

A new view of
SGRT



First experiences with DoseRT



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DoseRT: First Experiences with Real-Time Cherenkov Imaging



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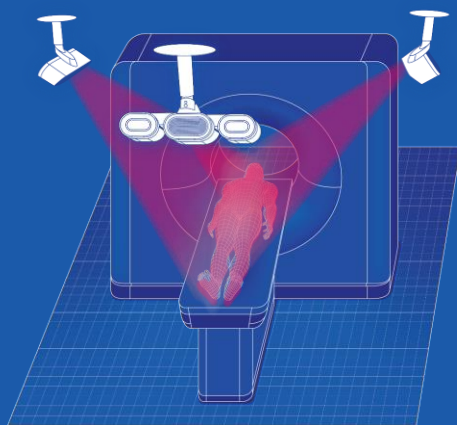
Disclosures

Physics Consultation Services

- Vision RT
- Varian

Our SGRT Patient Process

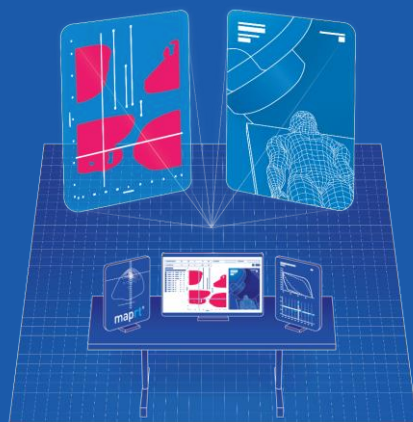
SIM



4D AND BREATH HOLD CT

