

Sharing Experience: AlignRT in Bore Implementation in Bore Based Linac

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Evolution of RT *(ai generated)*

1

**Cobalt-60
Teletherapy Unit**



2

Philips SL 25



3

Elekta Synergy



4

Varian Trilogy



5

CyberKnife



6

Varian TrueBeam



7

MR Linac



2003-2007

2007-2013

2013-2025

How we were positioning / treating ? (dark years)



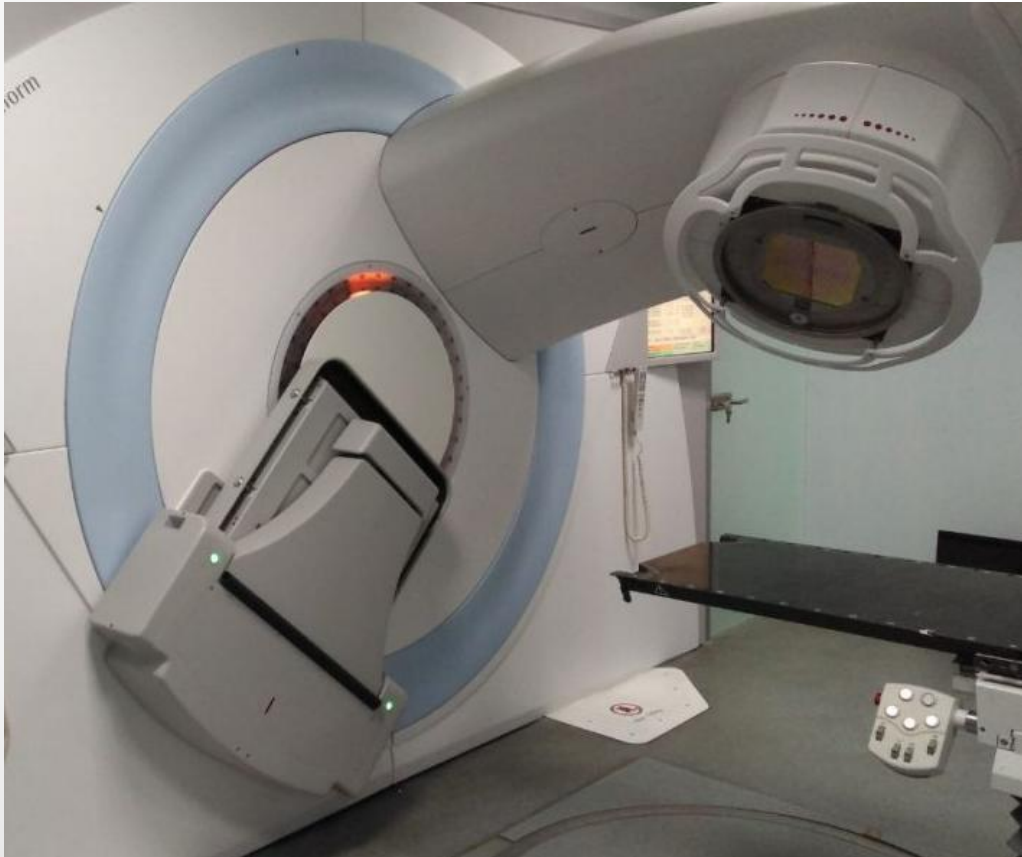
skin marks, lasers, field light,
SSD, machine cross

portable cassettes for imaging
(once a week)

conventional fields with blocks

no monitoring / tracking

How we were positioning / treating ? (first developments)



MLC and EPID

better and more imaging

3DCRT

no monitoring / tracking

How we were positioning / treating ? (concepts changed totally)



