



VersaHD



ELEKTA

VERSA HD

*The convergence of conventional
radiotherapy with advanced
stereotactic precision*

Irina FOTINA, PhD

*Software Product Specialist/
Sales Support EE BU*

Why Versa HD?

Versa **HD**[™]

Maximize health care resources

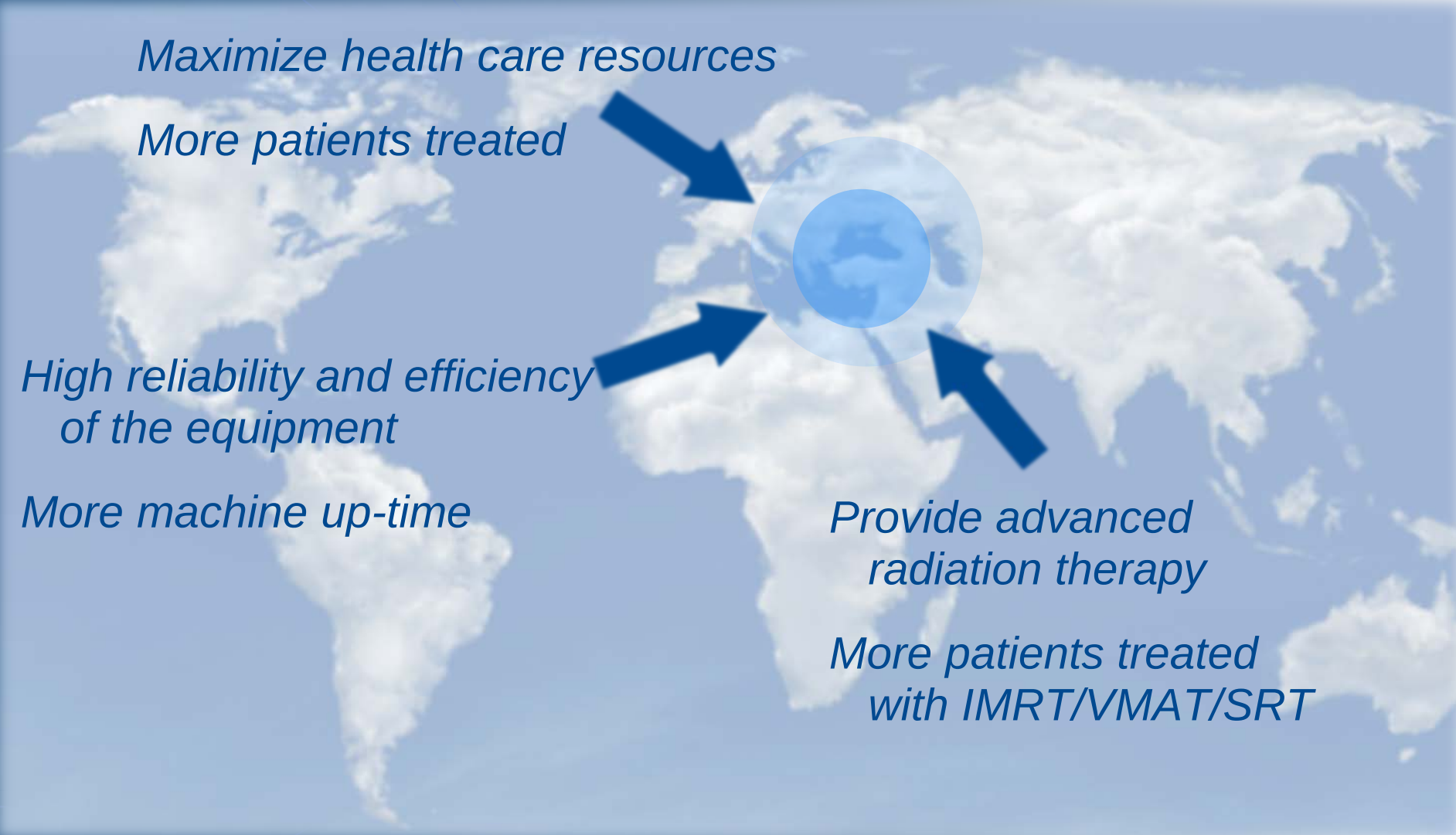
More patients treated

*High reliability and efficiency
of the equipment*

More machine up-time

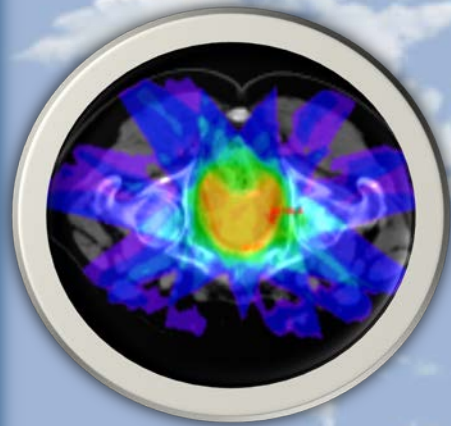
*Provide advanced
radiation therapy*

*More patients treated
with IMRT/VMAT/SRT*

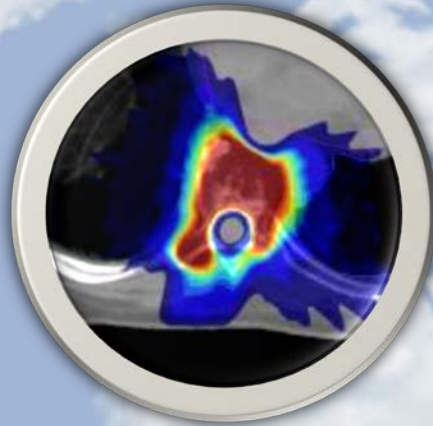


Why Versa HD?

Versa **HD**™



+



=



*Conventional
Radiotherapy*

*Advanced
stereotactic
precision*

*One Solution –
Unlimited possibilities*

70+ orders since release March 2013 (ESTRO)

Versa HD™

Johns Hopkins Kimmel Cancer Center Acquires Elekta Versa HD System

New system sets benchmark in radiation oncology versatility and capabilities

The Johns Hopkins Hospital (Baltimore, Maryland) has acquired Elekta's Versa HD™ linear accelerator.

"HOUSTON, April 18 – The University of Texas MD Anderson Cancer Center has purchased two Elekta Versa HD™ linear accelerators"

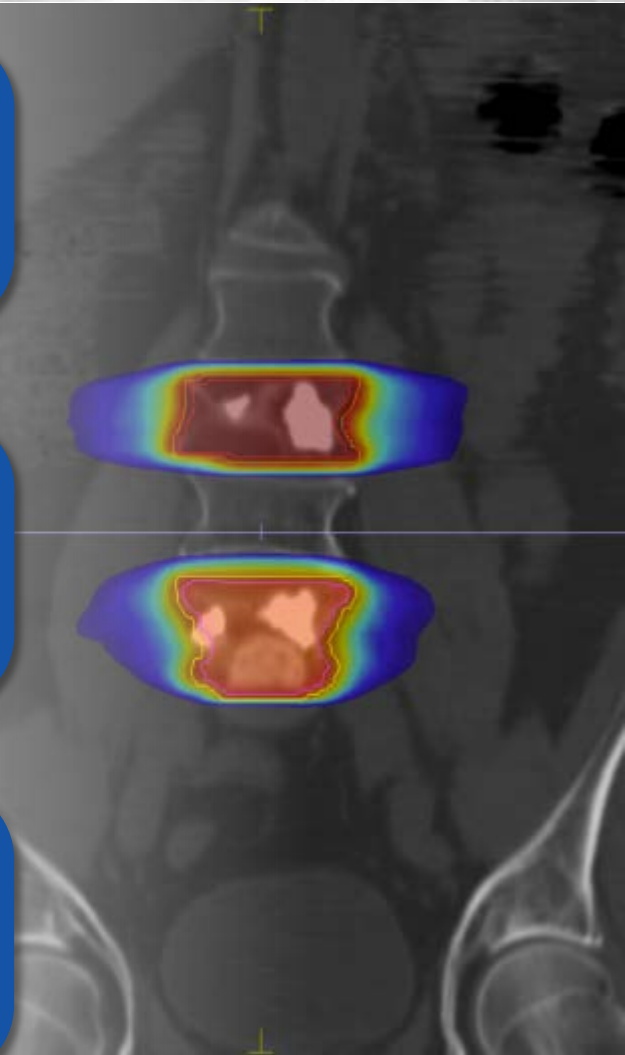
St James's University Hospital (Leeds, UK)

*"These early experiences with Agility and High Dose Rate mode formed our **decision to acquire two Versa HD systems at the earliest opportunity**," says Vivian Cosgrove, Ph.D., Head of Radiotherapy Physics at St James's.*

Seattle's Swedish Cancer Institute Acquires Four Elekta Versa HD Radiation Therapy Systems

*"Patients in the Pacific Northwest to benefit from latest radiotherapy technology".
SEATTLE 2013-07-03*

- With Versa HD, deliver high definition therapy for an expanded portfolio of cases
 - Both stereotactic and conventional targets
- High-definition (HD) beam shaping across the whole treatment field
- Superior target conformance and higher delivery efficiency with FFF High Dose Rate mode



What makes Versa HD so special? Versa HD™



Agility – fastest MLC on the market

+

Elekta **High Dose Rate Mode** (FFF)

+

Customized **clinical packages** (dedicated solutions for selected anatomical sites)