simrt™

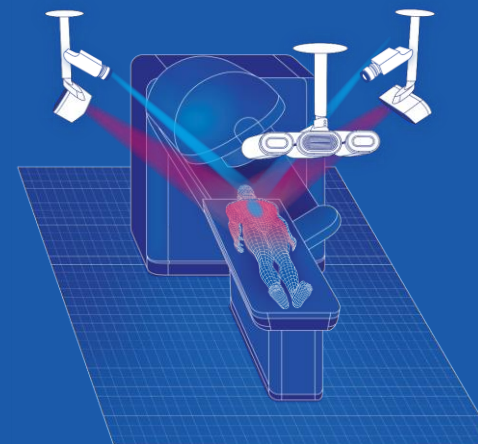
PLAN



CLEARANCE MAPPING

maprt®

TREAT / DOSE



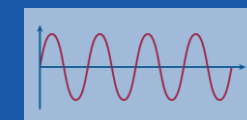
MOTION MANAGEMENT
DOSE VISUALIZATION

alignrt® dosert™
Powered by BeamSite®

PATIENT ID



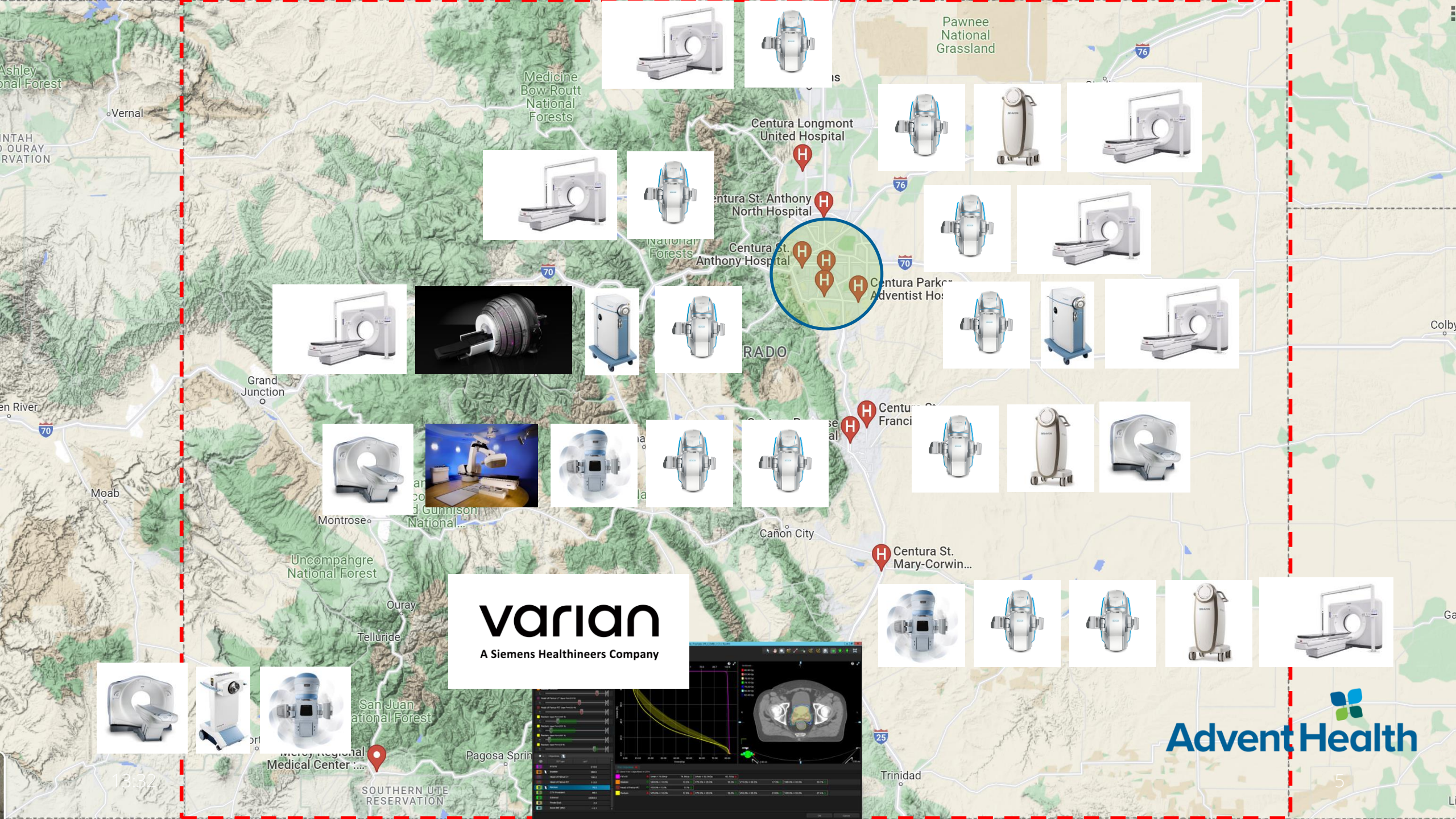
GATING



One Environment

Fostering **Innovation**
Improving the Patient **Experience**
Integrating **Quality, Safety** and **Efficiency**



