Implementing Dose Visualization To Help Improve Patient Safety

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Dose RT Install Base Overview

Installed (In-Use):

Advocate Sherman Hospital (2 Dose RT systems)

Aurora Baycare Medical System (2 Dose RT systems)

Atrium Health Cabarrus (1 Dose RT system)

Pending Installation:

Aurora St. Luke's Medical Center (3 Dose RT systems)

Initial Interest and Value

First discussed at ASTRO in Chicago under NDA

Analogous to a “seatbelt” you wear each time you drive but only notice it when you need it.

Aligns with our philosophy of the “loved one standard”

Strong perceived advantages:

Qualitative: enhanced visibility and confidence in treatment delivery

Quantitative (future): potential for measurable dose and workflow benefits as the technology matures

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Installation Experience

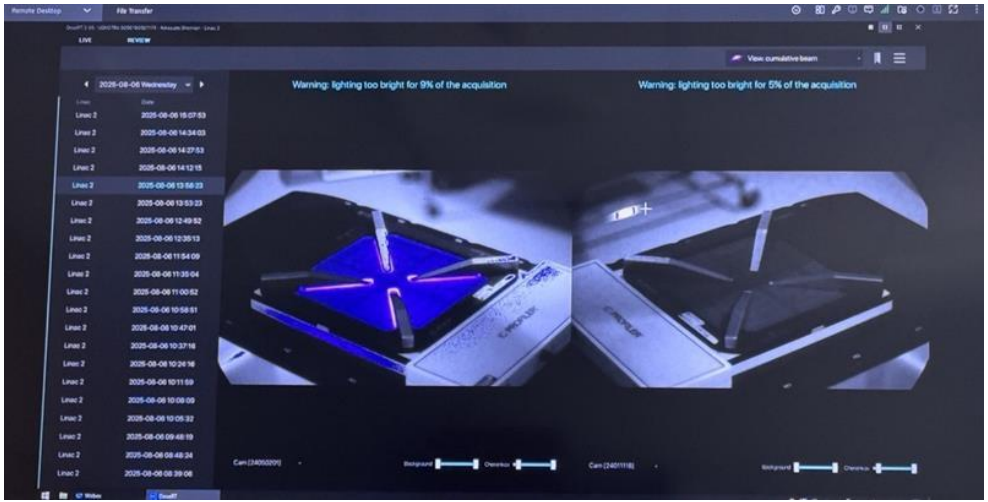
Overall positive experience with Vision RT support and training

Lighting considerations are critical (Image below light filtering differences)

Example: one facility includes both:

a traditional vault

a “garden vault” with significant variable ambient/outdoor light exposure



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Advocate Sherman Traditional Vault

Can be a complex installation with two dual in-room monitors (requiring a special switch), dual lasers (**green**) and an Arjo patient lift (track movement impacting camera)

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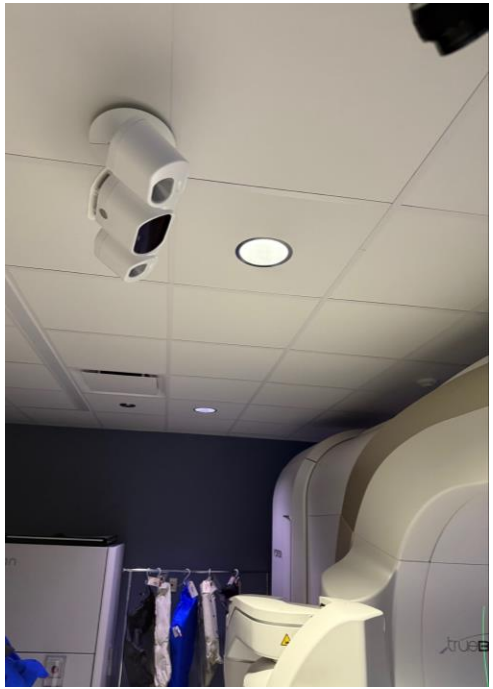
Advocate Sherman Traditional Vault

Light Filtering to remove red wavelength light, installation crew installed filters on the recessed can lights we previously installed.

