

# Delta<sup>4</sup>

by ScandiDos

## Delta4 Discover Transmission detector for at treatment QA



**At treatment**

CONFIDENCE | SAFETY | ACCURACY | EFFICIENCY



# Game changer in patient QA

**Delta4 Discover** transmission detector provides confidence and patient safety based on real time measurements. Its outstanding accuracy and ease of use assures the highest efficiency in your patient QA. Delta4 Discover is the most efficient solution for performing patient QA during treatment.

- Unique real-time patient specific QA
- Optimizes patient QA workflow
- An alternative or complement to pre-treatment verification
- The one and only transmission detector validated by Varian

## THE UTMOST IN CONFIDENCE AND PATIENT SAFETY WITH THE HIGHEST EFFICIENCY IN PATIENT QA

With the future of radiation therapy trending towards increasingly complex treatment plans, including 4D treatments, hypofractionation and adaptive radiotherapy, the need for instantaneous plan approval and maximum accuracy during all stages of QA is greater than ever before.

To us, a solution includes both accuracy in determining the dose delivered to the patient but also efficiency and ease of use with minimal changes to the normal workflow at the clinic. It also includes the tools required for a physicist to find the cause of errors and discrepancies when they occur.

Our solution is the Delta4 Discover, a transmission detector that measures the transmission dose in the cleverest way, including minimal attenuation and minimal increase in skin dose to the patient without reducing treatment clearance.

## EFFICIENCY AND EASE OF USE WITHOUT ADDITIONAL CLINICAL WORKLOAD

### Plan import

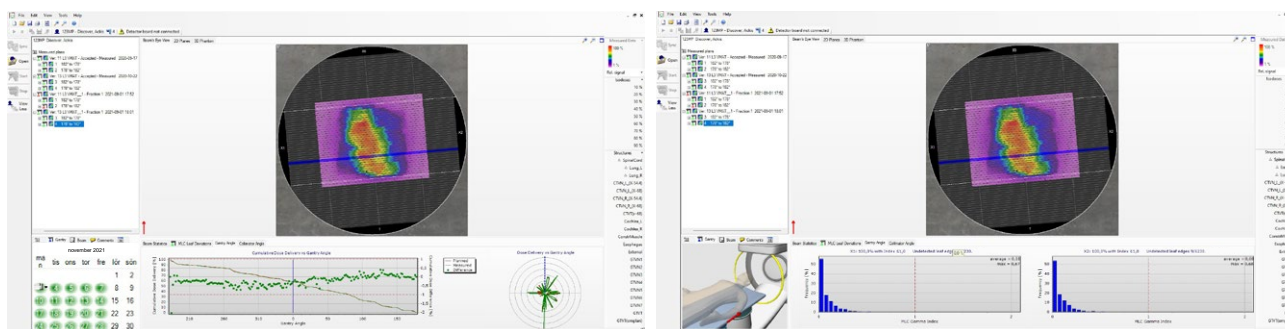
The physicist imports the patient's DICOM files into the Delta4 Software. No additional recalculations required.

### Delivery verification

The therapist selects the patient to be treated and the ADI interface automatically communicates with the Delta4 Software, which then selects the right patient for verification. Delta4 Discover synchronously monitors all treatment parameters in real-time, including dose, all individual MLC leaf positions, gantry angle, collimator angle, and patient positioning.

### Data analysis

Upon completion of treatment, data is automatically analyzed and displayed in the Delta4 Software. The software enables you to instantly view the results of verified parameters at any given time. You can view the results per fraction or accumulated after a certain amount of fractions. The software displays parameters including beam statistics, MLC leaf deviations, gantry angle, collimator angle and fraction.



MLC Gamma index – was invented by ScandiDos to improve and speed-up the analysis when having the luxury of synchronously monitored information. The MLC Gamma is an index combining deviation in MLC leaf positioning and gantry angle.

### Review and reporting

Treatment data and results are stored in the Delta4 Software. In case of an error, the physicist is immediately notified via an email automatically generated by the system. An overview of the treatment course progress and results are always available.



When implementing the Delta4 Discover it was a very simple characterization process, we did not have to do beam modeling and the automated interfacing with the R&V system enabled a seamless workflow. It is not time consuming in our daily routine and we intend to use it continuously in all treatment fractions, and also use it for our SBRT treatments and implement it in our Machine QA program.

Dr. Edoardo Petrucci  
Medical Physicist, Ivrea Hospital – ASLT04, Italy



# Innovative design and technical details

## The ultra-thin Delta4 Discover detector uniquely gives you:

- Maintained clearance. The detector fits within the anti-collision zone resulting in no reduced clearance.
- Beam transparency: with attenuation  $\sim 1\%^*$  – no need for recommissioning to begin using the Delta4 Discover.
- Minimal skin dose:  $\sim 1\%^*$  additional skin dose – system can be used at all fractions.
- Highest resolution: verify the MLC leaf position with sub-millimeter accuracy. Delta4 Discover features a detector matrix consisting of 4040 detectors with 1.5 mm spacing along MLC trajectories. (see “Figure A” below)
- Dose distribution independent from log-files.
- Integrated dose delivered to the patient. Support for decisions of adaptation during the course of the treatment including adaptive radiotherapy.