IMRT / VMAT / CBCT

every fr IGRT

6D couch

motion management

imaging based tracking

New treatment approaches



MR Based OART

daily treatment planning

volumetric imaging and
anatomical tracking

SGRT & Full Option C-Arm Linac

SGRT

6D Positioning

VCD

Realtime monitoring

Beam integration

C-Arm Linac

6D couch

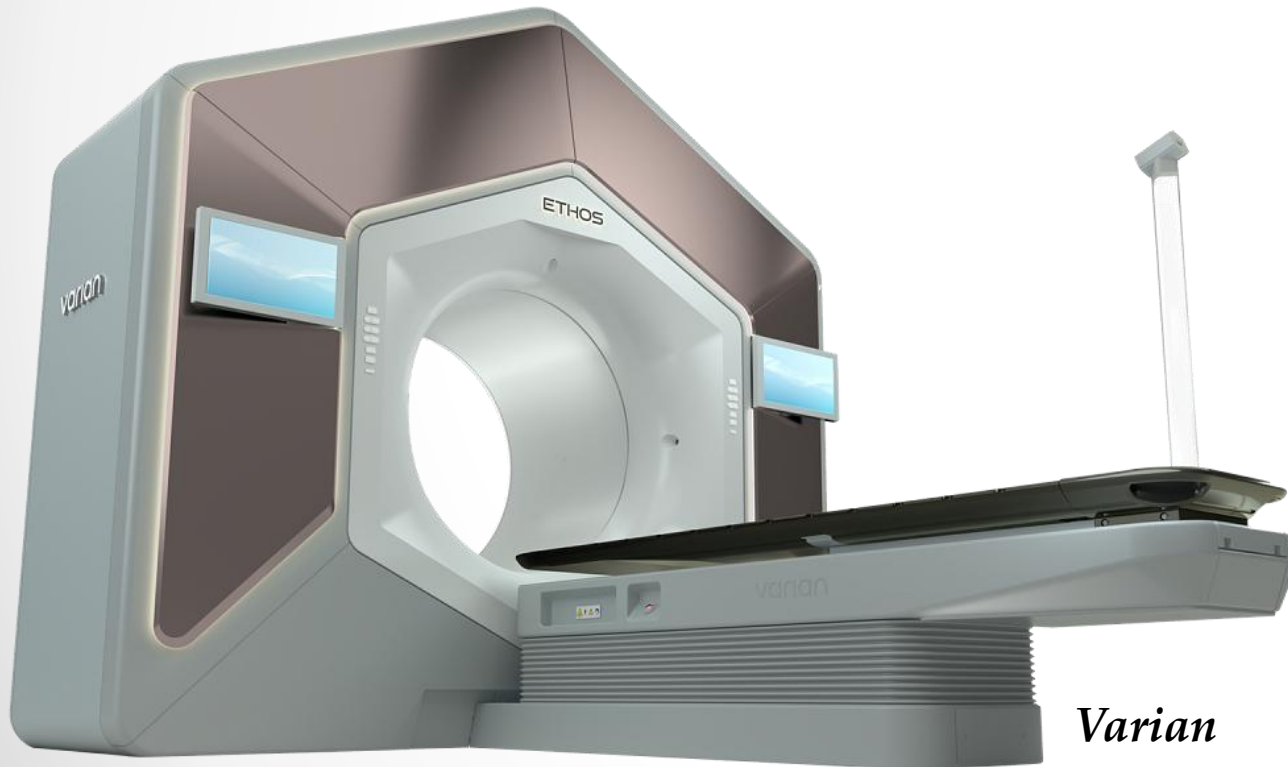
VCD

Motion management

Beam integration

triggered IGRT / brainlab / ray pilot

SGRT & O-Ring Linacs



Varian