Improving outcomes

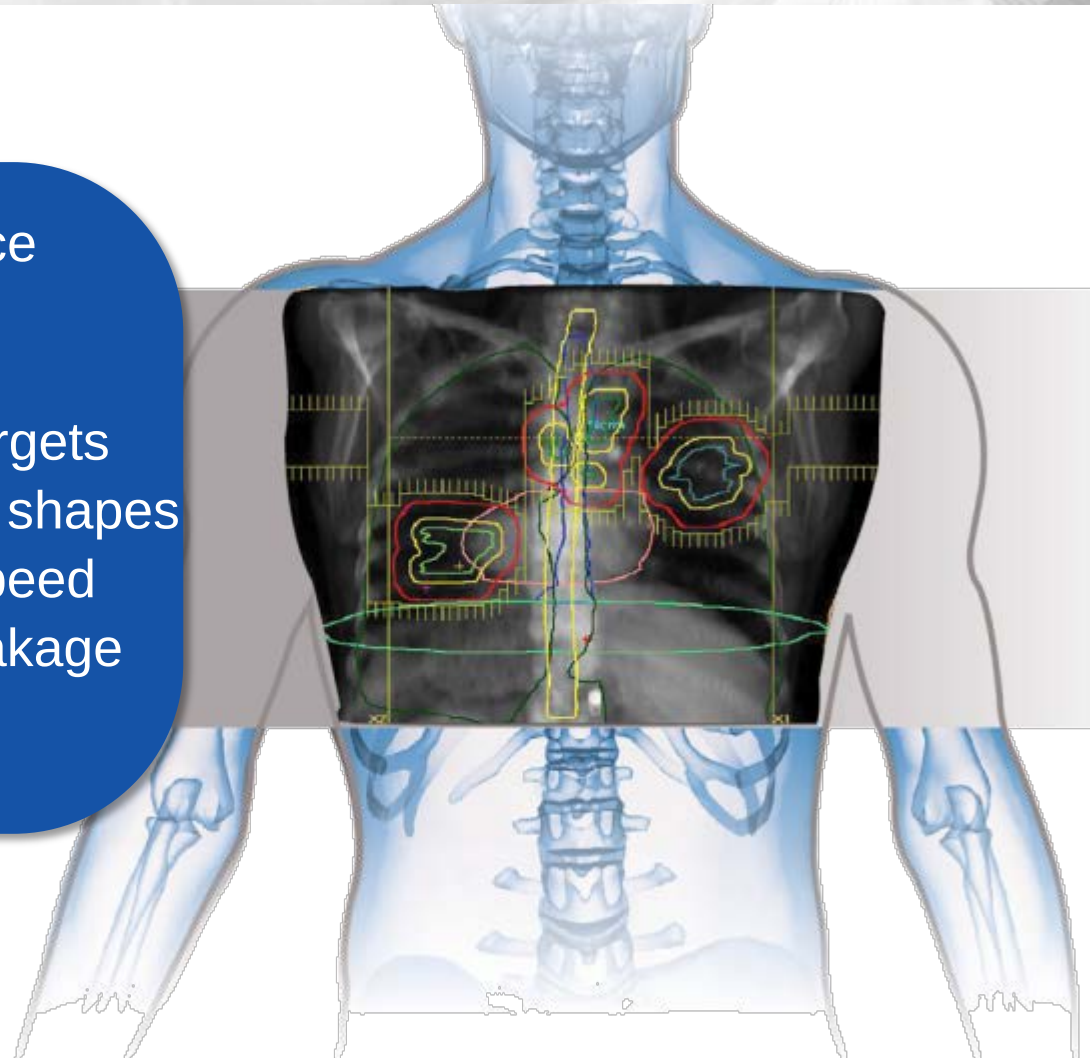


Agility®

Ground-breaking beam shaping technology

Versa HD™

- Superior target conformance
- 160 x 5 mm leaves across the full 40 cm x 40 cm field
- Efficiently cover multiple targets with interdigitation & island shapes
- Fast leaf and diaphragm speed
- Extremely low MLC leaf leakage and transmission



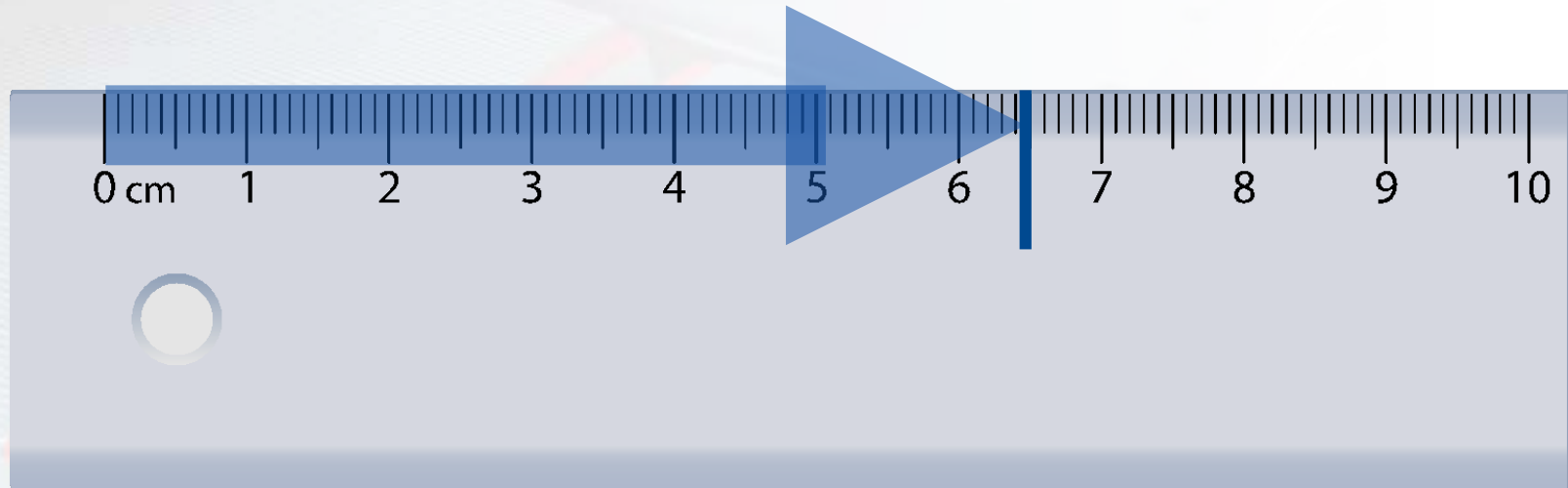
*Image courtesy of Christopher Walker, Head of Radiotherapy Physics
The James Cook University Hospital, Middlesbrough, UK*

Agility®

Ground-breaking beam shaping technology

Versa HD™

6.5 cm/sec

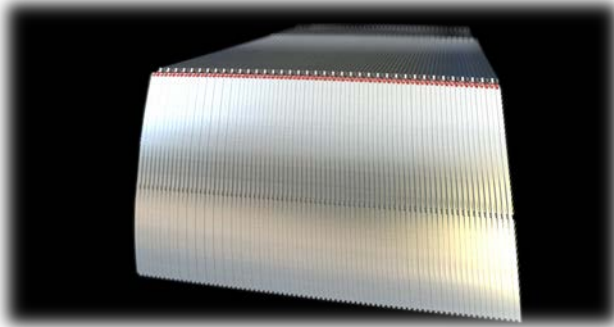


Faster effective MLC leaf speed

Agility[®]

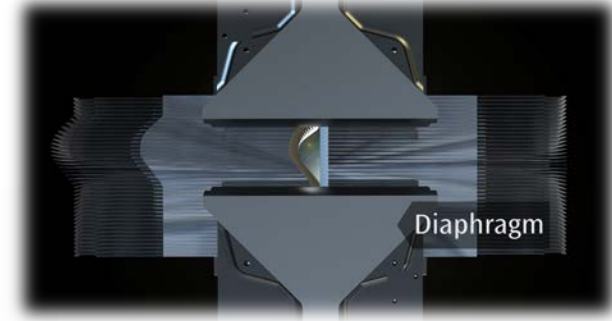
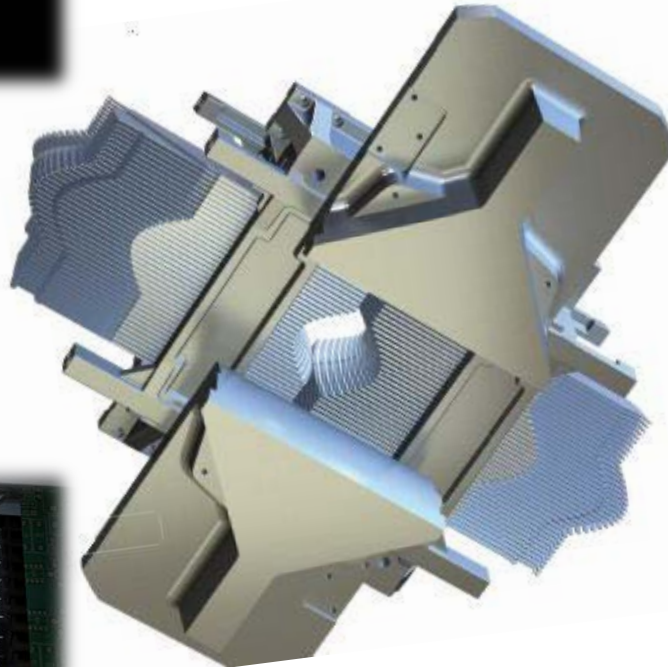
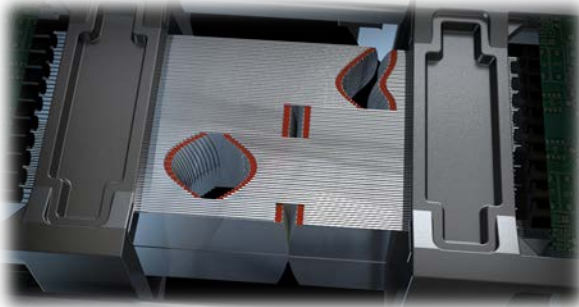
Ground-breaking beam shaping technology

Versa HD[™]



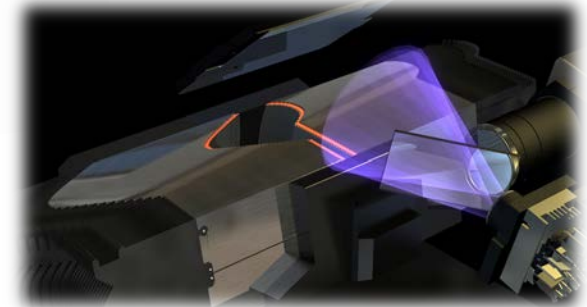
*Optimized penumbra
< 5.5mm for 10x10*

*Dynamic Leaf Guides
Full interdigitation*



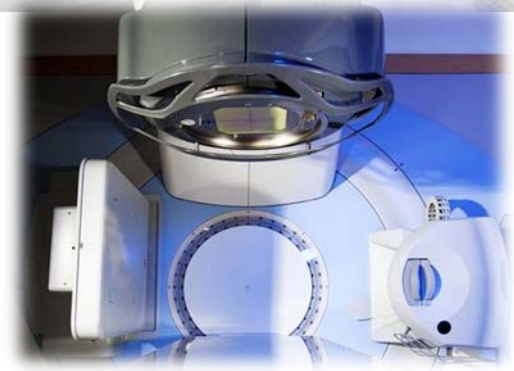
*Fast Dynamic Diaphragms
9cm/sec, 12 cm overtravel*

