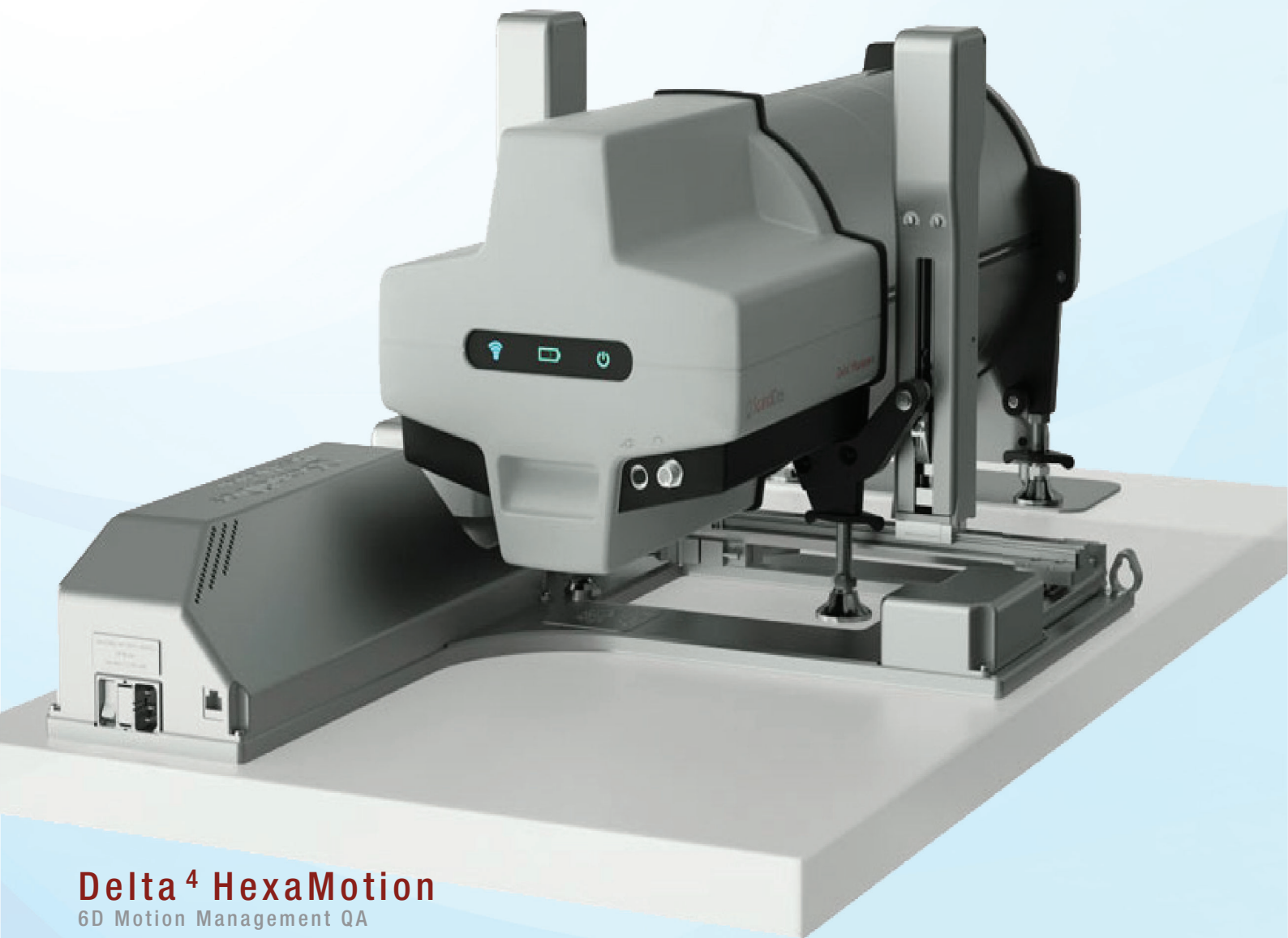


*Ensure Tumor Control in Moving Targets*



## **Delta<sup>4</sup> HexaMotion**

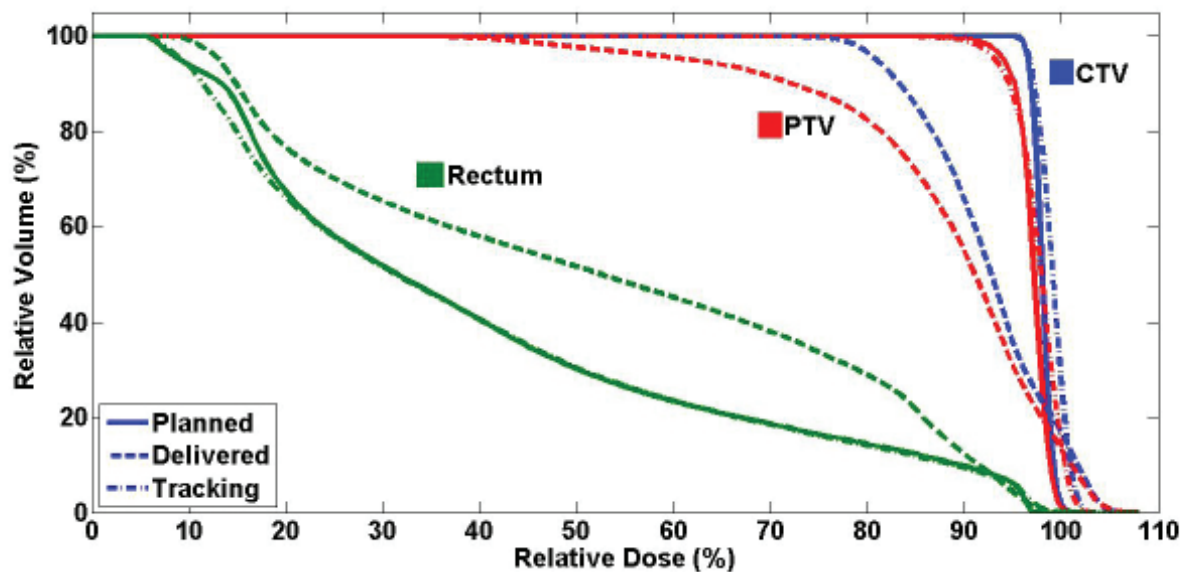
6D Motion Management QA