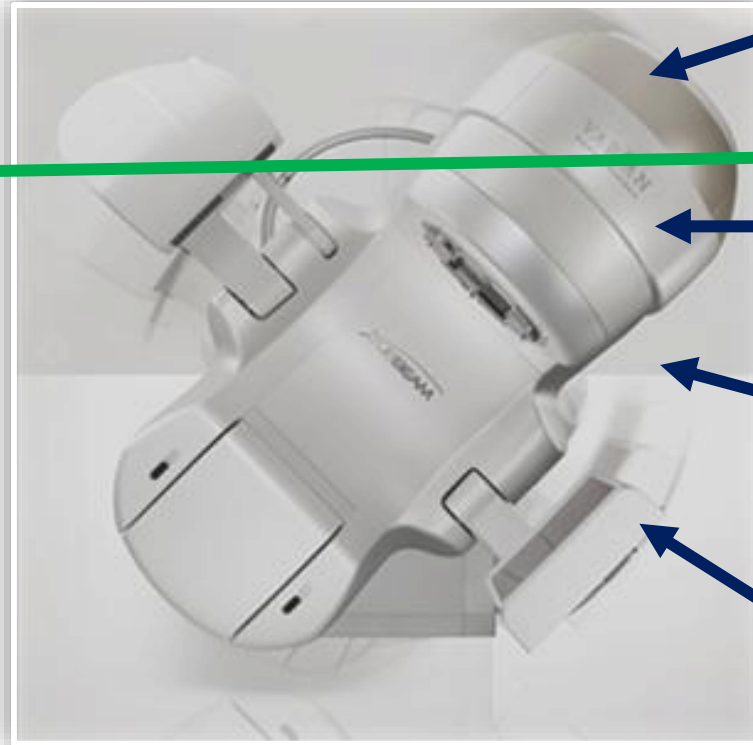
CBCT based OART

3D couch

No motion management

No treatment tracking

Acıbadem Maslak – Motion Management



Deep Breath Hold
(breast)

Breath Hold
(SBRT thorax / abdomen)

Breath Hold
(locally advanced lung ca)

4D CT - ITV approach
(locally advanced lung ca)

After Ethos with AlignRT

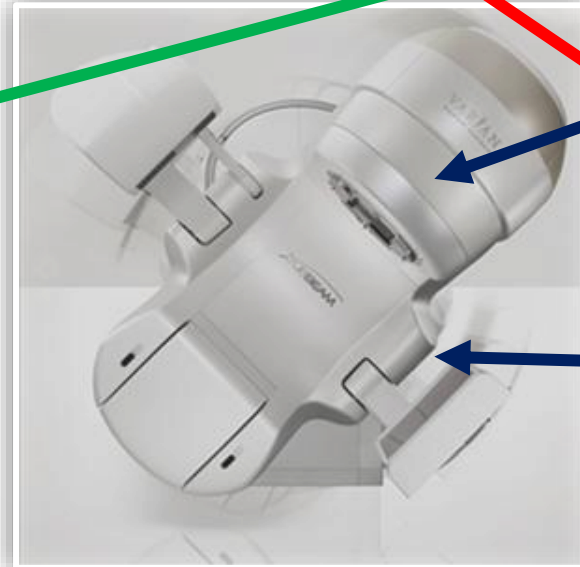


Deep Breath Hold
(breast)

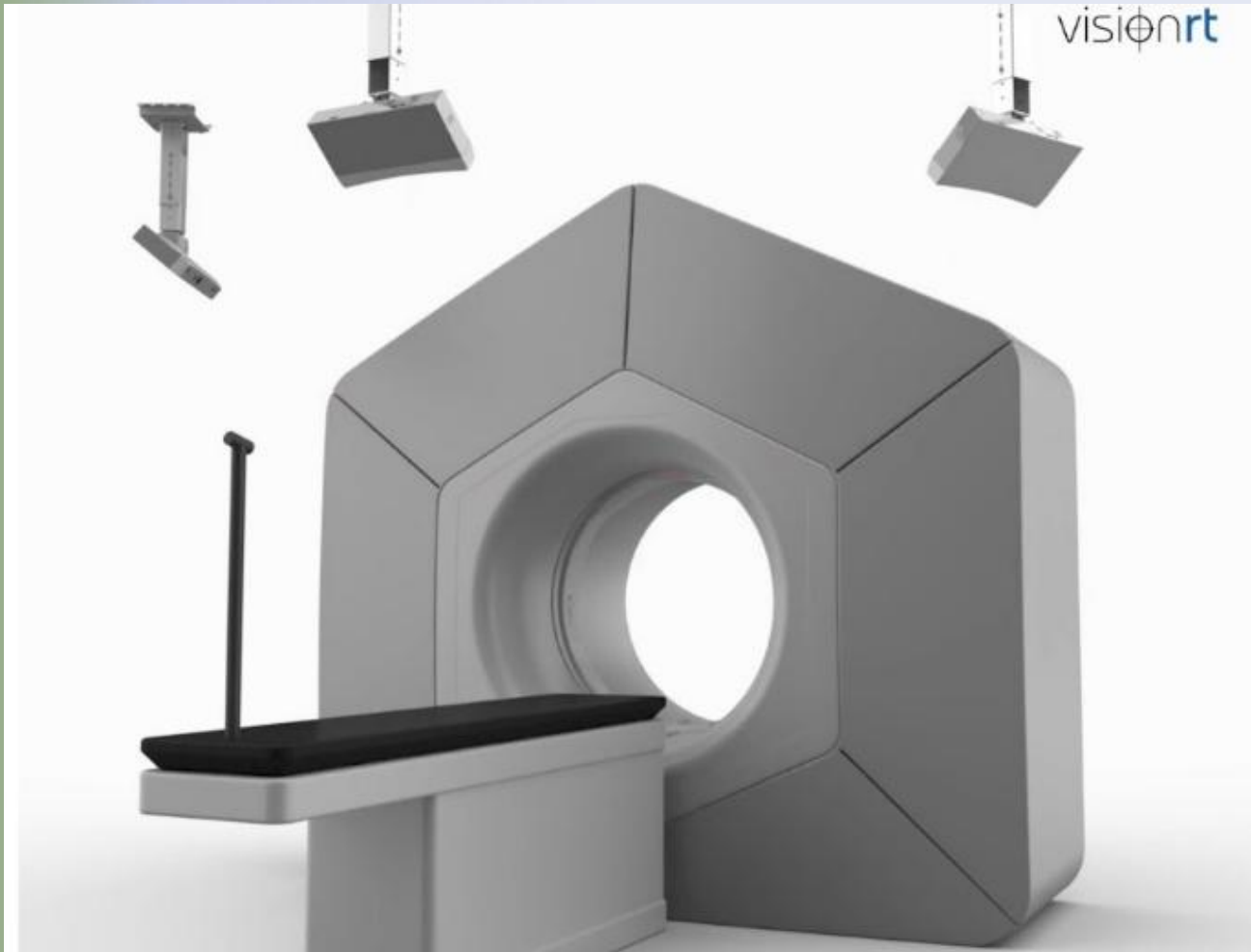
Breath Hold
(SBRT thorax / abdomen)

Breath Hold
(locally advanced lung ca)

4D CT - ITV approach
(locally advanced lung ca)



Varian Ethos with AlignRT

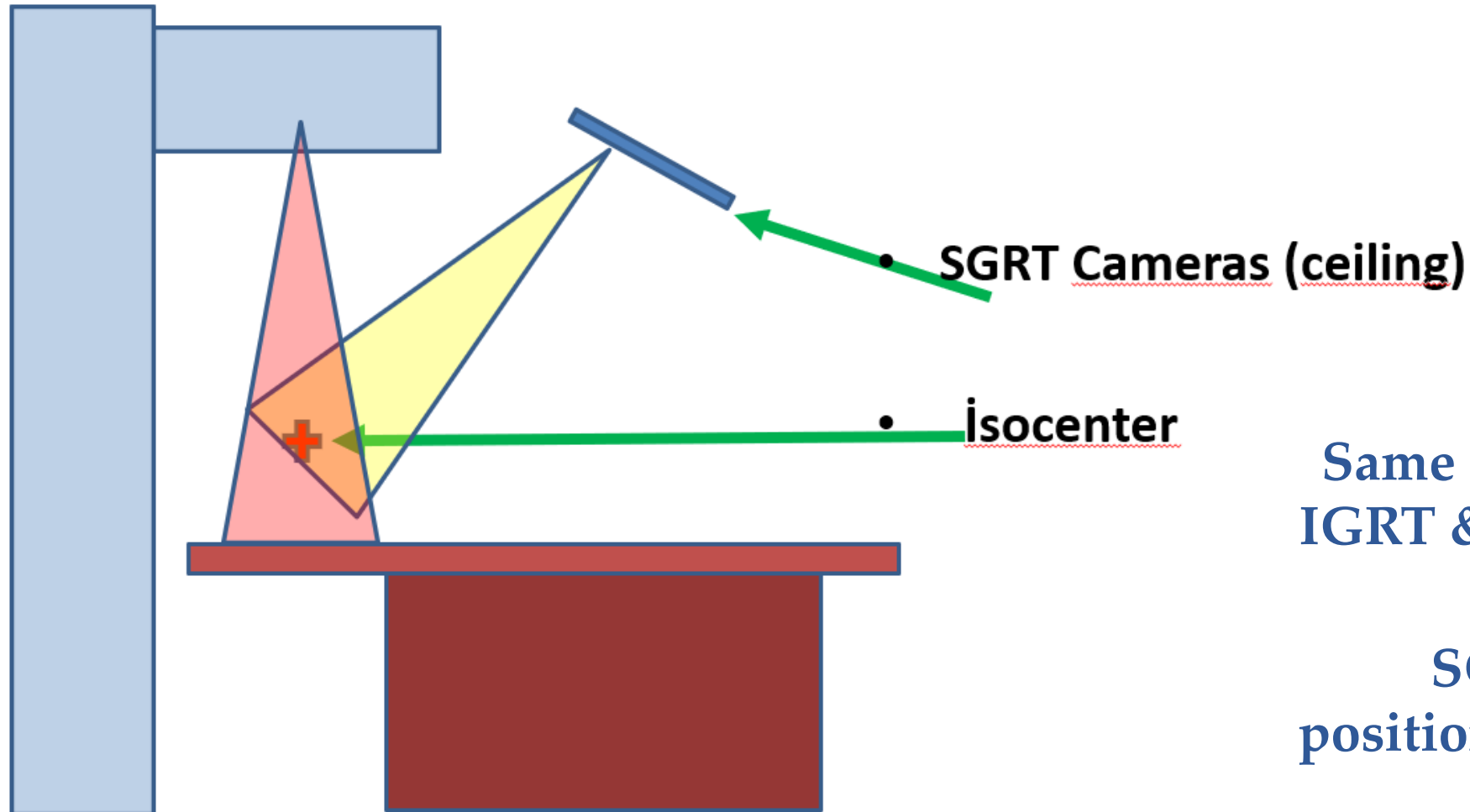


Not only OART specific
system

Also practical for any
cases because of MLC and
gantry speed

**positioning & monitoring
motion management**

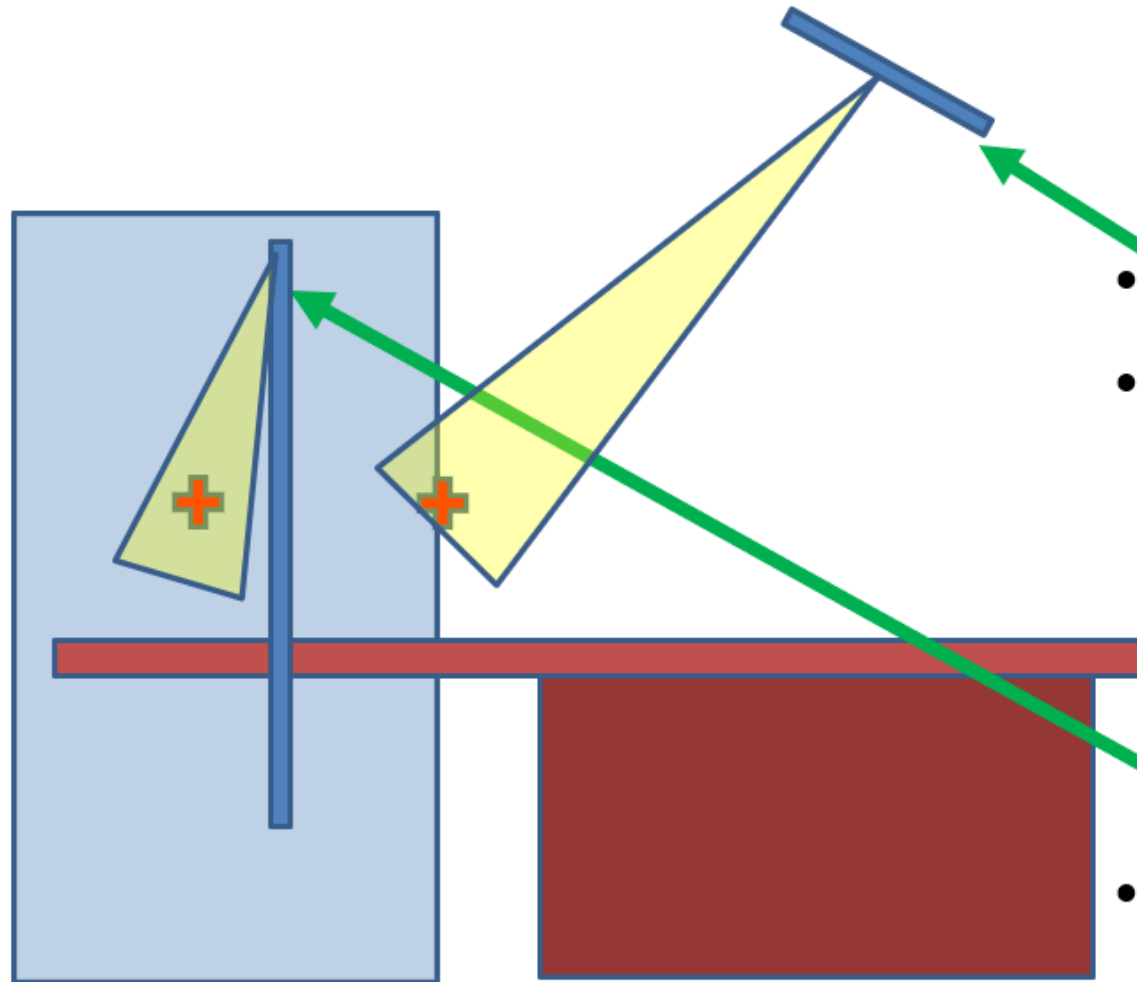
Standard SGRT workflow with C-Arm



Same point (isocenter) for
IGRT & Treatment & SGRT

SGRT is for both
positioning and monitoring

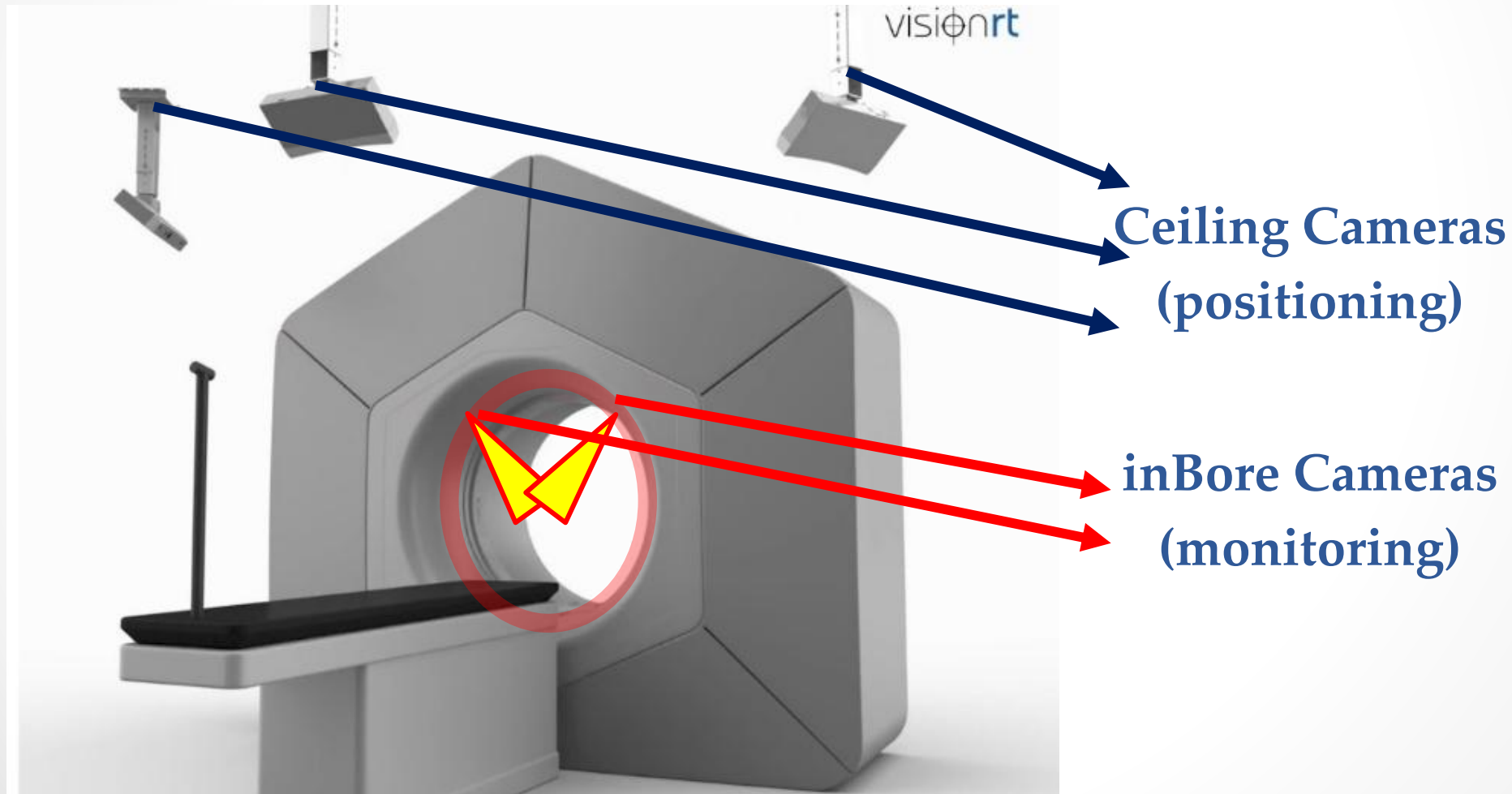
New SGRT workflow with O-Ring



- Virtual iso for SETUP
- 3x Horizon Ceiling Cameras

- Real Iso for TRACKING
- 2x Inbore Cameras

inBore AlignRT for Ethos



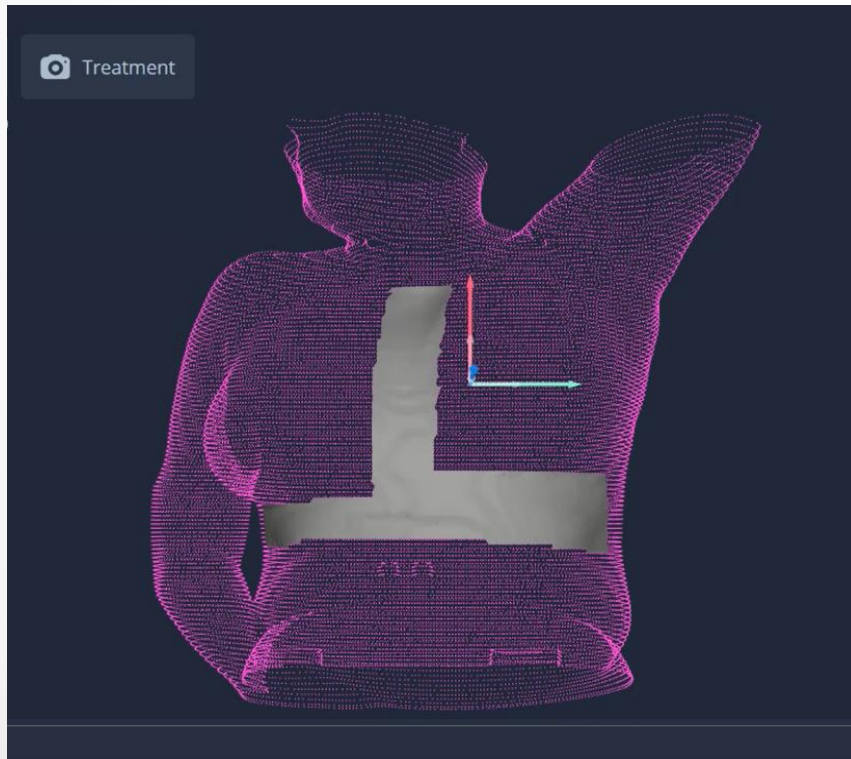
Differences @ inBore SGRT: ROIs

Virtual iso

Ceiling cams

Setup (positioning)

ROI for all geometry

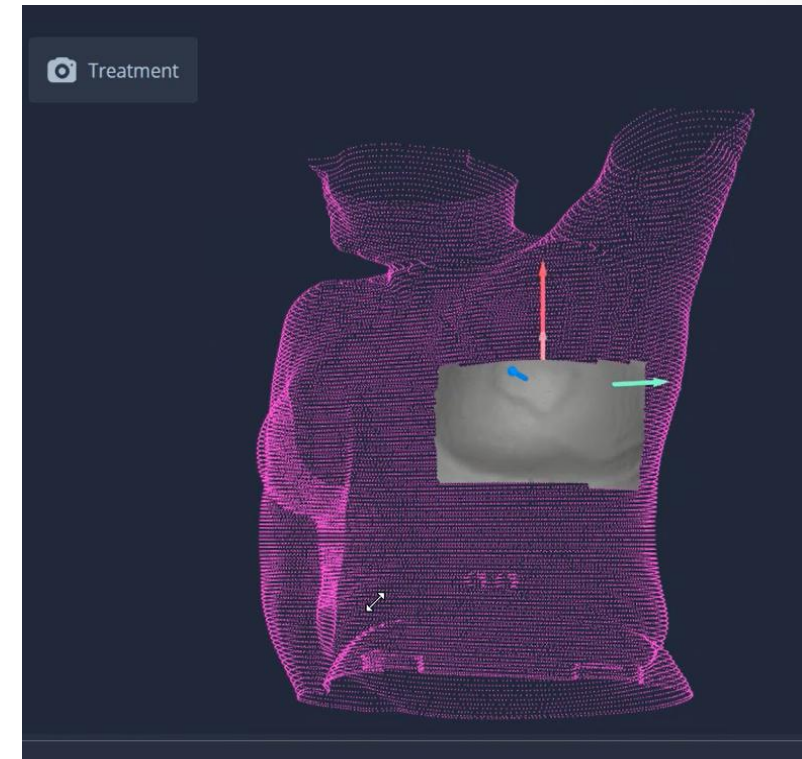


Real iso

inBore cams

Treatment (monitoring)

ROI for target



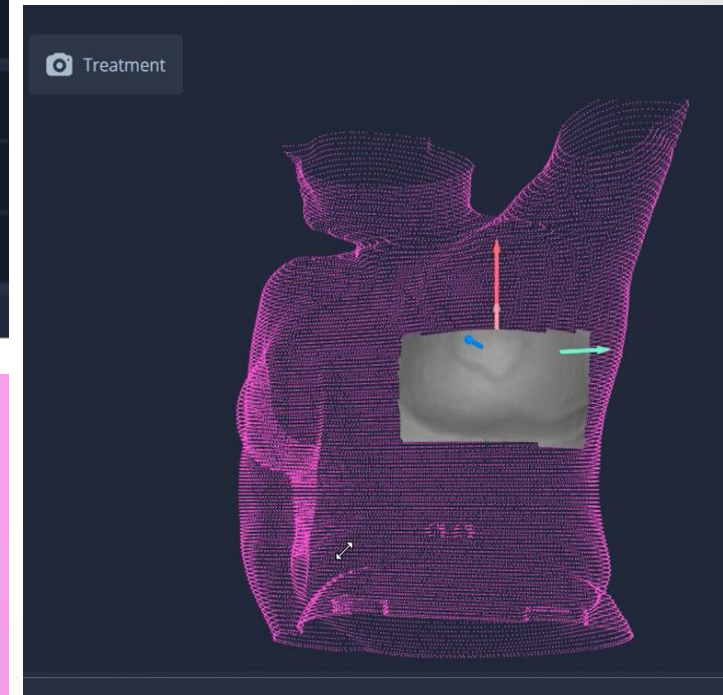
Challenges: O-Ring & inBore SGRT DIBH

Virtual iso
FB
Ceiling cams
Setup (positioning)

LAZER SETUP ISO 1	
VRT _{cm}	-0.02
LNG _{cm}	0.01
LAT _{cm}	0.01
MAG _{cm}	0.04
RTN [°]	1.2
ROLL [°]	-0.3
PITCH [°]	-1.1

pty50 ISO 1	
VRT _{cm}	0.14
LNG _{cm}	-0.04
LAT _{cm}	0.10
MAG _{cm}	0.18
RTN [°]	0.8
ROLL [°]	-0.3
PITCH [°]	-1.6

Real iso
DIBH
inBore cams
Treatment (tracking)



Camera & ROI differences
Patient may move between isos
FB uncertainty
BreathHold amplitude

Recommendations: Single ROI



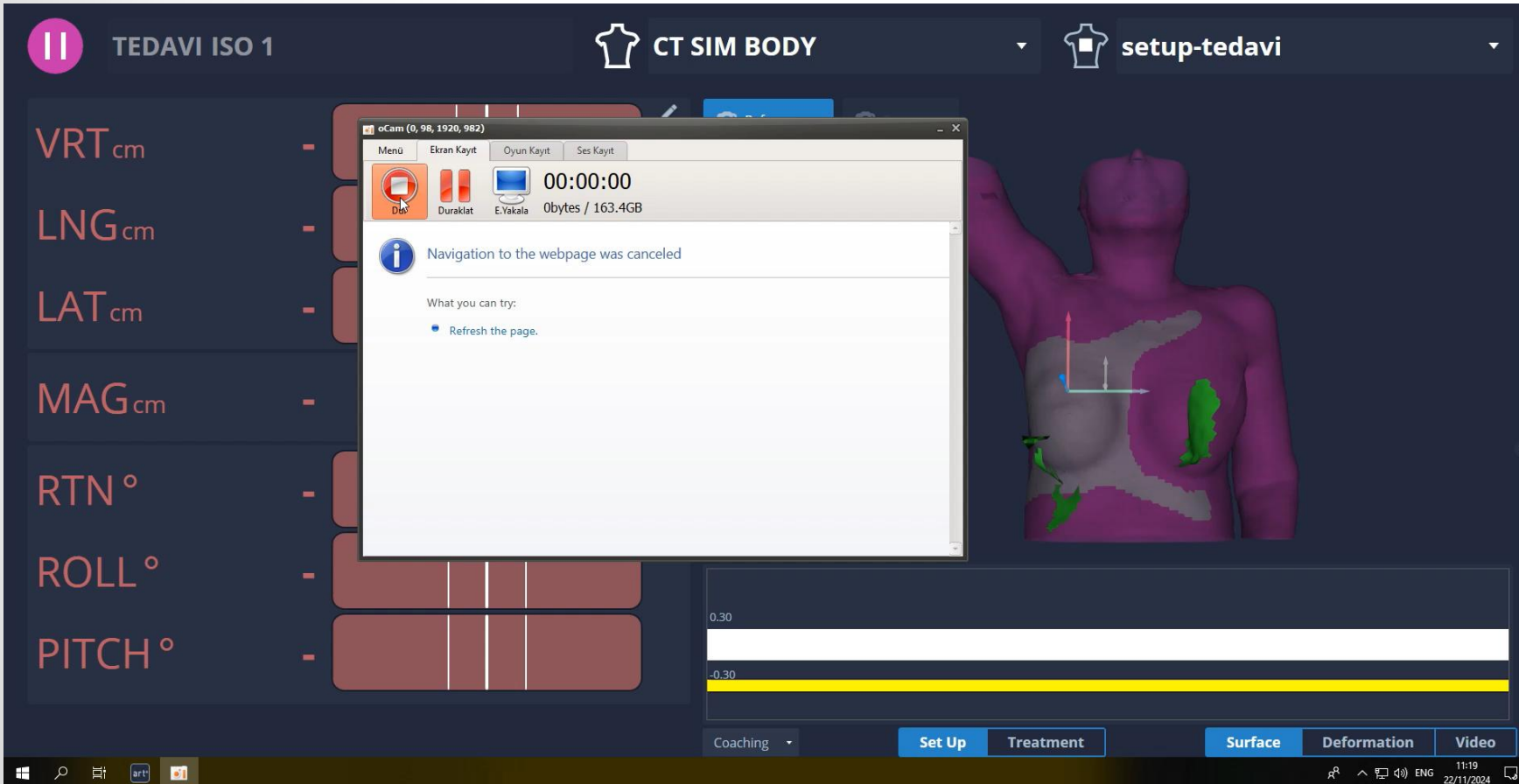
Recommendations: virtual to real iso

after completing setup
and checking DIBH is ok

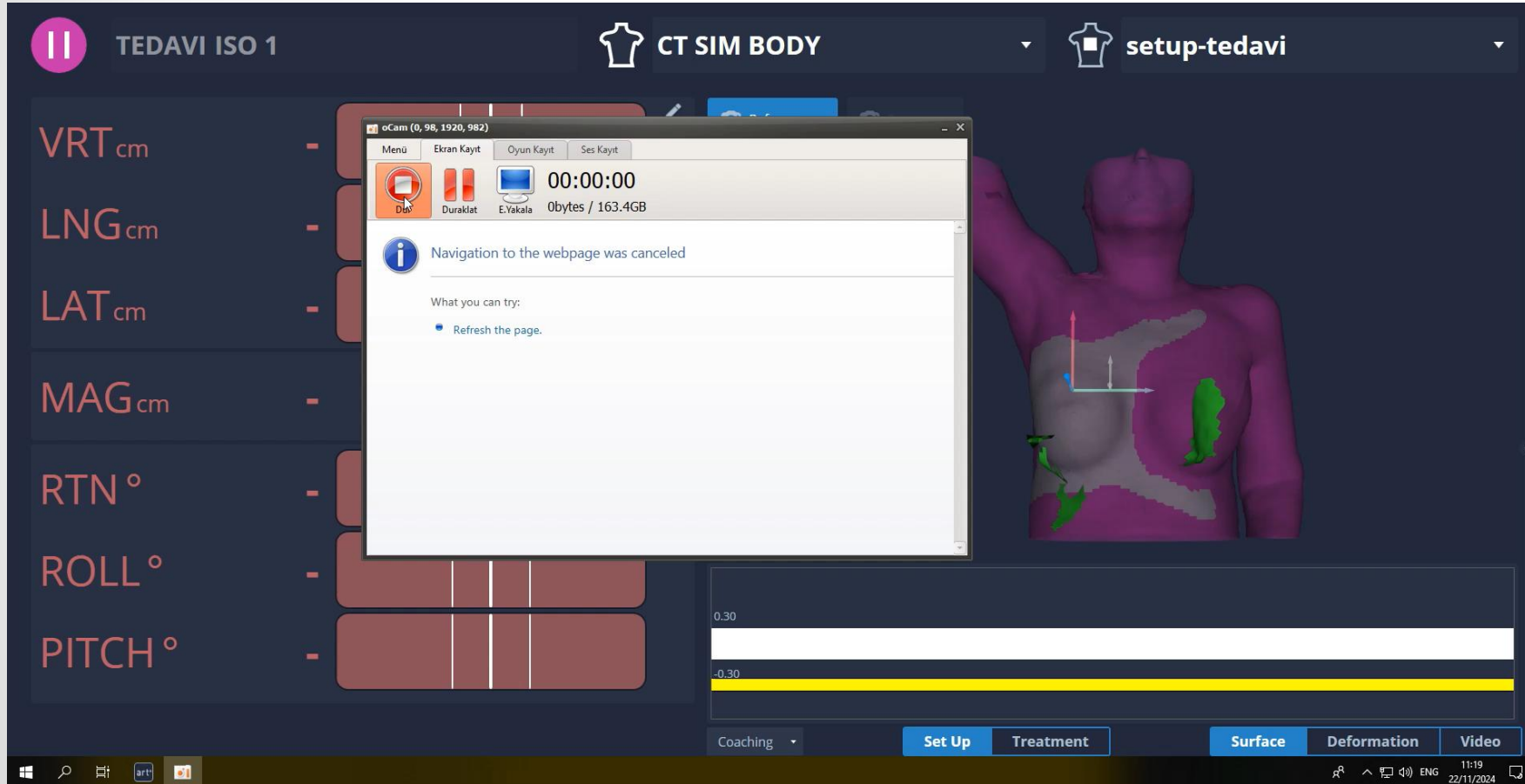
keep DIBH at virtual iso,
apply the shift to real iso
and take SGRT ref
with inBore cams

around 4-5 sec

this is the reference for
CBCT



IGRT and Monitoring (Reference Surface)



Breast Fast mode
CBCT time is 16sec

with HyperSight it is
reduced to 6sec

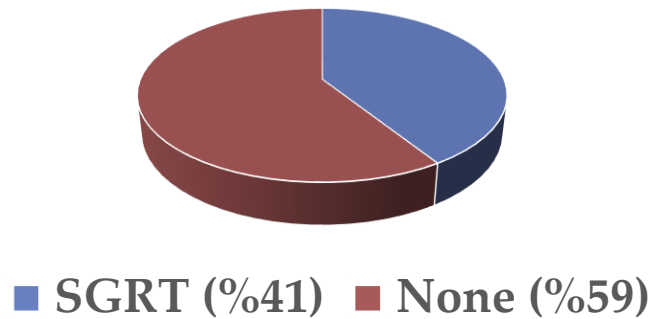
before apply IGRT
shift, BH again

After shift applied,
take reference capture
for monitoring

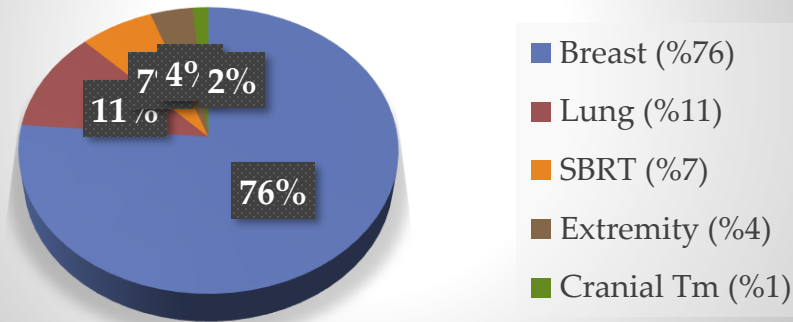
Ethos & VisionRT Experience

(Acıbadem Maslak data from first 2.5 years)

