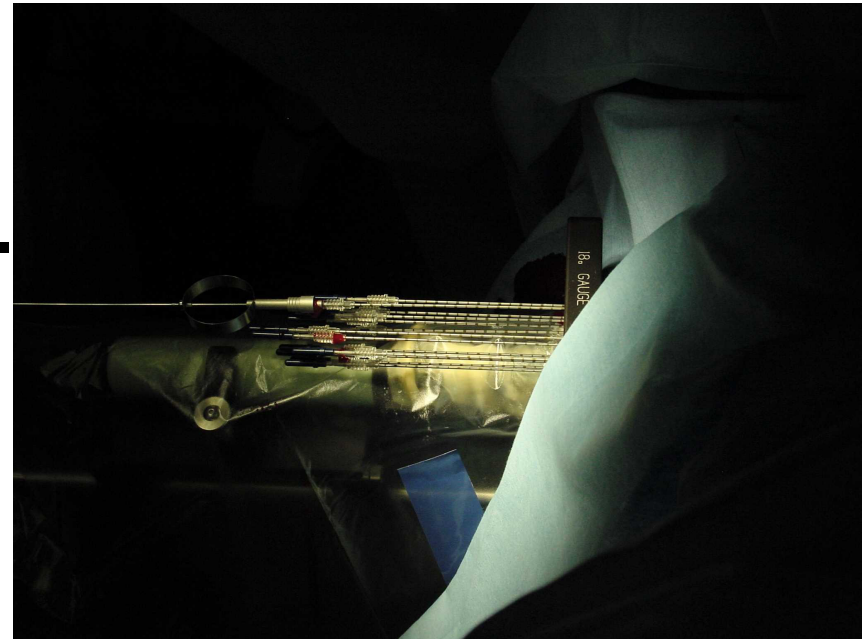
# FIRST System Assembly

- Seed Selectron Unit is switched on and assembled on a bracket to the stepper.
- Seed and spacer cartridges are assembled with the delivery wire.
- Disposables inserted into the Seed Selectron.



# Automatic Seed Loading

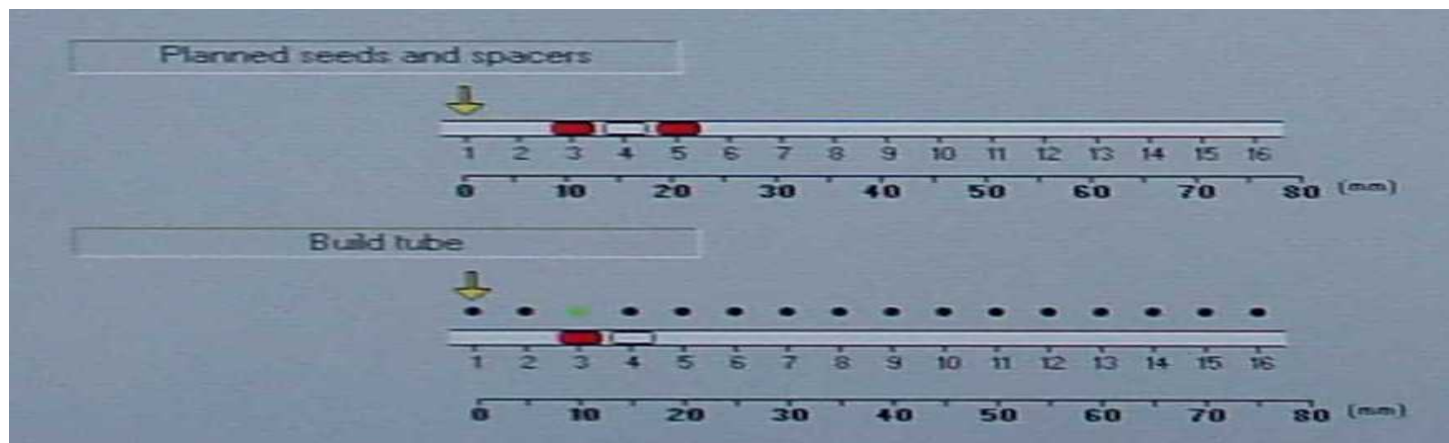
- Delivery tube connected.
- Seed Plan Assembly.
- Delivery of radioactive train.
- Final retraction of the needle, leaving train in place.



