THALES 3D MR SCANNER

Beam model validation of the MRIdian Linac with the THALES 3D MR SCANNER AAPM 2020

OUTLINE

- Challenges with MRgRT
- Helicopter view of the THALES 3D MR SCANNER
- Clinical workflows
- Performances

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New trend in IGRT with MR-Linac

Beam model commissioning of the MRIdian

- **Identified complexities**
  - Stereotactic treatments
  - Flattening filter free (FFF) beam type
  - Presence of the static magnetic field Bo
    (effect on dosimetry, conventional tools prohibited)

- **What to do**
  - Refer to existing guidelines: TG-106, TG-142, …
  - Prediction via simulations
  - Measure, measure, measure

- MR-compatible, efficient solution needed

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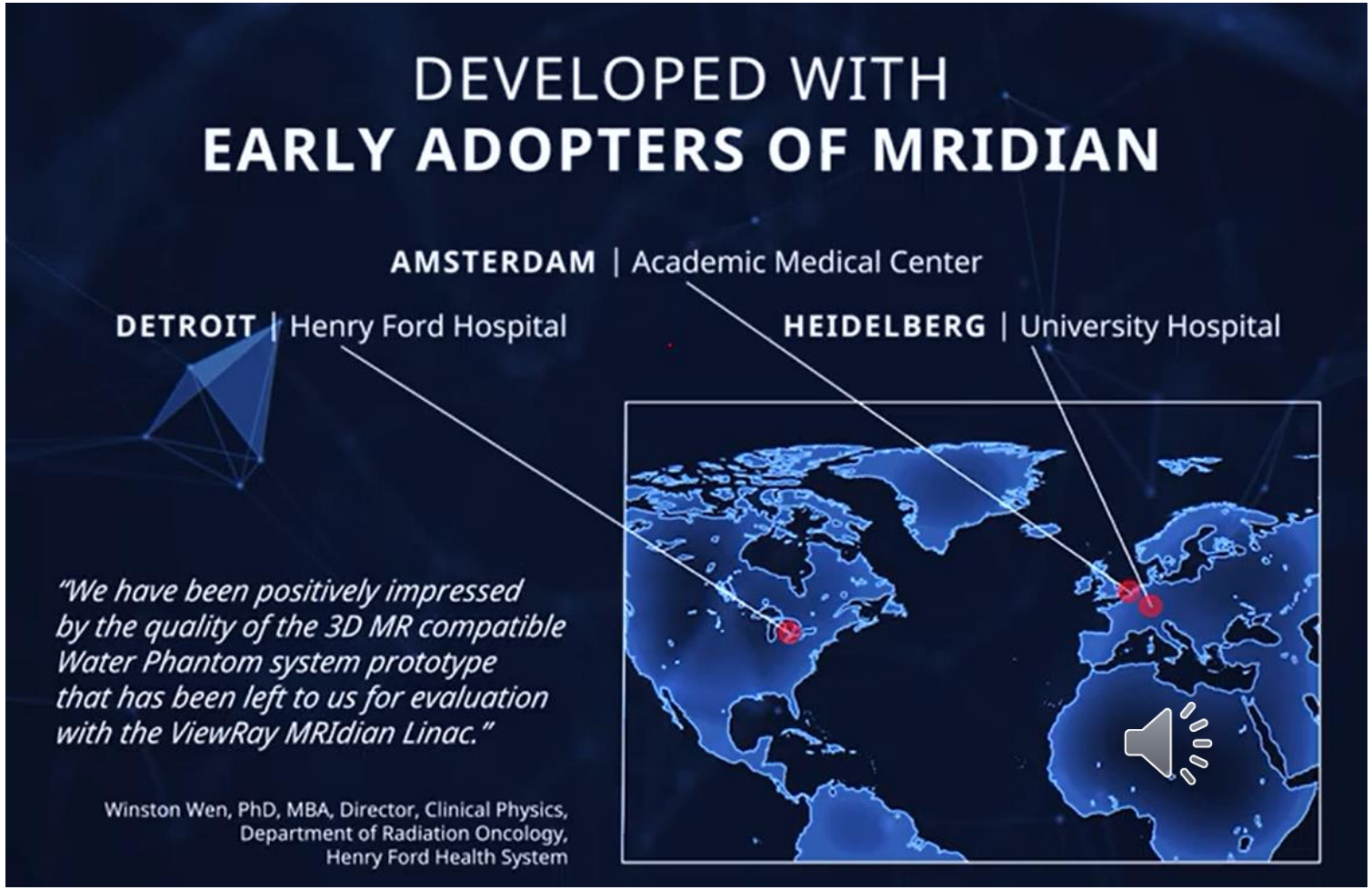
Outcome of successful partnerships

Collaboration with ViewRay

- MRIDian & TPS specifications
- Early system characterization

Collaboration with early adopters

- Identify challenges
- Evaluate solutions
- Validate workflows



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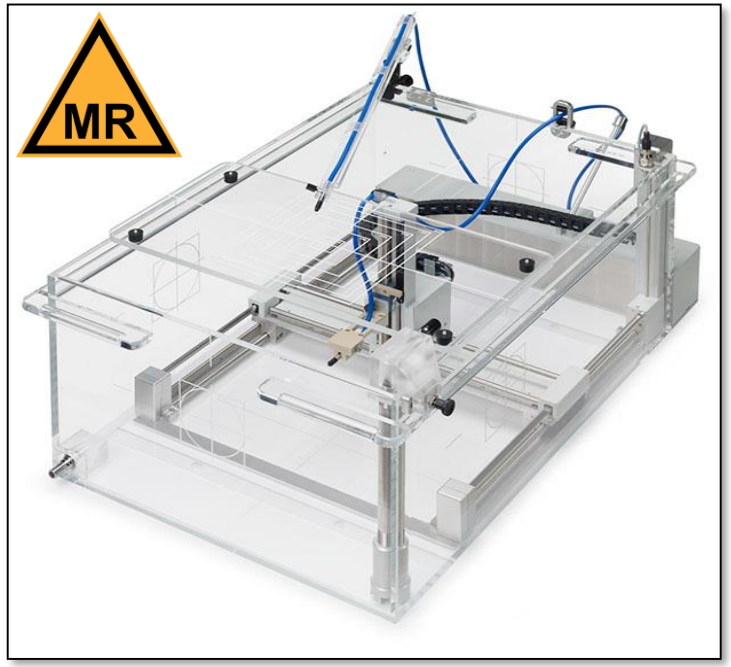
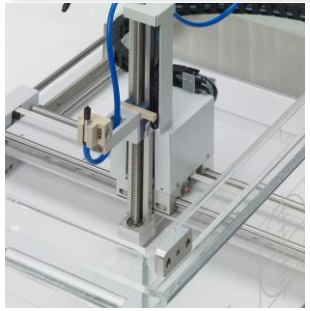
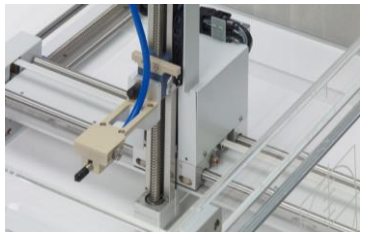
Solution for efficient commissioning and Quality Assurance

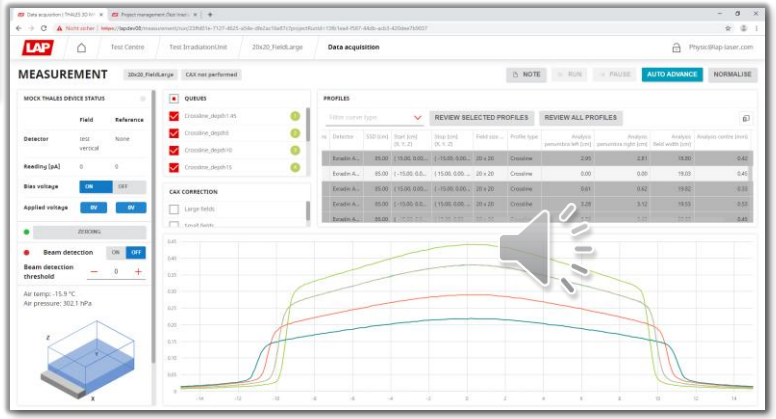
A complete package

- **MR-Certified Water Phantom**
  Scanning: 38cm(X)*38cm(Y)*24.2cm(Z)
  Accuracy: +/-0.25mm
- **Integrated electronic in carriage system**
  High resolution dual electrometer
  Compact equipment storage
- **Web-based acquisition software**
  Automated measurement process
  Dedicated Analysis tools for FFF









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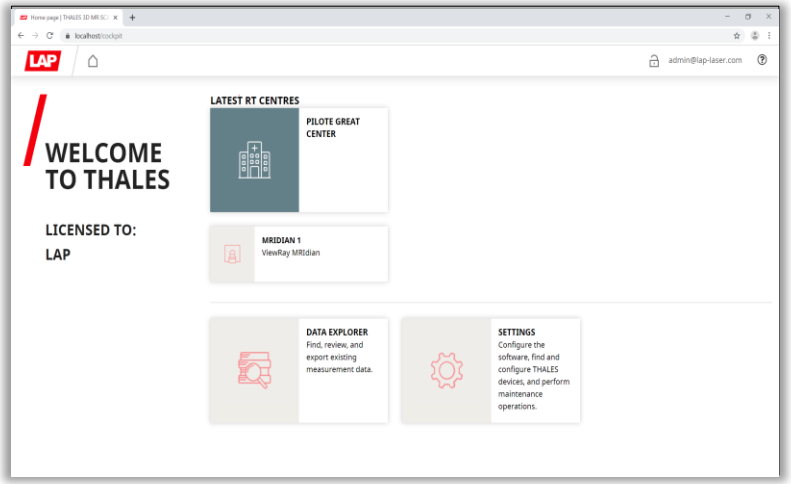
Getting started



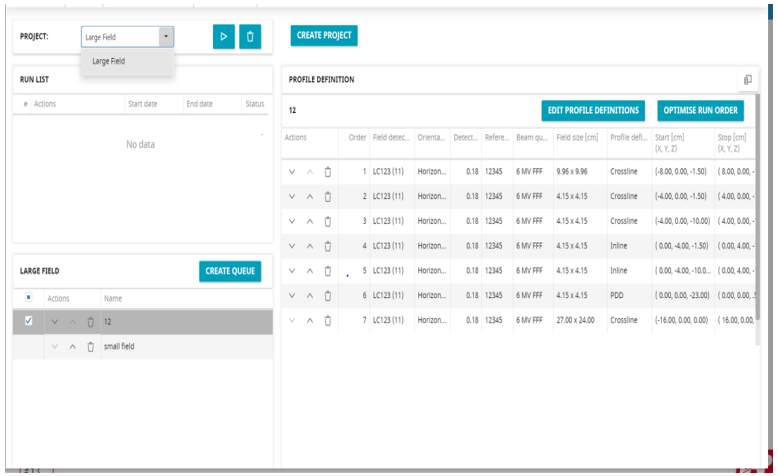
- Environment settings

RT centre

Linac

Detectors (EPOM shift)

User management

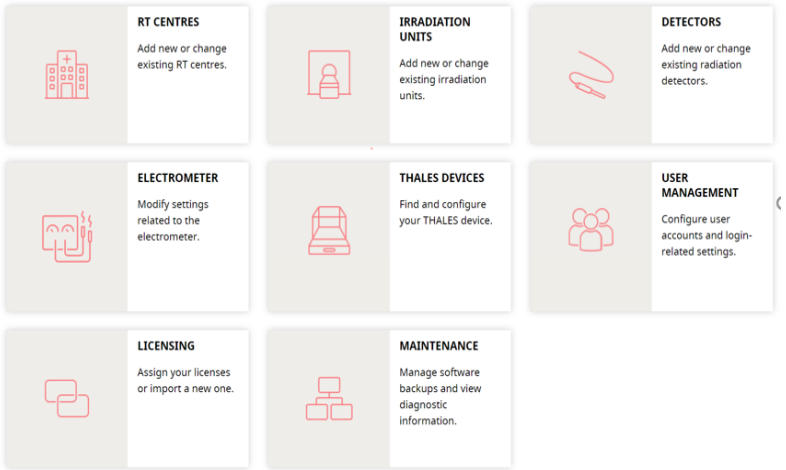


- Web-browser technology

Server / client installation

Welcome page

Access to different workspaces



- Plan your work

Project, Queue, trajectory

Optimize scanning time: Run order

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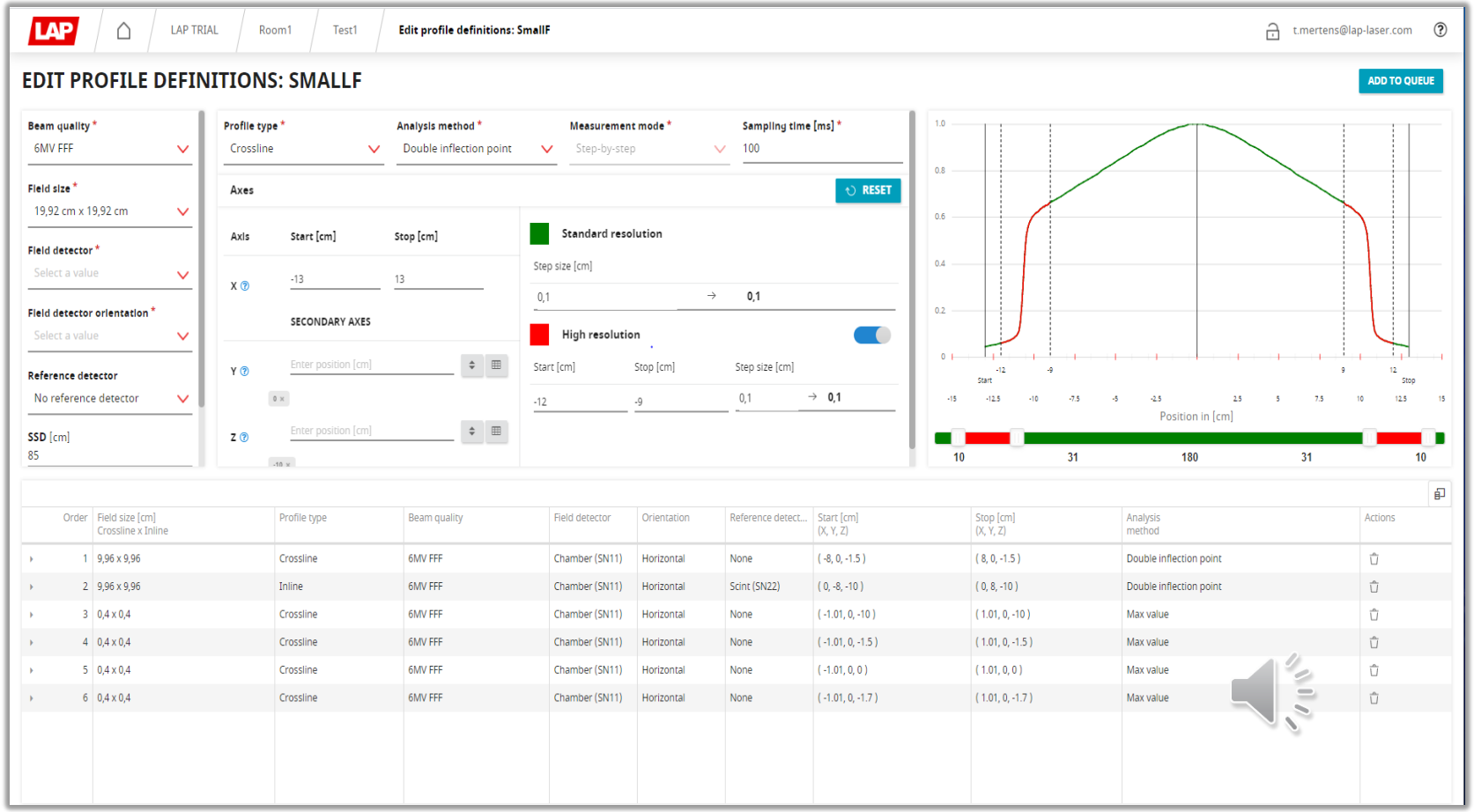
Preparation of the measurement plan

Guided trajectory definition

- Preparation of measurement queues
- Expected measurement lineshape for various field sizes
- Detector selection
- Dedicated analysis tools for FFF beams (small, large fields)



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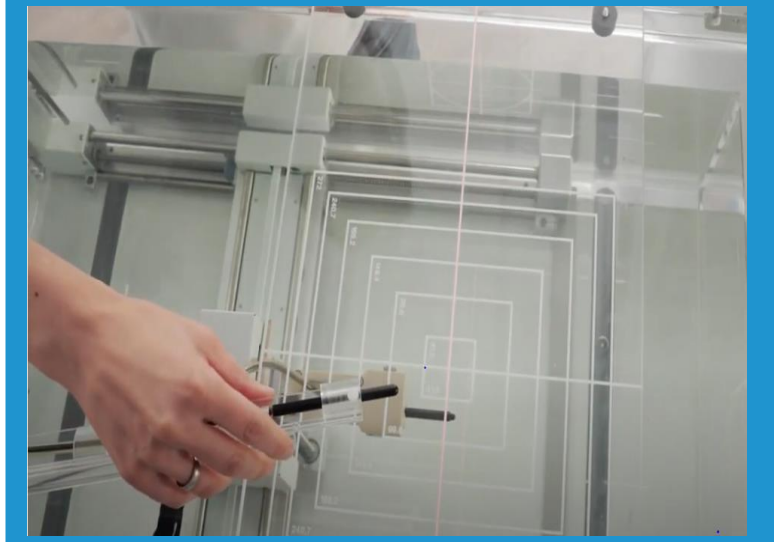
Setup: ready in 15min!

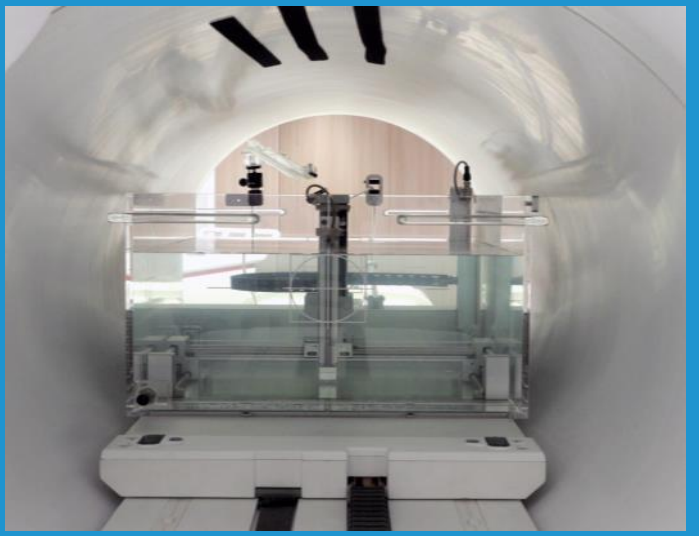
1. Installation on the couch

- Registration with index bars
- Localize vs. Lasers
- Cables connect & Water filling



