Pushing the Boundaries in SGRT

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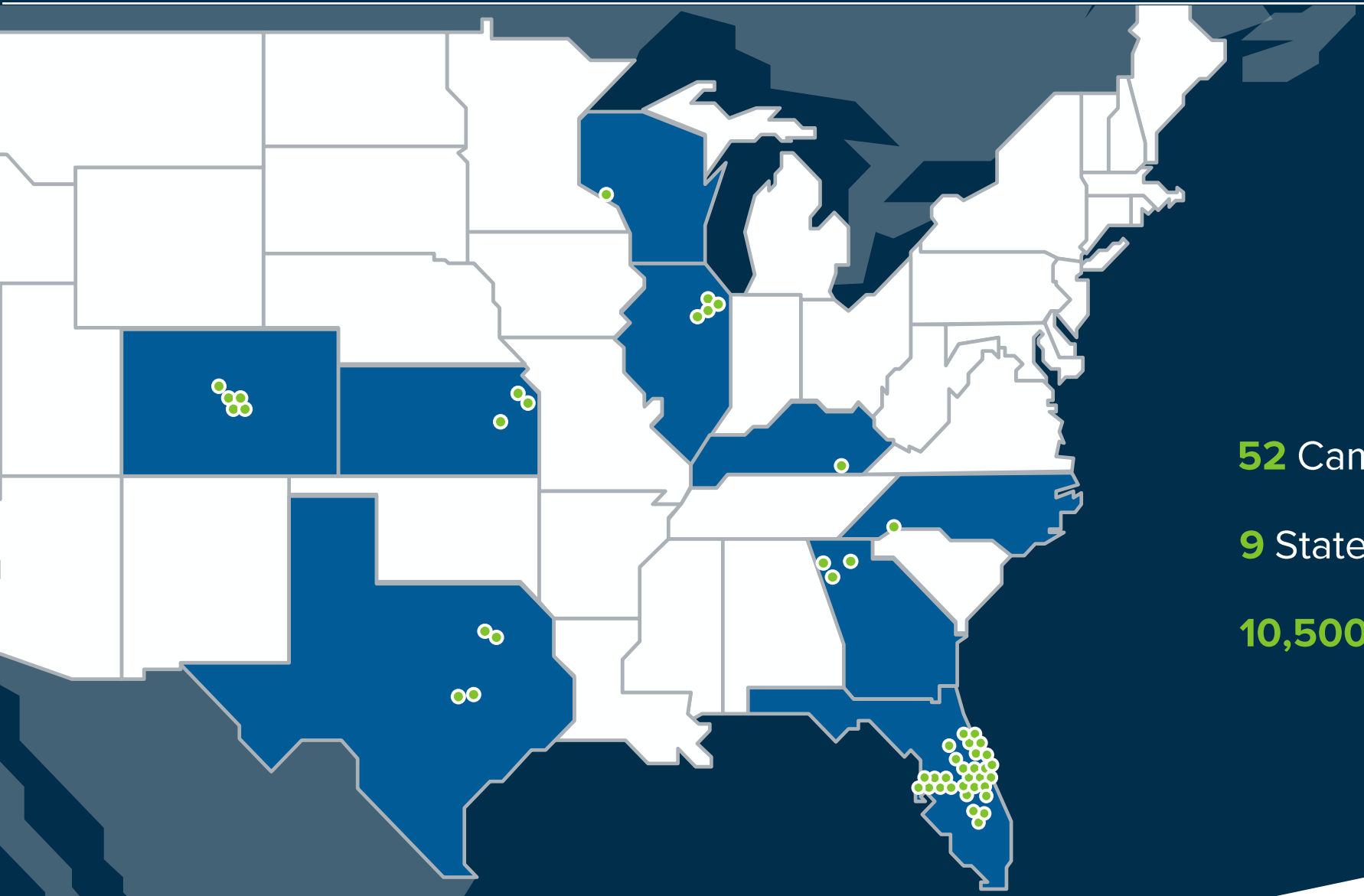

52 Campuses

9 States

10,500+ Licensed Beds

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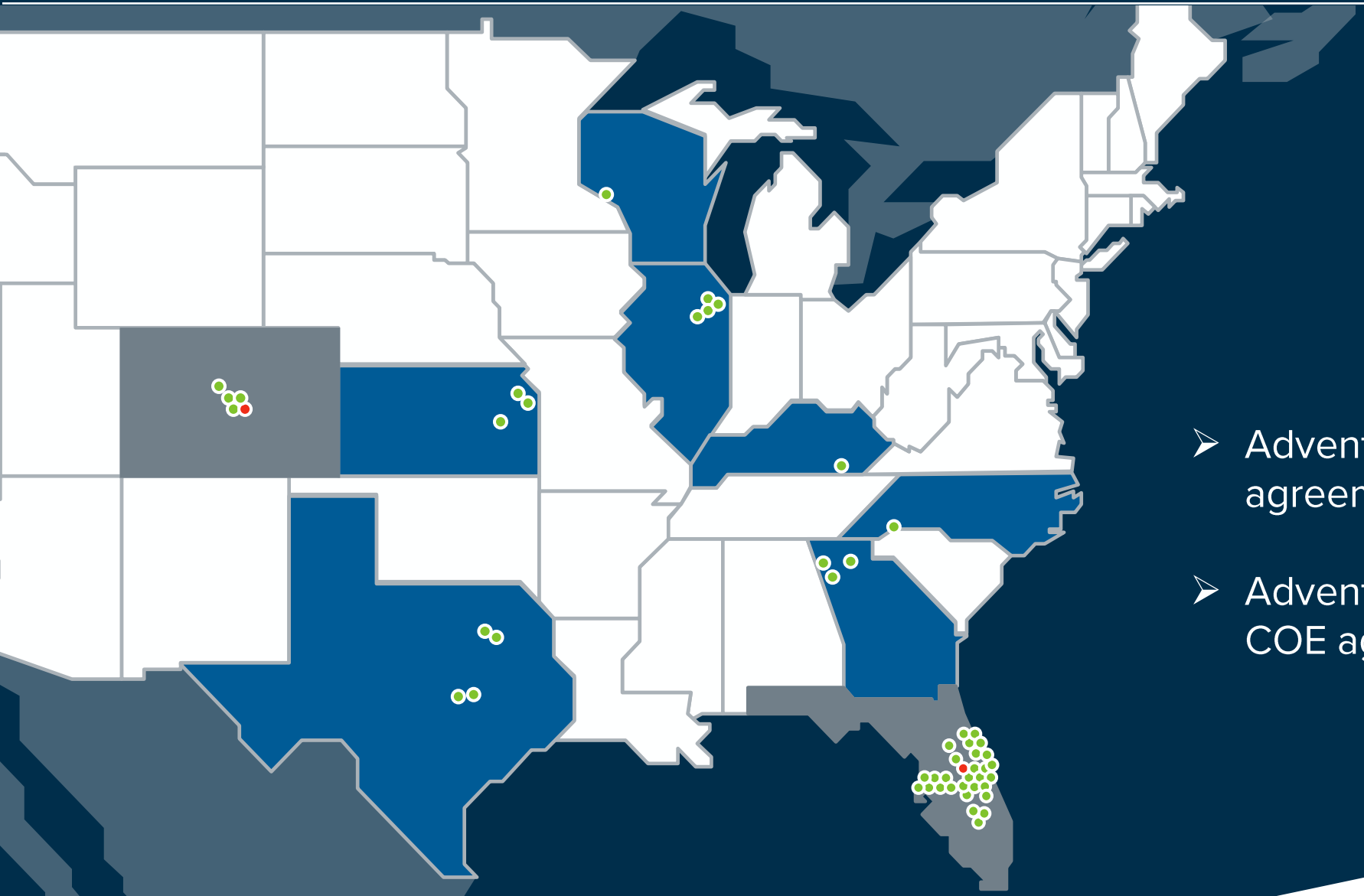
Disclosures



- AdventHealth – Parker has a PSA agreement with Vision RT.
- AdventHealth – Celebration has a COE agreement with Vision RT.

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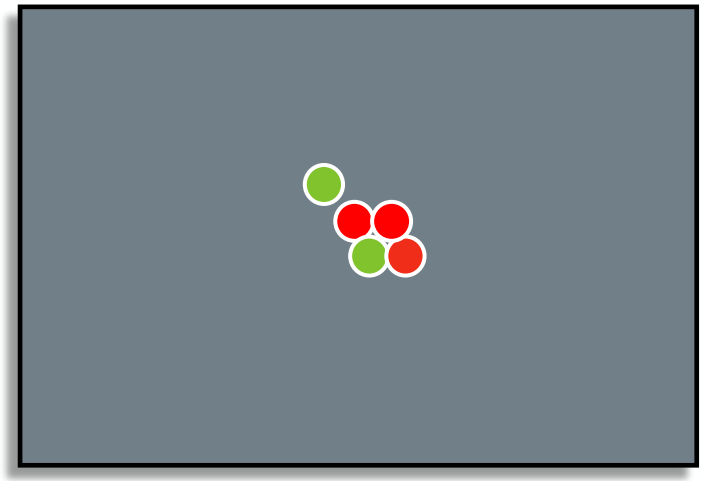
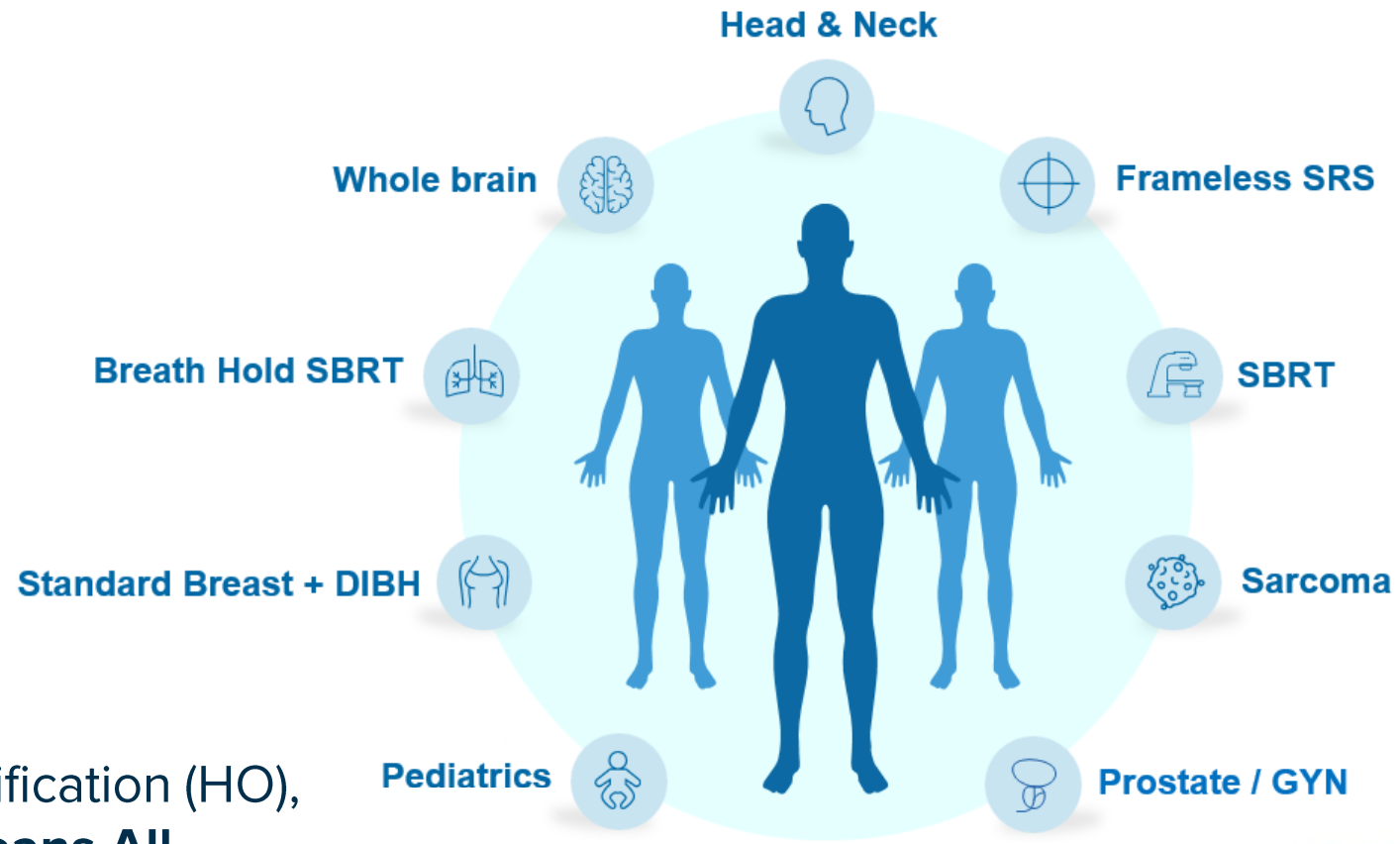
Rocky Mountain Region





- SGRT is standard of care
- 100% of patients treated with SGRT.
- All indications including Heterotopic Ossification (HO), Electrons, and Osteoarthritis (OA)…**All means All**
- SGRT used for Simulation, Planning, Patient Identification, Patient Setup, Motion Management (Respiratory), Treatment Delivery and Dose Visualization

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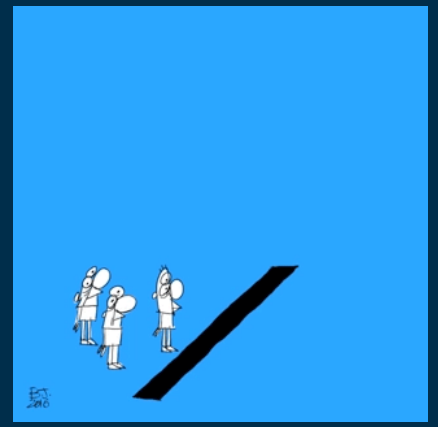
Pushing Boundaries Doesn't Mean Crossing "The Line"

This is a safe space



- SGRT as the standard of care was once thought of as one of those **"Out-there ideas"**
  - Generally refers to unconventional, extreme, or unusual ideas. It can be used to describe a person's thinking, their creative output, or even a situation that deviates significantly from the norm.

- Treating 100% of patients with SGRT is still, to some degree, seen as pushing some sort of boundary.
  - Tattooless treatments are still considered pushing the limits by some
  - Treating SRS cases is still considered "risky" by some, even with the body of literature out there related to accuracy and clinical outcomes .

- Apply the principles of SGRT and SGRT technologies to
  - Simulation
  - Planning
  - Treatment
  - Exploring the utility of Direct Visualization of the Dose Delivery

  is often seen as "***ill advised***" or even "***unnecessary***".

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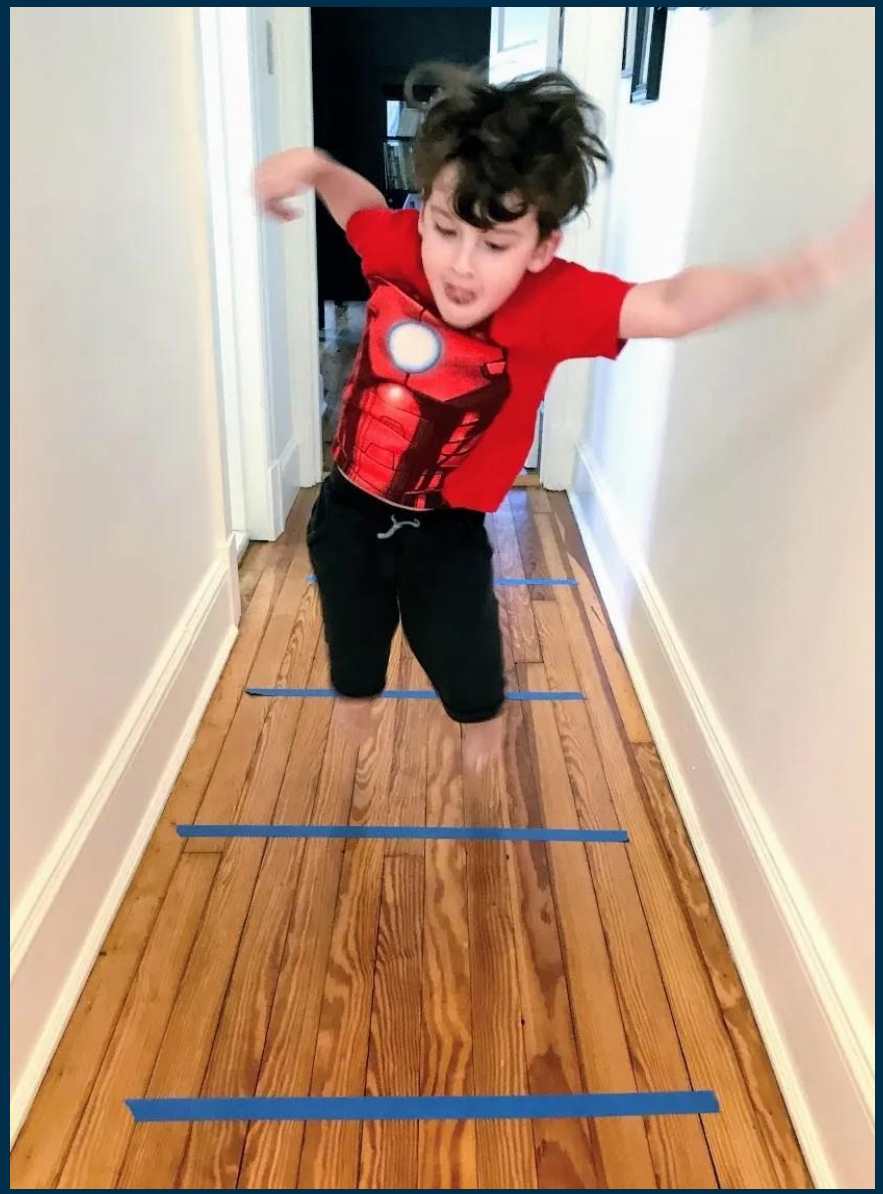
My philosophy tends to be “slightly” different



Goals

- Review a couple quick historical cases where boundaries may have been pushed and see where we are today.
- Look at some present “opportunities” to expand the utility of existing SGRT technologies by “nudging” a boundary or two.
- Peek over the fence and speculate on future opportunities.

“If you don’t push the boundaries you will never know where they truly are.”

"Only those who will risk going too far can possibly find out how far one can go,“

-T.S. Eliot

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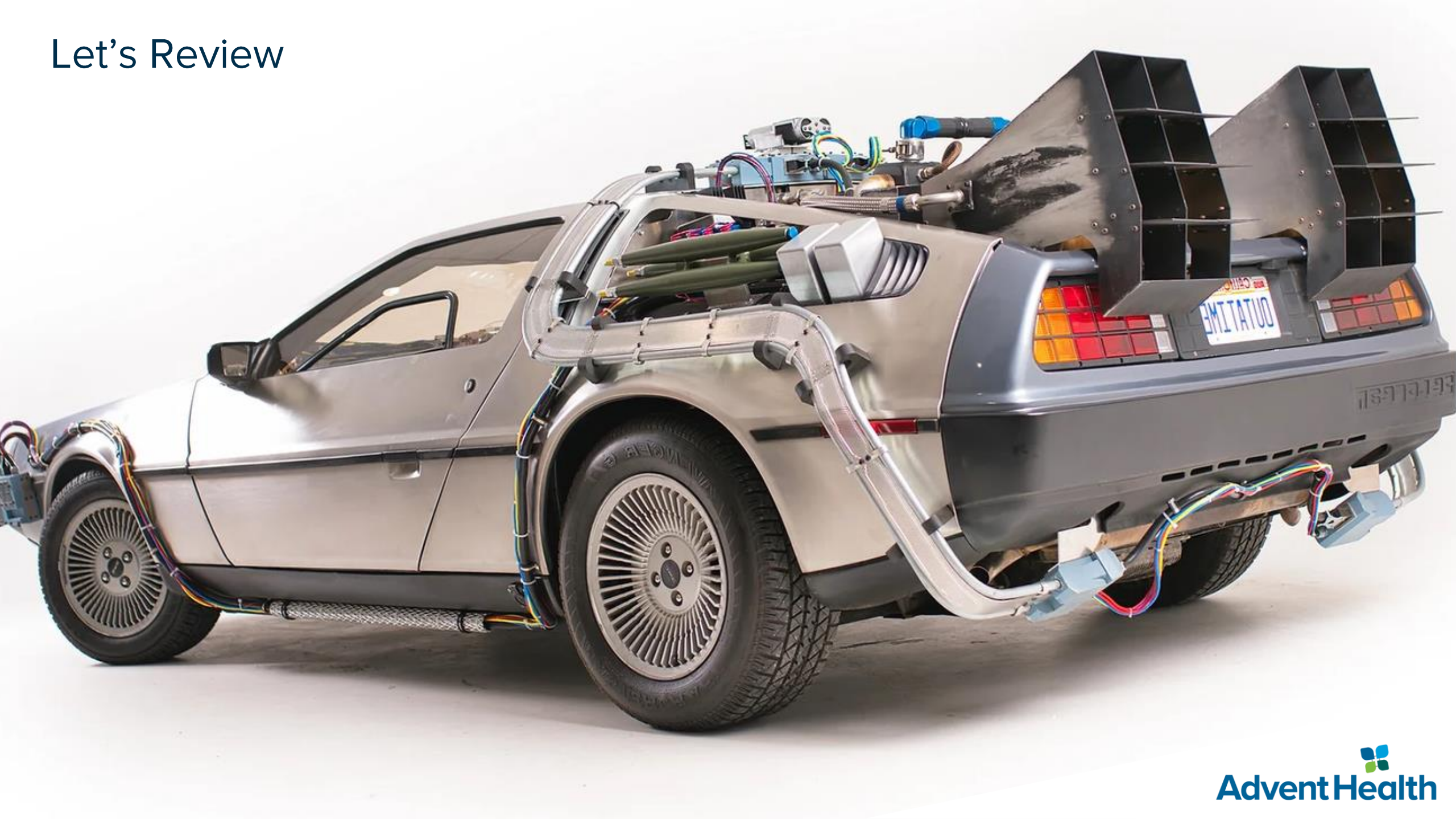
Let's Review



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SGRT Meeting 2019

- First 10 H&N patients presented
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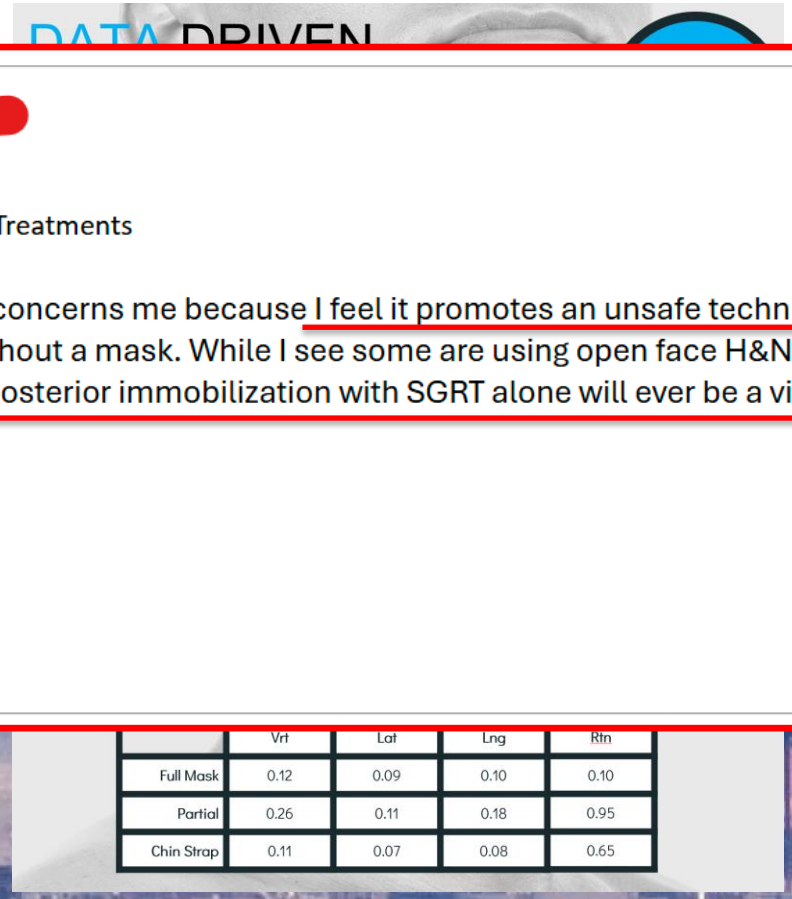
- Prin
  Pos
  ROI

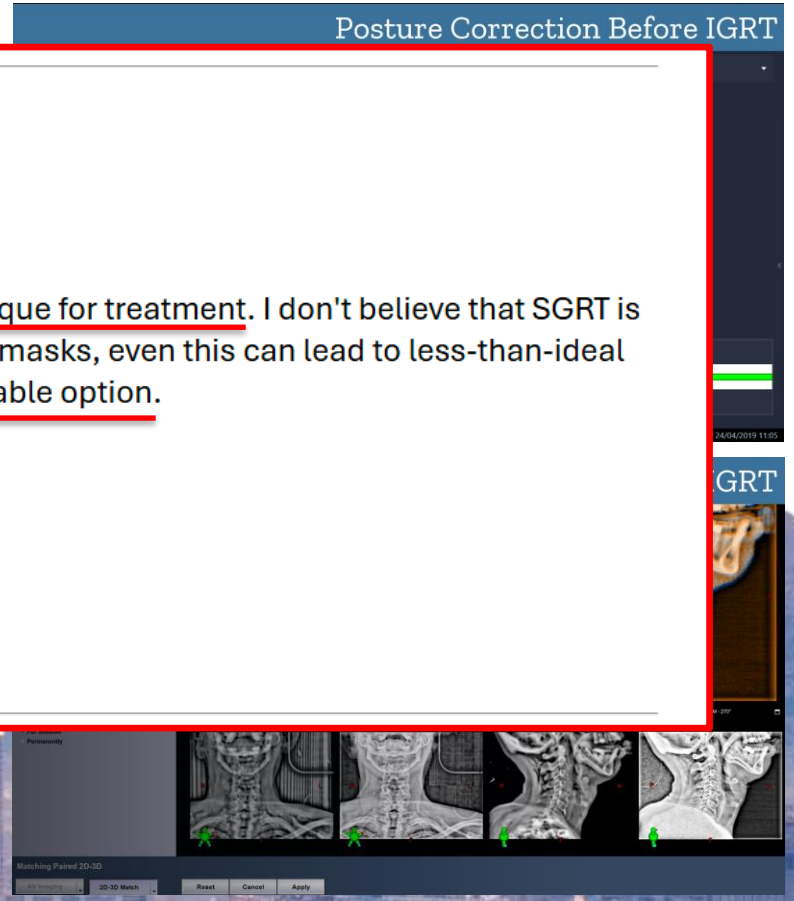
From: [redacted]
Sent: Thursday, June 27, 2019 12:45 PM
To: Tallhamer, Michael <MichaelTallhamer@Centura.org>
Subject: [EXTERNAL] Re: Vision RT Maskless Head & Neck Treatments

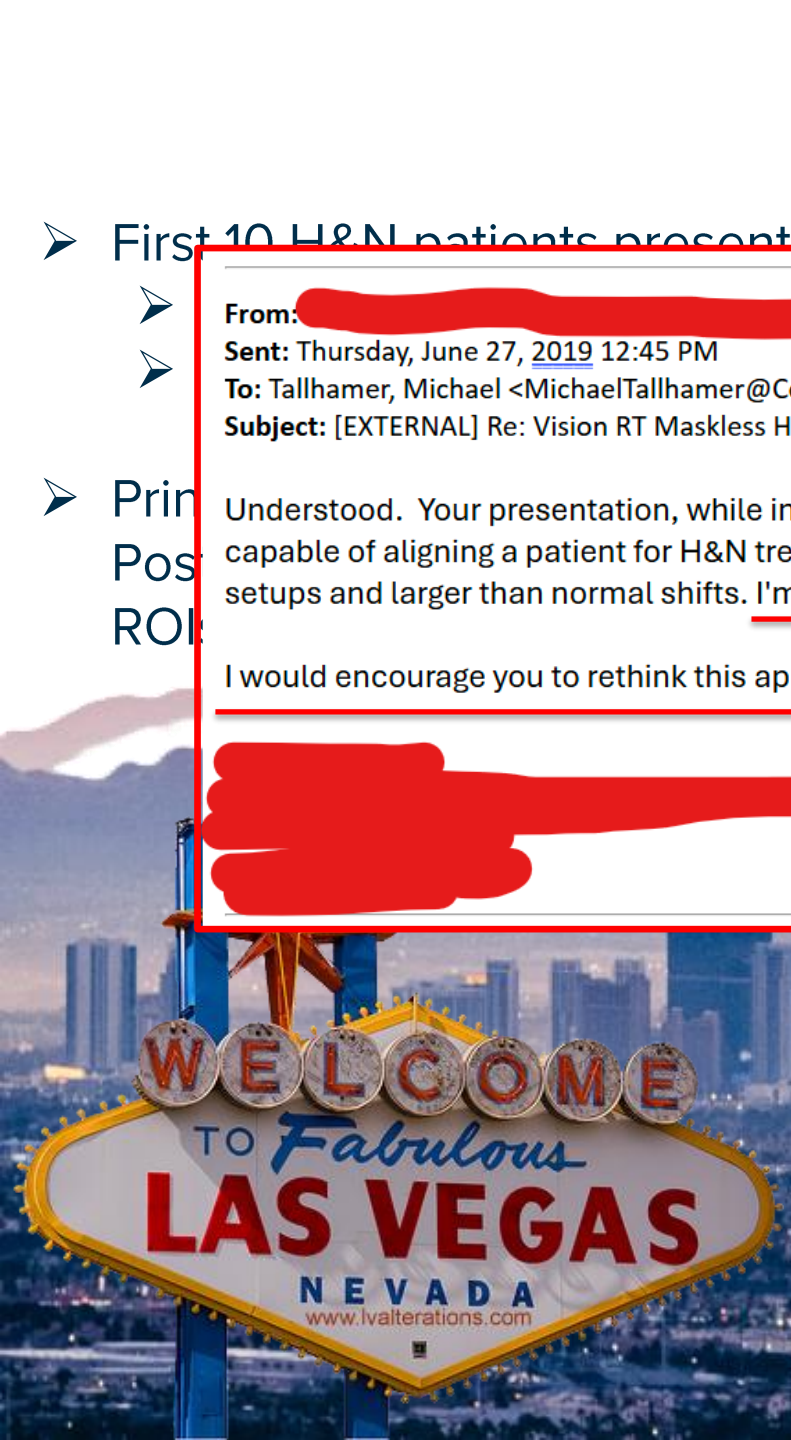
Understood. Your presentation, while interesting, concerns me because I feel it promotes an unsafe technique for treatment. I don't believe that SGRT is capable of aligning a patient for H&N treatment without a mask. While I see some are using open face H&N masks, even this can lead to less-than-ideal setups and larger than normal shifts. I'm not sure posterior immobilization with SGRT alone will ever be a viable option.

I would encourage you to rethink this approach.

[redacted]







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Back to 2025!

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What has happened while we were gone?