*Ruby based optical leaf
positioning and control*



Leakage & Transmission

Versa HD™



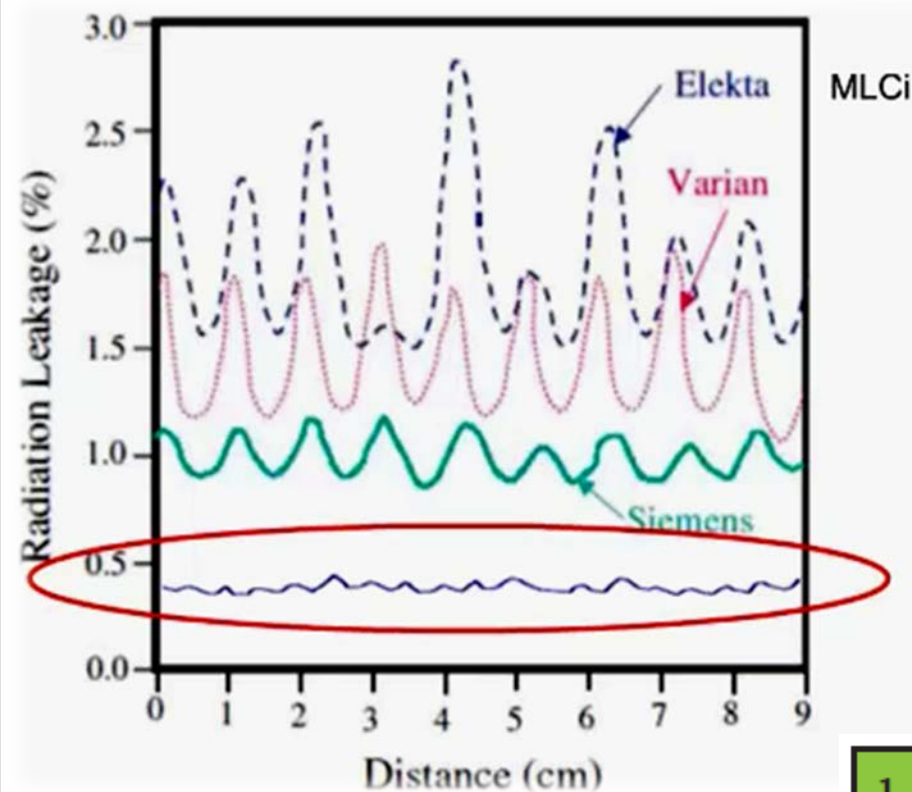
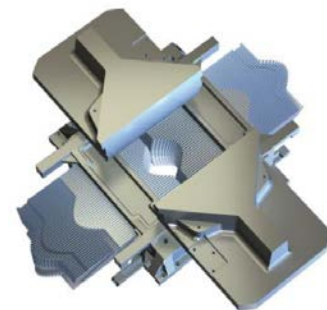
This shows 0.15%
0.07% leakage
leakage looks like

Agility - Exceptionally low leakage

Leakage & Transmission

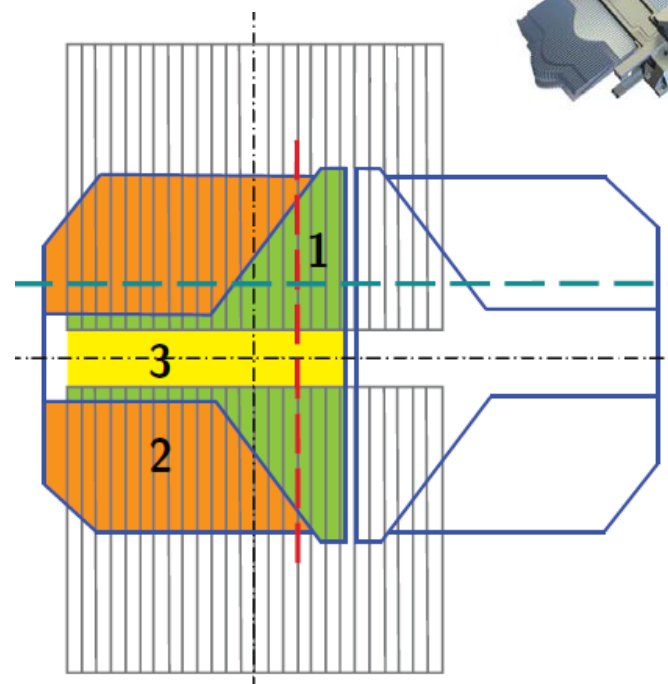
Versa HD™

Transmission becomes critical for the SRS/SRT as dose per fraction increases dramatically

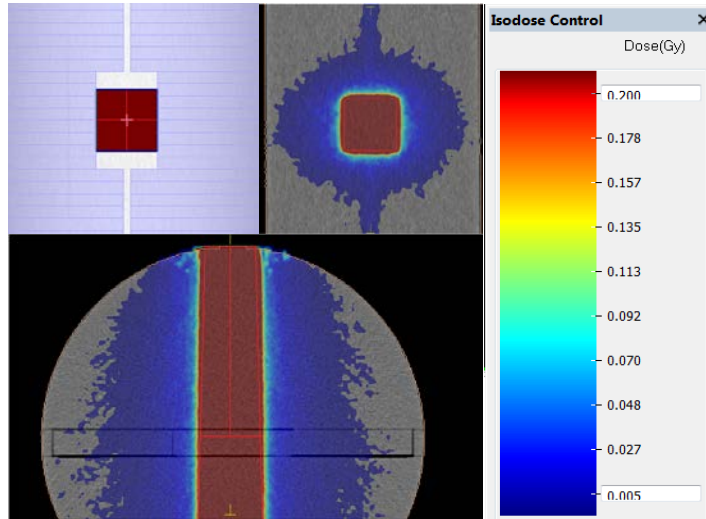


MLCi

Agility



1	Leaves + Diaphragms _{Thick}	<0.07%
2	Leaves + Diaphragms _{Thin}	<0.13%
3	Diaphragms _{Thick} alone	<0.35%



“Agility gives you better plans because transmission dose is dose that is not controlled by the treatment planning system”

“When transmission is low, the treatment planning system has more dose at its disposal to put it where it wants it. And, most likely, it will produce plans with less dose outside the target volume than would an MLC that has a high amount of transmission.”

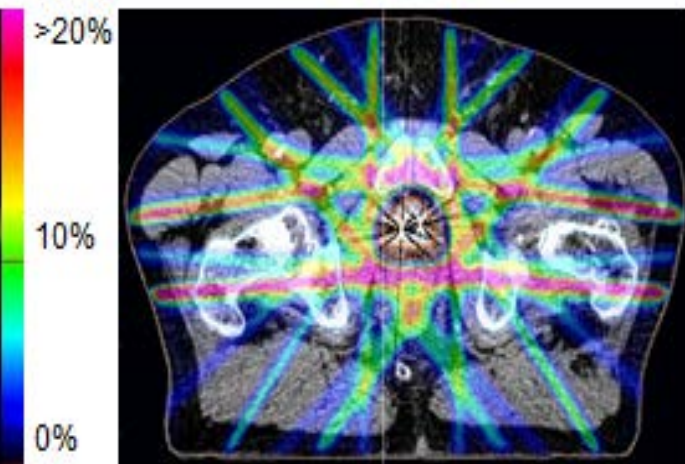
Prof. Frank Lohr

Vice Chairman

Department of Radiation Oncology

UMC, Mannheim, Germany

- ***Reduce dose to healthy tissue***
- ***Protect critical structures***





Versa **HD**[™]

High Dose Rate with rapid MLC leaf speeds

Versa HD is not available for sale or distribution in all markets.
Please contact your Elekta representative for details.