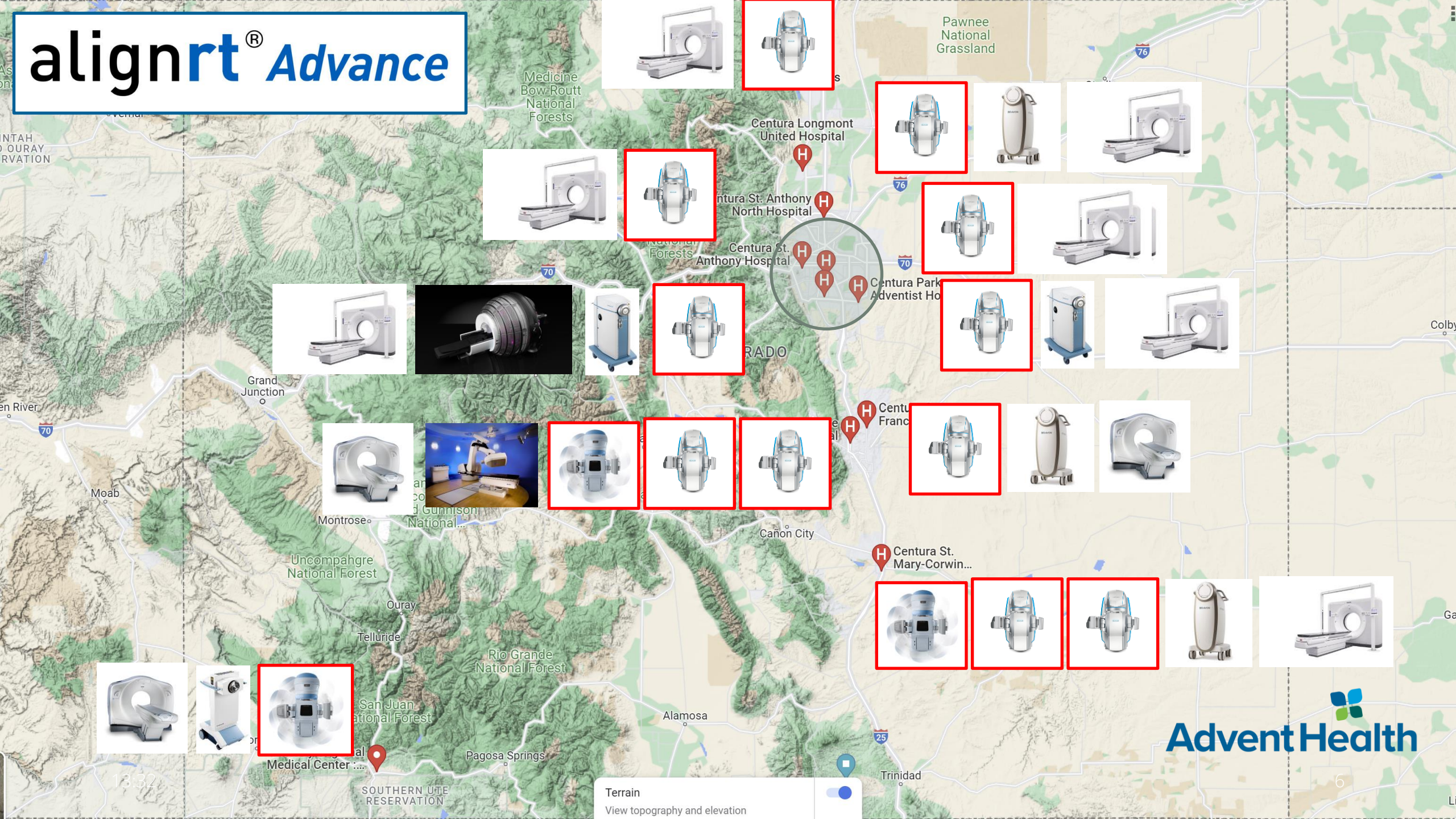


varian

A Siemens Healthineers Company

Advent Health

alignrt[®] Advance



Medicine Bow-Routt National Forests

Pawnee National Grassland

Centura Longmont United Hospital

Centura St. Anthony North Hospital

Centura St. Anthony Hospital

Centura Park Adventist Ho

GRADO

Centura Franc

Canon City

Centura St. Mary-Corwin...

Grand Junction

Montrose

San Juan National Forest

Uncompahgre National Forest

Ouray

Telluride

Rio Grande National Forest

Alamosa

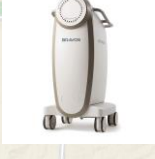
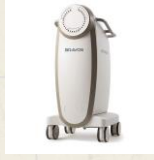
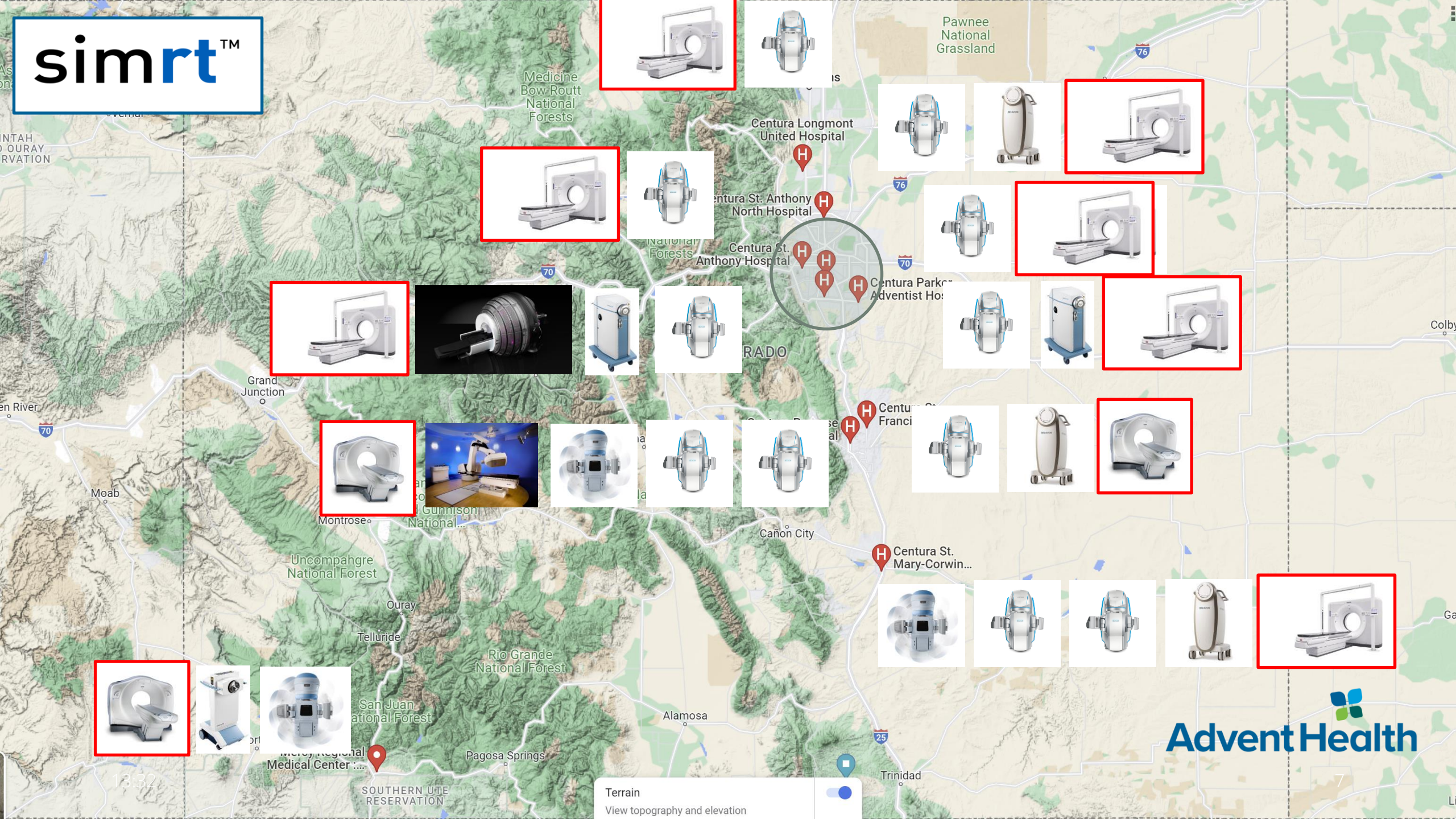
Pagosa Springs

SOUTHERN UTE RESERVATION

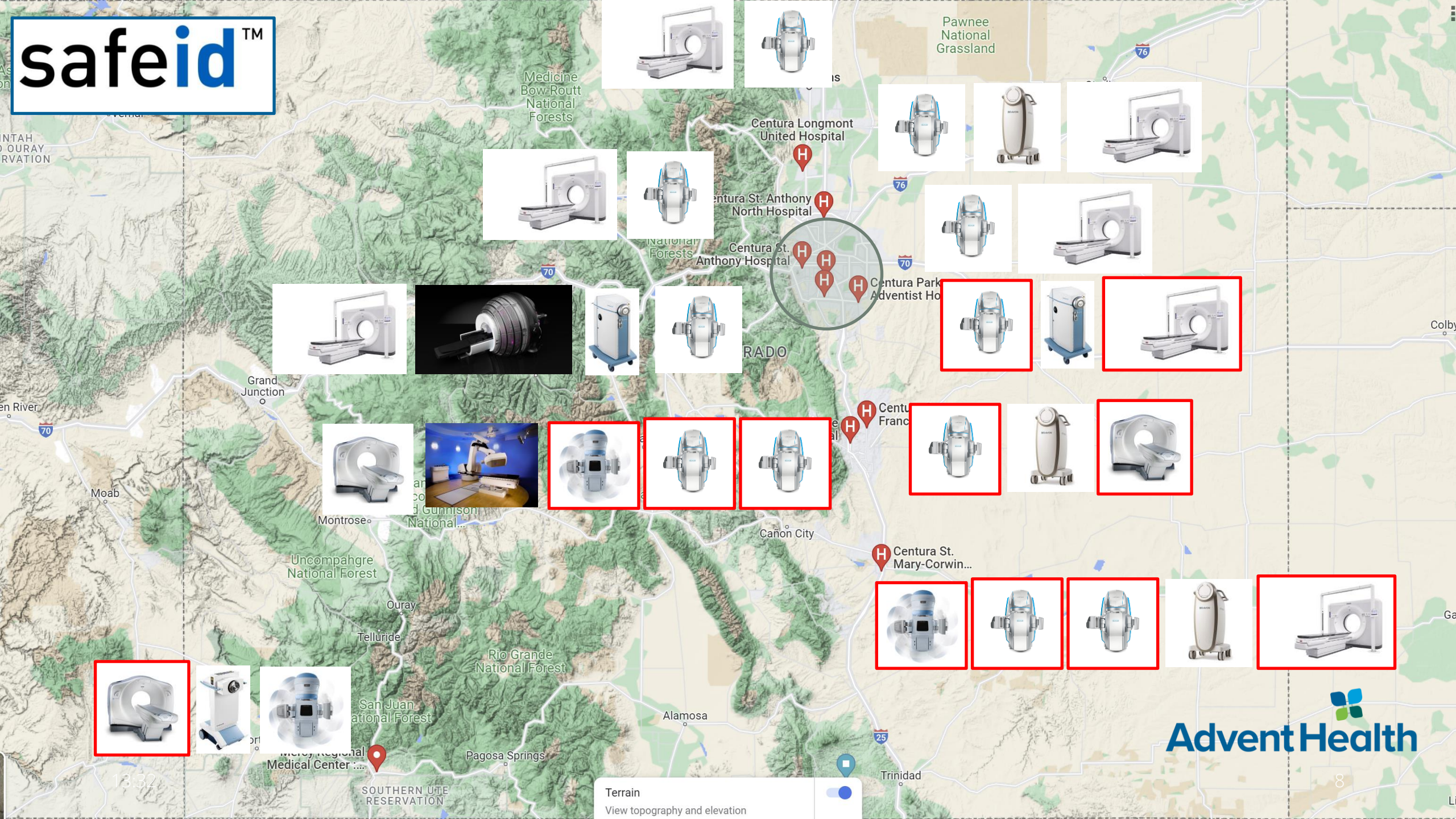
Trinidad

Advent Health

Terrain
View topography and elevation



Terrain View topography and elevation



Medicine
Bow-Rout
National
Forests

Pawnee
National
Grassland

Centura Longmont
United Hospital

Centura St. Anthony
North Hospital

Centura St.
Anthony Hospital

Centura Park
Adventist Ho

RADO

Centu
Franc

Canon City

Centura St.
Mary-Corwin...

Grand
Junction

Montrose

Ouray

Telluride

Rio Grande
National Forest

Alamosa

Pagosa Springs

SOUTHERN UTE
RESERVATION

San Juan
National Forest

San Juan
Regional
Medical Center ...



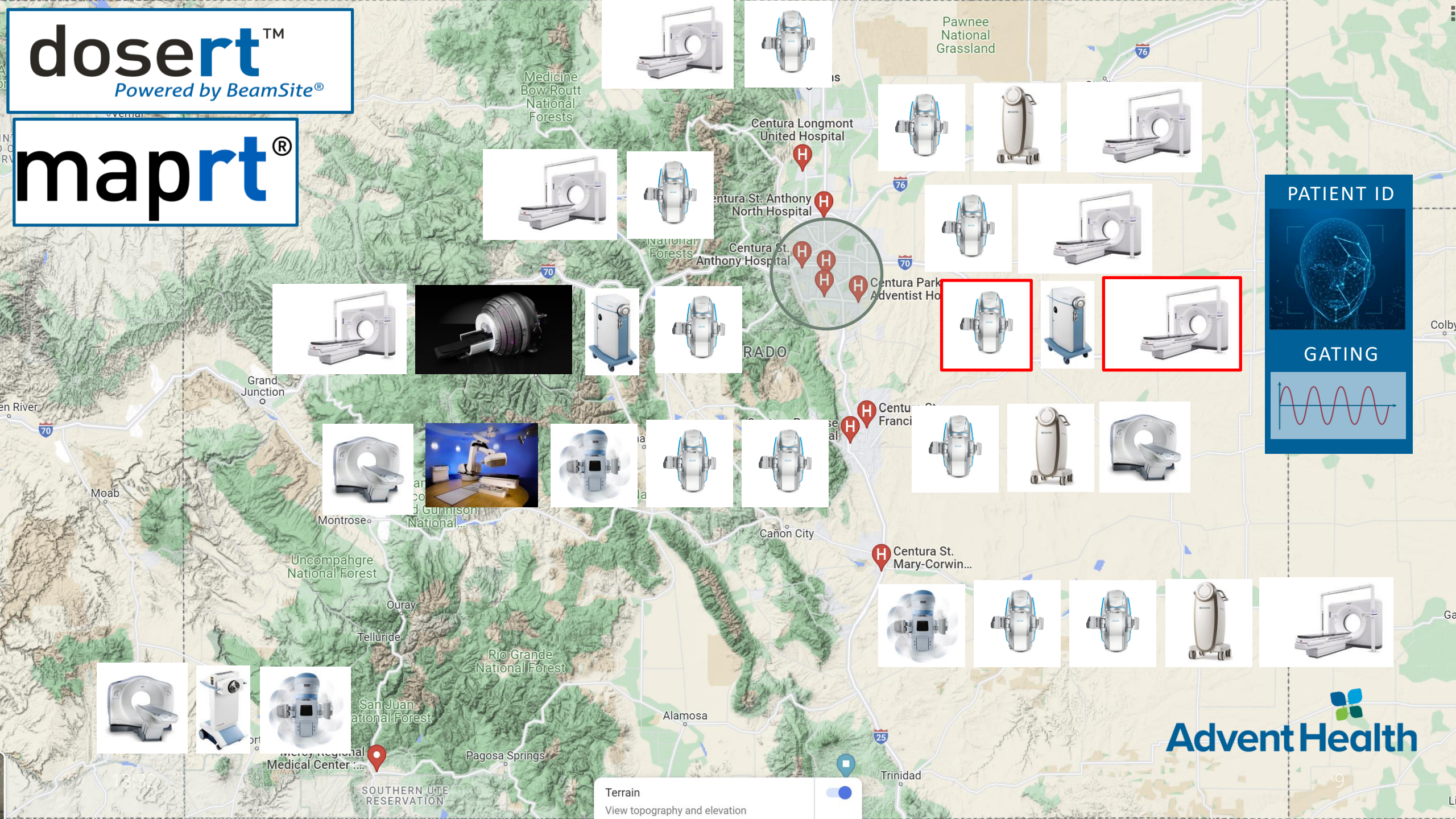
Terrain
View topography and elevation

13 32


8

dosertTM
Powered by BeamSite[®]

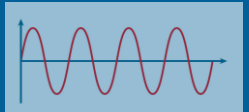
maprt[®]