However, one of the lights appears to be have a filter from a different batch, as it does not dim to the same level as the others.

The remaining lights have a slight purple tint, whereas this light appears to be standard in color temperature **due to difference in filtering batches.**



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Advocate Sherman Garden Vault-Install

•Garden Vault with significant variable ambient/outdoor light exposure key learnings from installation.

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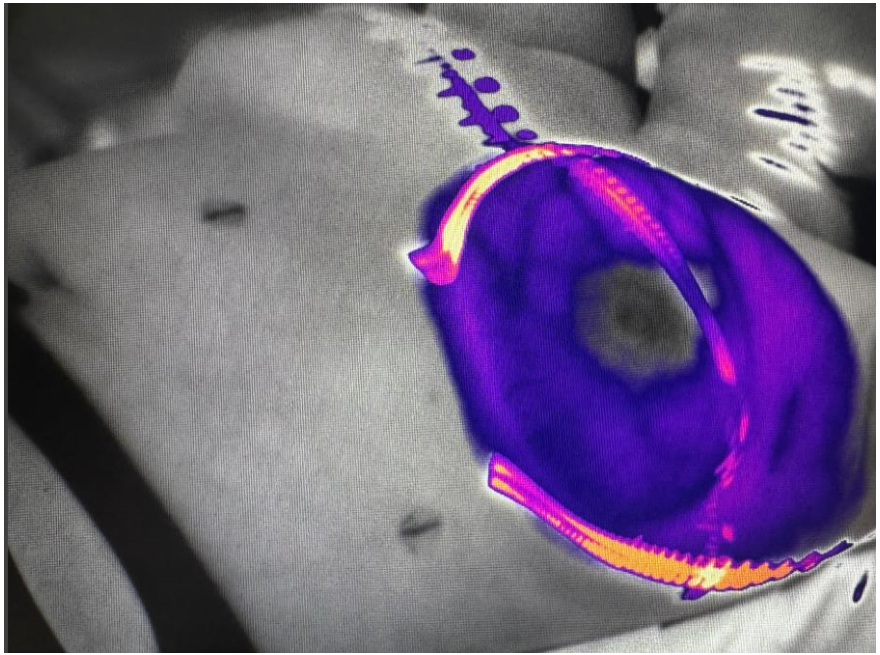
Operational Tips and Best Practices

1. **Turn off ODI** before exiting the room
2. **Use Align RT for virtual SSDs**—ODI often not needed
3. **Turn off lasers (red)** when using Dose RT
4. With in-room monitors and for dual in-room monitors **install a switch to turn off power** to these devices and darken the room when needed

Operational Tips and Best Practices

5. **Green light ODI** is preferable to white (less obscuring)



White Light ODI

Green Light ODI

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Operational Tips and Best Practices

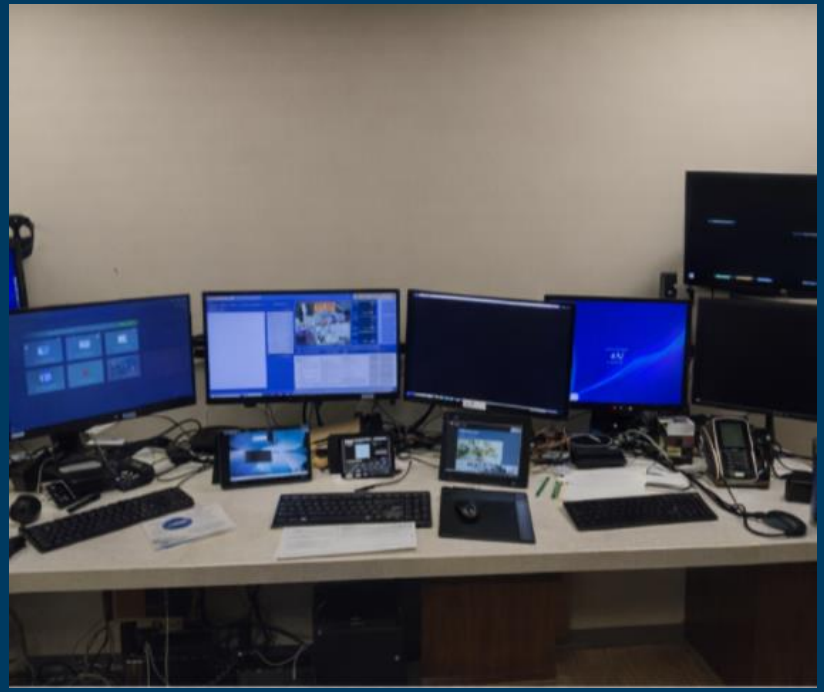
6. **Early IT engagement** is critical:

   Required to export Dose RT reports to the network
7. Review frequency- First fraction and weekly.
8. Bolus placement and verification

Console and Workflow Design

One RTT focused on treatment delivery, MLCs

Second RTT focused on monitoring Dose RT and the patient. Allows for messaging from medical Physicist review notification.



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Importance of:

Early site visits

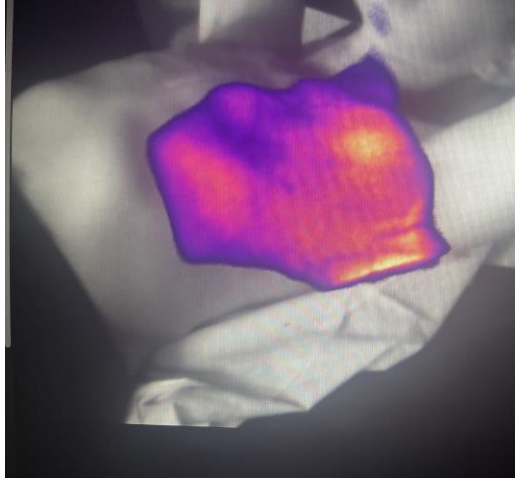
Strong vendor support during go-live

Staff buy-in and feedback—this needs to be implemented as a team project. Some staff may not want the room to be completely dark.

Clinical Use Cases:

Breast treatments:

1. 4-field breast
2. Bilateral breast (example where an issue was detected)
3. Therapists have stopped treatment several times to confirm dose to the neck/chin or contralateral breast.
4. Changed how we evaluate plans, low isodose review, improving plan quality.
5. Review Posterior field exit dose



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Clinical Use Cases and Strengths

Prone Breast:

Verifying appropriate setup and flash. Camera FOV limitations make right breasts harder than left breasts to visualize.

Bolus Positioning Verification:

Can verify on ports after cumulative dose map reconstruction

Able to visualize on electron fields (as long as gantry does not obstruct FOV)

Other Limitations:

Skin pigmentation: patients with tattoos and patients with darker skin tones demonstrate signal loss

Camera FOV: limited by certain anatomical sites, field orientations, and gantry positions

Modulated fields: increased noise during VMAT delivery

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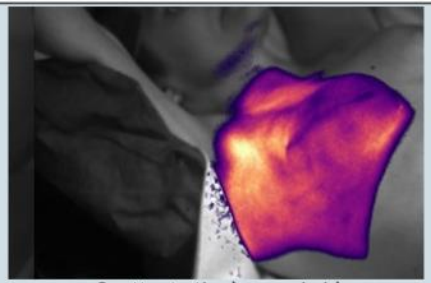
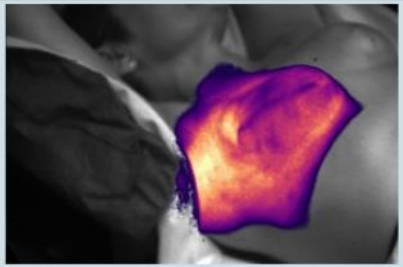
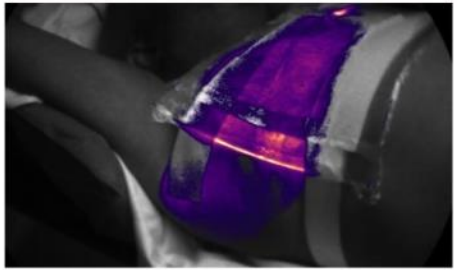
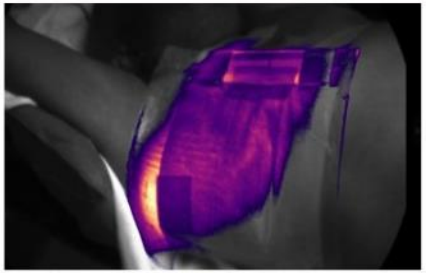
Clinical Use Cases and Strengths

Breast treatments: Positioning and Bolus Placement

	Pre-adjustment images	Post-adjustment images
Patient positioning error	 Scatter to the jaw and chin	 Corrected: patient head turned per protocol
Bolus positioning error	 Incorrect bolus positioning identified in portal images prior to treatment delivery	 Bolus adjustment and verification: covering intended treatment area

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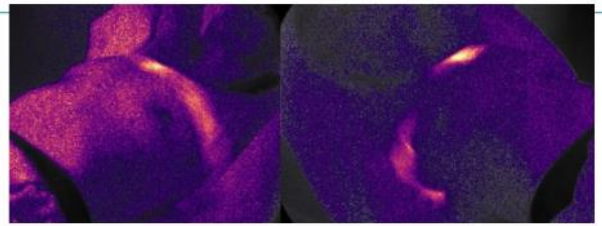
Clinical Use Cases and Strengths

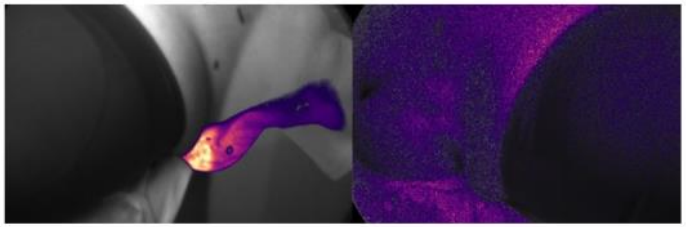
Limitations

Modulated fields



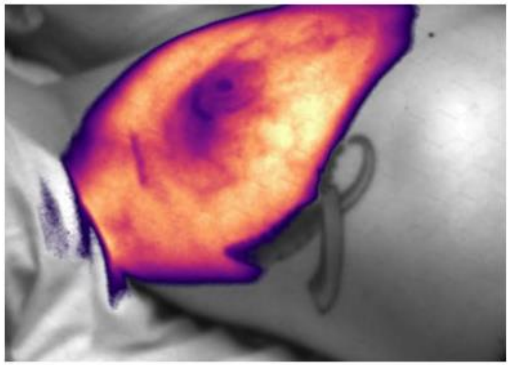
Increased Noise: modulated field delivery visibility

Camera FOV obstruction



Right Prone Breast images unusable in DoseRT camera's FOV

Signal Intensity variations with skin pigmentation



Tattoo artifact

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Clinical Use Cases and Strength

1. **High sensitivity**:

Can visualize down to at least 20% isodose line

Confirms plan delivery (intensity mapping is relative, not absolute)

2. **Additional value**:

SRS and SBRT

Side-by-side review with the plan

Visualization of interfraction motion and positioning variability

Current Challenges and Limitations

Ambient light and reflections (e.g., from vac-locs, bolus, linac housing) can create artifacts

Upgrade pending to improve light filtering

Some false-positive reflections do not represent true dose

Software limitation:
-Currently displays date/time only
-Upcoming upgrade will also display patient name

Future Optimizing Cherenkov Imaging & Patient Comfort

Cherenkov imaging requires minimal ambient lighting during treatment, which can impact both image quality and patient comfort.

BeamLights™ Lighting Solution

A lighting solution that synchronizes the vault lighting with the beam delivery.

- Manages treatment room lighting conditions, creates an optimal environment for Cherenkov imaging without fully darkening the room
- Enhances Cherenkov Imaging, supports clearer visualization and more consistent dose imaging
- Improves patient viewing and comfort allows vault lighting to appear to be at a comfortable setting

We will be installing the BeamLights solution at St. Lukes soon and are evaluating it for our other sites.