# ALARA

## Patient During Implant

- ALARA criterion establishes that the procedure has to be performed so that the patient receives the prescribed dose to the target volume and as low as reasonably achievable to the organs at risk.
  - High accuracy on the physical placement of the radioactive seeds.
  - Quality control on the activity of each seed.





# ALARA Personnel During Manual Seed Loading

- In case the emergency tool is needed, and assuming once more the longest possible train of 5 seeds with the maximum possible activity (1.1mCi), the resultant dose rate produced during composition and insertion would be only 0.002mSv/hr on the surface of the build tube and negligible at 1m distance.



# What Do I Inspect?

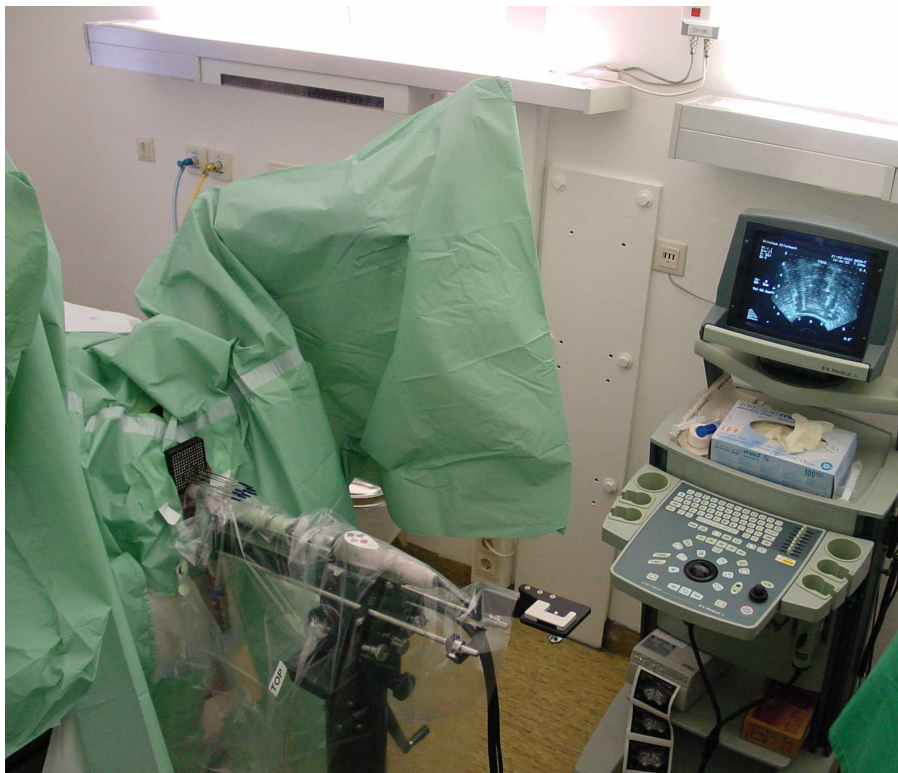
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As with any Brachytherapy Procedure

- License
- Authorized Users
- Radiation Safety Program
- Staff Training / Monitoring
- RAM Records  
(WD, Order, Receipt, Use, Disposal)
- Patient Records

# Fully Integrated Real-Time Seed Treatment (FIRST™) from Nucletron

*Thank You!*



**Nucletron** Sonographic Planning of Oncology Treatment - SPOT Version 1.15.7

DISPLAY  Show Light Box

IMAGE

Image View: 140.00 Gy, 800.00 Gy

Image View: 5.5, 5.0, 4.5, 4.0, 3.5, 3.0, 2.5, 2.0, 1.5, 1.0, 0.5, -1.0, -1.5, -2.0, -2.5, -3.0, -3.5, -4.0, -4.5, -5.0, -5.5

Patient Information

Patient ID: Sample3  
Last Name: Third  
First Name: Sample  
BirthDate: dd-mm-yyyy Gender:  M  F  
Physician: \_\_\_\_\_  
Physicist: \_\_\_\_\_

Notes: \_\_\_\_\_

Hard Drive: \_\_\_\_\_ Available Capacity: 5954.96 MB.

Navigation: