



Elektä Unity

Intérêt et points de vigilance

Audrey Planquellé – Global Product Marketing

Why MR/RT?

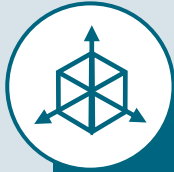


See clearly

Reduce margins



Stereotactic treatments



Monitor motion

Minimize OAR toxicity



Improve local control



Adapt real-time

Inter-fractional changes



Daily plan optimization



Assess response

Biological information



Earlier treatment adaptation

Hard to treat cancers

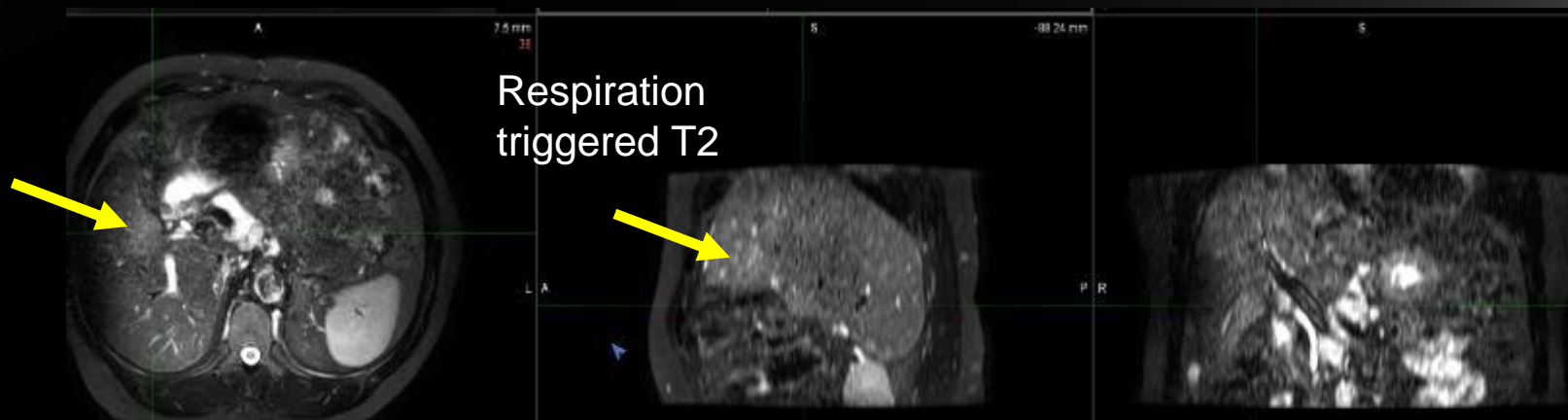
SBRT 40Gy / 5 fx