PATIENT ID



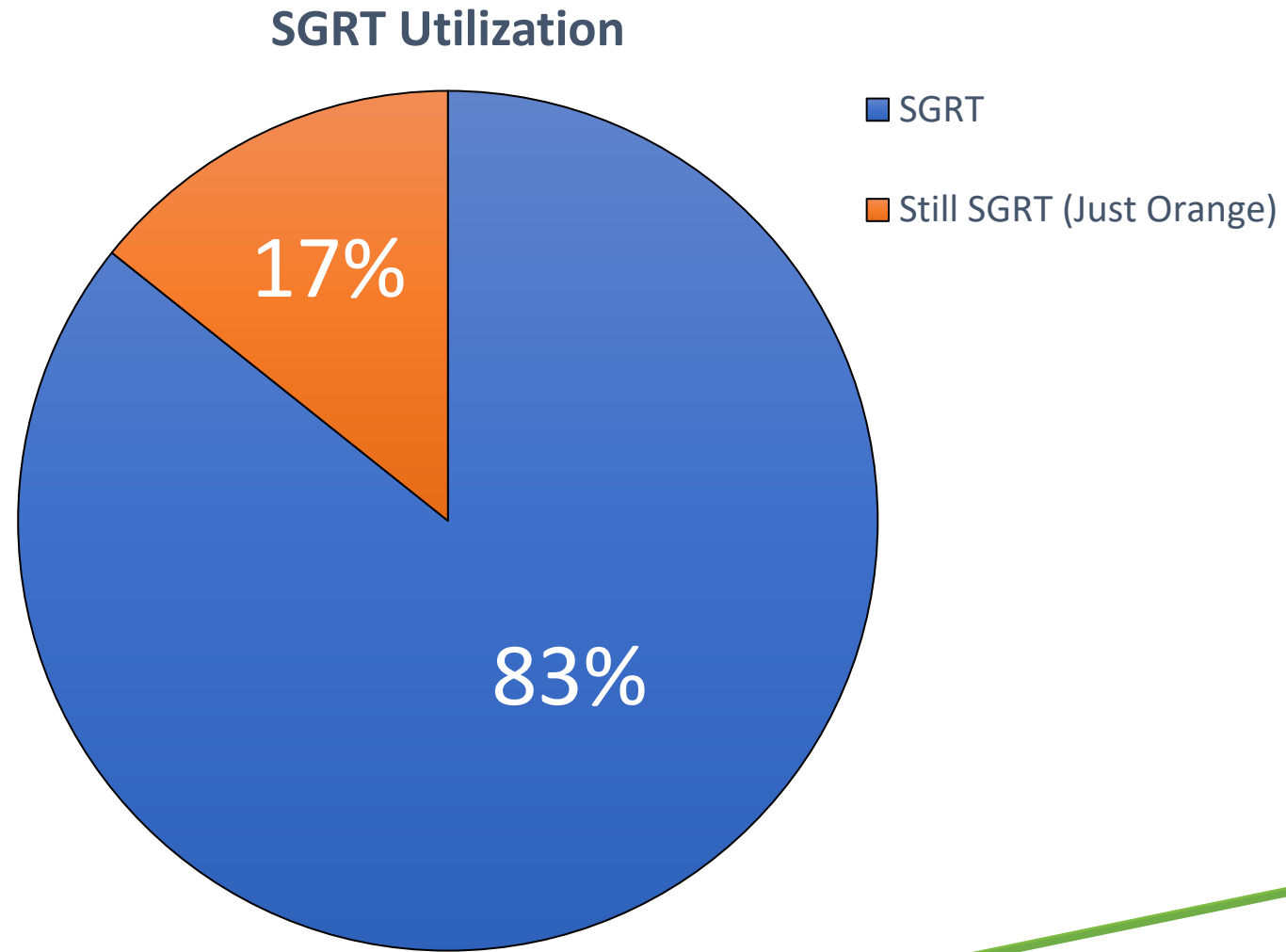
GATING



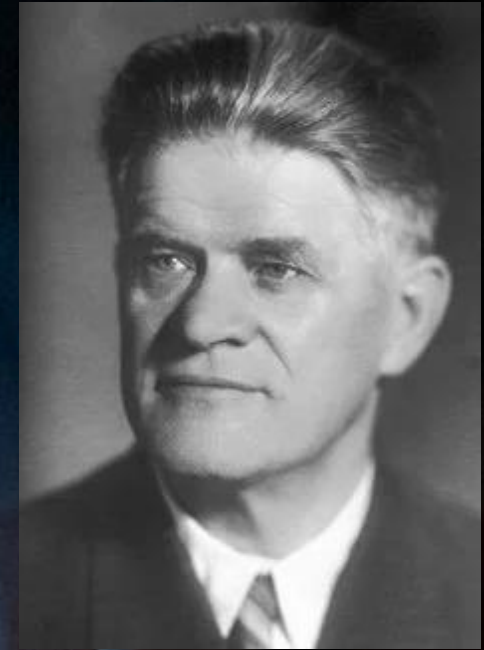
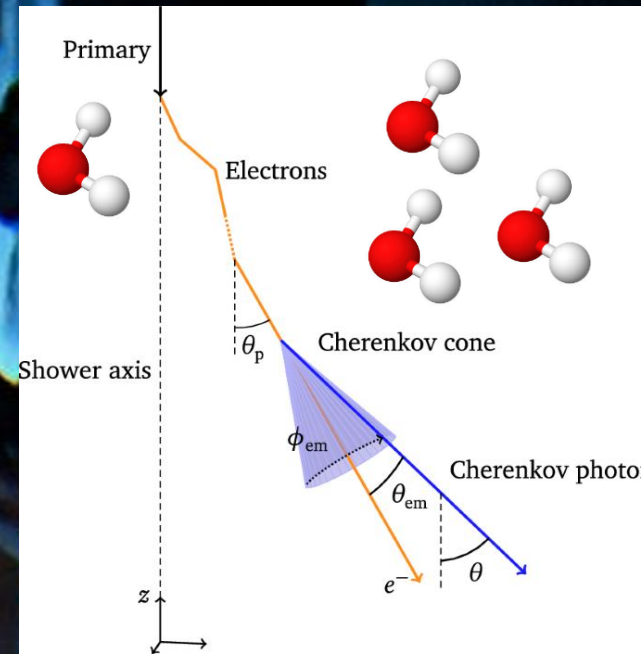
Advent Health

Terrain
View topography and elevation

Current SGRT Utilization (Total Patient Population)