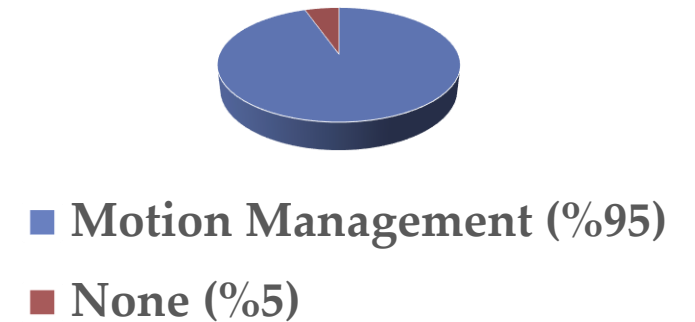
Patients with VisionRT



VisionRT – Distribution of Indications



Motion Management with VisionRT

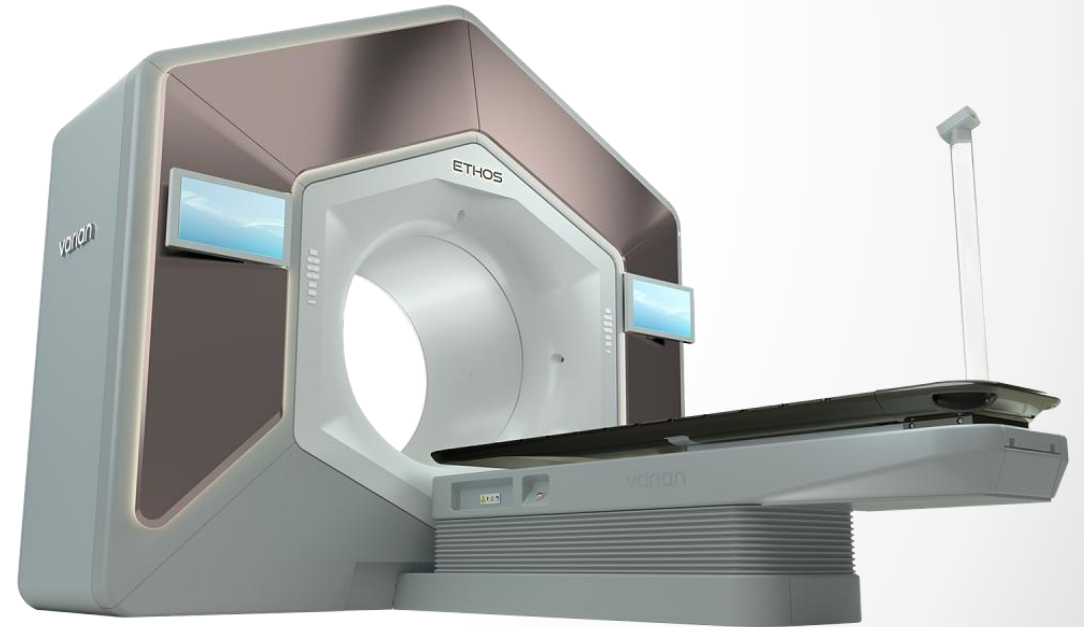


Good News about O-Ring SGRT

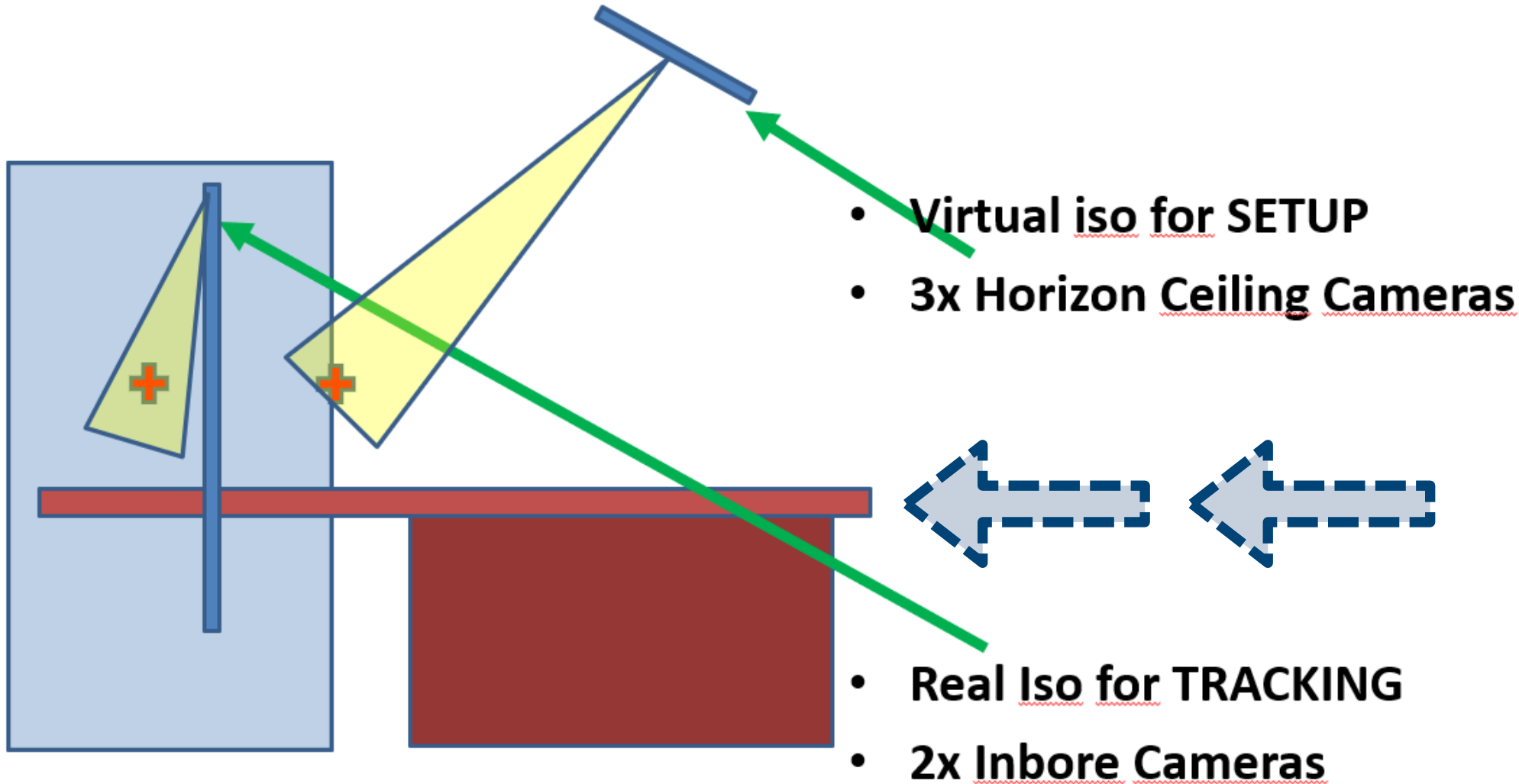


Accuray RadixAct

Different Beauties but Same Problems



Similar SGRT workflow with Ethos

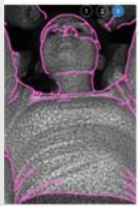


Radixact with AlignRT inBore

For patient setup:

3 Stereo Camera Pods

(ensure setup coverage for all treatments) ceiling-mounted using **deep red light** (robust to different skin tones) designed for clinical use only



Postural Video

Visual support for patient alignment

For monitoring during treatment:



Relevant ROI



Continuous visibility

thank you...!