Navigated T2 Pre Tx MR

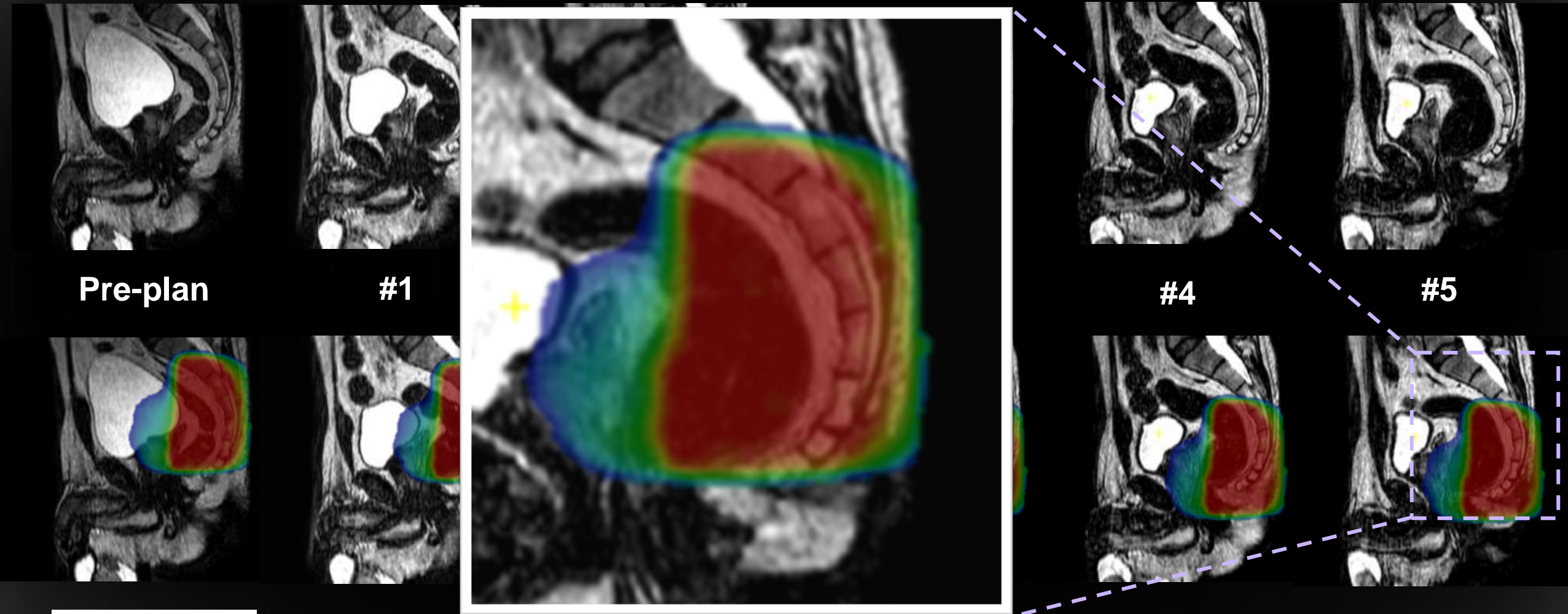
Adapt to shape

Beam-on motion monitoring

On-table time 52 min



Current clinical practice without adaptation

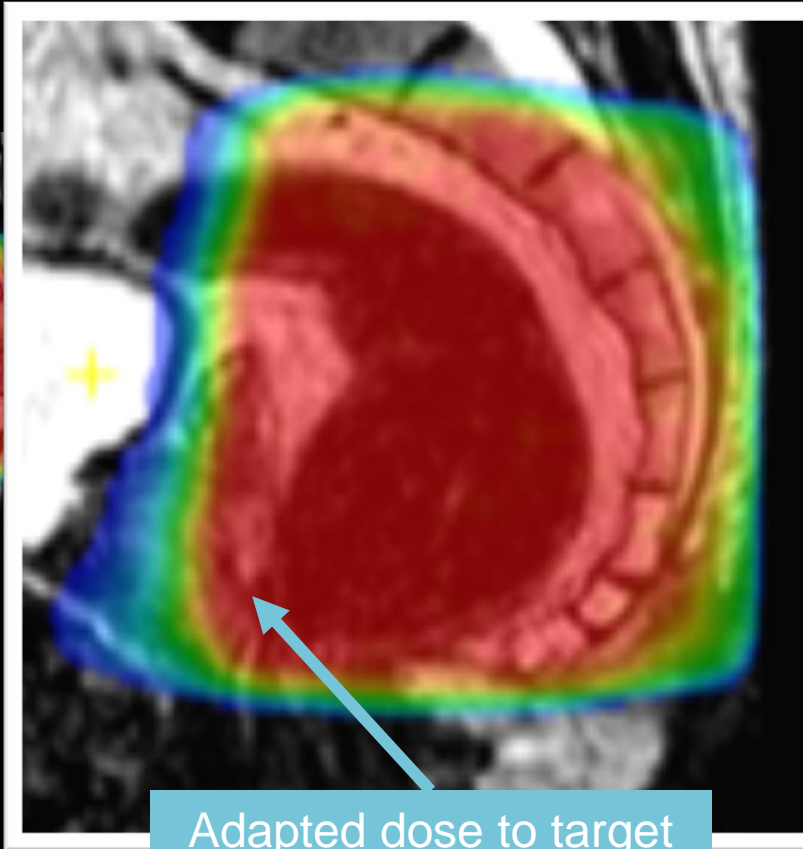


Daily dose reshaping

SBRT – 25 Gy / 5 fx

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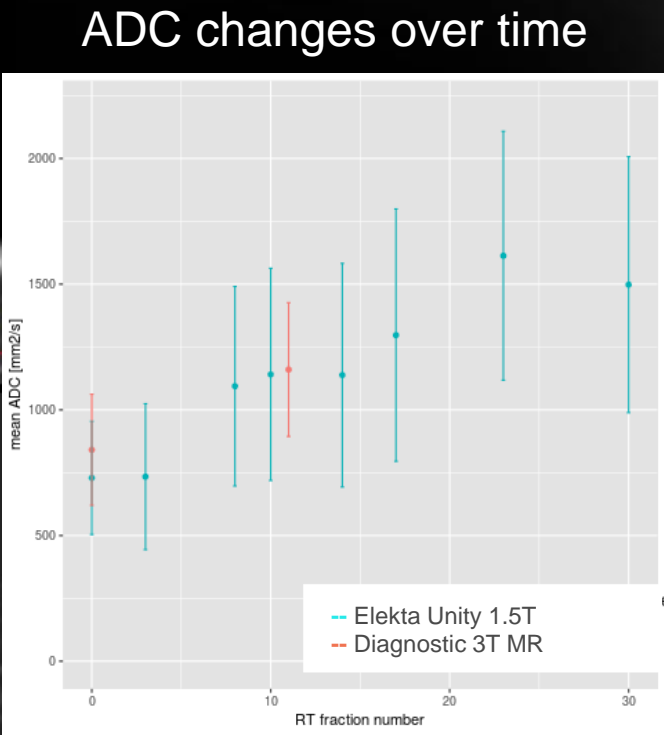
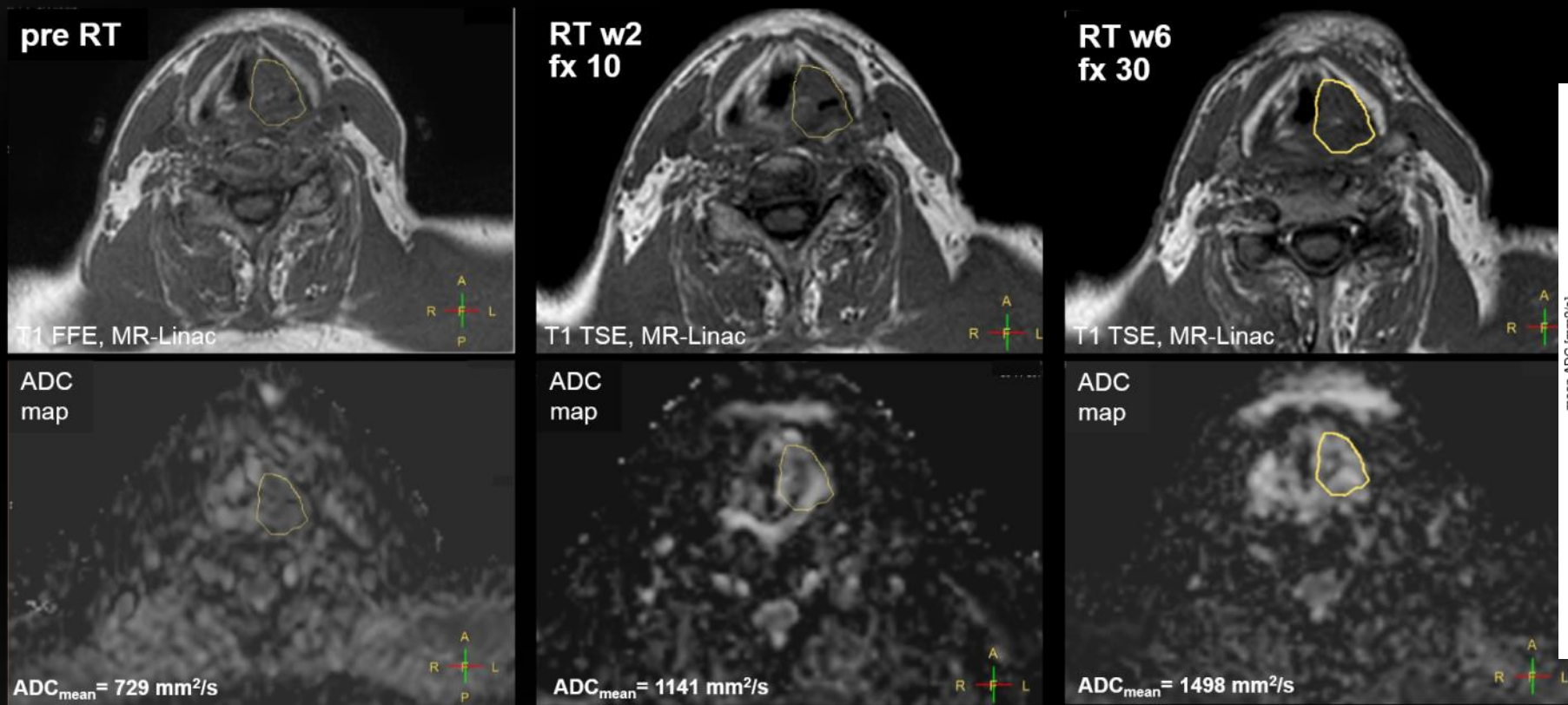
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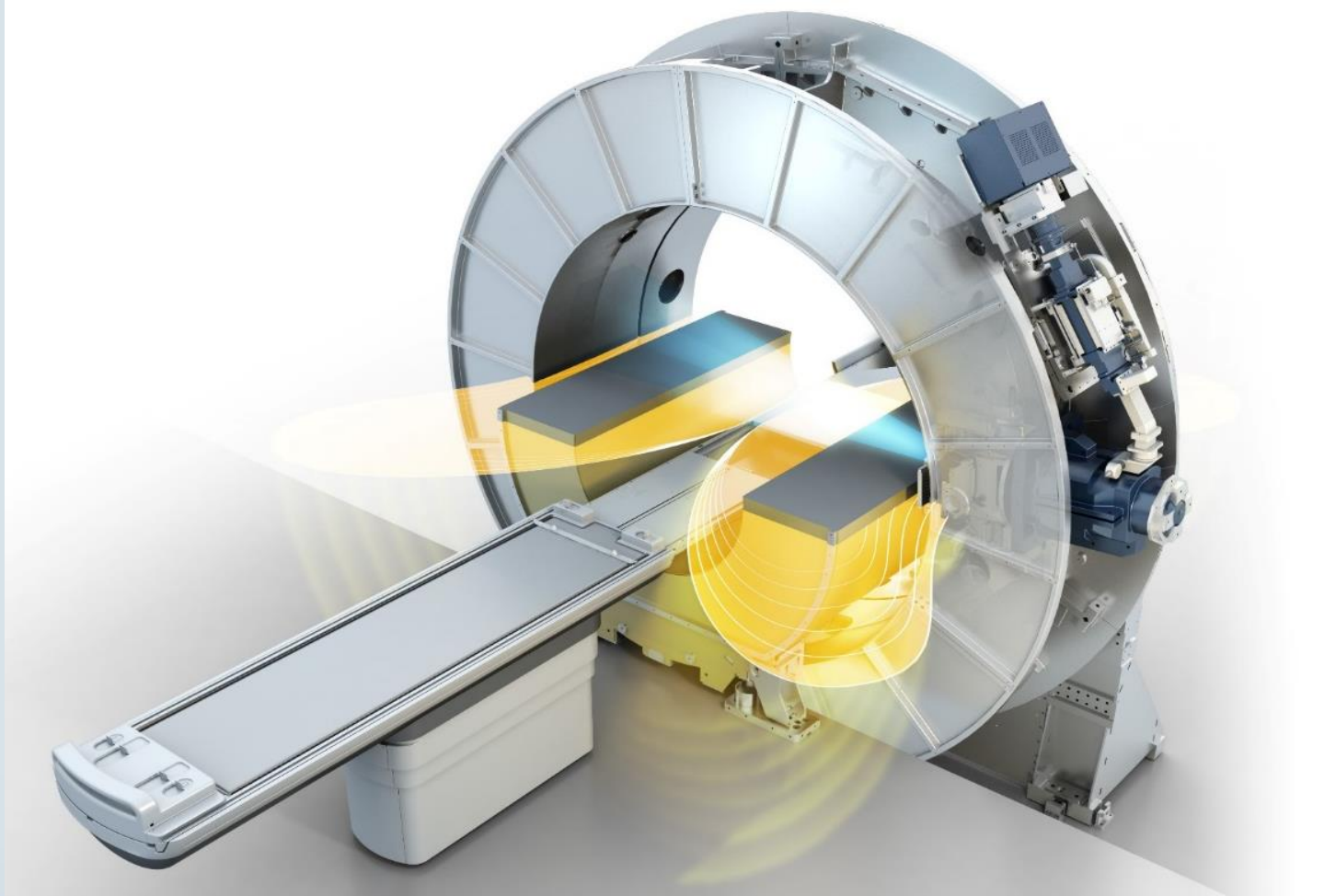
Adapted dose to target
and OAR