"Th SGRT" presented at meeting

Postural Video Released allowing for real-time video based postural correction prior to IGRT

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2020

2019

Maskless H&N enters clinical discussion

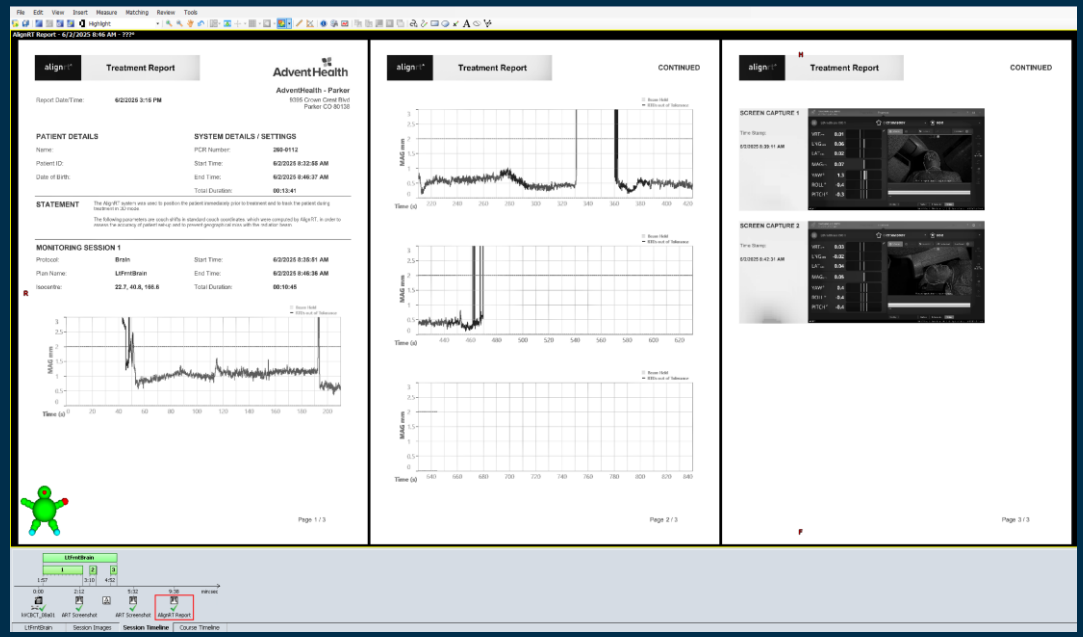
Postural Correction and IGRT Augmentation Promoted

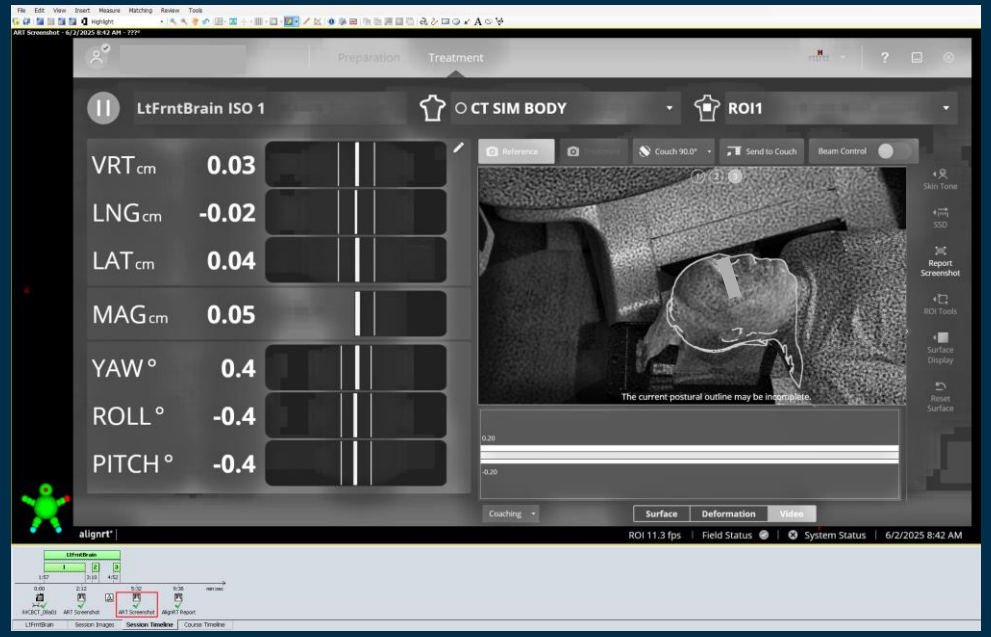
Importing of SGRT images and reports into OIS was first reported

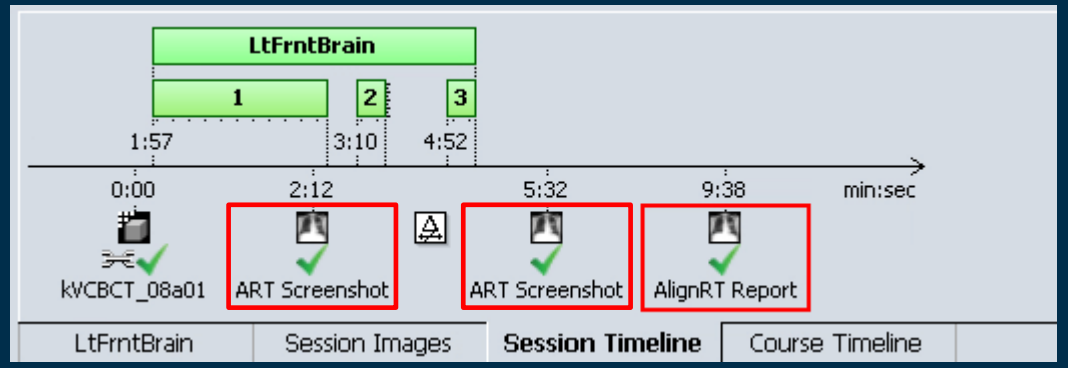
What is Happening Today? - SGRT 2025

2025

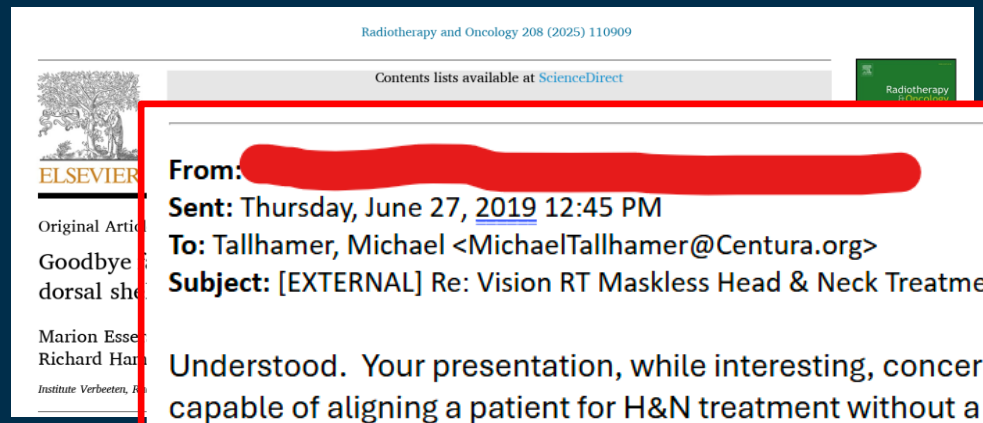
OIS Module allowing for SGRT images to be displayed in the Aria IGRT timeline

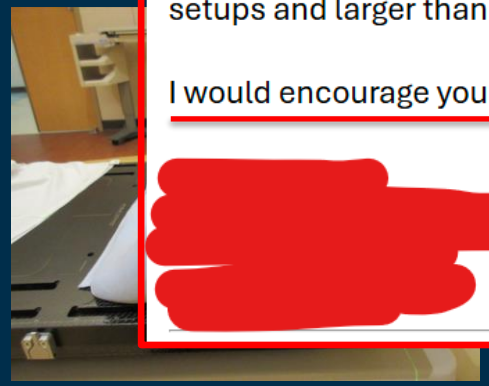


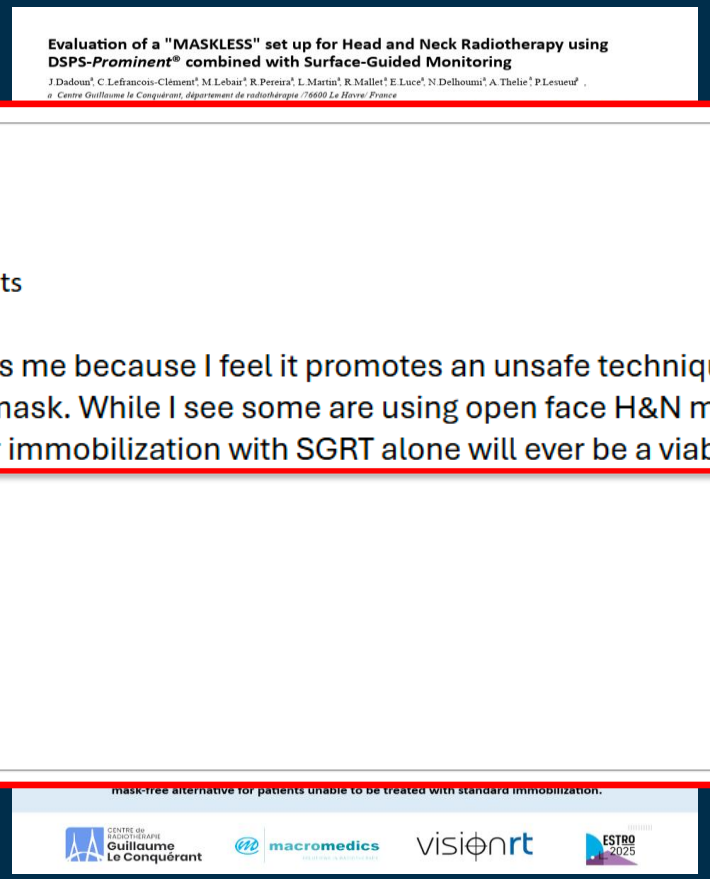


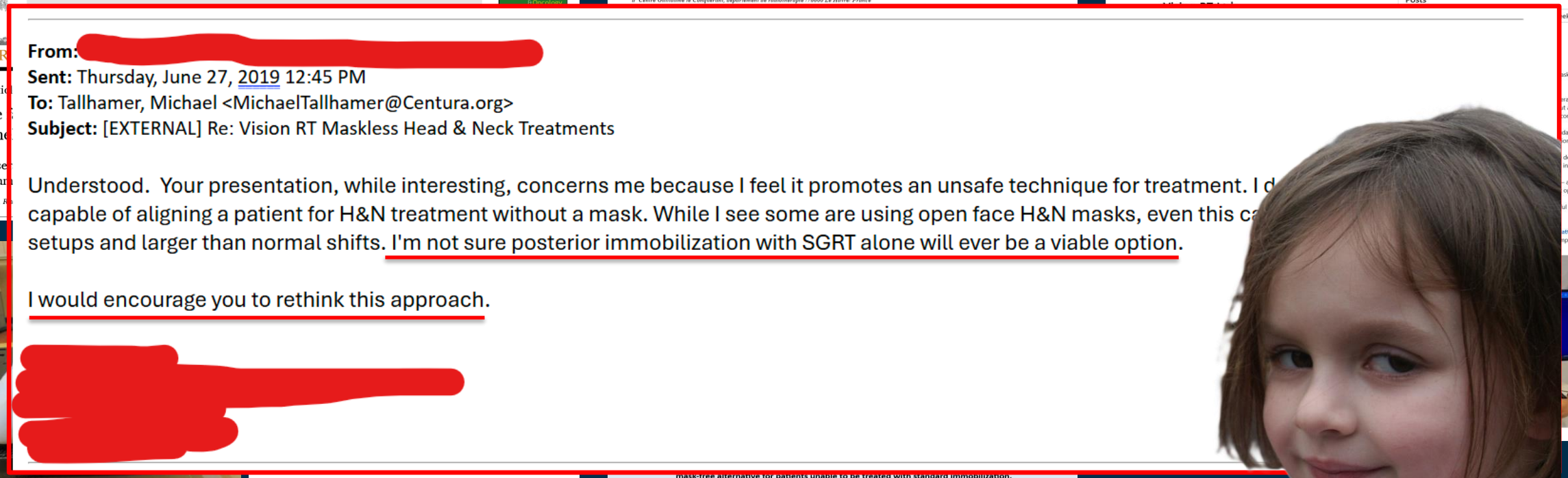


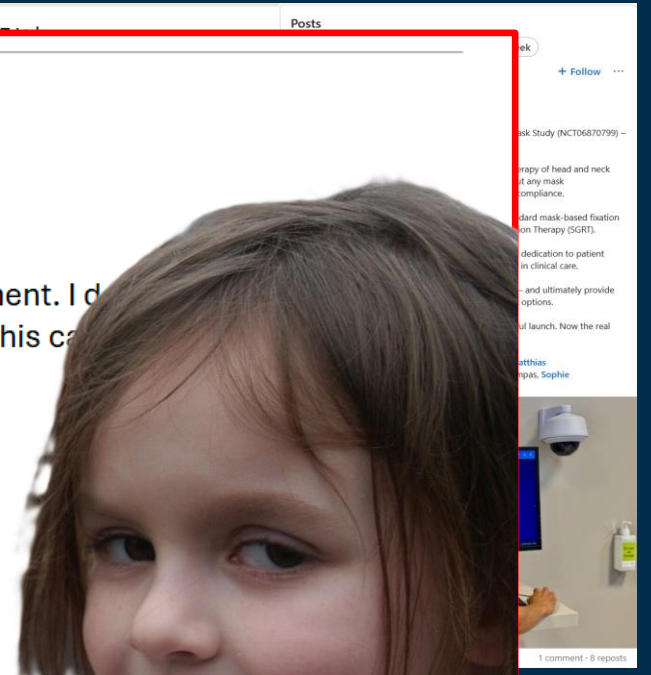
What is Happening Today? - SGRT 2025











2025

Maskless H&N now being supported by mask vendors WHAT!?!?

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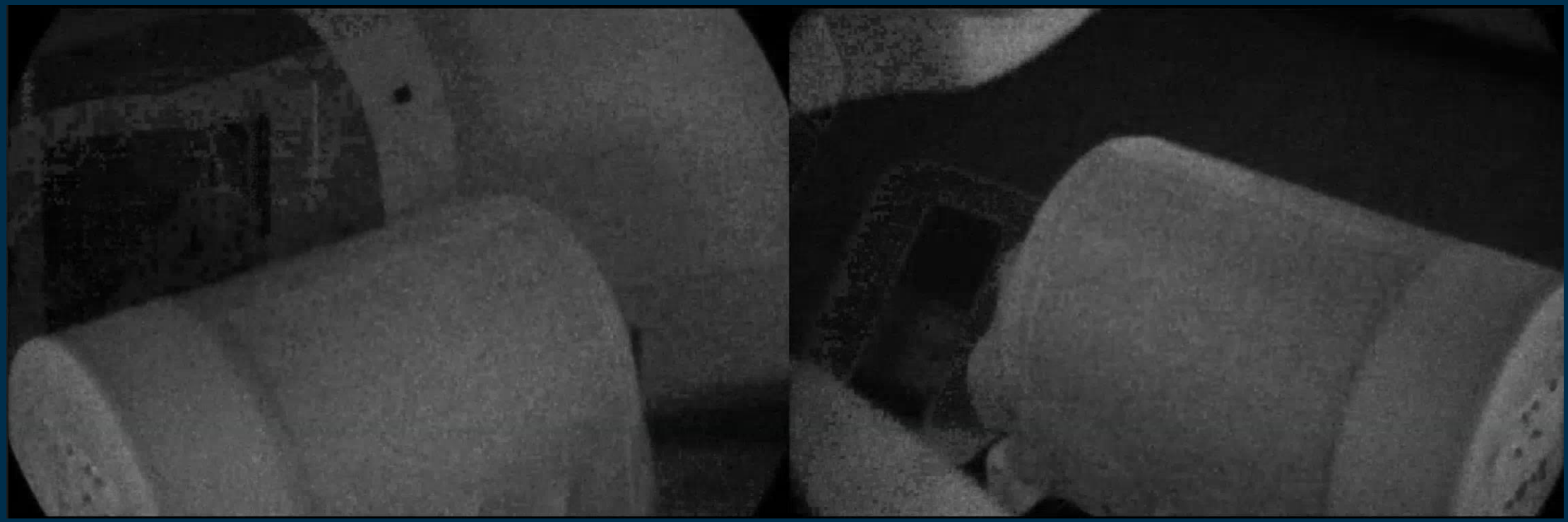
What is Happening Today? - SGRT 2025



2025

BeamLights introduces synchronized lighting for more refined Cherenkov imaging with DoseRT

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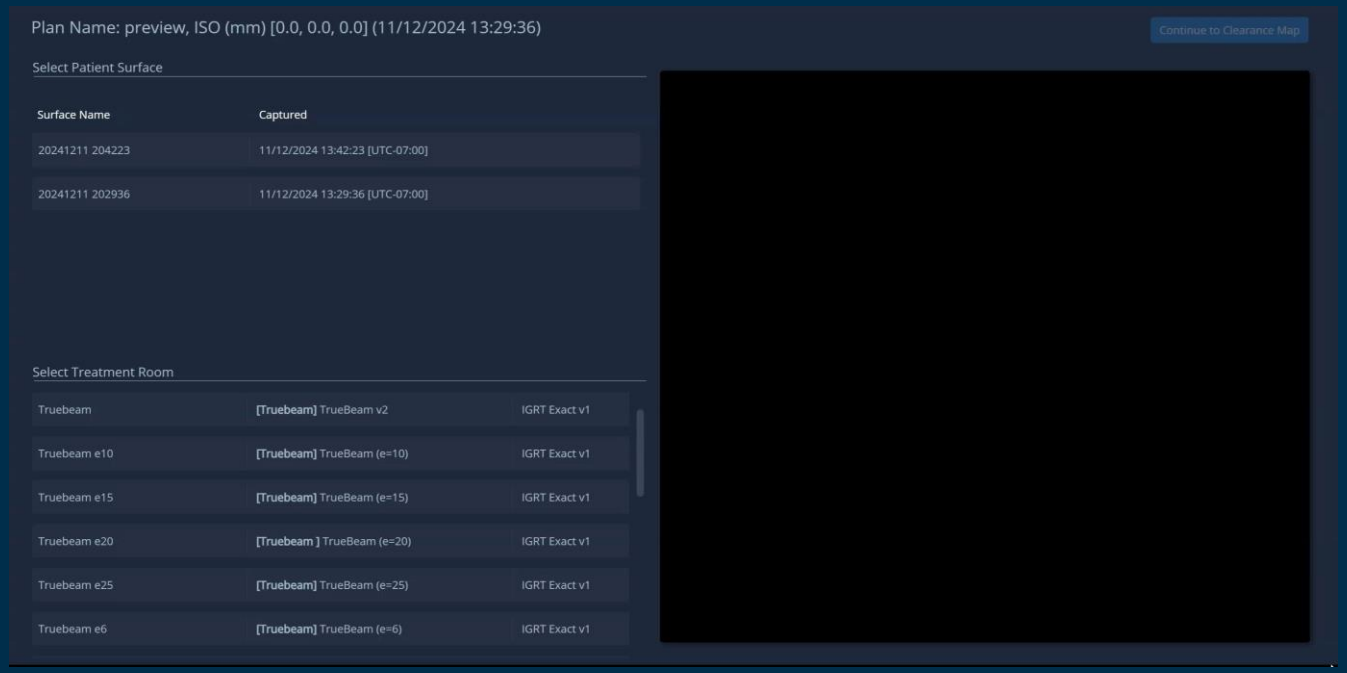
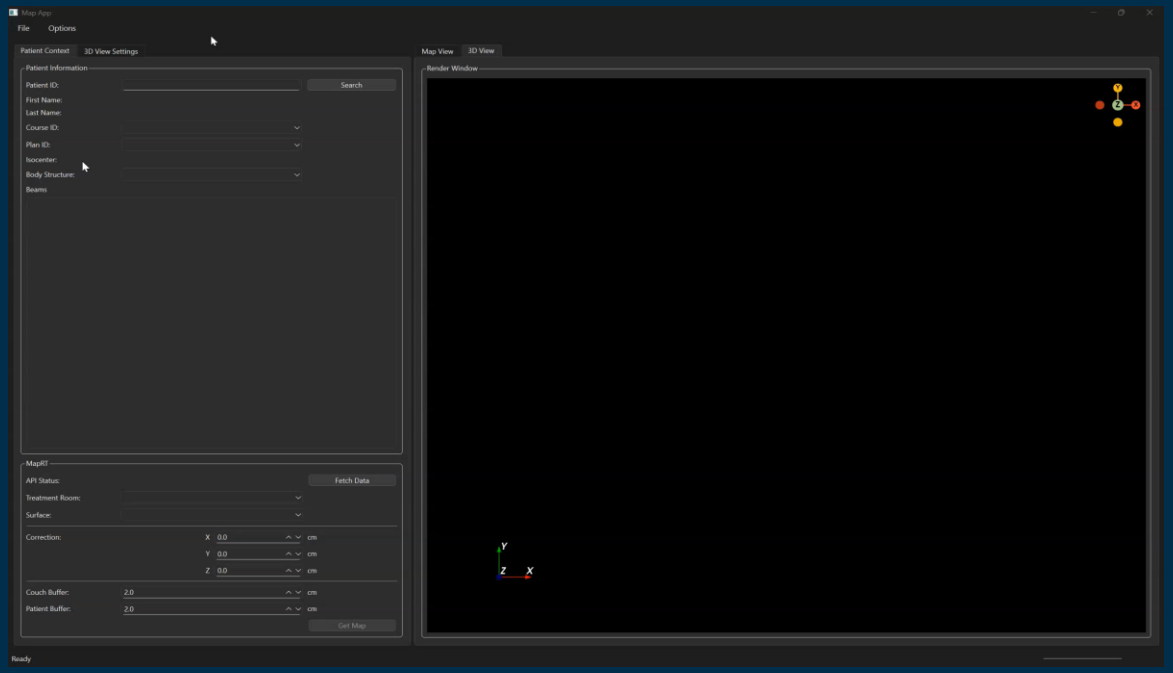
Workflows – Making Tweaks!



MapRT Web Interface



MapRT API

We can work with the therapy teams to

- Design workflow to take advantage of the familiarity of the sim room (e.g. lasers vs axis marker)
- Set isocenter once and compare multiple collision maps
- Cache maps to avoid recalculation with repeated changes

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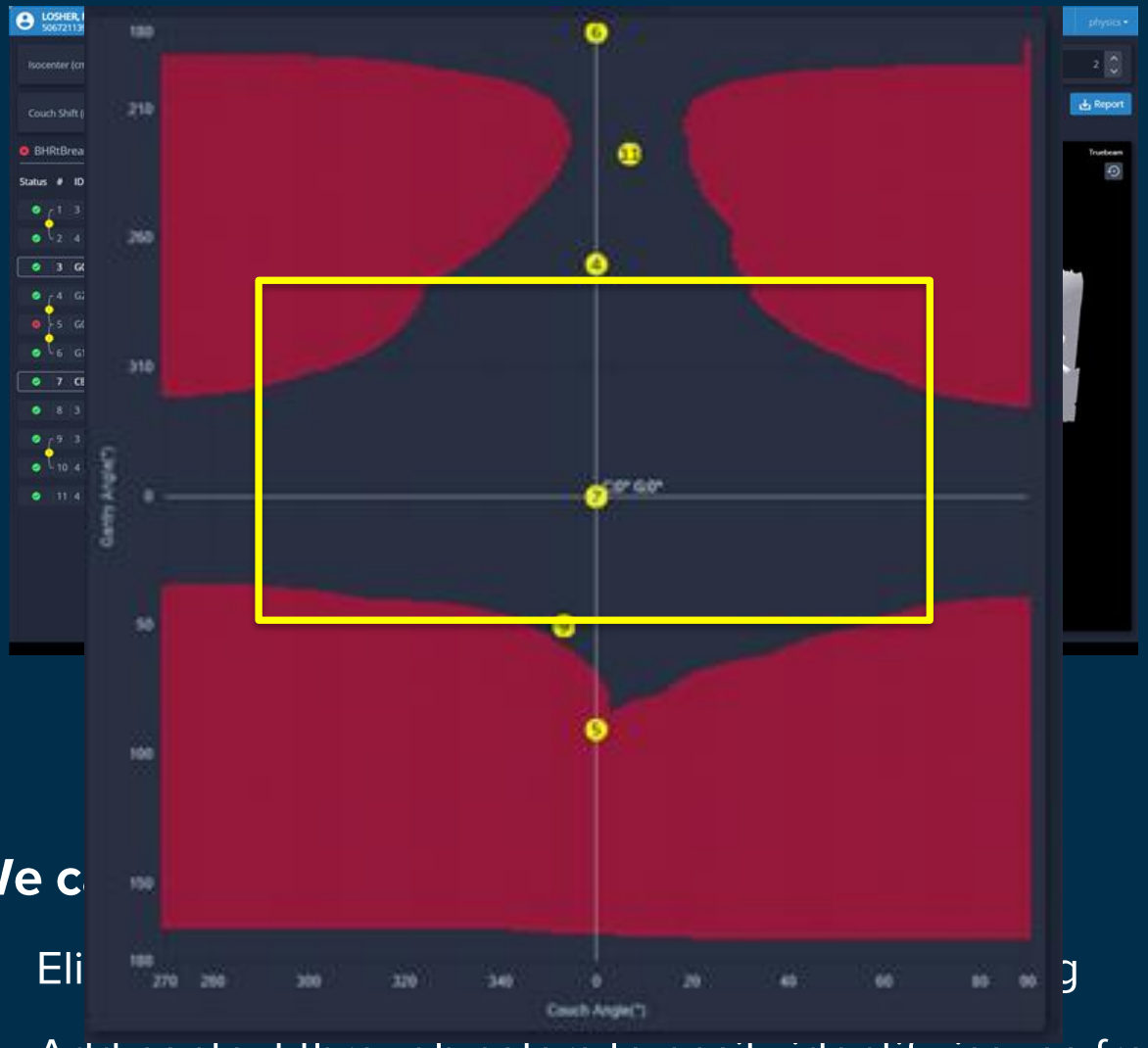
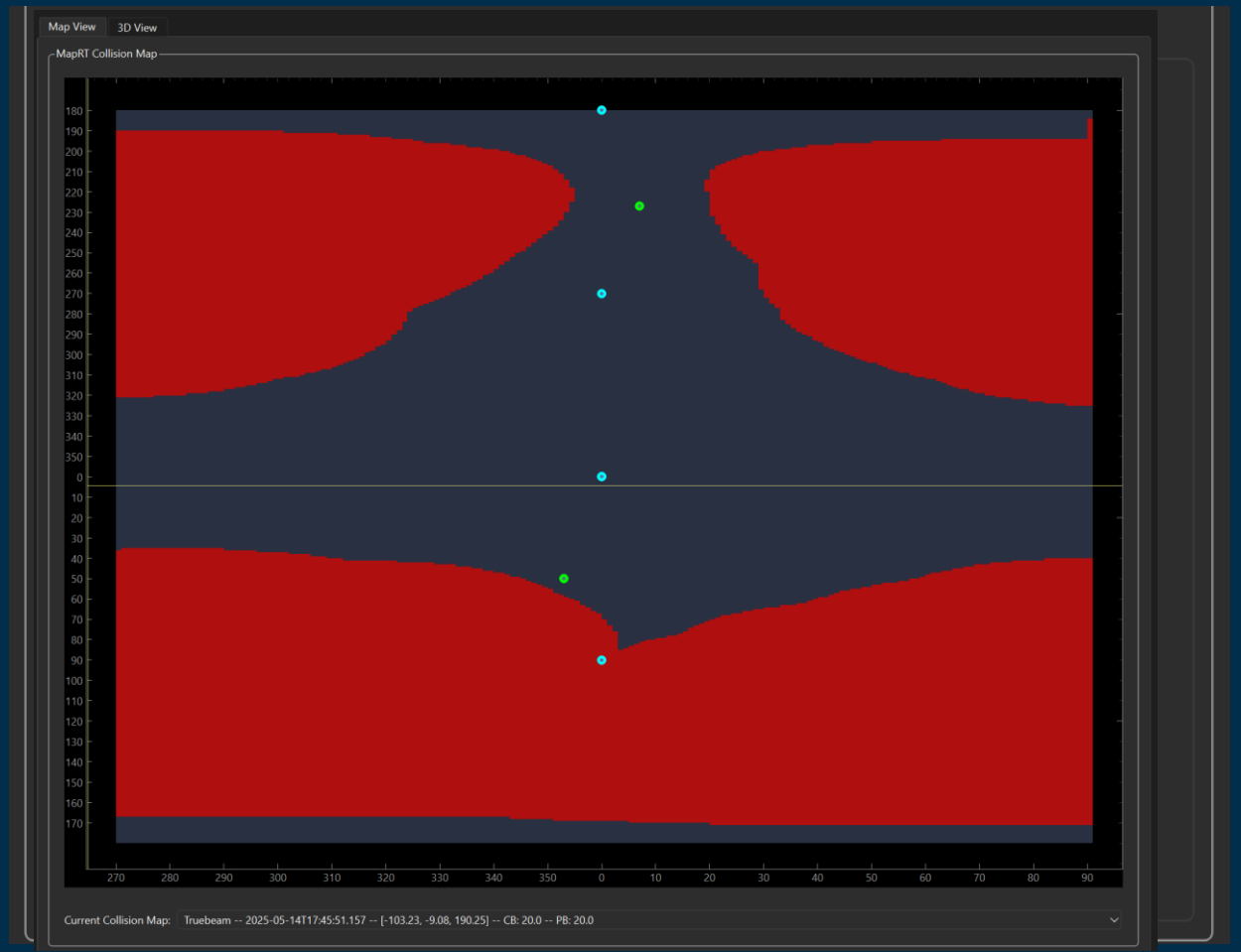
Information Display – Making Tweaks!





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- Add context through colors to easily identify issues from non-issues
- Simply make folks happy

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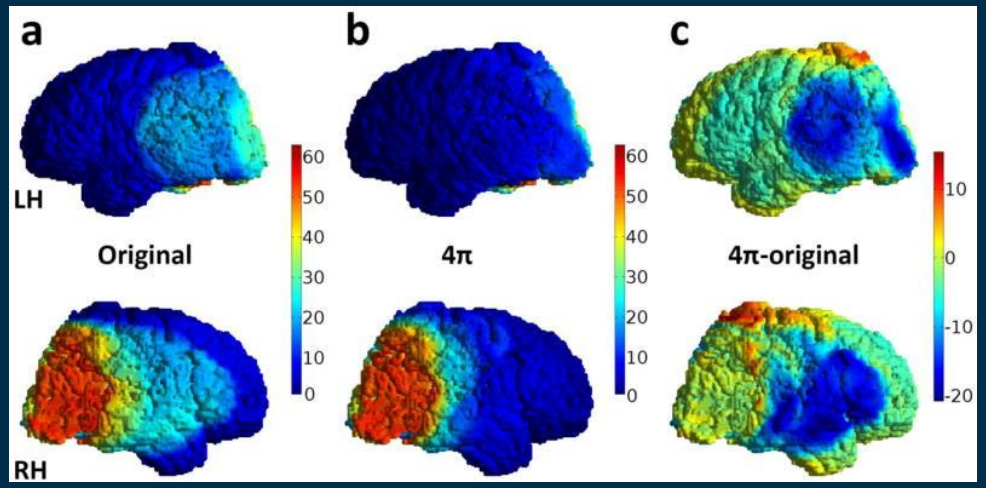
MapRT: Plan and Isocenter Validation and Treatment Coordination

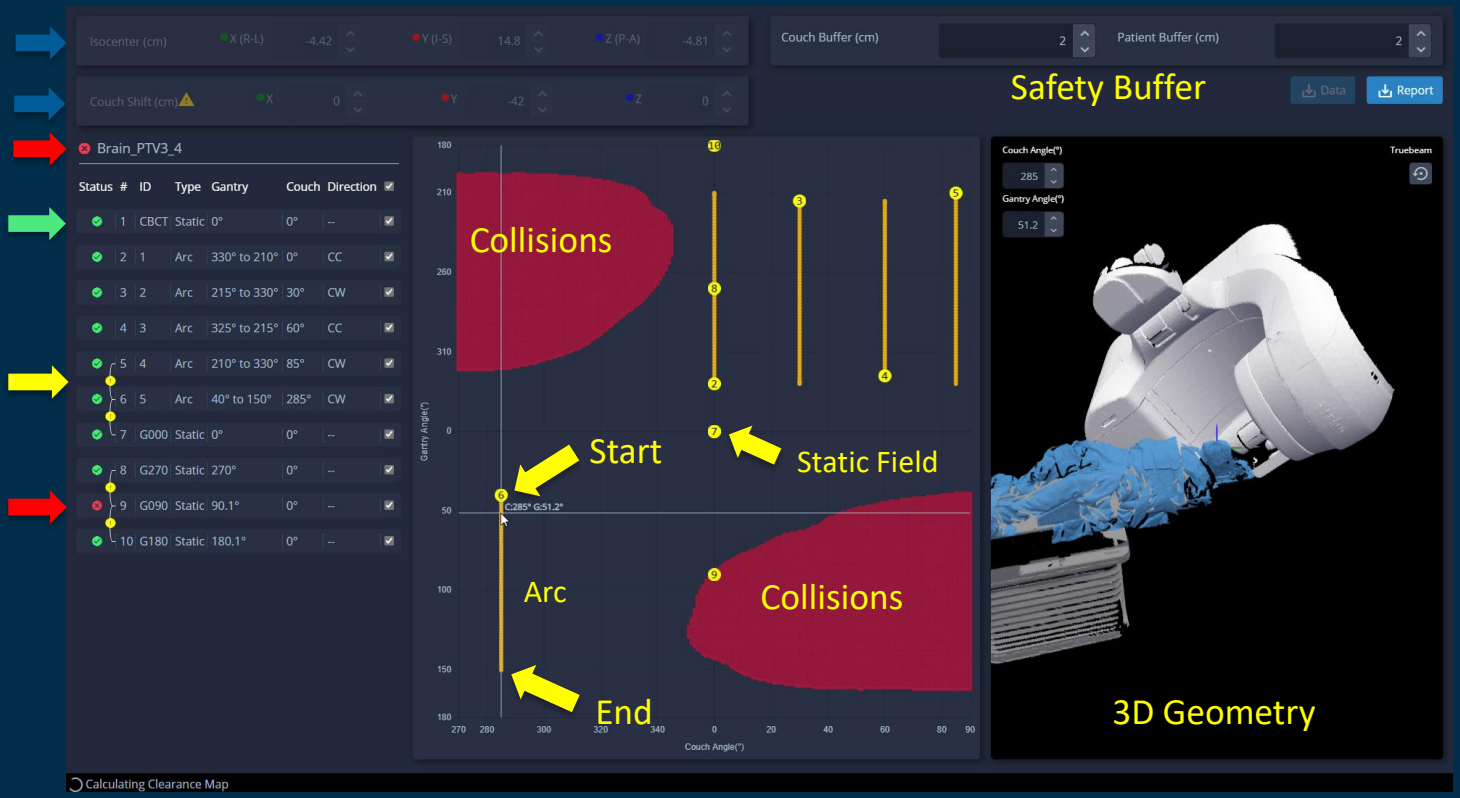
SGRT for Treatment Planning

Non-Coplanar Treatment to Spare Cortex

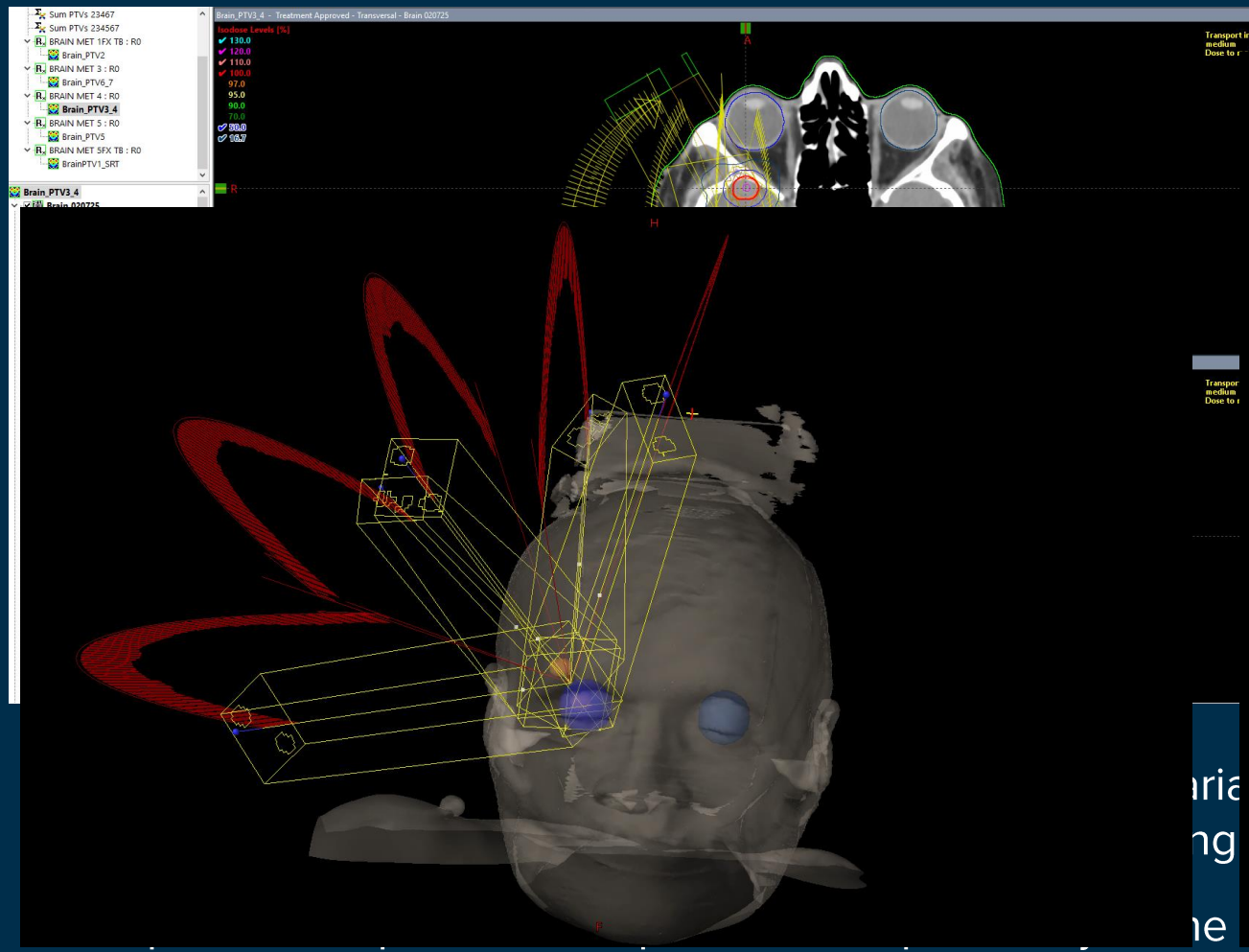
- Non-coplanar beam delivery enhances conformality
- 13 patients evaluated, non-coplanar versus delivered plans
- Example: Hippocampus mean dose improved 40%



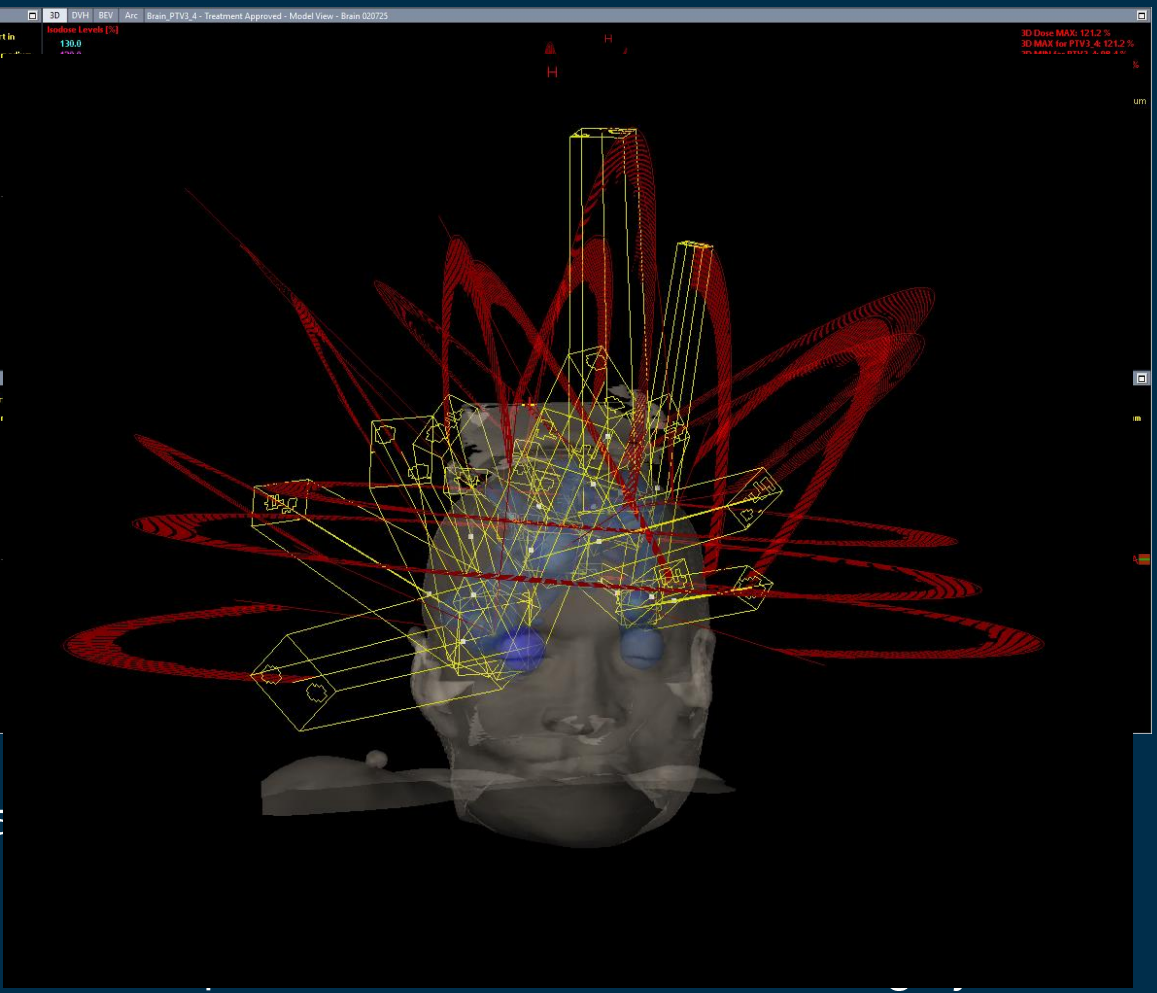
Murzin et al., Radiother Oncol, 2019



SGRT for Intracranial SIMT SRS Planning



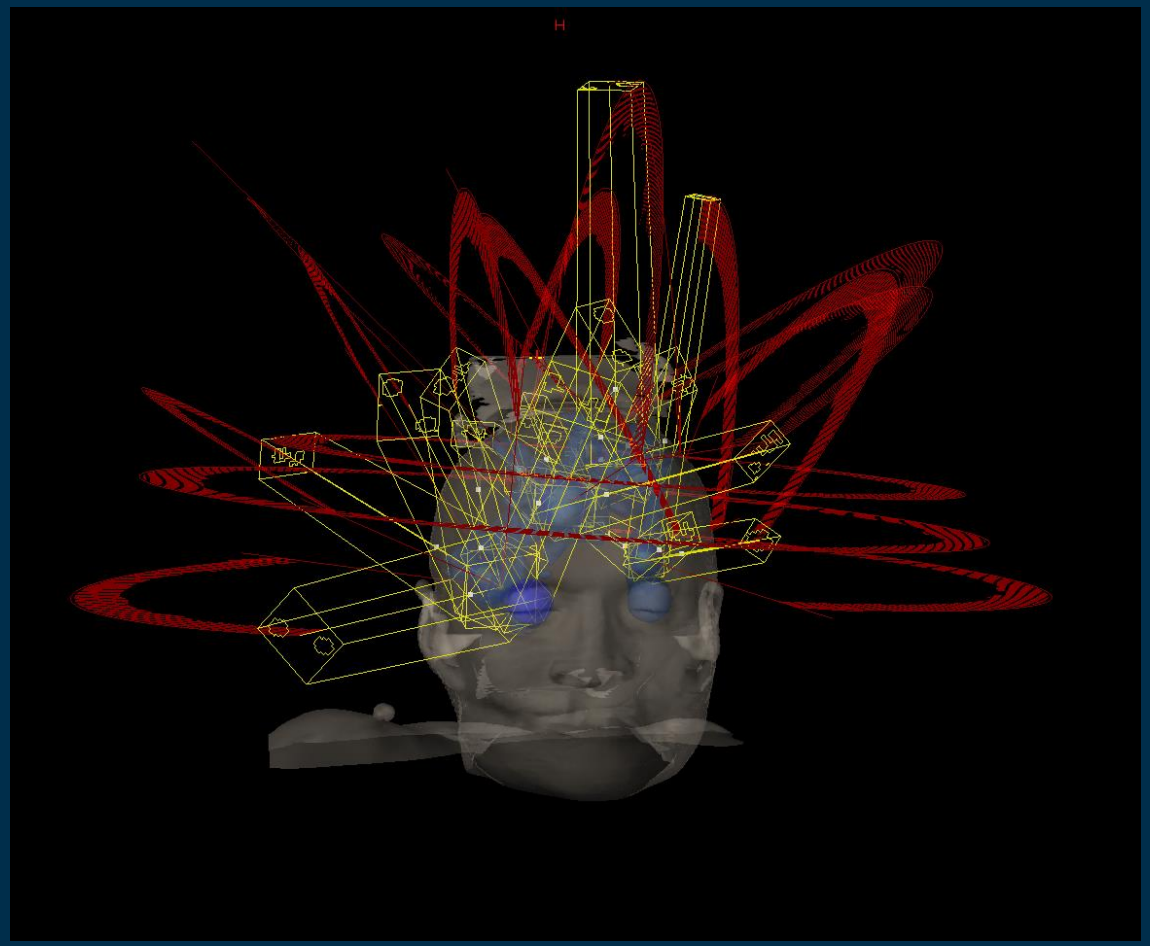
Single SIMT SRS Plan



4 grouped SIMT SRS Plans to avoid previous treated areas

complex single isocenter multiple target (SIMT) SRS cases with previous irradiation that need to be avoided

MapRT Rapid Planning and Efficiency



4 grouped SIMT SRS Plans to avoid previous treated areas

- In order to review each of the isocenter groups or individual plans in MapRT each of them must be pushed to the MapRT DICOM SCP application via a DICOMRT SCU in your TPS
- Each plan can then be selected within the MapRT application along with the proper surface and machine geometry (organized by treatment room)
- Once the plan, surface and treatment room are selected the collision map can be calculated for the combined geometry
- This process can be time consuming for multi plan deliveries and requires the dosimetrist or physicist to work within an additional environment other than the TPS.

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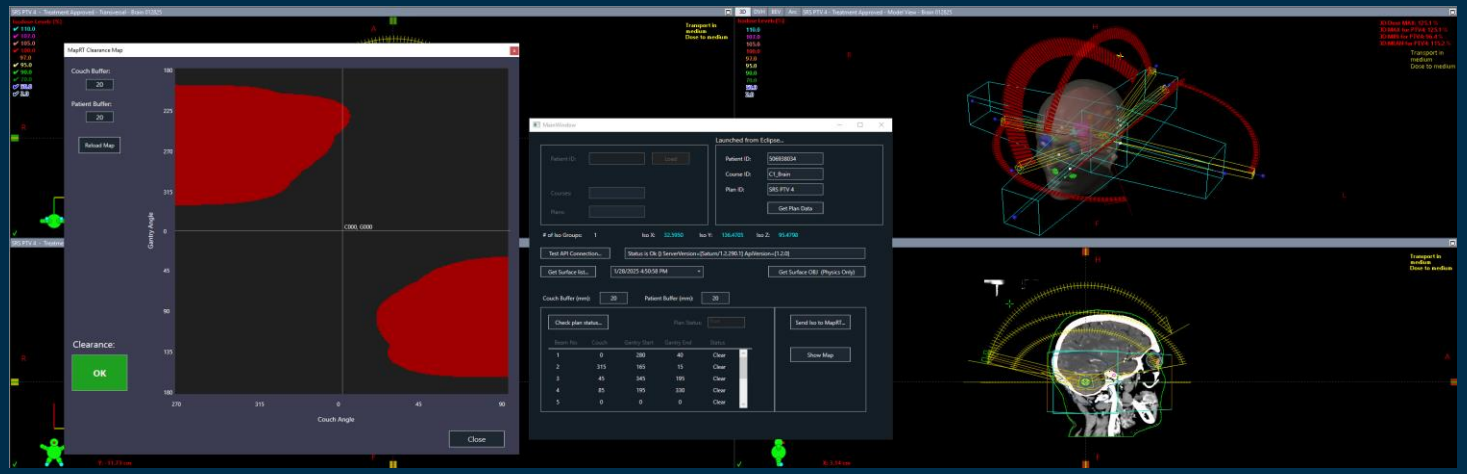
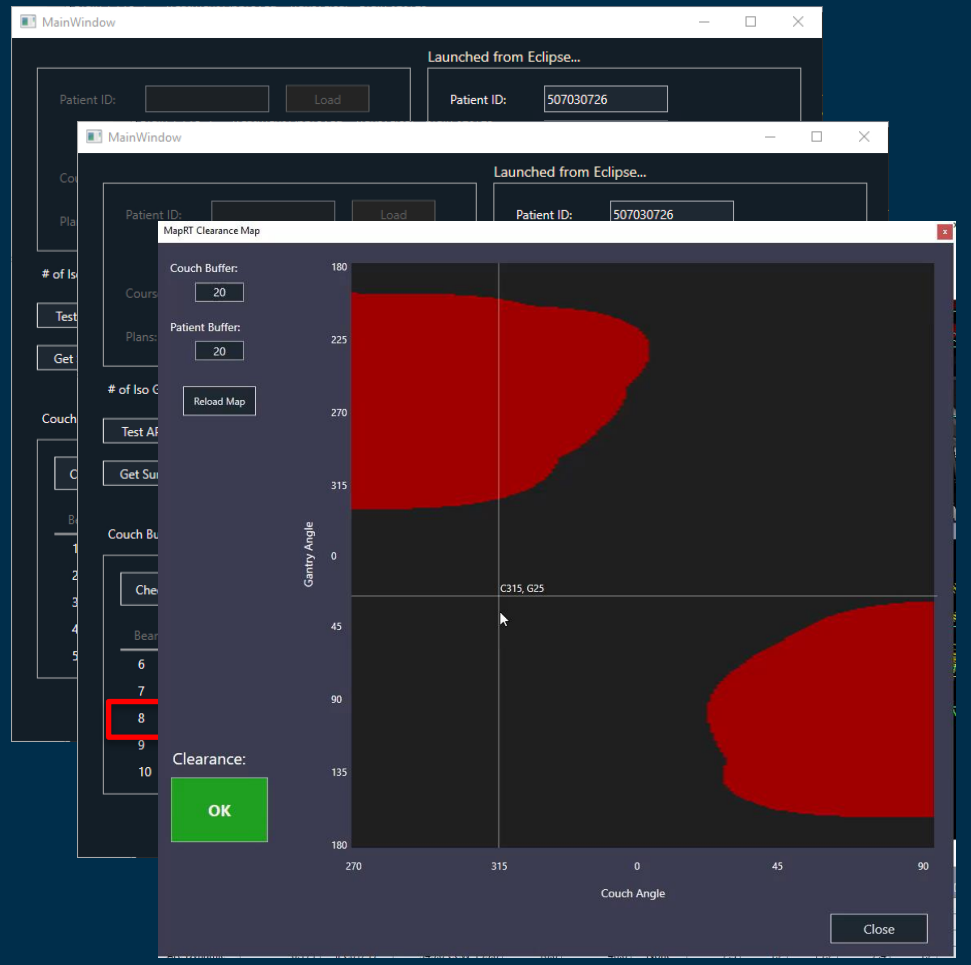
MapRT Rapid Plan Validation Through ESAPI Integration (C#)





- Leveraging the API allows the user to rapidly evaluate the plan context being worked on while planning.
- The API also allow the user to generate a collision map that can be dynamically explored for alternate solutions for failing fields reducing planning time by more than 30 minutes.