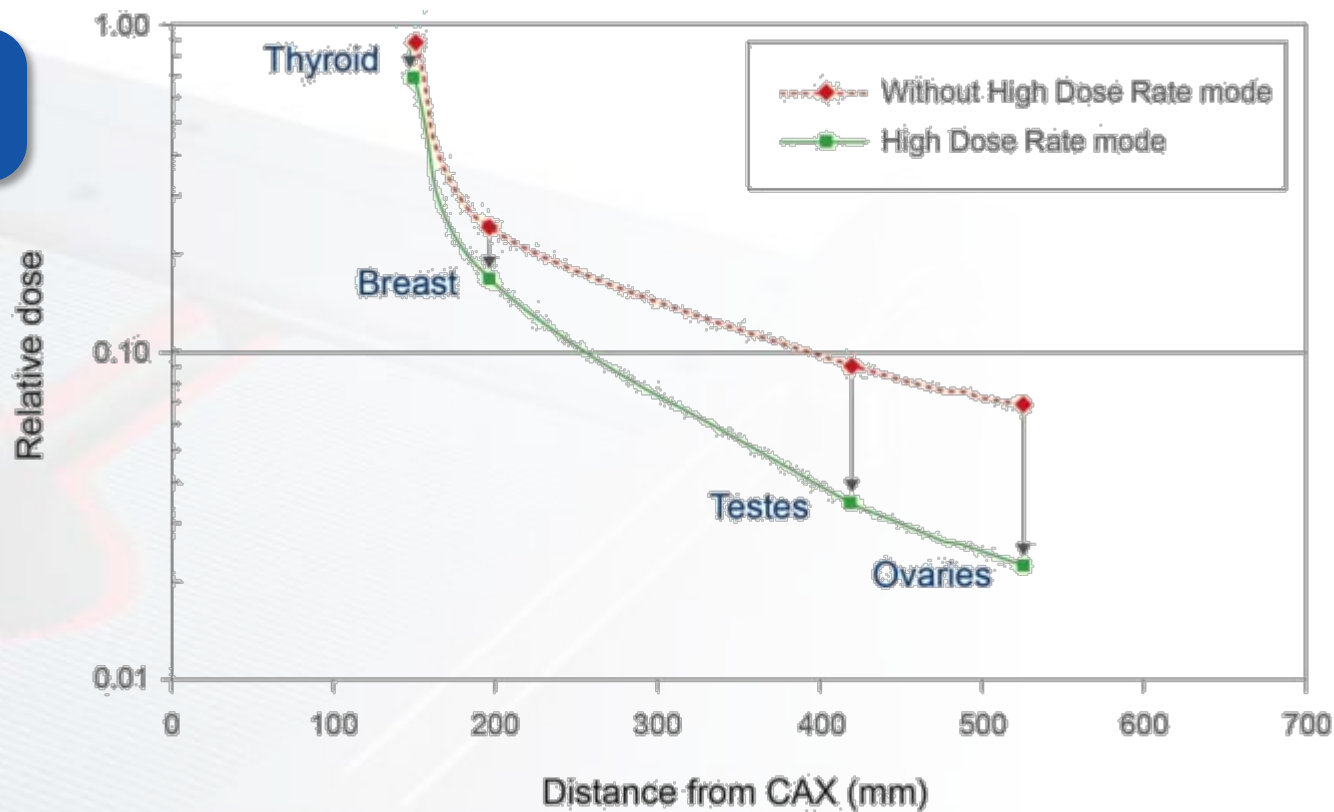


Lowering whole body doses

70% dose reduction

Reduction in Dose

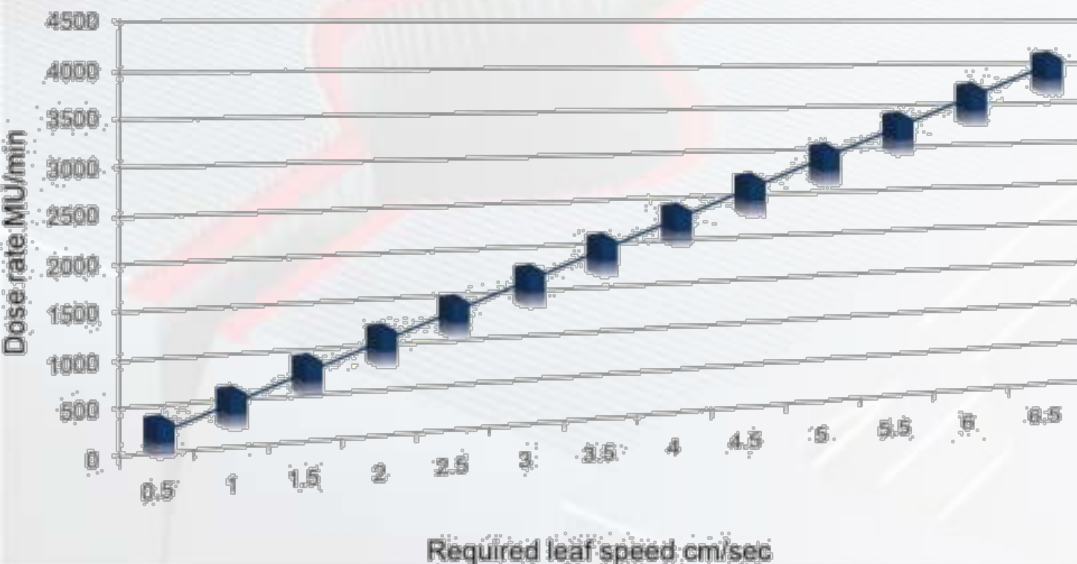
Thyroid	22%
Breast	31%
Ovaries	62%
Testes	67%



Reduced dose outside of the treatment area

High Dose Rate mode

- 3X higher dose rates
- 2200 MU/min at 10MV
- 1400 MU/min at 6MV



*“Delivery of a non-flattened beam with VMAT requires greater leaf velocity. The leaves need to move very quickly to manage the combination of modulation and high dose rates. **Up until now, leaf speed has been the limiting factor. The full potential of Agility will be realised with flattening filter free delivery.**”*

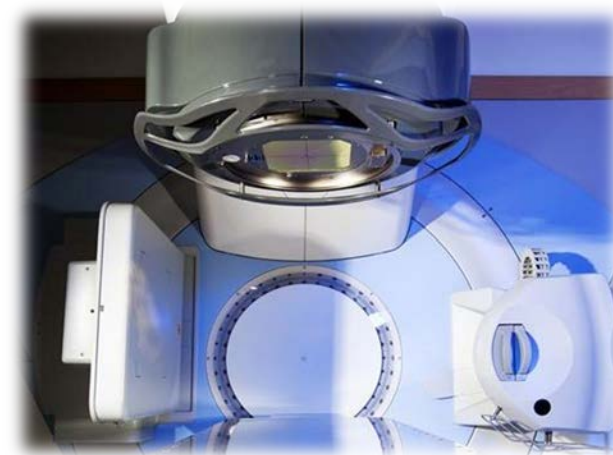
Vivian Cosgrove, Ph.D., (2013)

Head of Radiotherapy Physics at St. James's
Institute of Oncology,
Leeds Teaching Hospitals NHS Trust, UK

High Dose Rate mode

- Beam characteristics for standard and FFF delivery - matched

Nominal energy, MV	6	10
Depth of dose maximum, d_{max}	1.58	2.10
Percent dose at 10 cm depth, $D_{10} \pm 1\%$	67.5	73.0
Penetrative quality, $d_{90\%}$ cm, ± 0.3 cm	6.4	7.6
Quality index, $TPR_{20,10}$	0.68	0.73

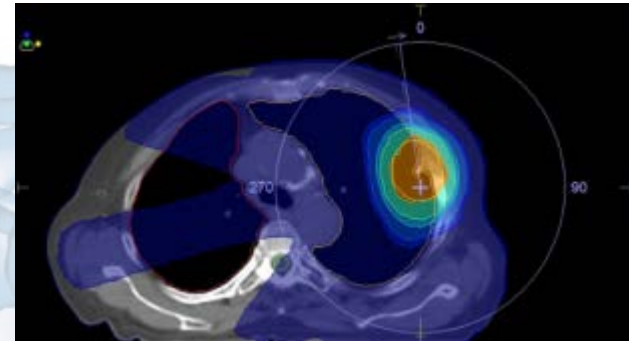
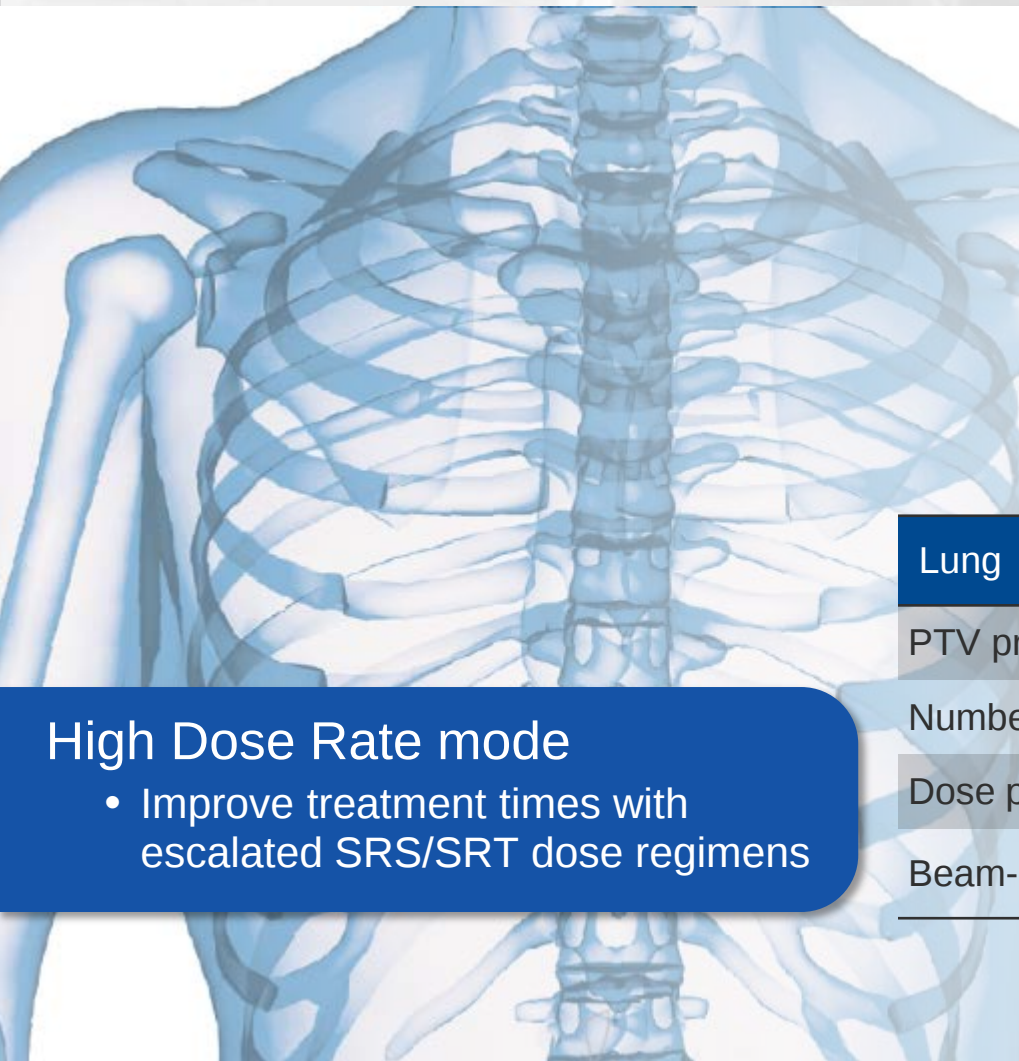


X-ray beams - High Dose Rate Mode

Energy – beam quality

Nominal energy	6MV	10MV
Percent dose at 10 cm depth, $D_{10} \pm 1\%$	67.5	73
Minimum nominal dose rate	200	400
Maximum nominal dose rate	1400	2200

High dose rate delivery



High Dose Rate mode

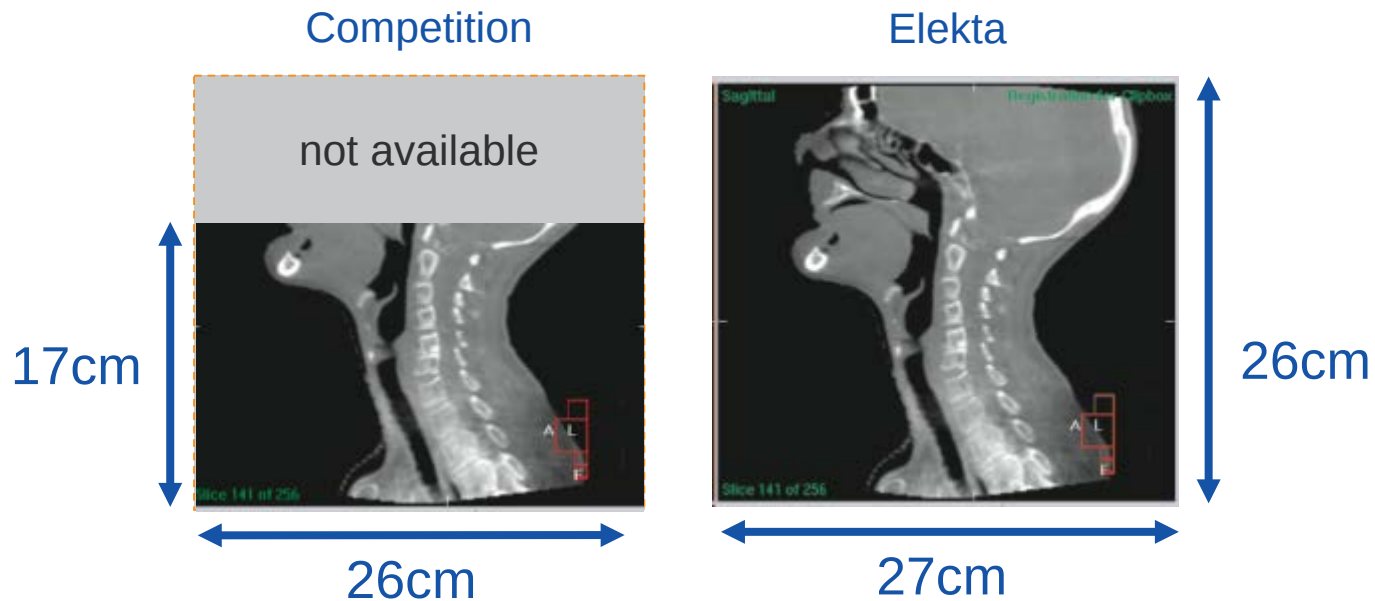
- Improve treatment times with escalated SRS/SRT dose regimens

Lung	Previous Generation	Versa HD
PTV prescription	60 Gy	60 Gy
Number of fractions	5	5
Dose per fraction	12 Gy	12 Gy
Beam-on time per fraction	3 mins 50 seconds	2 mins 10 seconds

49% faster

Confident dose placement

Industry-leading CBCT field-of-view



Visualize significantly more anatomy

Versa **HD**[™]

Custom configurable for unique clinical needs

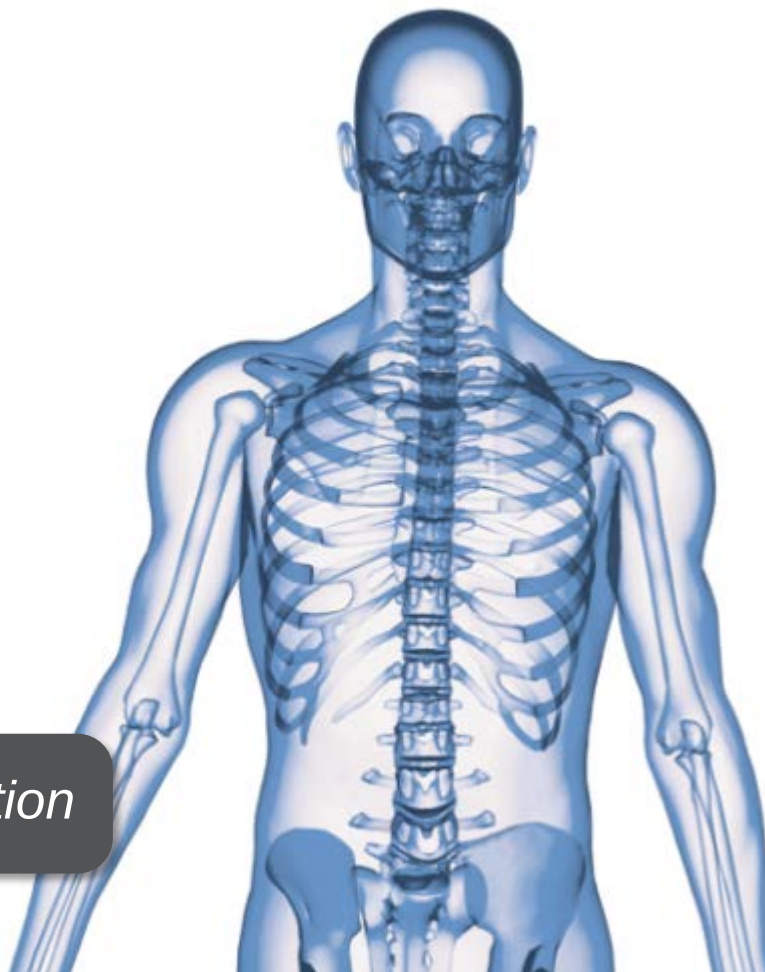
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Packages for unique clinical needs

- Brain & Spine
- Head & Neck
- Lung
- Breast
- Prostate

Enhancing the Versa HD Core solution



Versa HD Prostate

*Addressing the challenges
of Prostate radiotherapy*

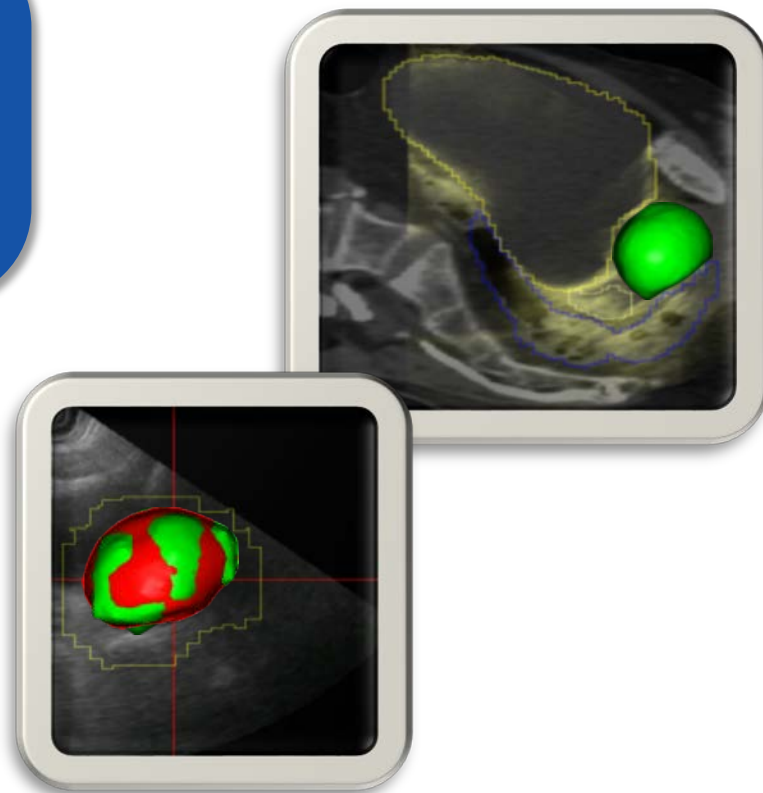
- Manage inter- and intra-fraction motion
- Avoid critical structures surrounding target area
- Accurate visualization of soft tissues



Non-invasive, no-dose soft tissue imaging

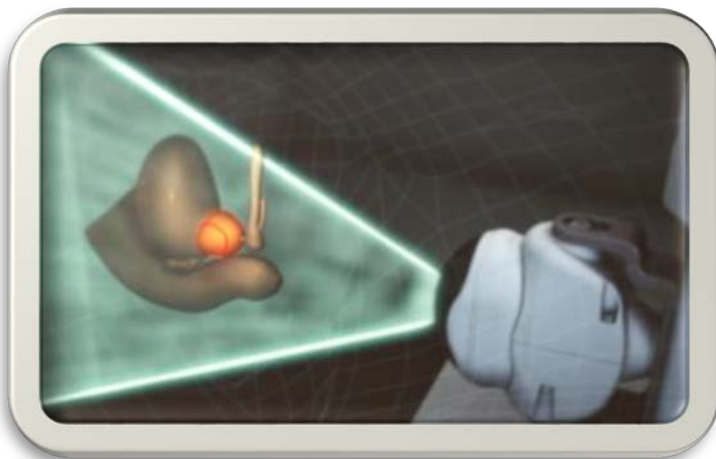
- Combine with CT images for increased contouring confidence
- No need for invasive markers
- Fast, non-ionizing image guidance

Comprehensive view of prostate and nearby soft tissue anatomy

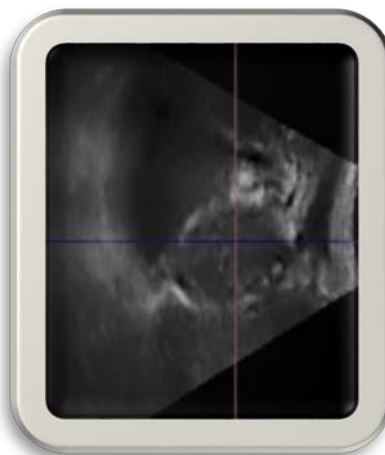


Real-time 4D intra-fraction image guidance

Automated (user independent) scanning



Clarity



MRI



- Trans-perineal probe offers exceptional imaging of prostate and surrounding anatomy
- Remote robotic image acquisition
- Live images during treatment
- No imaging dose and no invasive procedures required



Elekta Software: The Convergence of OIS and TPS

New Monaco

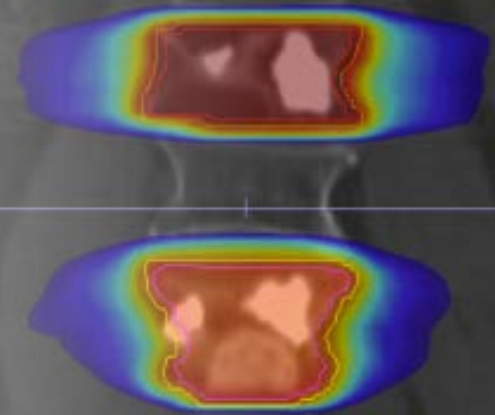
Accuracy Accelerated

Gold-standard Monte Carlo
for electrons and photons

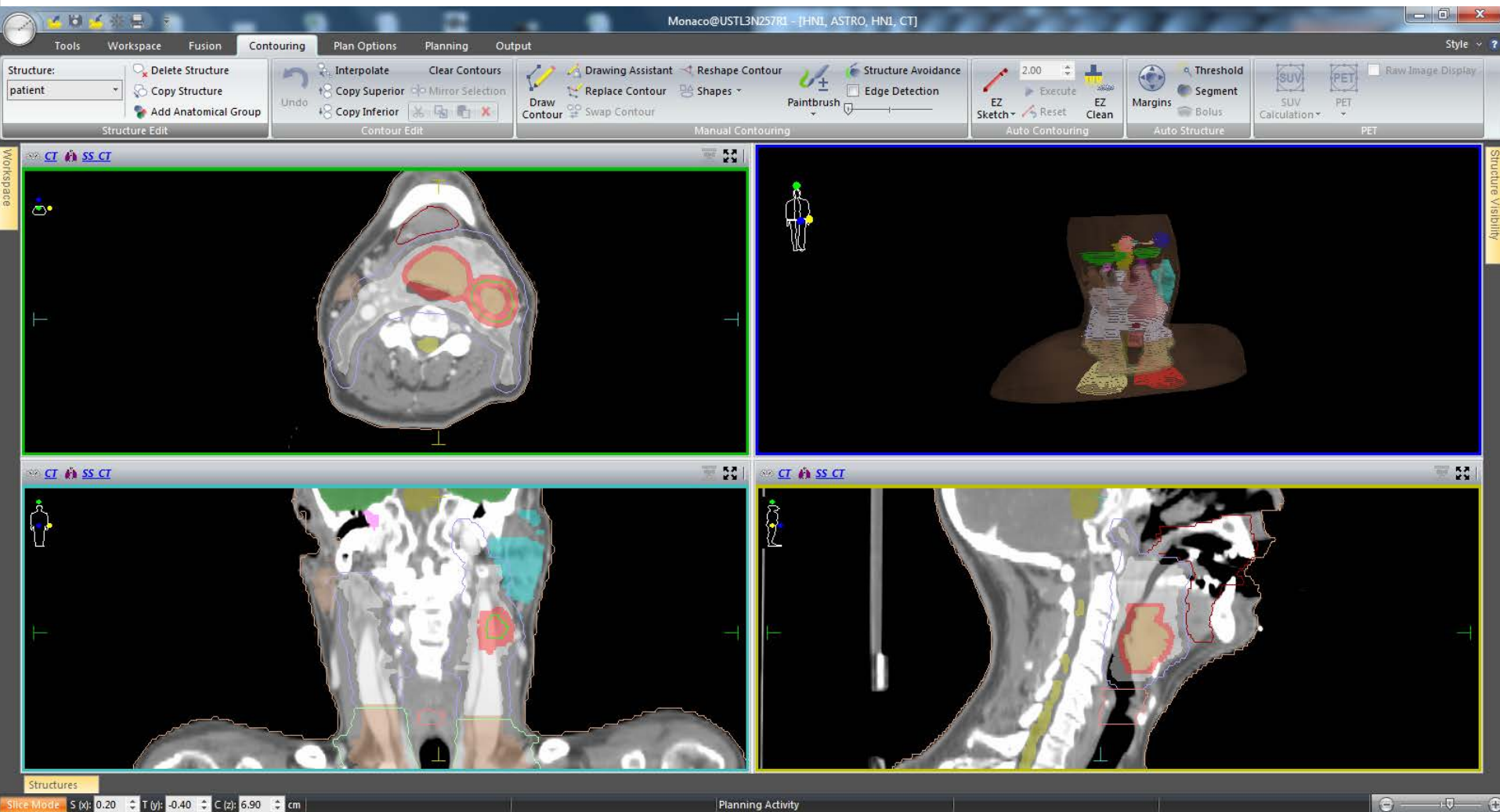
New User Interface;
more efficient workflow

GPU-driven Collapsed Cone
for Fast 3D planning

More Modalities Supported



New Monaco GUI Experience



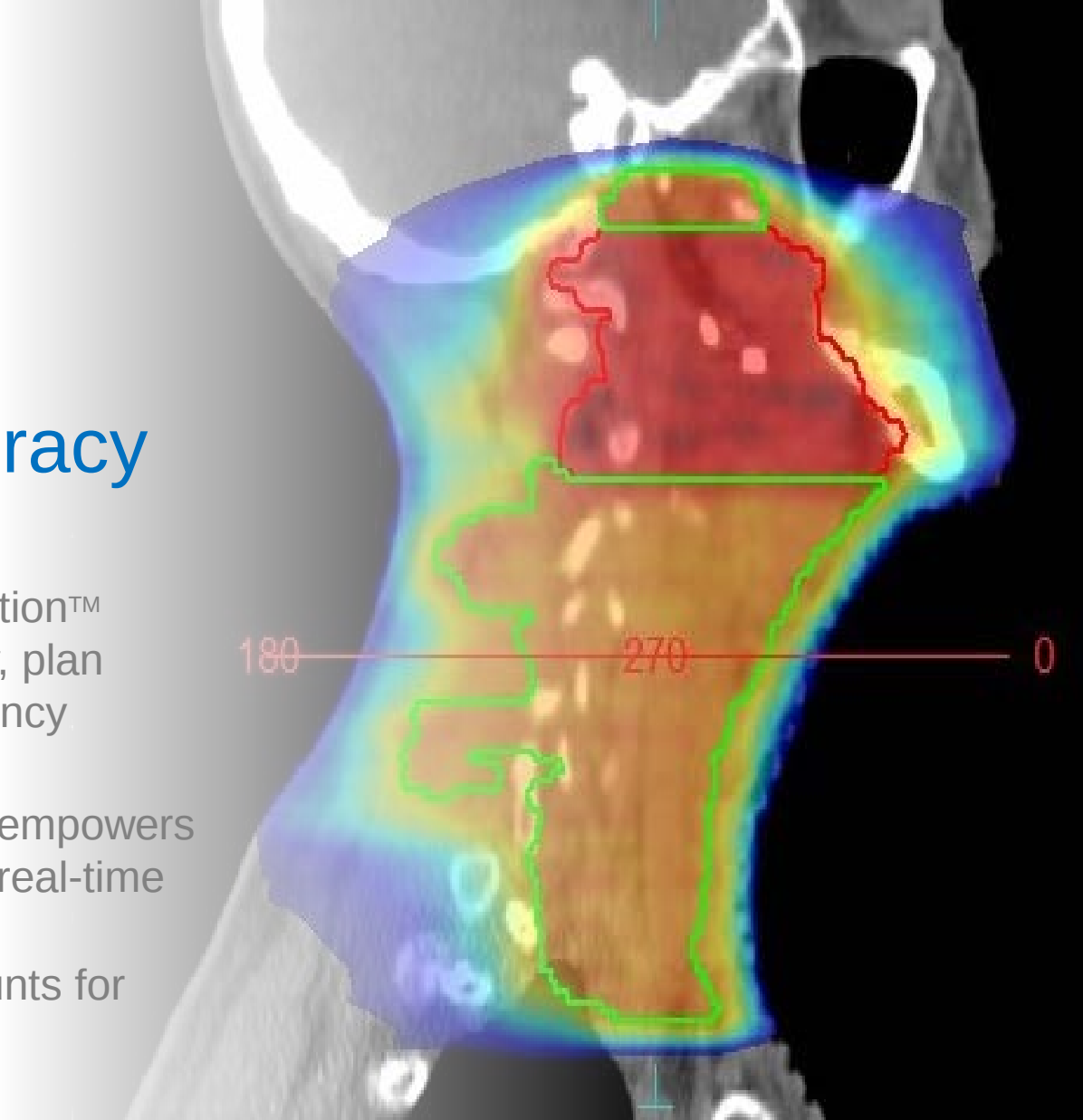
New Monaco

Power of Accuracy

Segment Shape Optimization™
Improves dose conformity, plan
quality and delivery efficiency

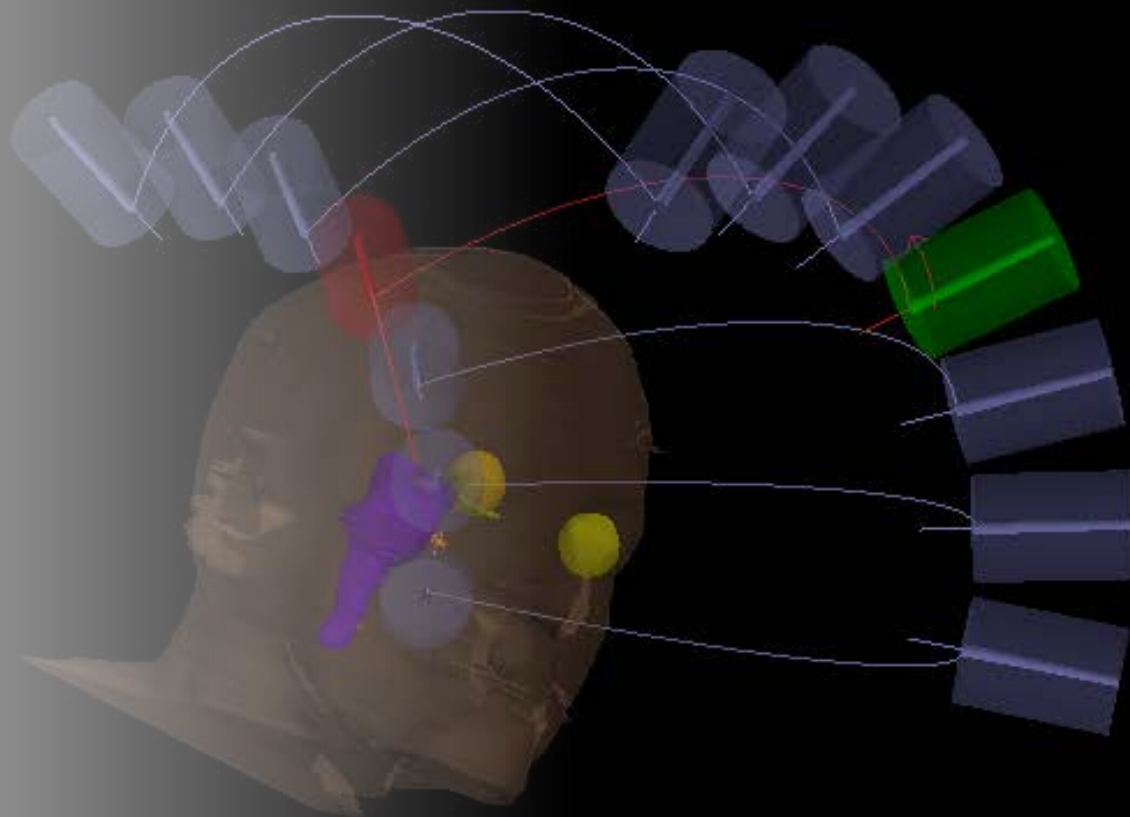
Multi-criteria optimization empowers
clinicians to adjust plans, real-time