**Delta<sup>4</sup>**  
by ScandiDos

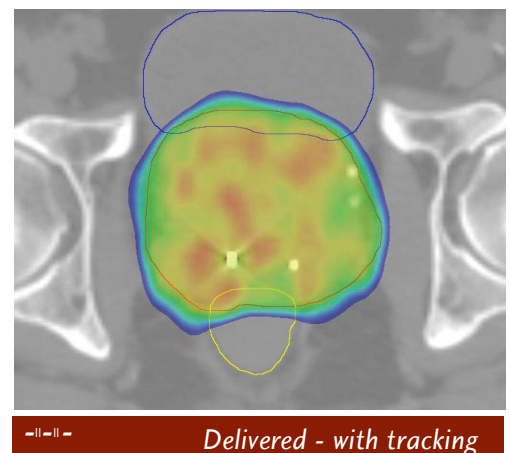
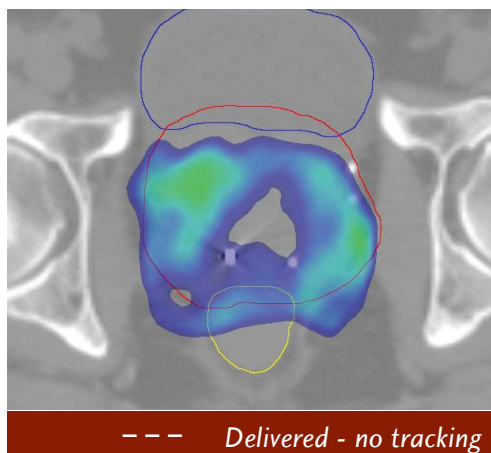
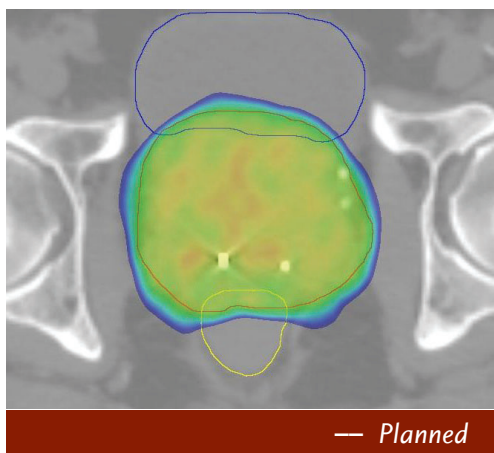
Confidence | Safety | Accuracy | Efficiency