\*6MV, 10x10cm field

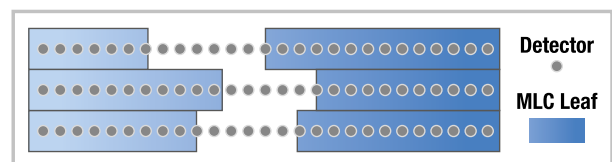


Figure A

## Delta4 Discover Advantages

- Measures with outstanding accuracy
- Minimum efforts with no interactions required if treatment is within acceptance criteria
- Together with Delta Phantom+ it delivers quantified information and verifies 3D dose and DVH in patient anatomy
- No recommissioning required
- Alternative or complement to pre-treatment verification, verifying MU, MLC position, gantry and collimator angle, and patient position

## Delta4 Discover Applications

- VMAT and IMRT
- FFF
- 3D Conformal
- Hypofractionation
- 4D Treatments
- Adaptive Radiotherapy
- SRS/SBRT cases with non-coplanar beams



# A comprehensive solution for all stakeholders

## BENEFITS FOR THE PHYSICIAN, PHYSICIST AND THERAPIST

### For the physician

- Evidence for the delivery of the prescribed dose
- Permanent control of delivered dose to the OAR
- Optimizes staff workflow and ensures patient safety
- Sets the stage for adaptive radiation therapy



Physician confidence

### For the medical physicist

- Optimizes workflow with unmatched efficiency and accuracy
- Real time dose verification
- Flexibility to choose the optimal QA for the patient
- Independent verification of all treatment parameters
- Scheduling minimizes time and effort for pre-treatment verification



Physicist efficiency

### For the radiation therapist

- In Vivo dosimetry without placing diodes
- Ensures patient safety and team confidence
- No extra workload
- Maintained clearance
- Light field and ODI visible



Therapist seamless process



...the plan quality does change for each treatment due to changes in machine output or small differences in leaf position. The information provided by the Delta4 Discover can prove invaluable to the treating team in determining how to proceed with treatment when non-ideal treatment delivery quality is observed. (Validation of motion-tracked prostate SBRT treatments with a transmission detector)

Dr. Martin Szegedi,  
Assistant Professor, Huntsman Cancer Hospital, Utah, USA



A photograph of a woman with long, wavy brown hair carrying a young child on her shoulders. The woman is wearing a grey t-shirt and has her eyes closed, looking upwards towards the sun. The child is wearing an orange t-shirt and a red wristband. The background is a bright, hazy outdoor setting with a cityscape visible in the distance. The text "We drive the development of solutions for safer radiation therapy" is overlaid in white, bold, sans-serif font on the left side of the image.

**We drive the  
development  
of solutions  
for safer  
radiation therapy**

# Technical Specifications

## DELTA4 DISCOVER

### Accuracy

**Dose measurements in prescription point** Within 1.5%

**MLC Positioning Determination** 95% within 1 mm

### Beam attenuation

**Beam Attenuation** About 1%<sup>1</sup>

**Increase of skin dose** About 1%<sup>1</sup>

<sup>1</sup>6MV, 10 x 10 cm field

### Detectors

**Total number** 4040

**Diameter** 1 mm (disc shaped)

**Spacing** 2.5 mm\* (along MLC trajectories); 5 mm\* (transverse to MLC trajectories)

**Area covered** 195 x 250 mm<sup>2</sup>\*

**Type** p-Si

**Sensitivity decrease (6MV beam)** 1% / 25kGy

\*When projected down to isocenter plane.

### Weight and dimensions

**Dimension** Diameter: 790 mm, disc shaped

**Weight** 8.7 kg without batteries (0,5kg / battery)

### Reduced linac clearance when mounted

**E.g. Varian TrueBeam** 6 mm from the top of the accessory pins, 23 mm from collimator surface

### Linac's light field

**Elekta and Varian machines** Delta4 Discover can be extracted so that the linac's light field is completely visible

### Battery

**Operational Capacity** >6 hours; Rechargeable Li Ion battery – Charger is included

**Clearance** The Delta4 Discover is an FDA 510(k) and CE cleared QA solution.



<sup>TM</sup>Delta4 Discover is a trademark of ScandiDos AB (publ)

®TrueBeam is a registered trademark and Millenium MLC is a trademark of Varian Medical Systems, Inc.





By using the Delta4 Discover during treatment we can confirm the actual dose in the patient. The real-time dose verification from Delta4 Discover plays an important role when physicians do treatment planning. They can adapt the plan if they find out that any errors have occurred during treatment.

Dr. Hirofumi Honda  
Chief physicist, Ehime University Hospital, Japan

# Innovative and Efficient QA

[delta4family.com](http://delta4family.com)

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