Biological modeling accounts for
tissue response



Stereotactic Support

MLC and Cones



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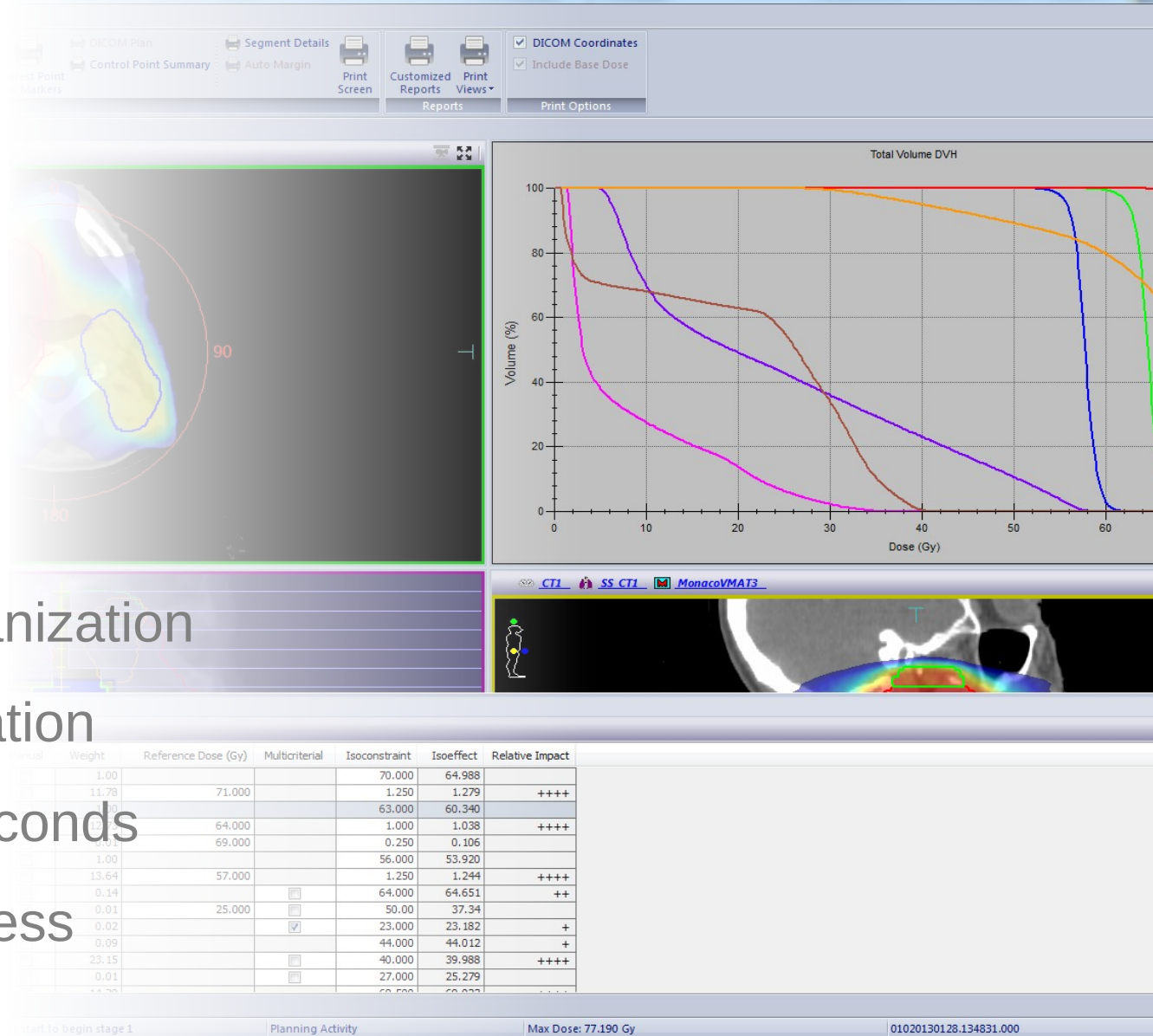
Elegant Workflow

Enhanced organization

Faster optimization

Calculate in seconds

Immediate access



is in all markets.
sales.

Introducing MOSAIQ® Evaluate...

- Plan and dose review capabilities
- First step in bringing classic TPS features into OIS
- True RT Plan review...



MOSAIQ® Evaluate – Multiple Plan Review

MOSAIQ - Sunnyvale Radiation Oncology 2.0

File Schedule eChart Tools Code Mgmt Claims Payments Ledgers Window Help

Home Chart Reports Chart Check QCL Multi-Code Notes Documents D and I Images Evaluate RO Treat Quick Orders Alg/Alrt Help

Prostate, Test MR#: Prostate Select Patient

Plan Review

Window: 400 Level: 0 W/L Affects: CT 8/20/2008 2:18 PM

Visualization

CT 8/20/2008 2:18 PM STRCTRLABEL Normalization: 7560.0 cGy

IMRT7560cGy IMRT7560cGy

CT 8/20/2008 2:18 PM STRCTRLABEL Normalization: 7560.0 cGy

VMAT7560cGy VMAT7560cGy

Dose Control

VMAT7560cGy IMRT7560cGy

Isodose

Normalization 7560.0 cGy

	2D	3D	Color	Dose (cG)	Dose (%)
☒	☒	☐		7,938.0	105.00
☒	☒	☐		7,560.0	100.00
☒	☒	☐		7,408.8	98.00
☒	☒	☐		7,182.0	95.00
☒	☒	☐		6,804.0	90.00
☒	☒	☐		5,292.0	70.00
☒	☒	☐		3,780.0	50.00
☒	☒	☐		2,268.0	30.00
☒	☒	☐		1,512.0	20.00
☒	☒	☐		756.0	10.00

☒ Isolines ☐ Isofill

Navigator Structure Control Beam Control Dose Control

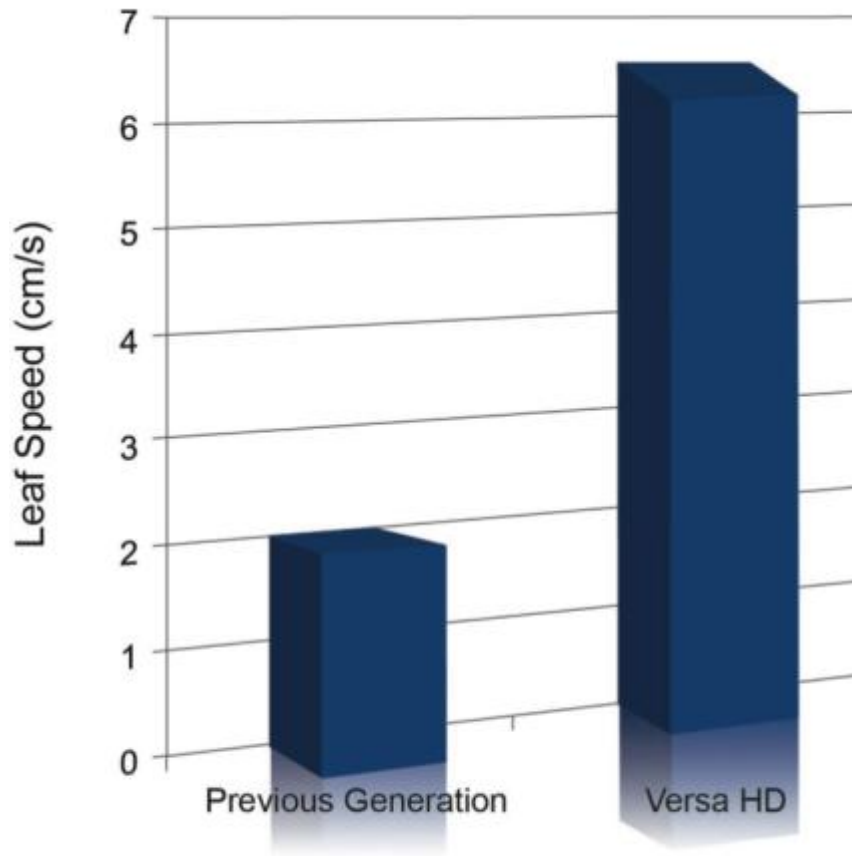
z: -0.45cm

Plan Spreadsheet

Versa **HD**[™]