2. Detector alignment

- Adjustment vs. lasers
- EPOM at water surface
- Reference detector positioned



3. Localize at the isocenter

- Send inside the bore
- Perform CAX corrections

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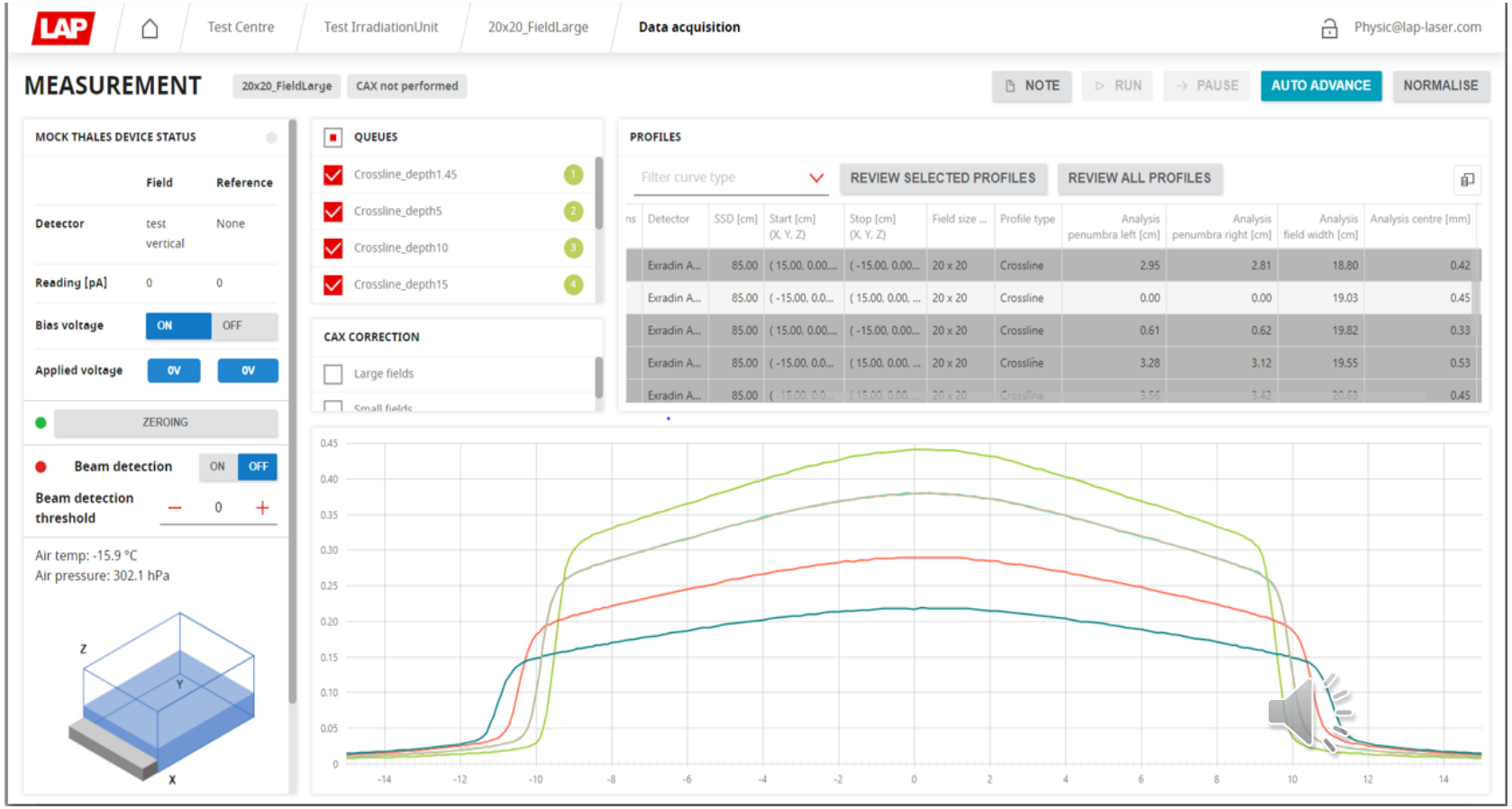
Acquire your data

Acquisition screen

- Real time key informations
  - ➢ Position field chamber
  - ➢ Electrometer readout
- Automated CAX process
- Data acquisition status progress
- Link to review & analysis screen



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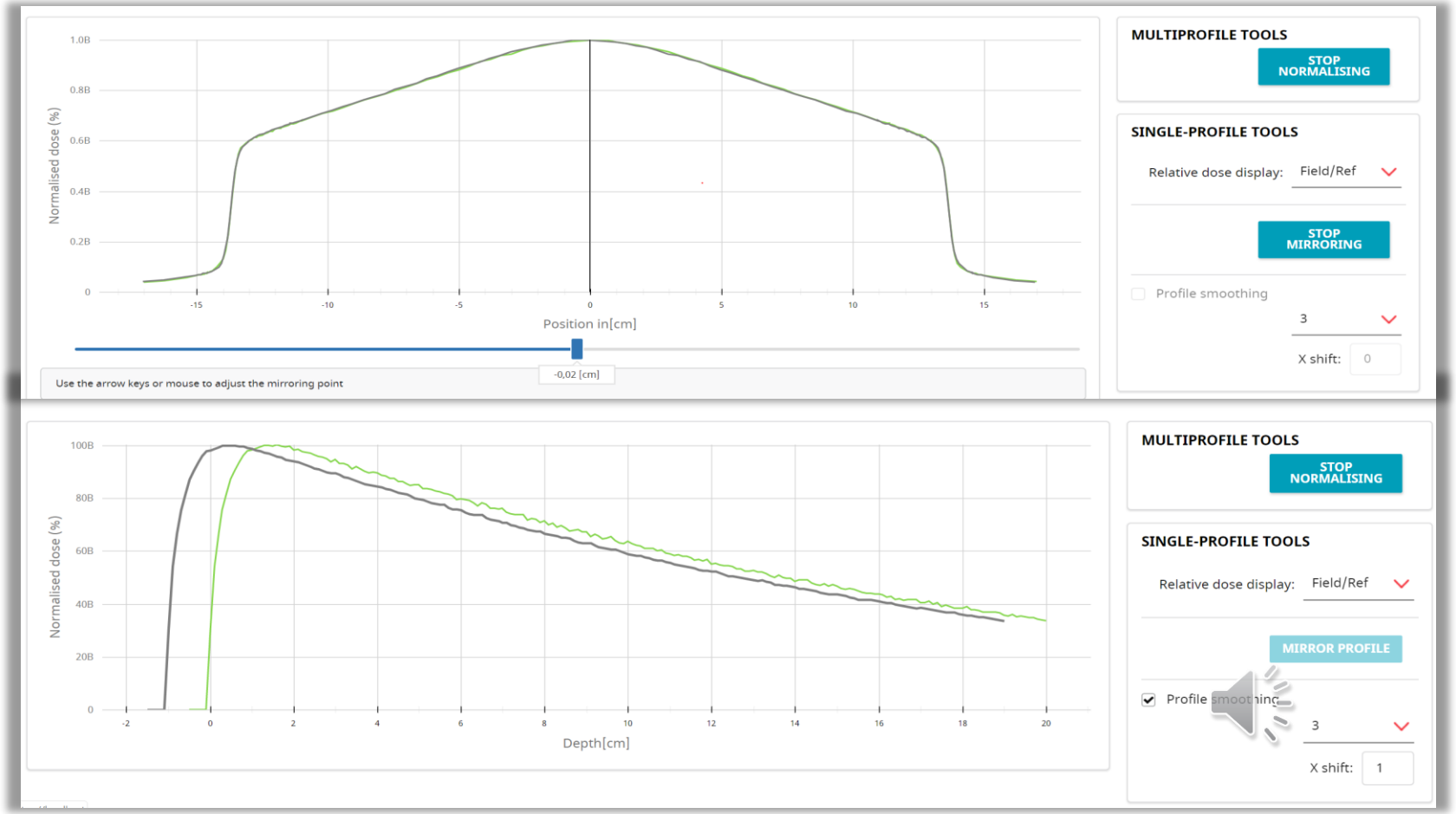
Review your data