#5

Potential for early tumor response assessment



Groundbreaking technology



Partnering with the MR/RT experts

MR-Linac Consortium



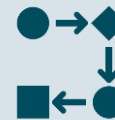
MOMENTUM



Clinical outcome reports



Reimbursement changes

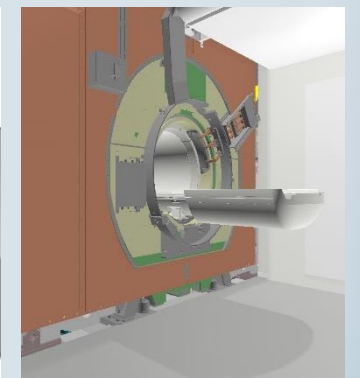
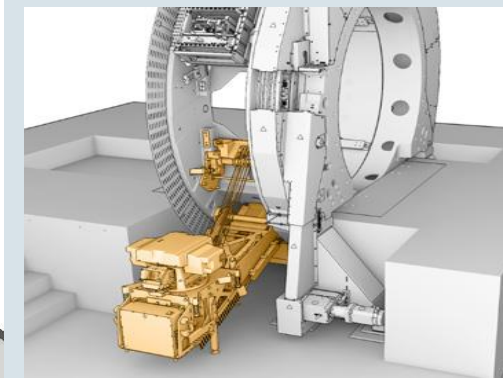
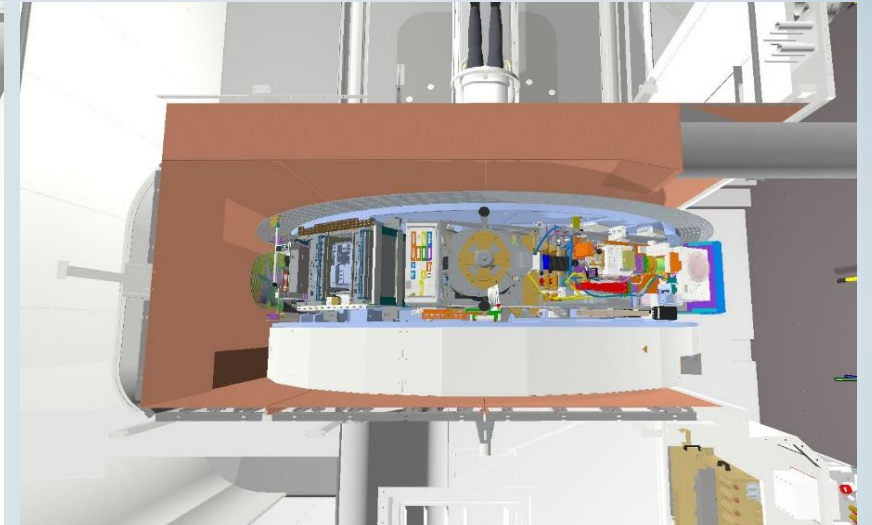


Protocol standardization



Artificial Intelligence

Bringing two worlds together



The power of 1.5T MR – Unmatched image clarity

Uniform tissue contrast
($<0.17\text{ppm}$ @ 30cm)



Real-time motion monitoring
(5Hz)



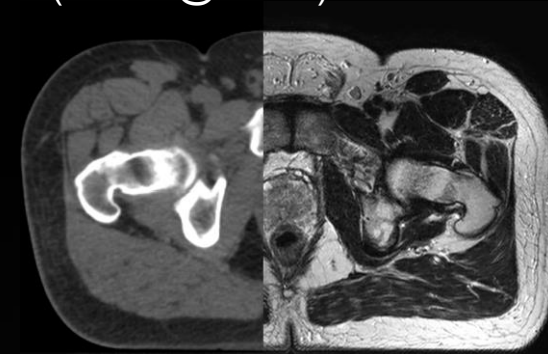
Large imaging field
(50cm)



Sub-millimetric, isotropic resolution



Guaranteed geometric accuracy
($\leq 2\text{mm}$ @ 42cm)



Management of Electron Return Effect

Total beam path modelling

Cryostat & modified scattering

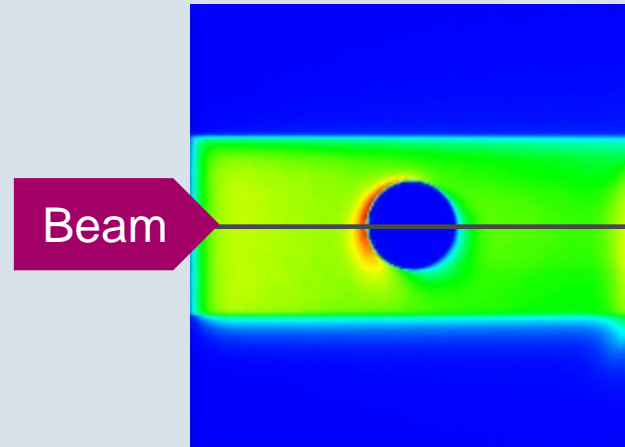
Coils, positioning devices & table

Magnetic fields

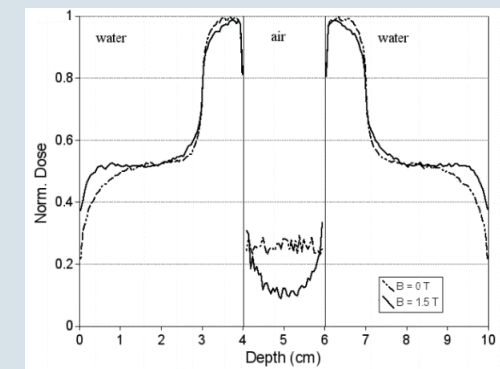
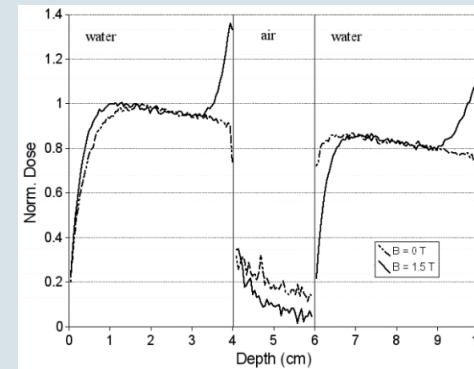
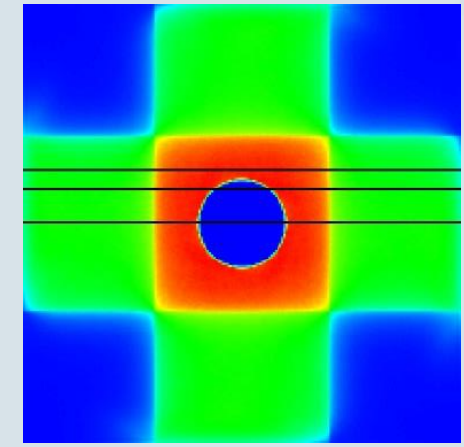
Modelling of secondary electrons

Part of constraints in optimizer

Single field



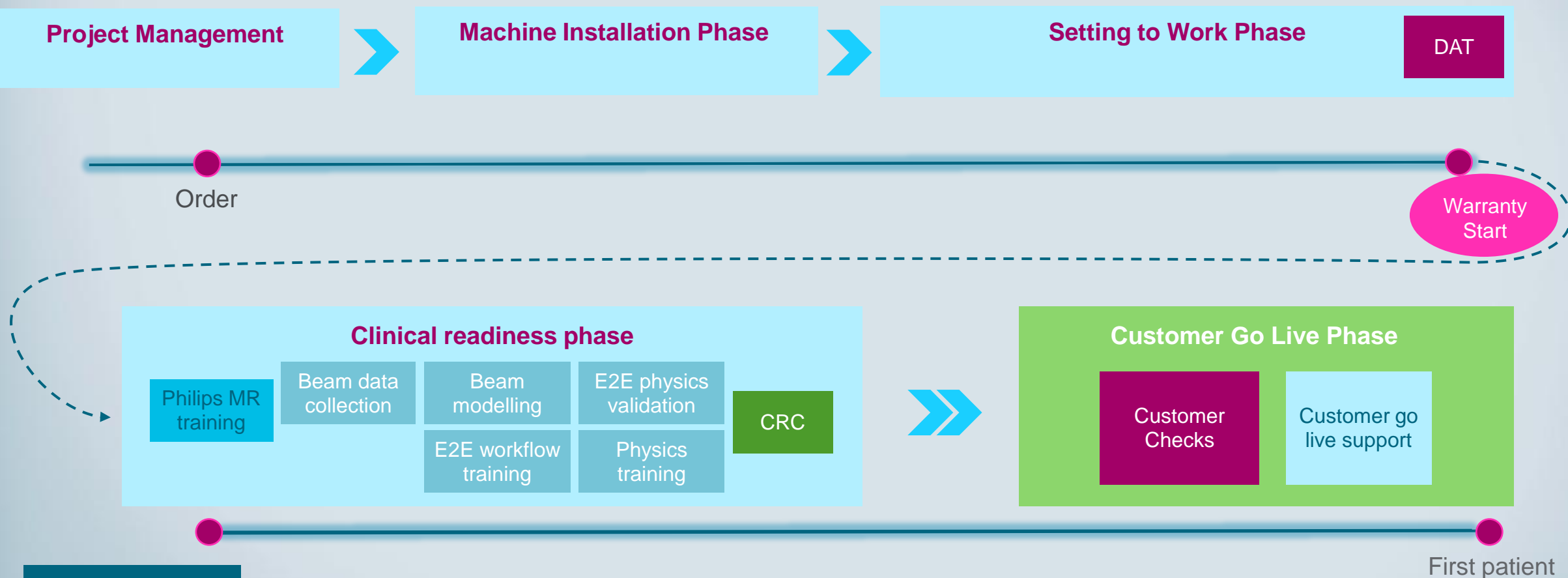
4 field box



Using just 4 beams reduces the peak dose from 35% to 3%

Central axis 0T vs. 1.5T

Full support with Elekta



Simplify the adaptation with online Scan – Plan – Treat

Offline Adaptive Therapy today

N days



CT



Import



Fusion



Re - contouring



Re - planning



QA check



Data import



Pre-treatment
check



IGRT and
treatment



MR



N minutes



Scan

Acquire pre-selected daily MR images with superior soft tissue visualisation.

Plan

Instantaneously react to daily tumor changes with automatic image fusion, plan adaptation and plan review tools

Treat

See the tumor in 3 planes while treating with stereotactic precision

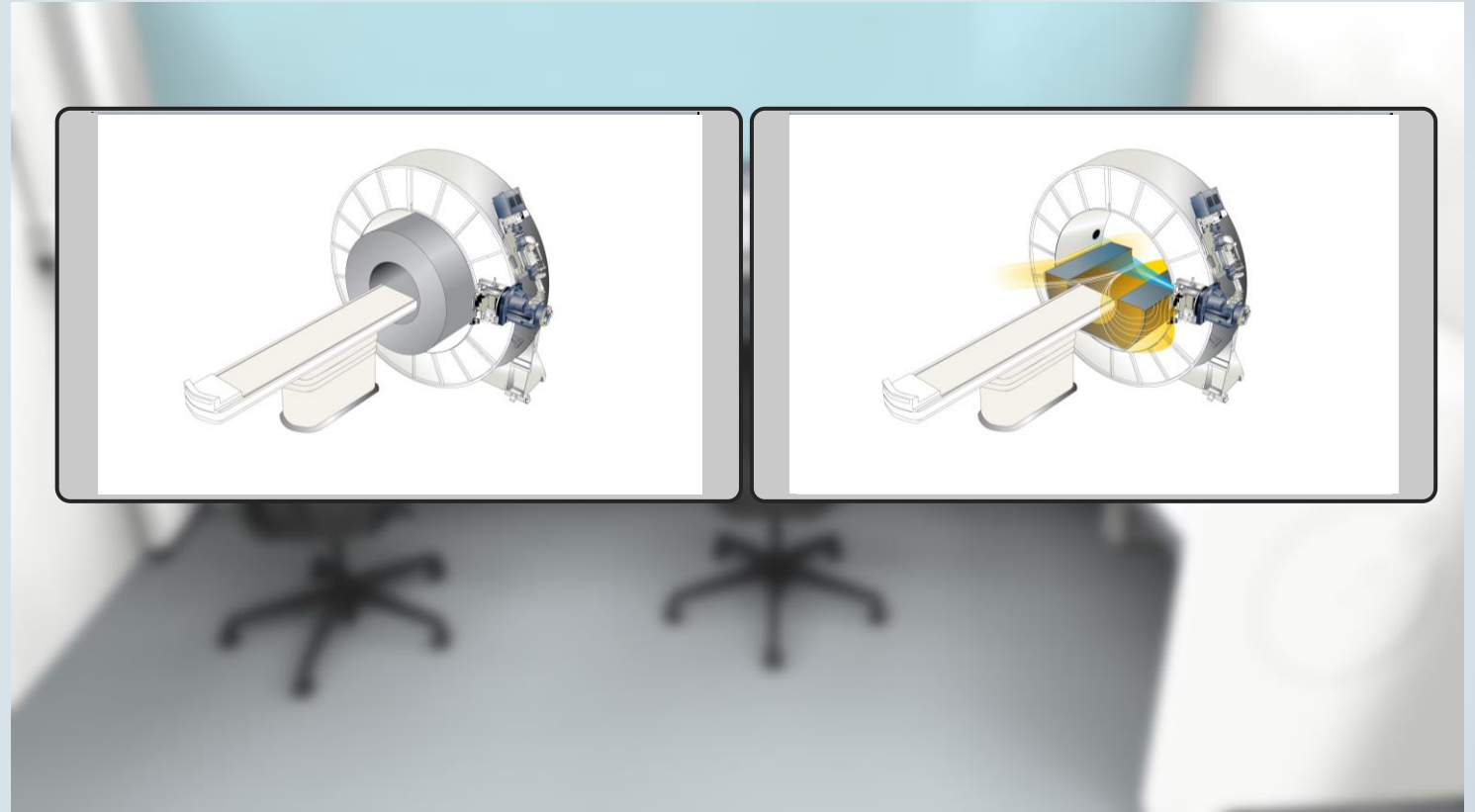
New integrated user interface

Data Management

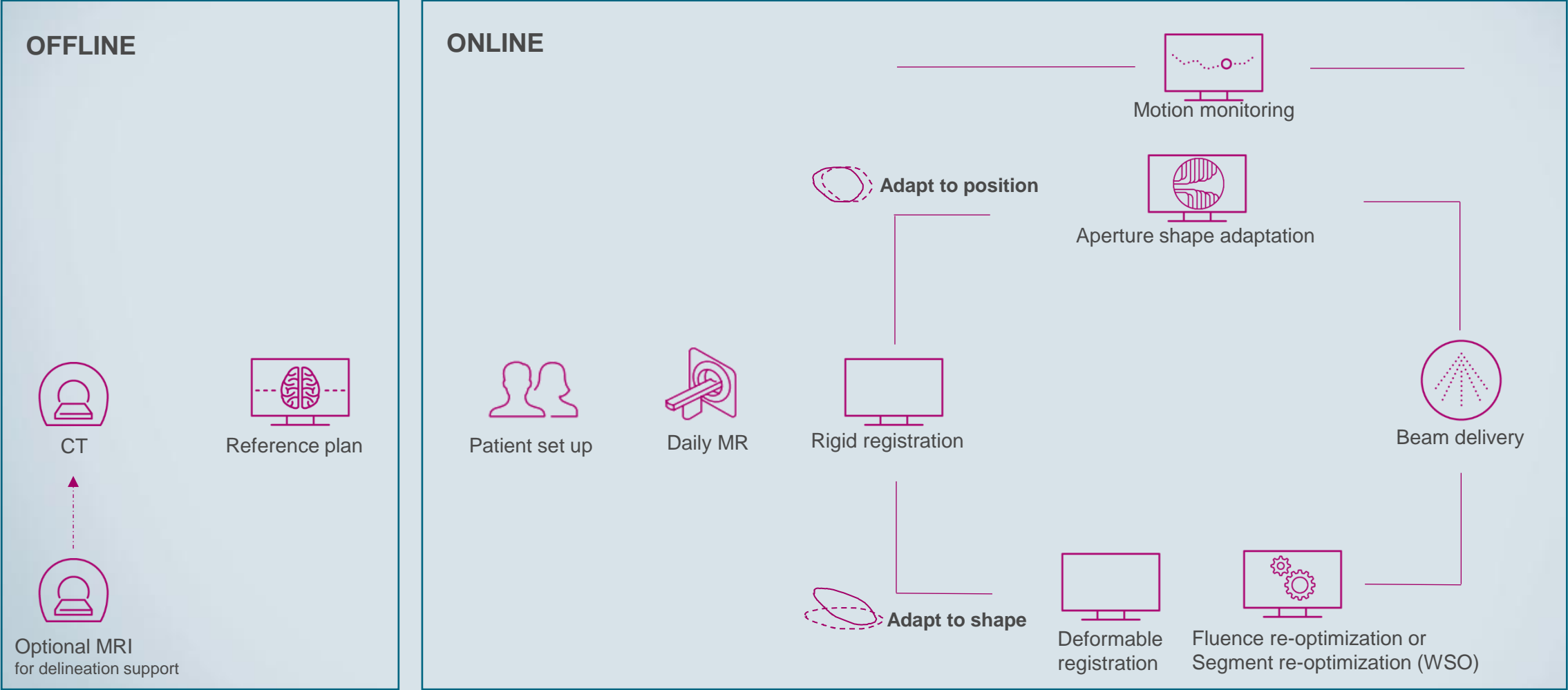
Online Adaptive Planning

RT-optimized Plug&Play MR

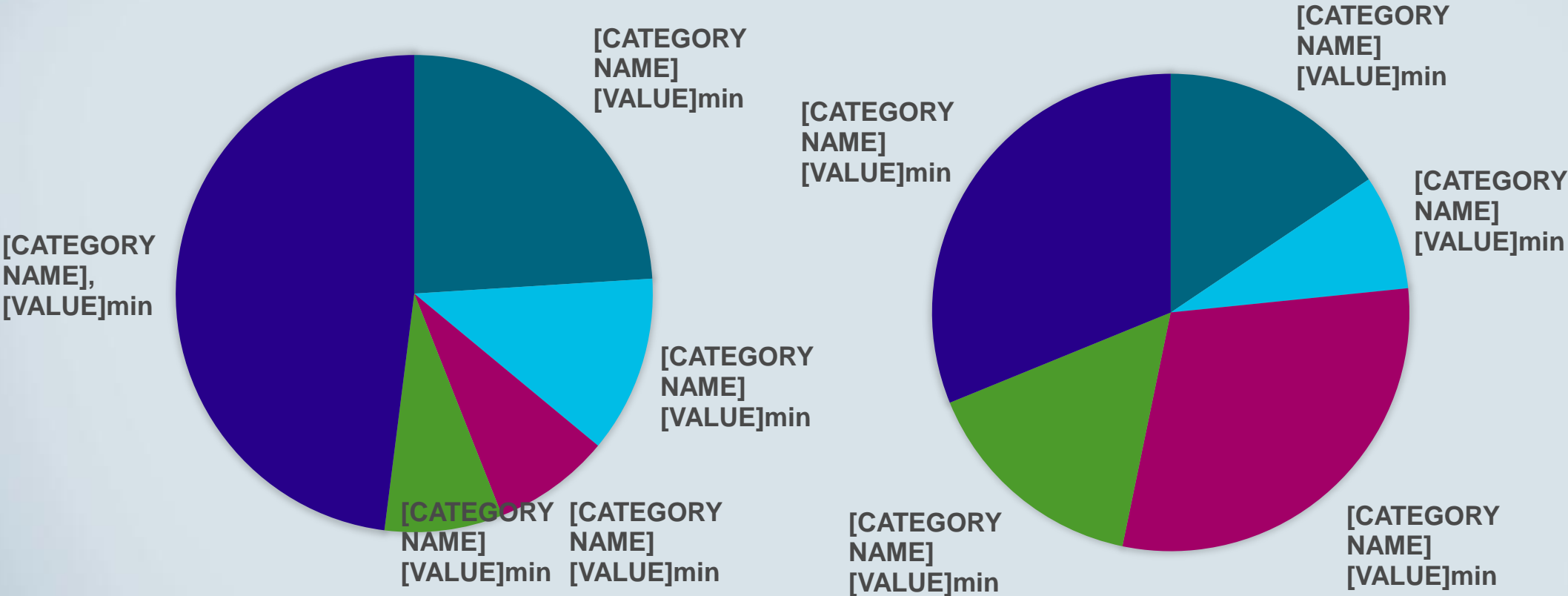
Integrated workflow console



Personalized adaptive radiotherapy



Workflow timings



Mean time ATP = 26 min

Mean time ATS = 42 min

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Secondary MU check solution

Fast

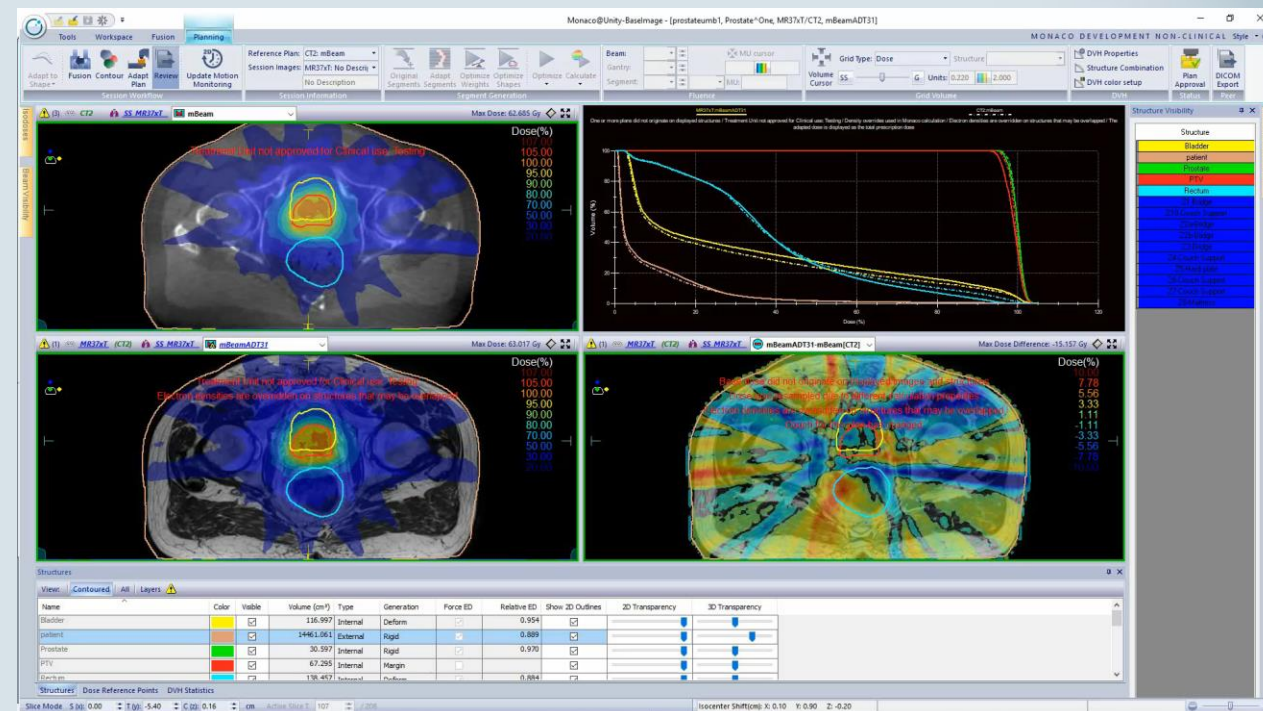
Secondary MU check calculation completed in seconds

Integrated

Data import directly from the main user console to web-based platform

Independent

New algorithm based on limited number of experimental data



Dosimetric Accuracy

ArcCheck pass rate measured

Cryostat & modified scattering

Coils, positioning devices & table

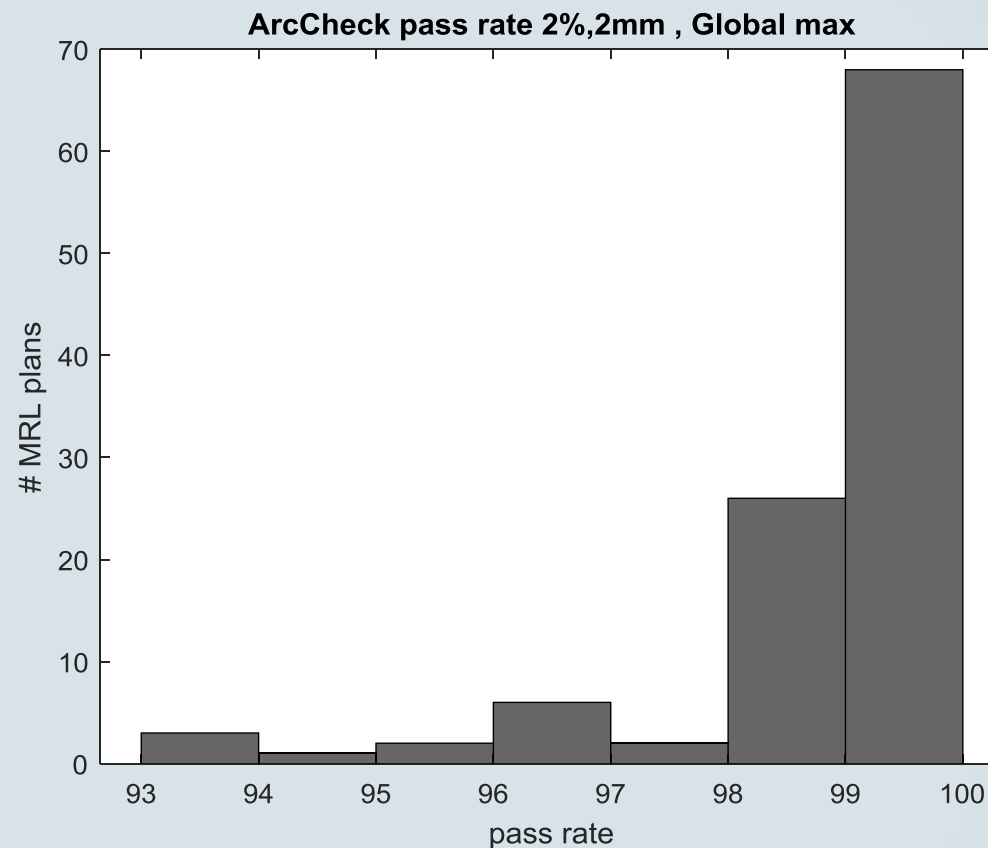
Median pass rate of 99.2%

Range 93.4–100%

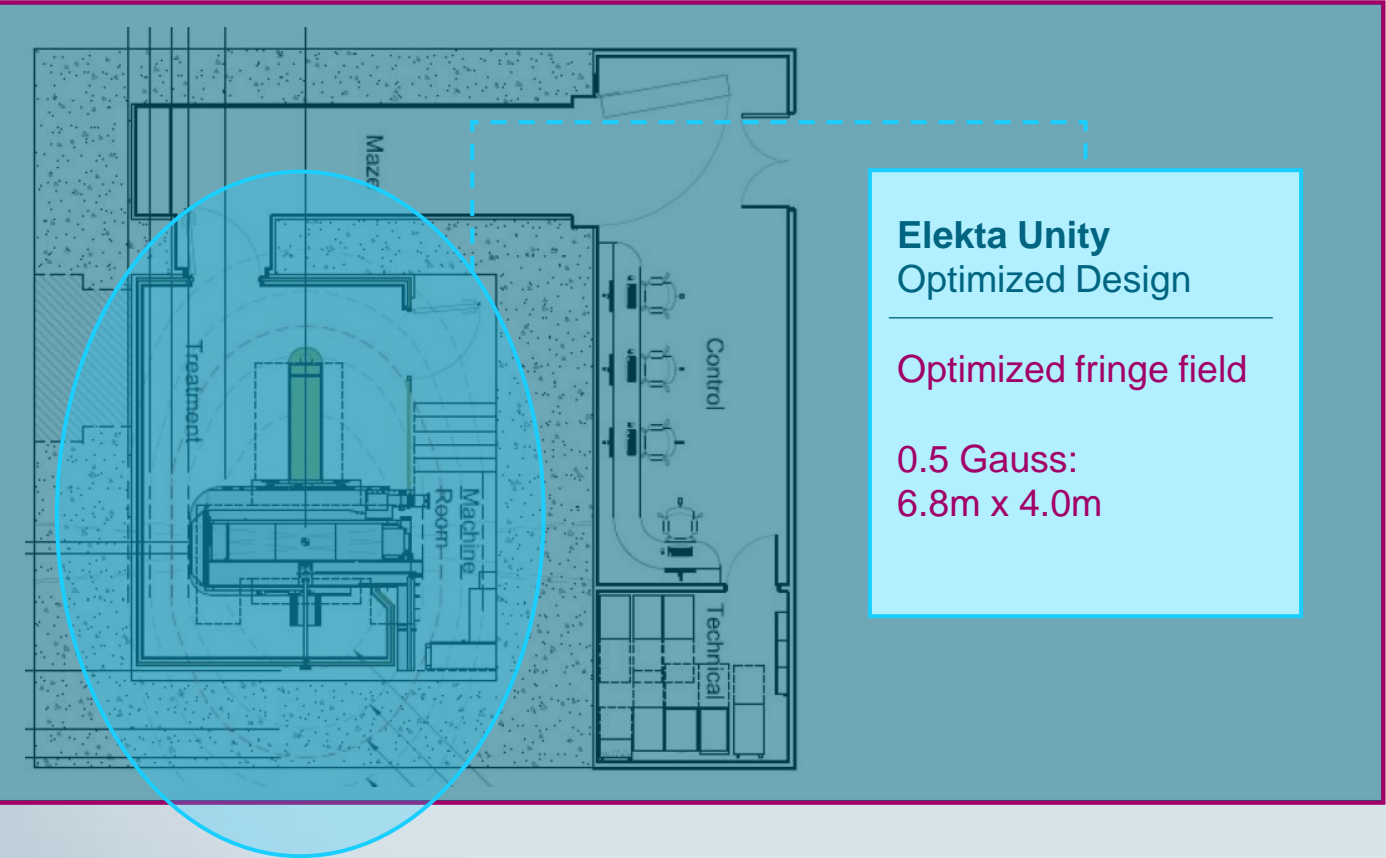
Excellent agreement

Excellent delivery accuracy

Magnetic field effects are fully managed



Unique & optimized magnetic design



Dimension	MR-linac	Standard linac
Width	6.7 m	6 m
Length	6.7 m	5.8 m