Improved therapy for
more patients

Improved therapy for more patients



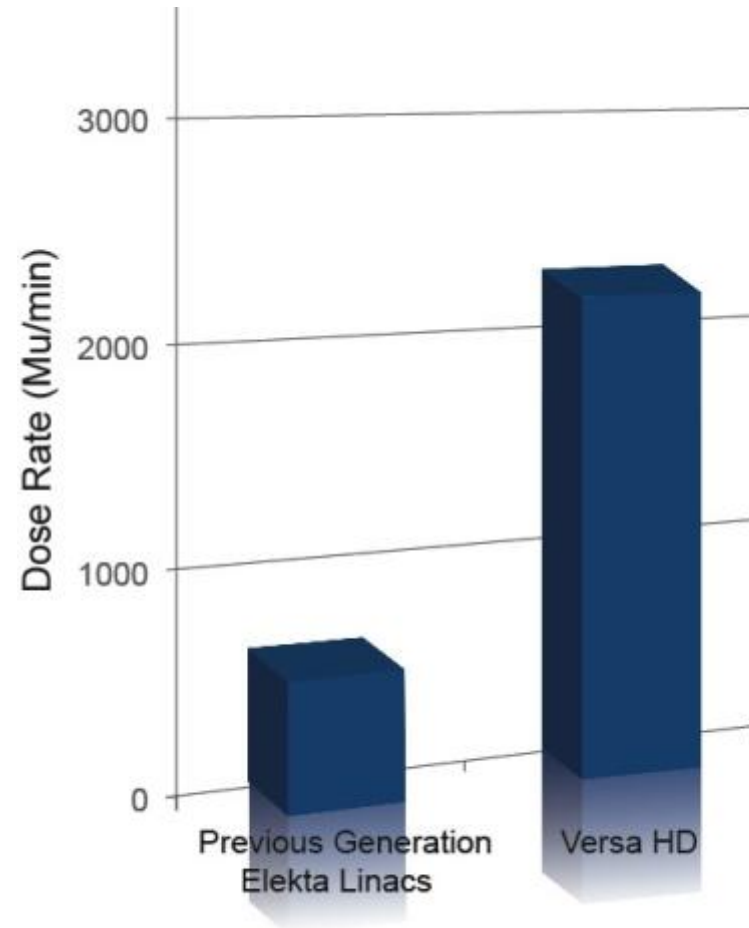
>2X

Faster MLC leaf speed

Improved therapy for more patients

3X

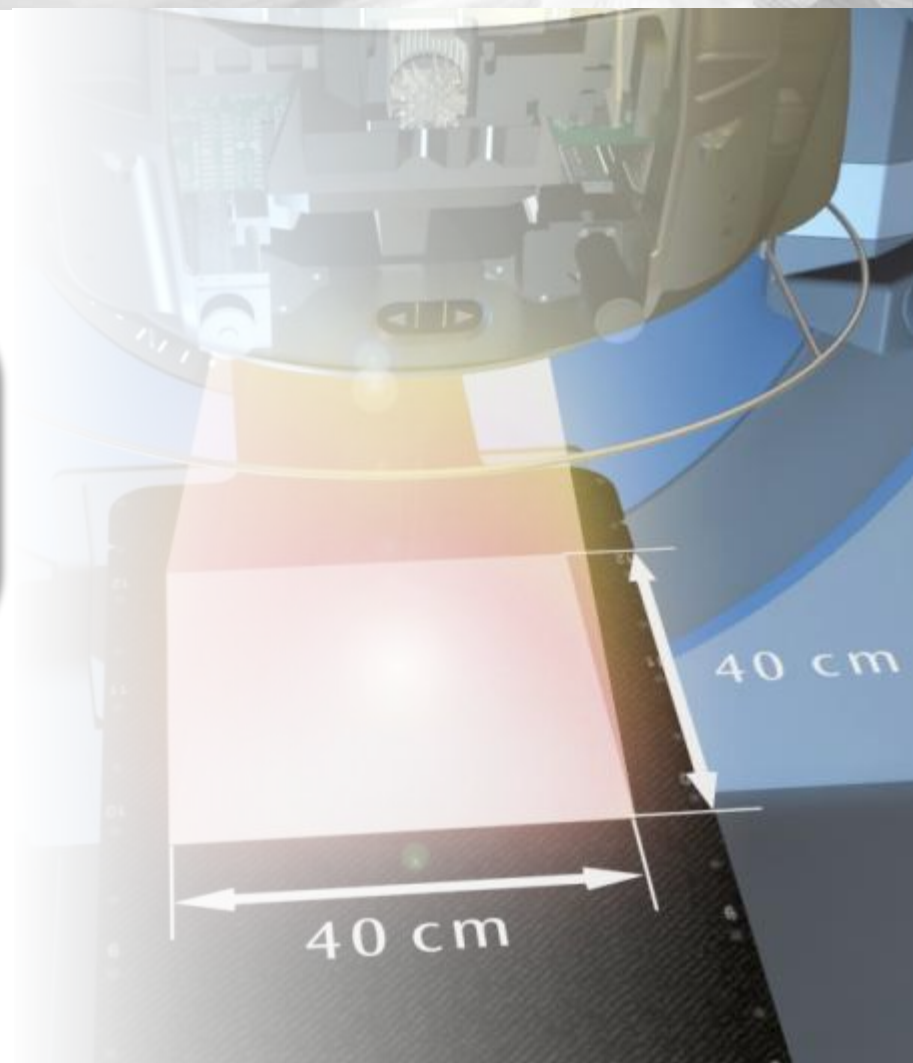
Higher dose rate



Improved therapy for more patients

2X

Larger high-definition field size



Improved therapy for more patients

>2X

Faster MLC leaf speed

+

3X

Higher dose rate

+

2X

Larger high-definition field size

=

- *Greater Versatility*
- *Improved Efficiency*
- *Higher Quality Patient Care*



VersaHD

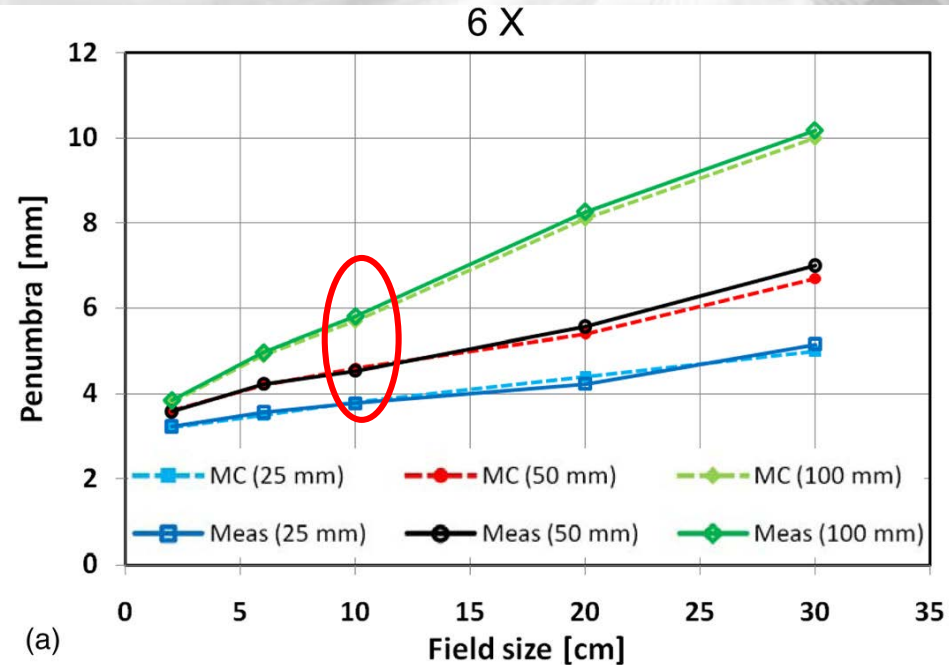
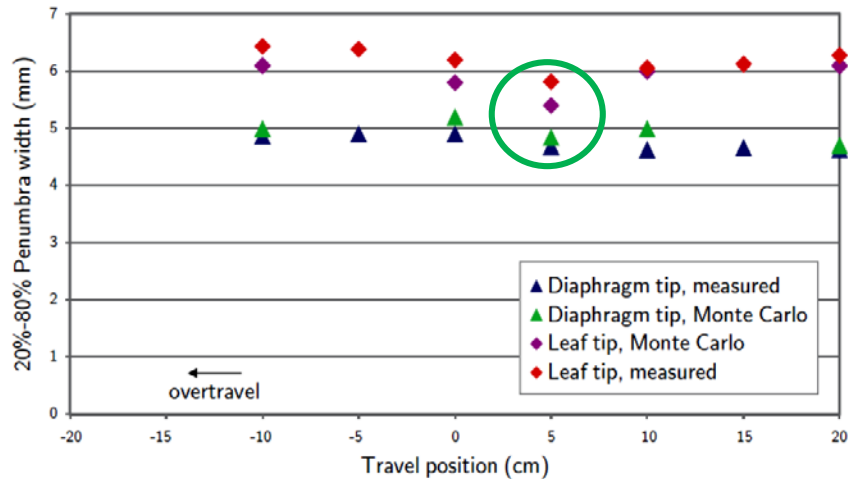
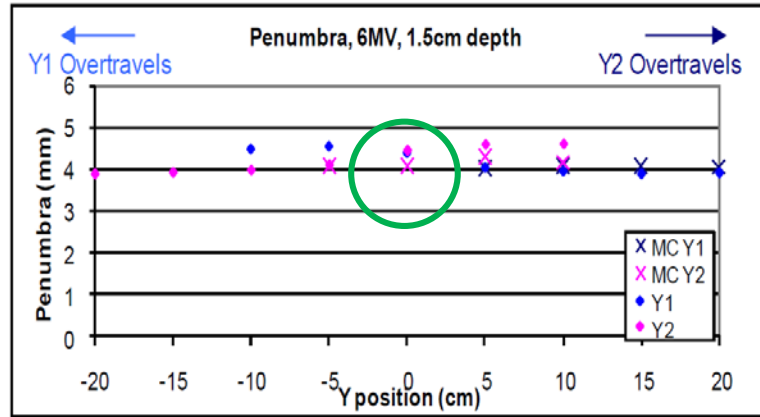


ELEKTA

www.VersaHD.com

One Solution. Unlimited Possibilities.

MLC penumbra comparison



Comparison of calculated and measured penumbra values for different field sizes defined by the HD120 MLC and depths in water. (a) data for the 6 MV beam;

Source: Monte Carlo implementation, validation, and characterization of a 120 leaf MLC Michael K. Fix, Werner Volken, Daniel Frei, Daniel Frauchiger, Ernst J. Born, and Peter Manser
Division of Medical Radiation Physics, Inselspital and University of Bern, CH-3010 Bern, Switzerland