# The tumor moves

Intra-fractional movements of the tumor can cause large geometrical errors. This is especially true for tumors in the lung and the liver, it has been shown that even the prostate can move considerably during the treatment. If these geometrical errors are not handled correctly they can result in critical dosimetric errors. This may result in the tumor volume receiving too little dose to achieve tumor control whilst organs at risk can receive too high dose.



*Treat what you intend to treat*



These images and data courtesy of the University of Sydney and the Royal North Shore Hospital, Sydney, Australia. See graph above.

## Use Real Tumor Motion

The Delta<sup>4</sup> HexaMotion 6D motion platform accurately replicates the actual tumor motion. The QA is based on how the real tumor is moving. The motion patterns both for the tumor and the patient can be imported from your motion management system and the same movement cycle is then exactly reproduced with the Delta<sup>4</sup> Phantom+. The phantom is positioned quickly and within sub-millimeter accuracy.

## Find out when Motion Management is required

The Delta<sup>4</sup> HexaMotion 6D motion platform is used together with the Delta<sup>4</sup> Phantom+ to provide a full analysis of the dosimetric effect of tumor respiratory motion. The true delivery of the prescription dose can be studied in detail for each patient and critical structure, allowing the clinician to easily identify which patients or which groups of patients require motion management.

## Validate the complete delivery chain

The complete motion management QA process shall examine the entire delivery system, including accelerator, MLC control, the motion detection and the gating or tracking system. The Delta<sup>4</sup> Hexamotion system allows the user to scrutinize:

- Monitor system start and stop
- Latencies in the delivery system
- Beam hold for anomalous conditions
- Beam hold if target exceeds threshold
- Correctness of the coordinate systems
- Baseline shifts
- End-to-end dosimetric effect

## Specification Delta<sup>4</sup> HexaMotion

- Positioning accuracy: better than 0.5 mm
- Movement range:
  - X: +/- 40 mm
  - Y: +/- 40 mm
  - Z: +/- 40 mm
  - Roll: +/- 10° @ origin
  - Tilt: +3°/-6° @ origin
- Weight: 17 kg
- A trolley provides easy and ergonomically handling of the system eliminating heavy lifts
- Used with Delta<sup>4</sup> Phantom+ or Delta<sup>4</sup>PT



## References

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*Performance assessment of a programmable five degrees-of-freedom motion platform for quality assurance of motion management techniques in radiotherapy:* Australasian Physical & Engineering Sciences in Medicine - Sept. 2017, Volume 40, Issue 3, pp643-649

*DMLC tracking and gating can improve dose coverage for prostate VMAT:* Med Phys. 2014 Sep; 41(9):091705



*Innovative and Efficient QA*

## The ScandiDos mission

The Delta<sup>4</sup> family of products are developed, engineered and manufactured by ScandiDos, a company that strives to improve the treatment of patients with cancer worldwide. ScandiDos achieves this by reinforcing the confidence in radiotherapy clinics using innovative solutions that further individualize the radiation treatment, making the process safe and efficient. The Delta<sup>4</sup> family of products delivers a comprehensive solution for radiation therapy and quality assurance, ensuring safe and accurate treatment. Today, we support our customers worldwide with offices and partners in Europe, USA and Asia, continuing our mission of **empowering professionals with power and performance.**

**ScandiDos AB, a worldwide leader in quality assurance solutions and dosimetry for radiation therapy.**

For more information about the Delta<sup>4</sup> family of products, please visit [delta4family.com](http://delta4family.com).

For more information about ScandiDos, please visit our corporate website at [ScandiDos.com](http://ScandiDos.com).

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