Height	3.25 m	3.2 m
Pit	1.05 m	0.45 m

Designed for minimal magnetic presence outside treatment area
Comparable to Magnetic Earth field

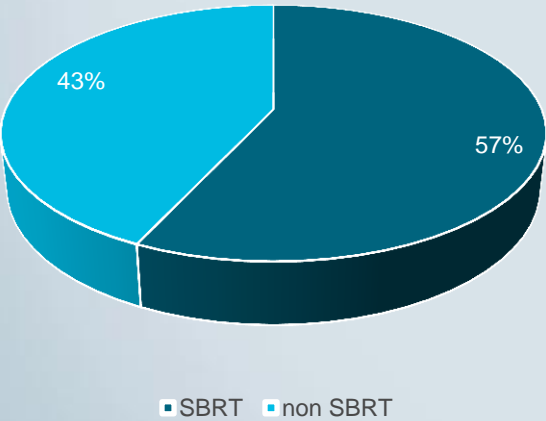
Easy integration in RT clinics
*Normative calibration for surrounding Linacs***

*Data from Unity Site planning guide;
**The impact of a 1.5 T MR-Linac fringe field on neighbouring linear accelerators. T.J. Perika et al.

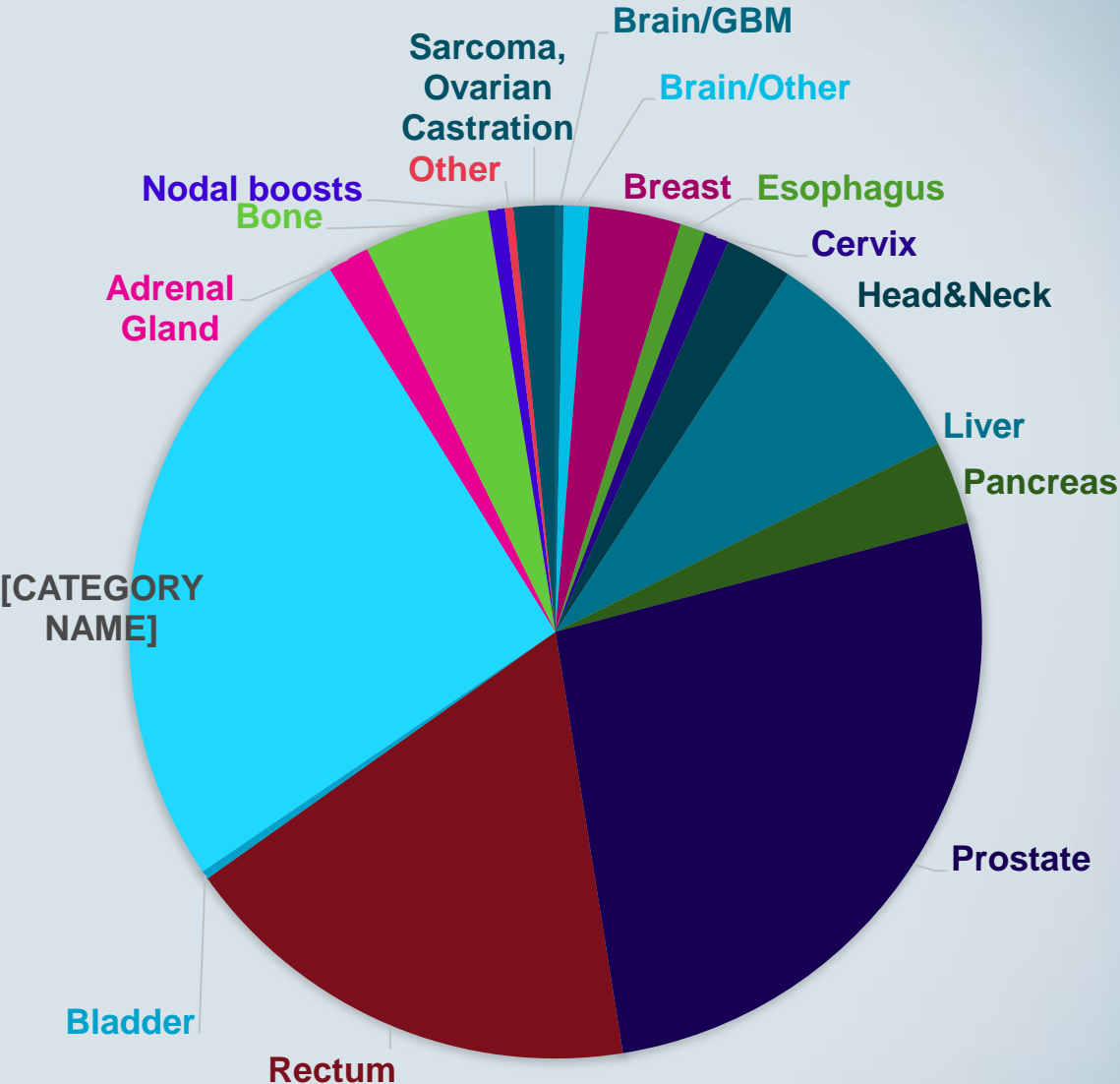
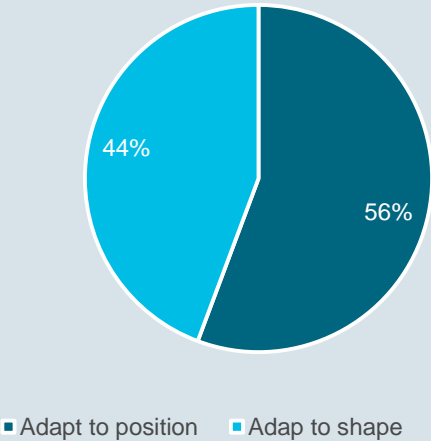
Clinical experience so far

>350 patients treated across 11 sites

Type of treatments



Type of plan adaptation



Thank You