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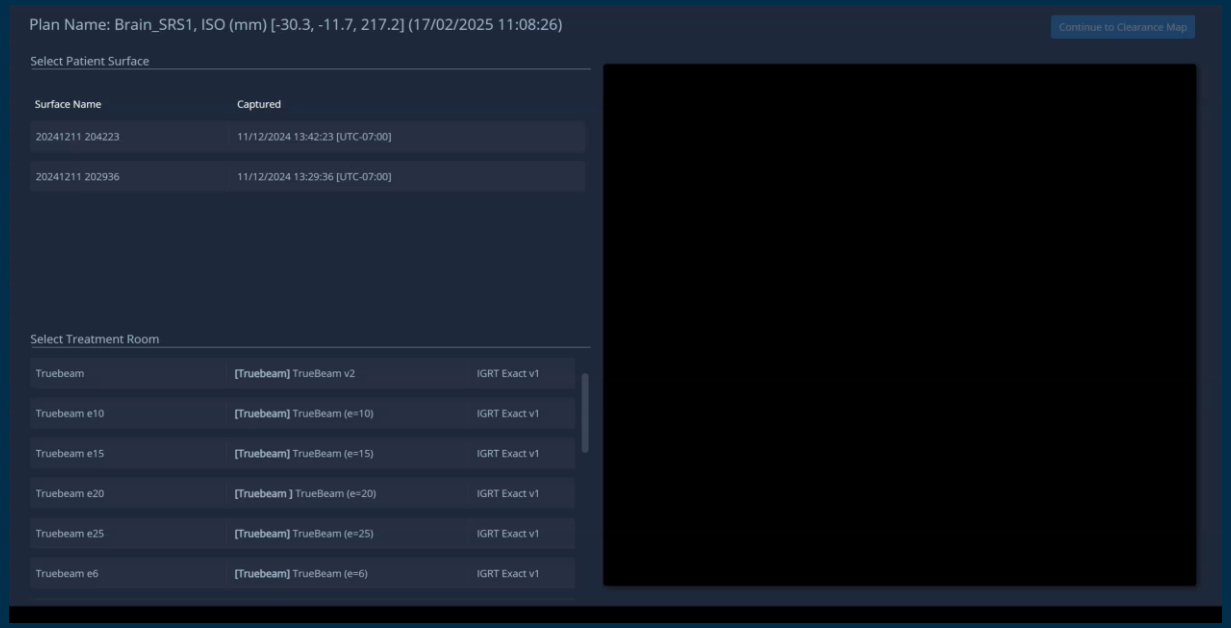
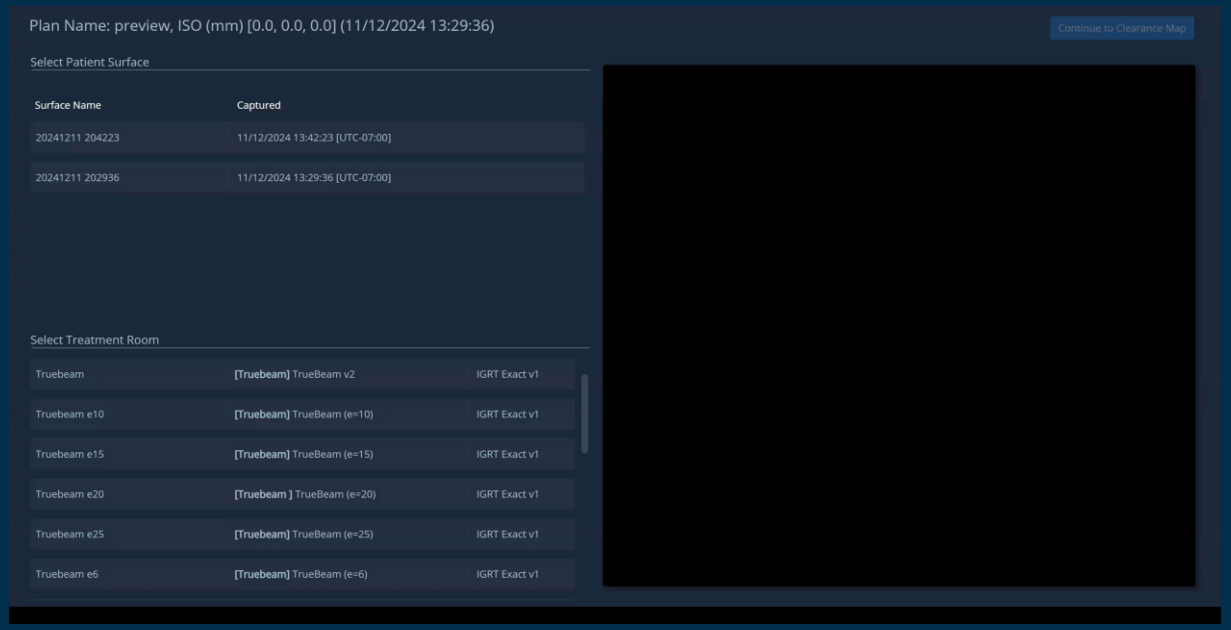
Workflow Dependent Errors: Collision Map Validation





Promoting replacement of safety checks with new methods requires new safety checks

- We need to verification that the proper data is used for collision map calculation if collision maps are going to be used to help guide our planning
- Safety dictates that errors should be readily identifiable if the new check is to replace the old
- **Policies and Procedures** are the lowest level of the **Hierarchy of Effectiveness**

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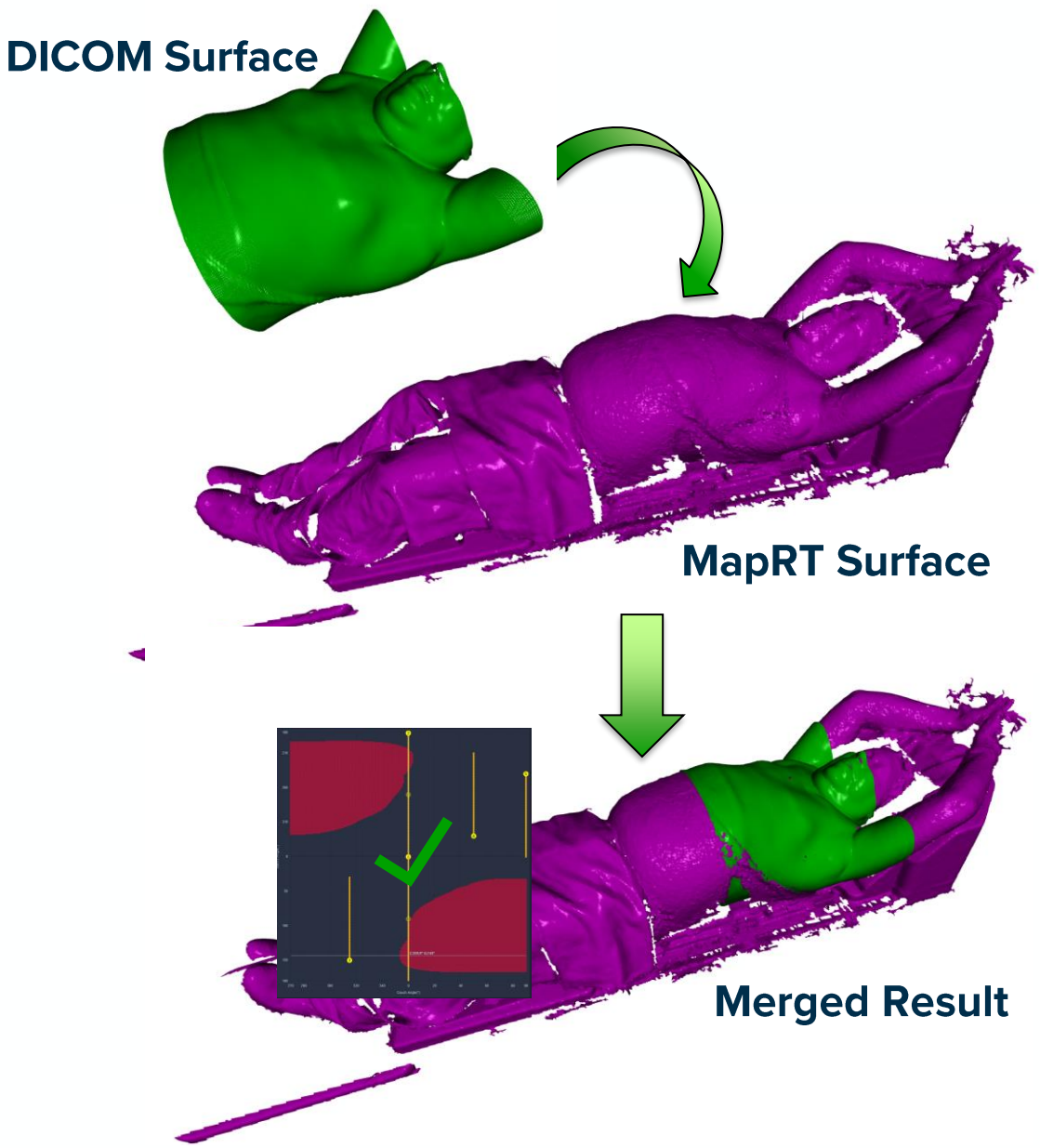
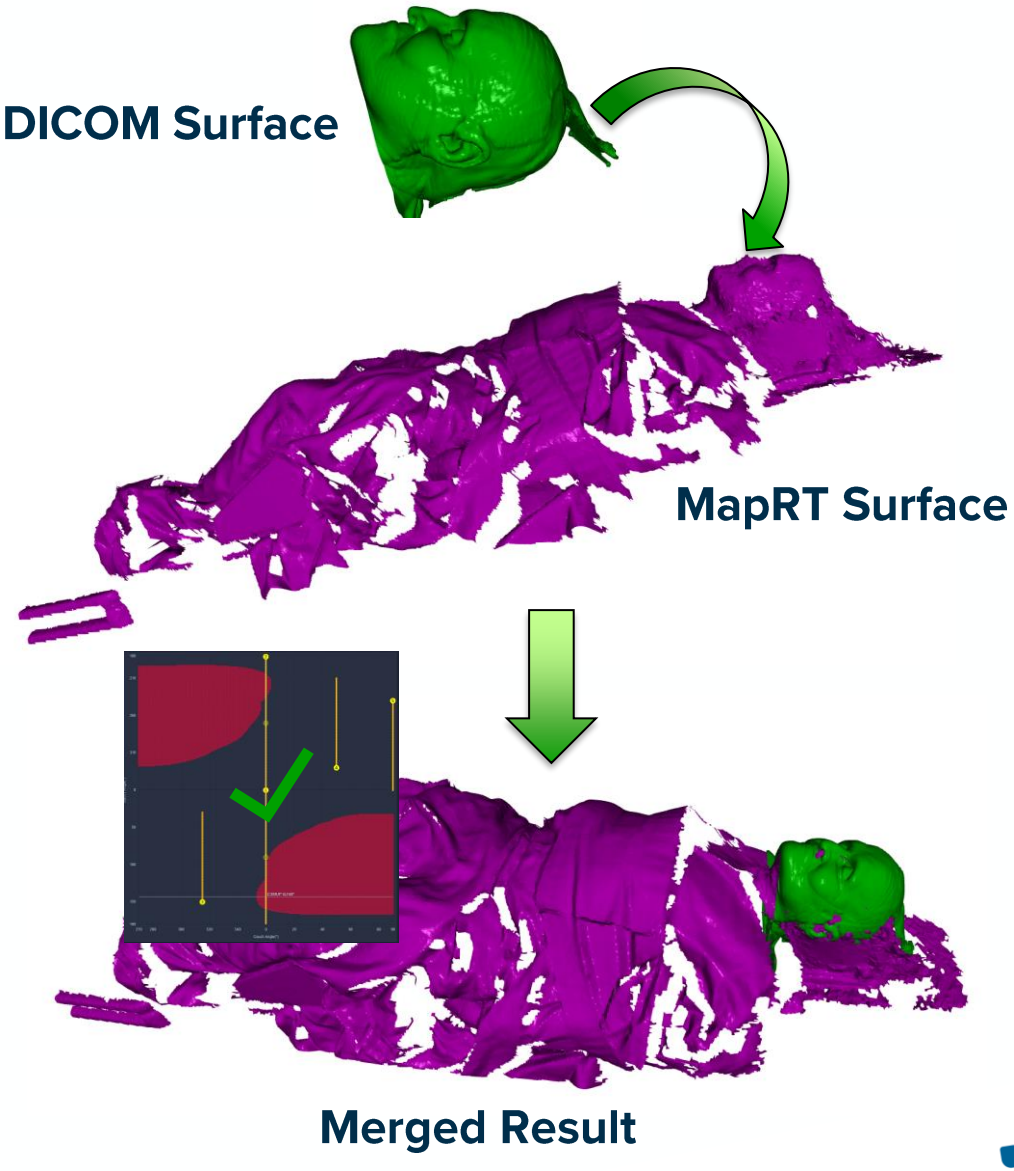
MapRT API: Additional Isocenter Verification (HTTPS and Python)