Analysis tools

- **Curve normalization**
- **Analysis functions**
  - Mirroring profiles
  - Smoothing curves
  - Beam parameters analysis
  - Linac stability during measurement (ref. chamber output)



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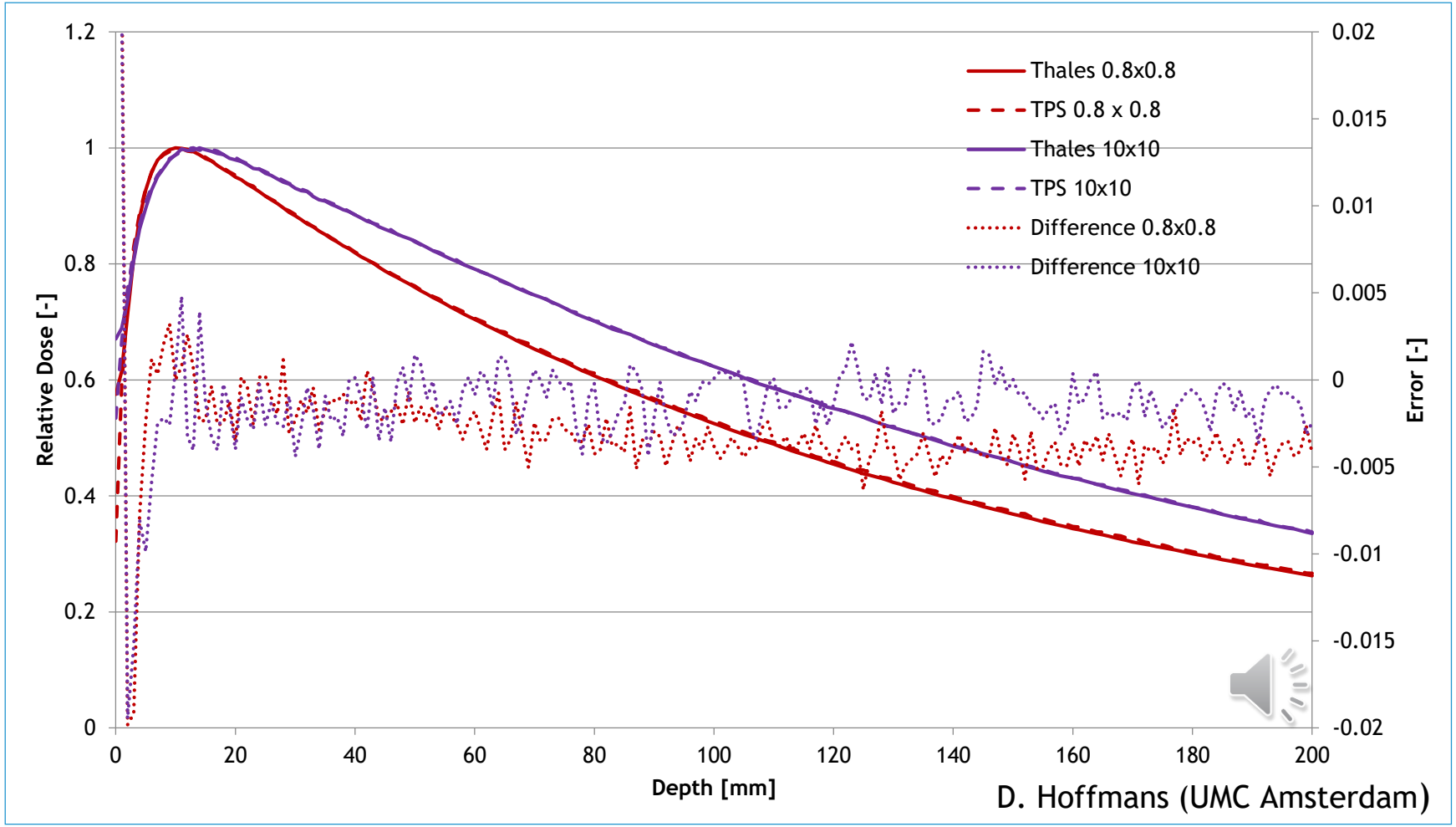
Performance assessment (1)