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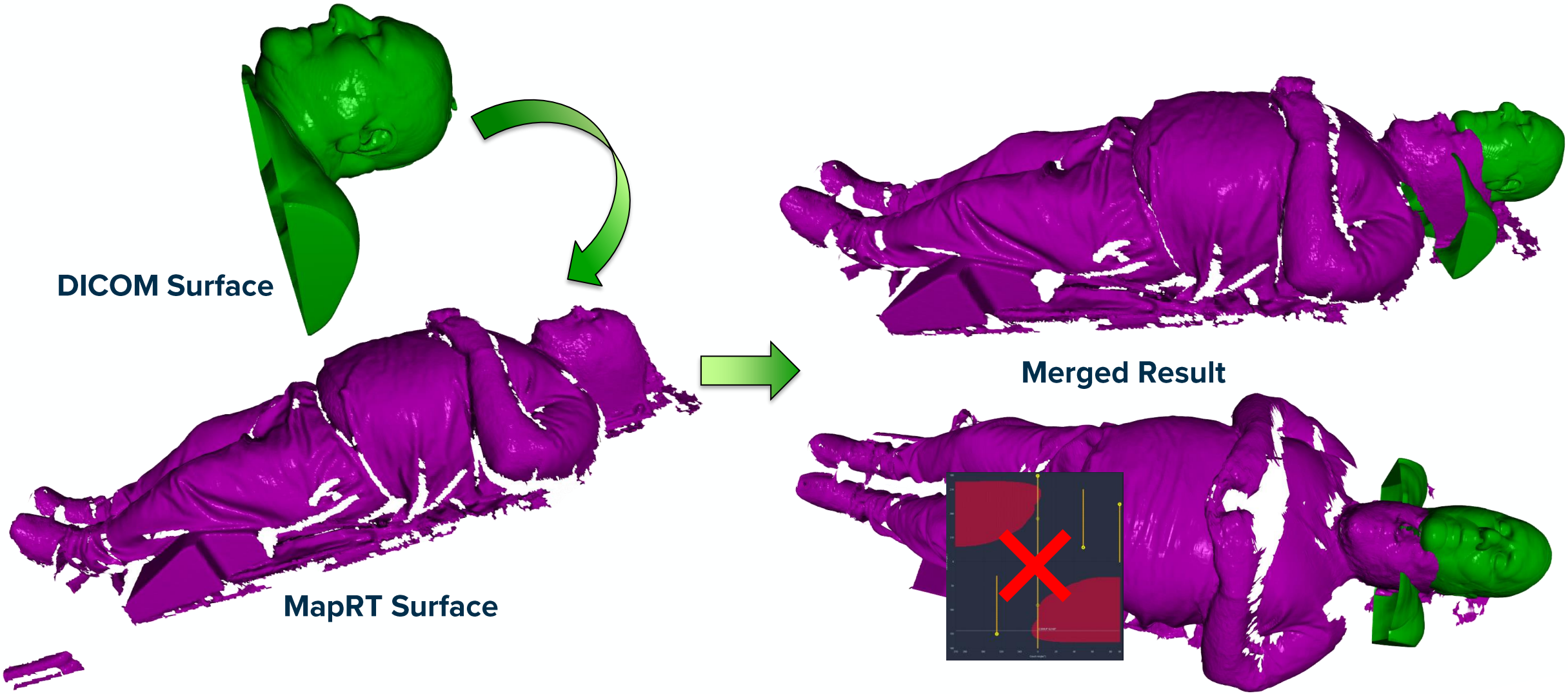
Preventing False Collision Maps From Incorrectly Captured Surfaces



- Incorrect captures can result in artifical clearance due to an offset in DICOM isocenter

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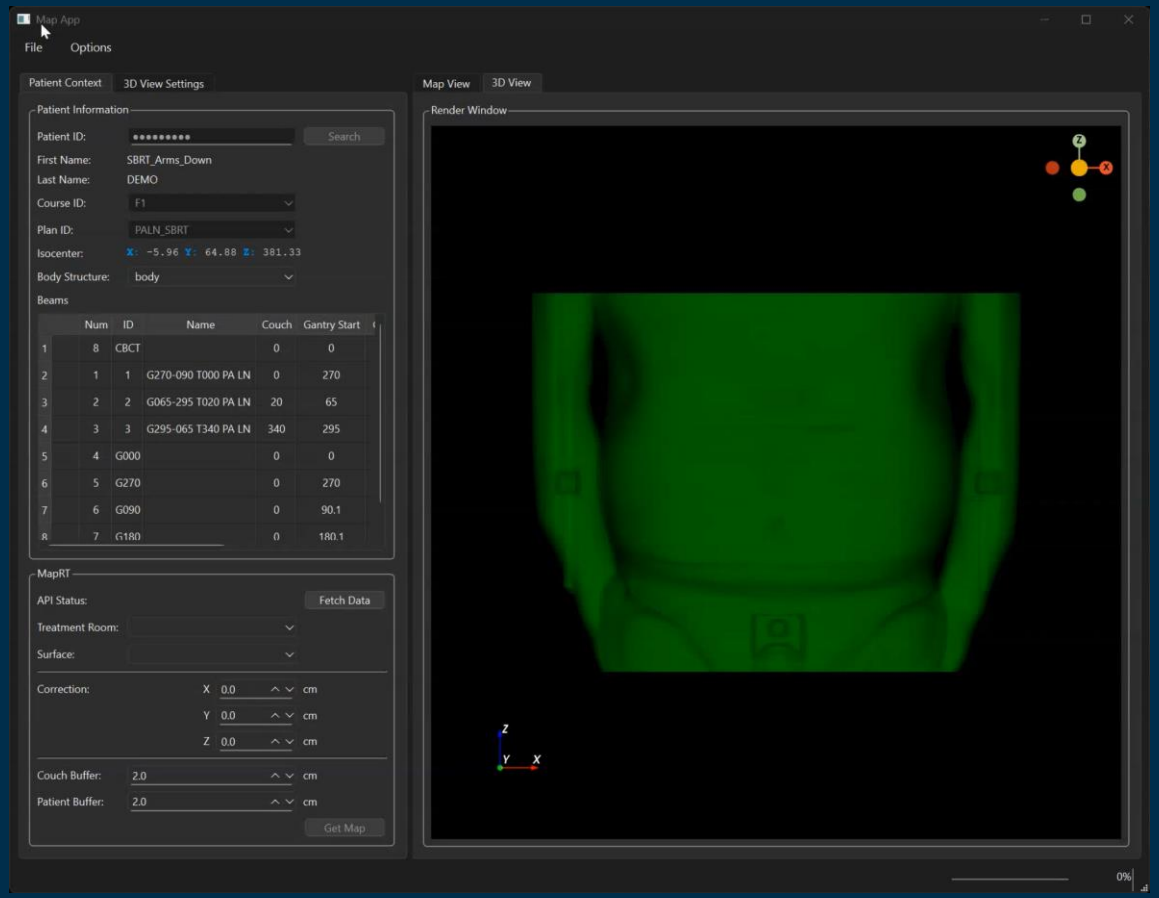
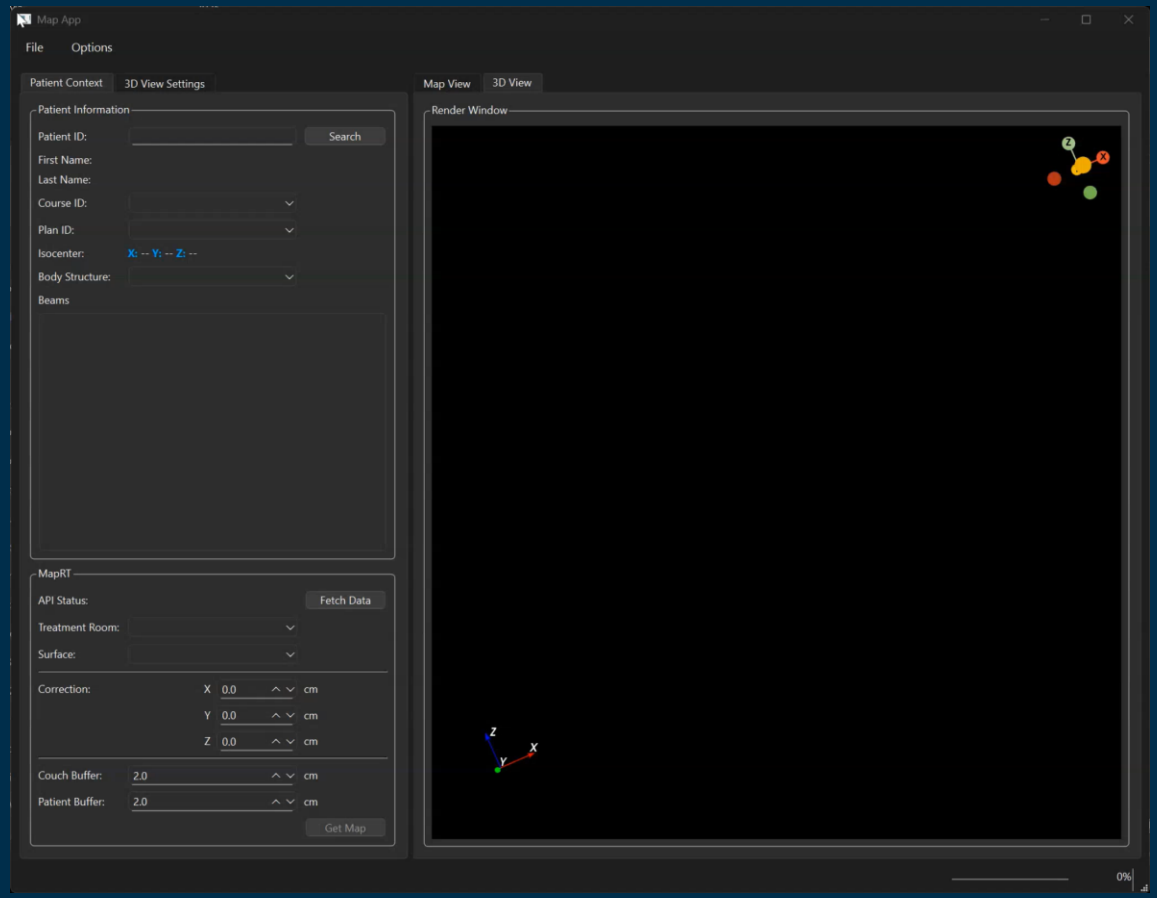
Improper Surface Capture Correction Workflow with MapRT API



Validation of Correction During Simulation



Correction During Treatmetn Planning

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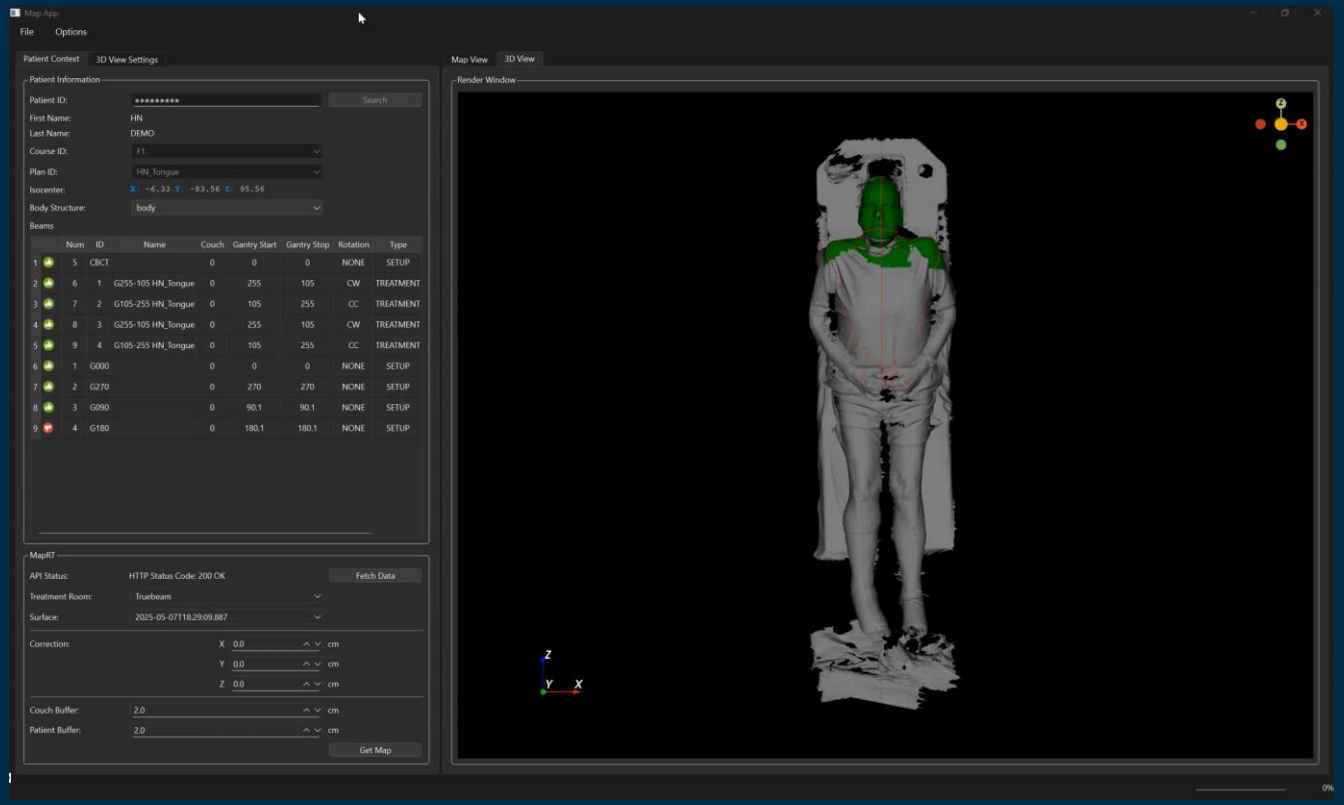
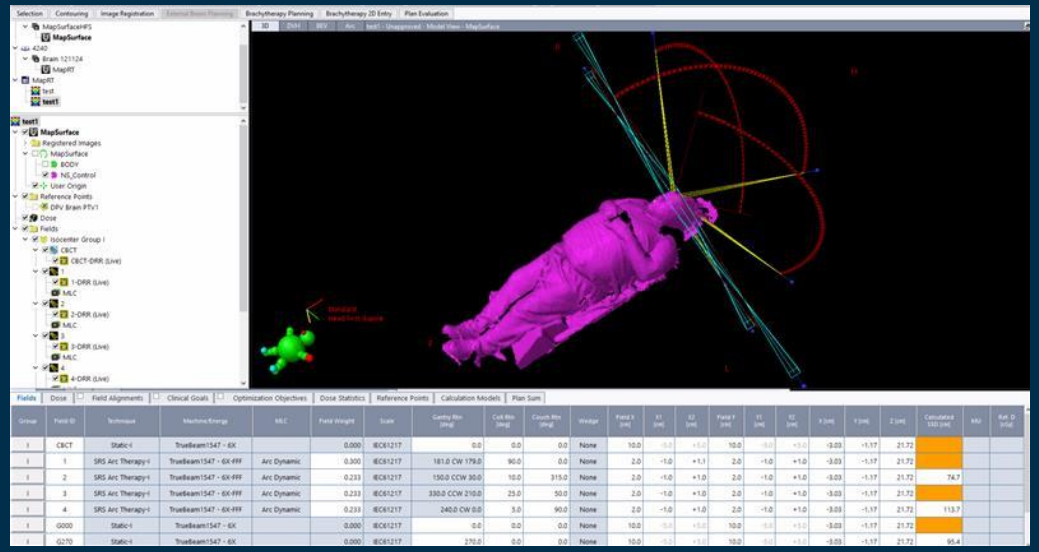
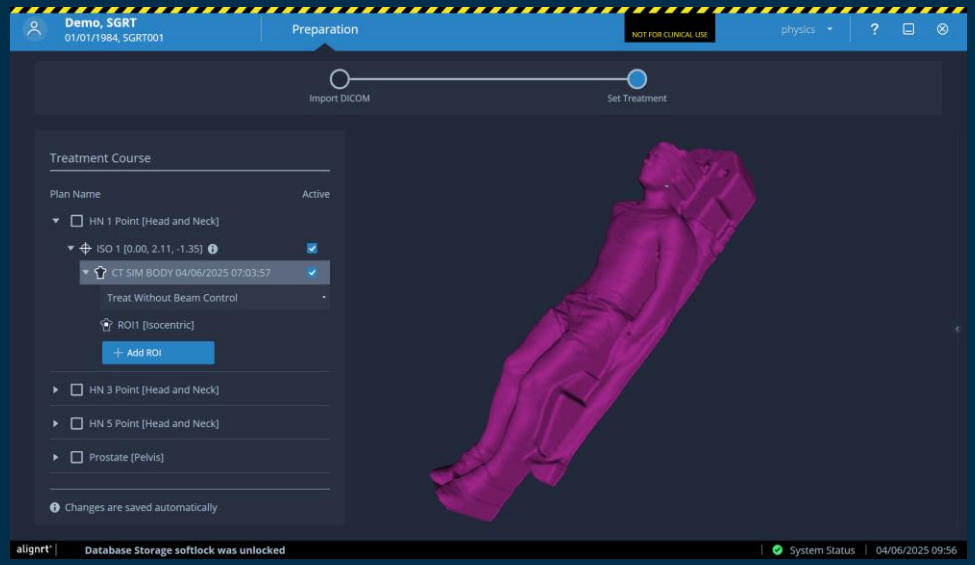
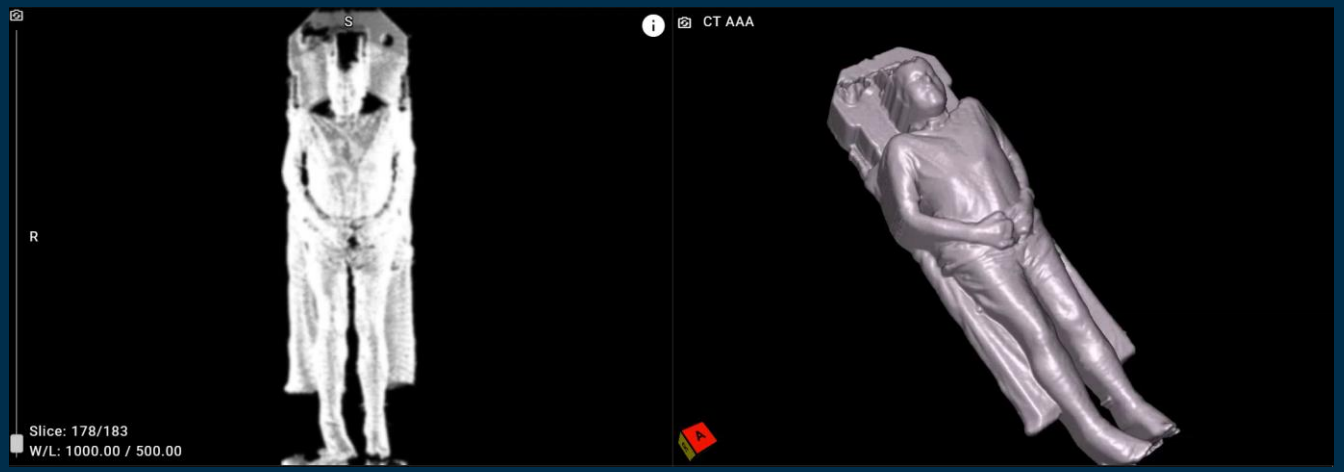
Conversion of Surface Mesh to DICOM and Generation of Synthetic CT









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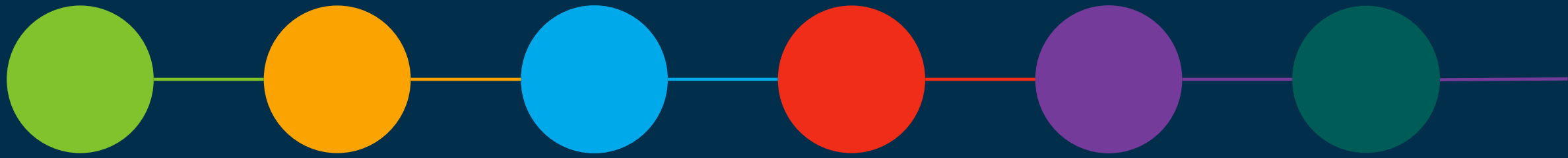
Sim – Plan – Treat – Dose



What could a future Sim – Plan – Treat – Dose process look like?

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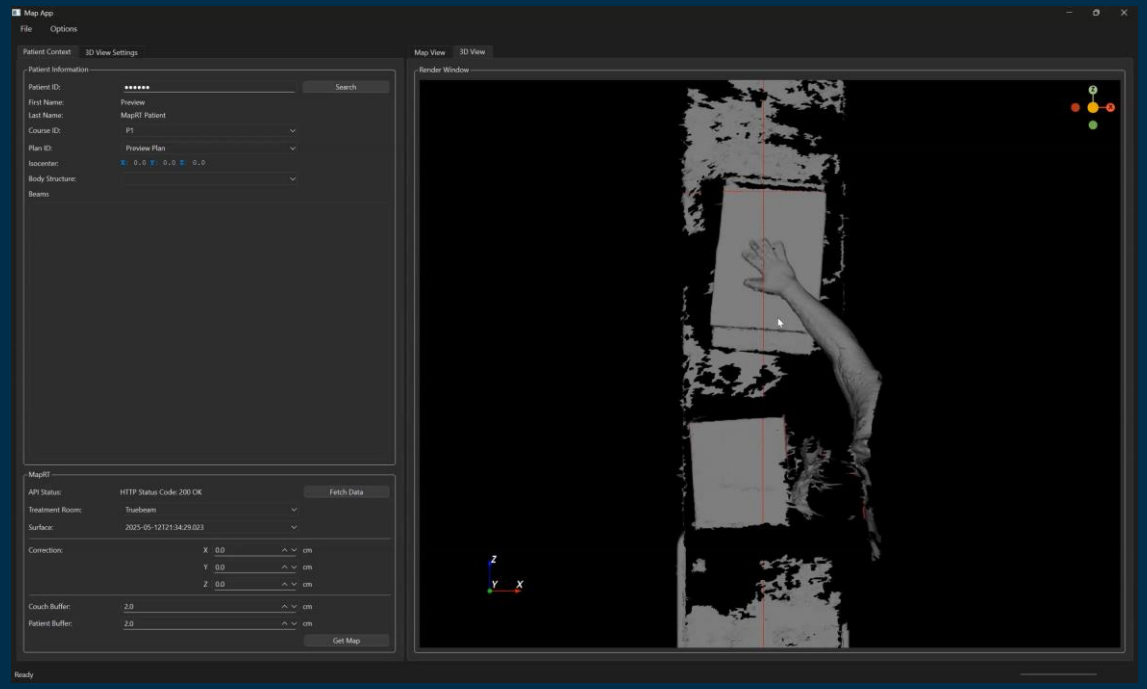
Sim – Plan – Treat – Dose



We can replace a standard CT sim with a completely optical sim for some indications.

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Sim – Plan – Treat – Dose

We can then convert an optical sim surface to a synthetic planning CT.

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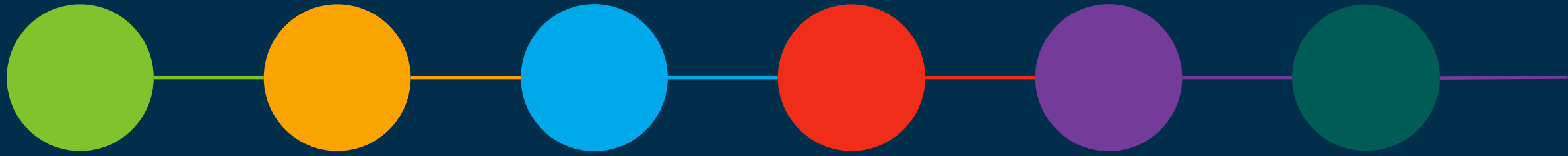
Sim – Plan – Treat – Dose



The sim surface then becomes the treatment setup surface.

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Sim – Plan – Treat – Dose

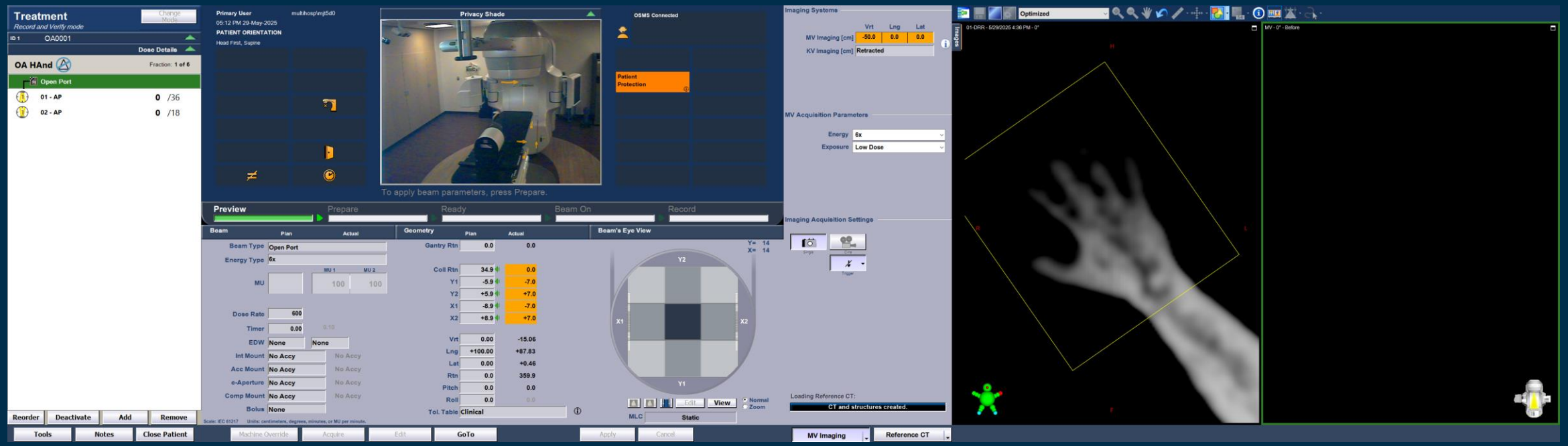

Image and deliver the treatment as planned using the synthetic CT.

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Sim – Plan – Treat – Dose

Visualize the dose delivery using Cherenkov imaging.

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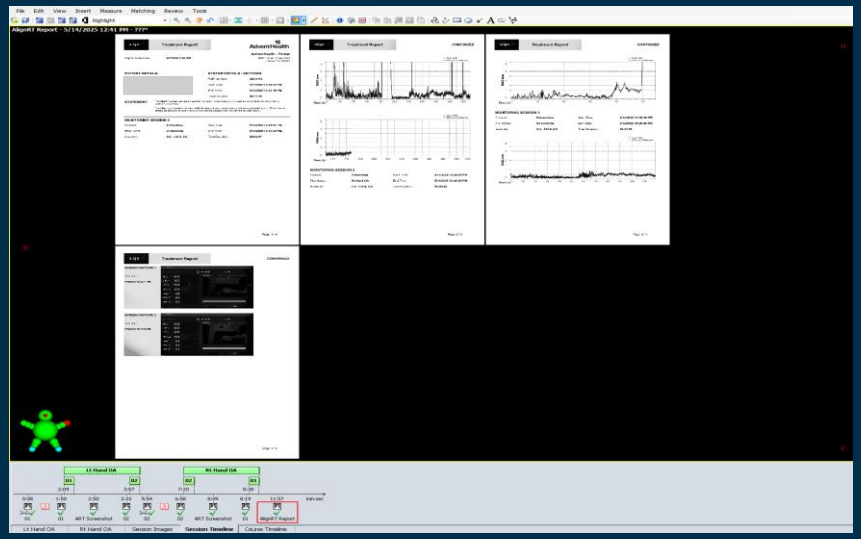
Sim – Plan – Treat – Dose - Document



Document and review the treatment in the OIS (Offline Review) just like any other treatment.

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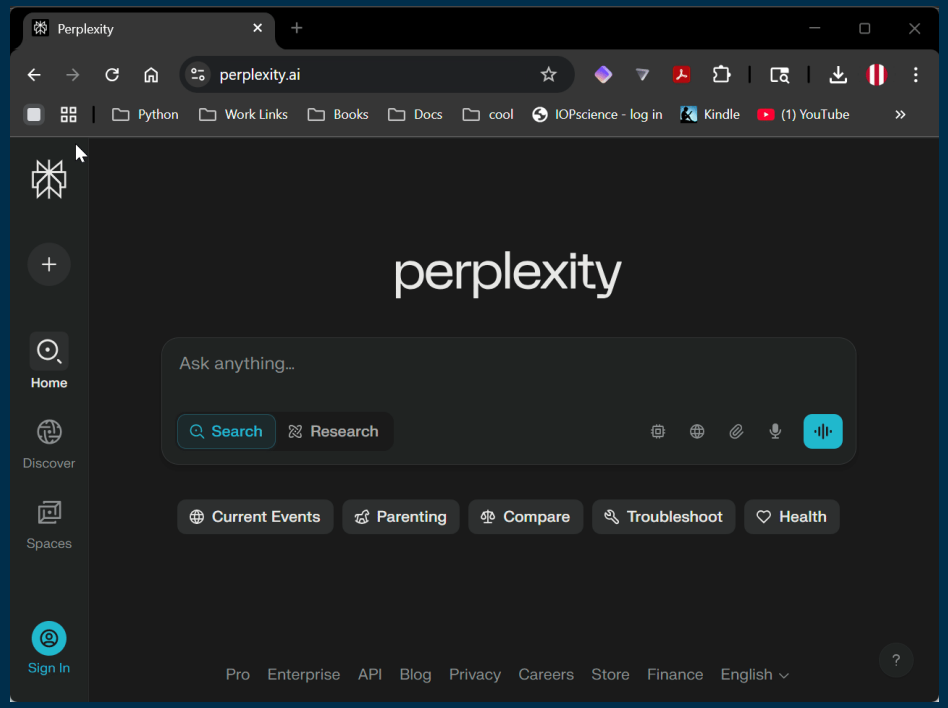
Are there any SGRT boundaries left to push?

Trend/Advancement	Impact on SGRT
AI and advanced imaging integration	Enhanced accuracy, adaptive therapy
Workflow automation	Reduced setup time, improved efficiency
Markerless, tattoo-free setup	Better patient experience
Real-time motion and dose monitoring	Increased safety, precision
Portable device proliferation	Greater accessibility
Expansion into new clinical areas	Broader application, personalized care

In the future, SGRT is expected to enable:

- Biometric patient identification
- In-room scene mapping and augmented reality integration
- Broader use in adaptive radiotherapy protocols
- Real-time visualization of dose delivery
- Improved planning efficiency through vault geometry mapping
- Integration with advanced imaging and AI for adaptive, personalized radiotherapy
- Continued reduction in treatment times and further workflow automation



https://www.perplexity.ai/search/what-is-the-future-of-sgrt-GjCYpogvQrqTH.X.aChJGw

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Are there any SGRT boundaries left to push?

Trend/Advancement	Impact on SGRT
AI and advanced imaging integration	Enhanced accuracy, adaptive therapy
Workflow automation	Reduced setup time, improved efficiency
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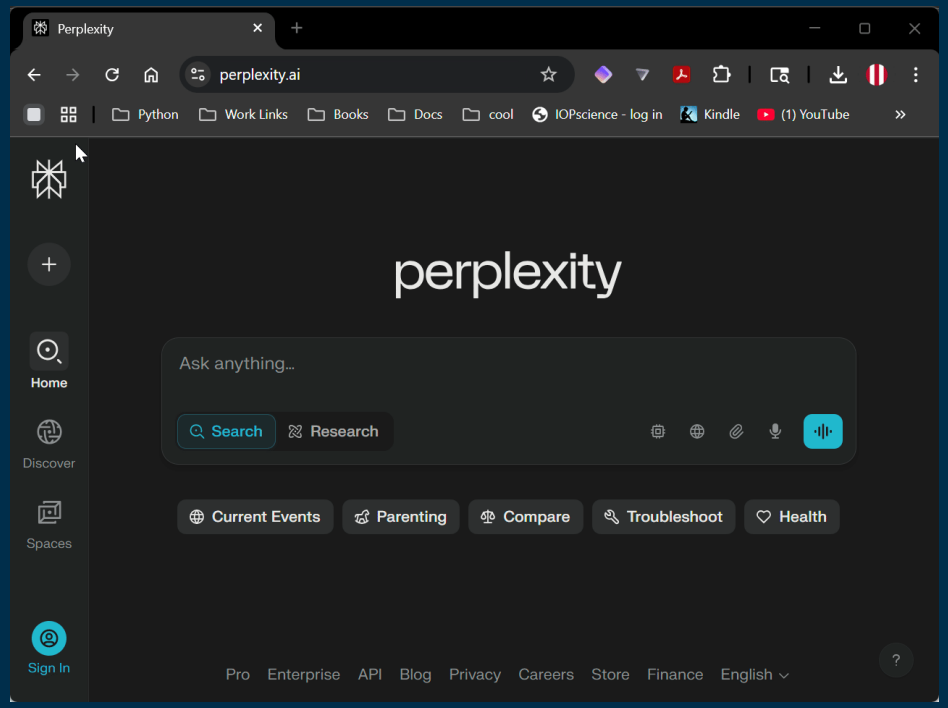

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Thank You!

- Special Thanks to the AdventHealth Physics team.

Extending the Healing Ministry of Christ

REACHING NEW HEIGHTS WITH SGRT

SGRT COMMUNITY

SURFACE GUIDED RADIATION THERAPY

To take part in our event polls, scan here:

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