Comparison with Monte Carlo

- Small and large fields
  9.96cm * 9.96cm
  8.3mm *8.3mm
- A26MR (small field)
- A1SL (large field)
- Excellent agreement is observed: deviations < 1mm



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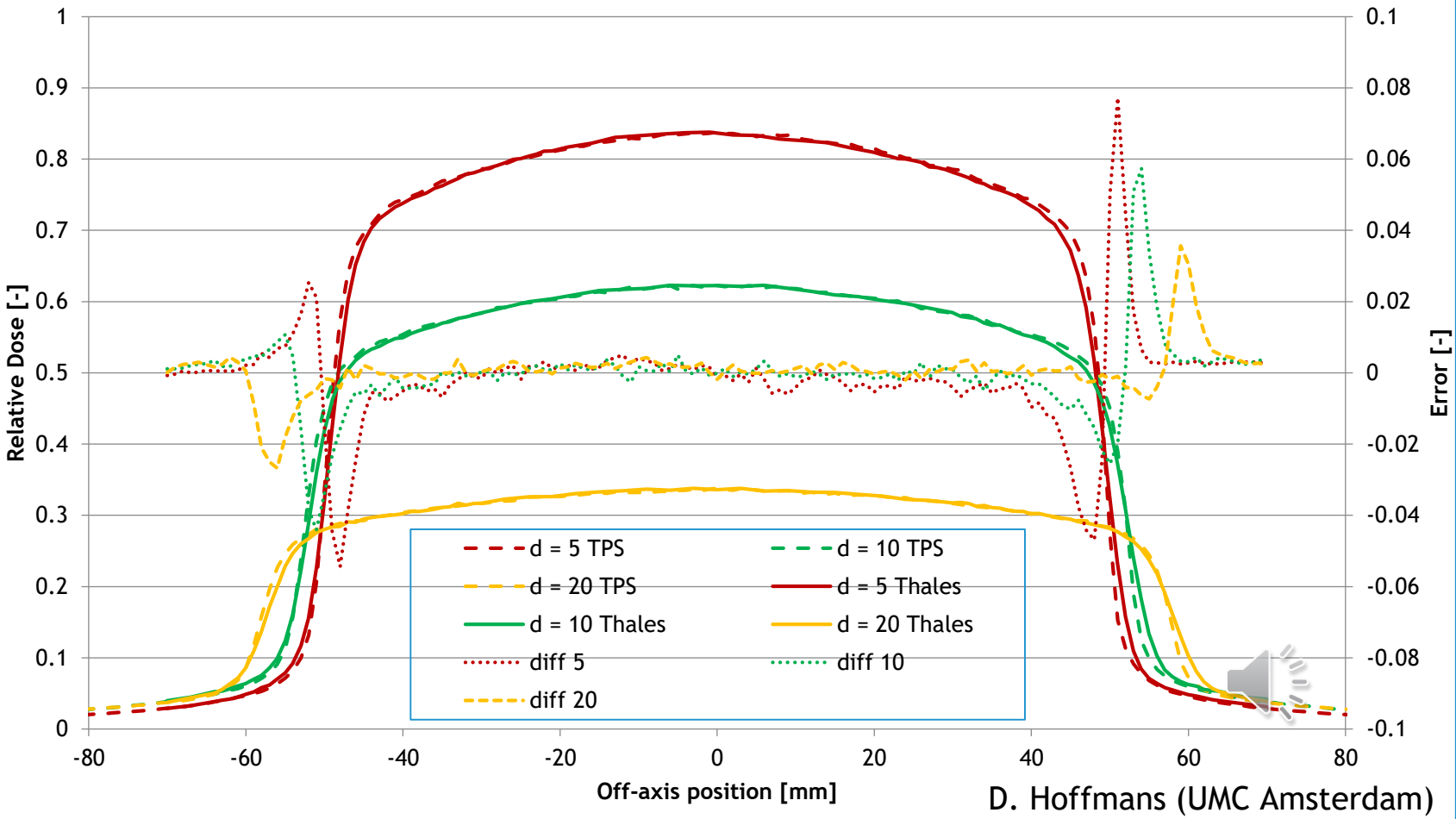
Performance assessment (2)

Comparison with Monte Carlo

- Field size: 9.96 * 9.96
- A1SL field chamber
- Crossline for various depths
- Excellent agreement is observed: deviations < 1mm



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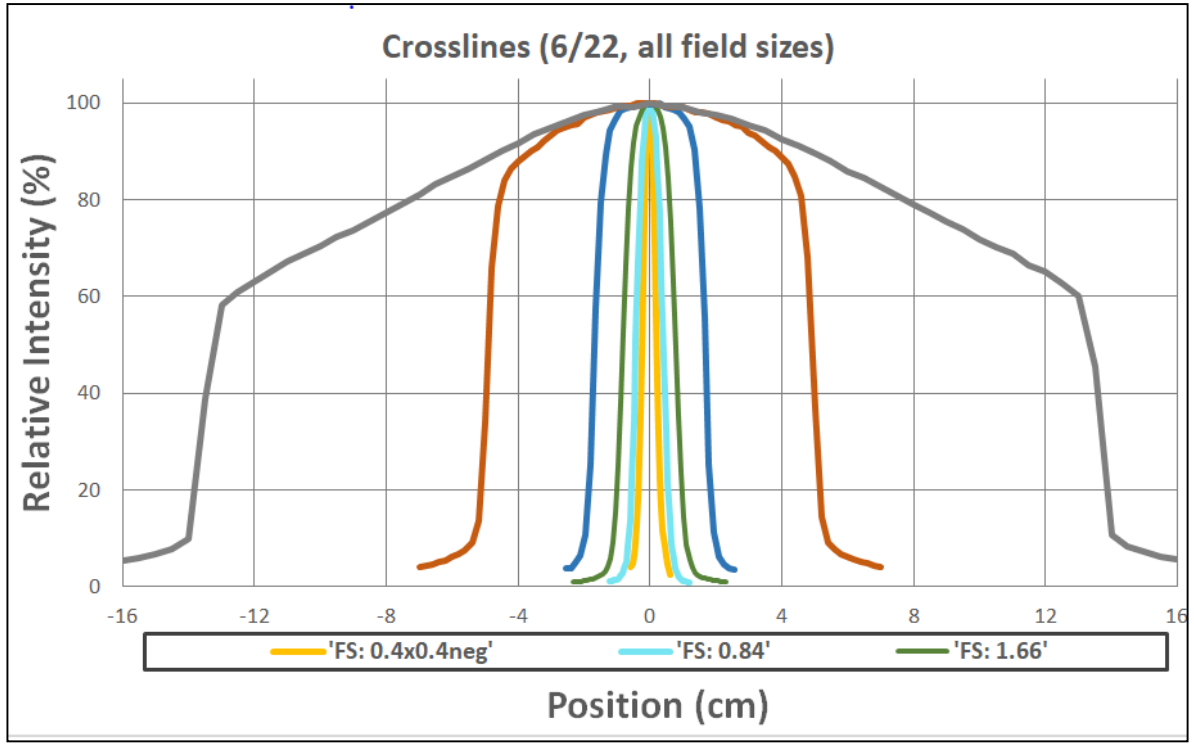
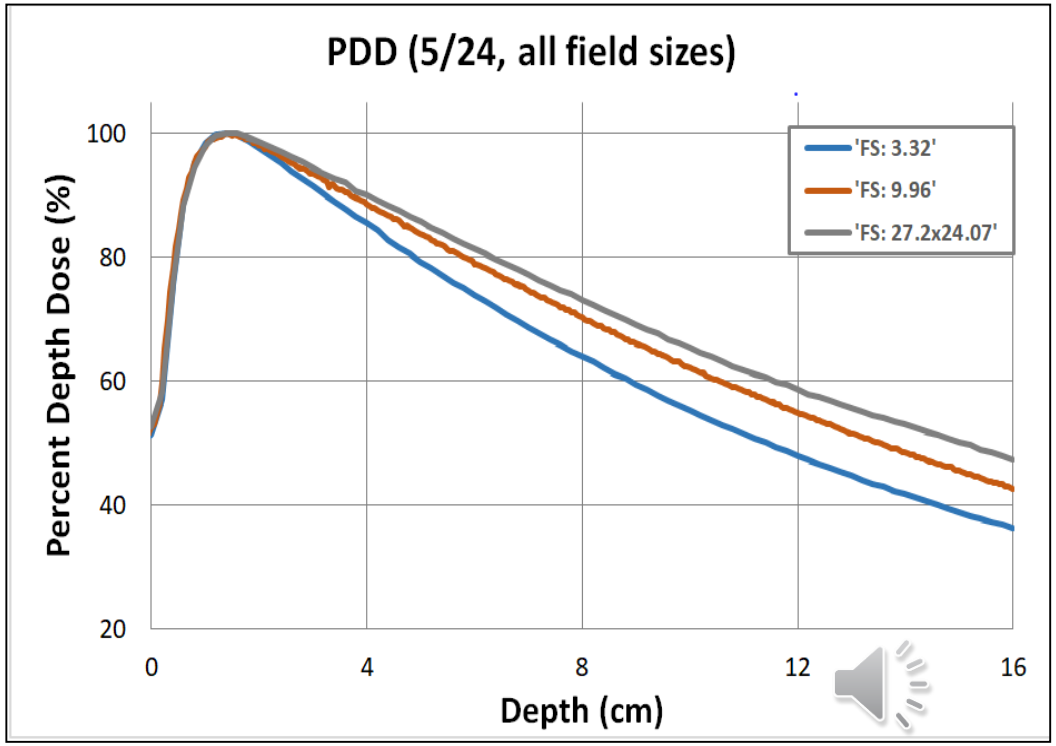
Performance assessment (3)

Example of data collection





N. Weng (Henry Ford Detroit)

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News

THALES 3D MR SCANNER is now FDA (510k) cleared! Available Q4 2020

For more information please contact your regional Sales representative:

https://www.lap-laser.com/de/produkte/thales-3d-mr-scanner/

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Time for questions