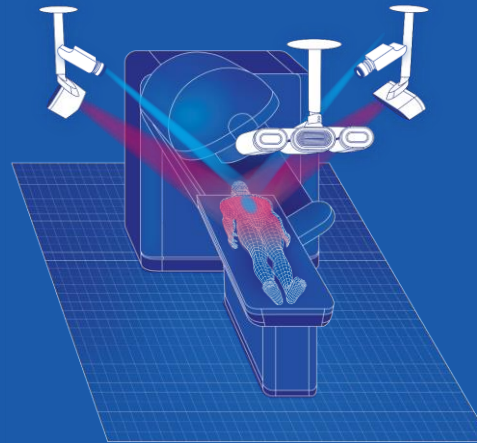
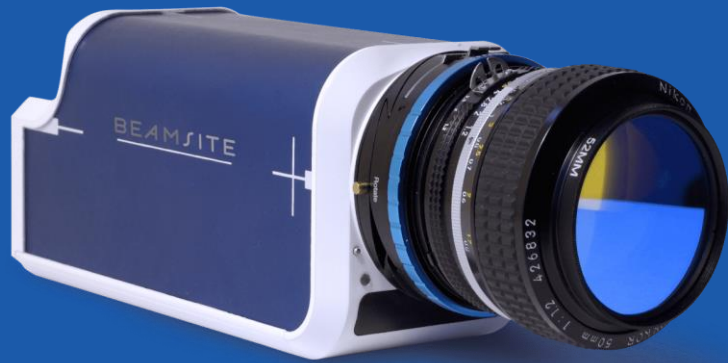
Cherenkov Radiation



Pavel A Cherenkov

A New Surface Imaging System is Born

TREAT / DOSE



MOTION MANAGEMENT
DOSE VISUALIZATION

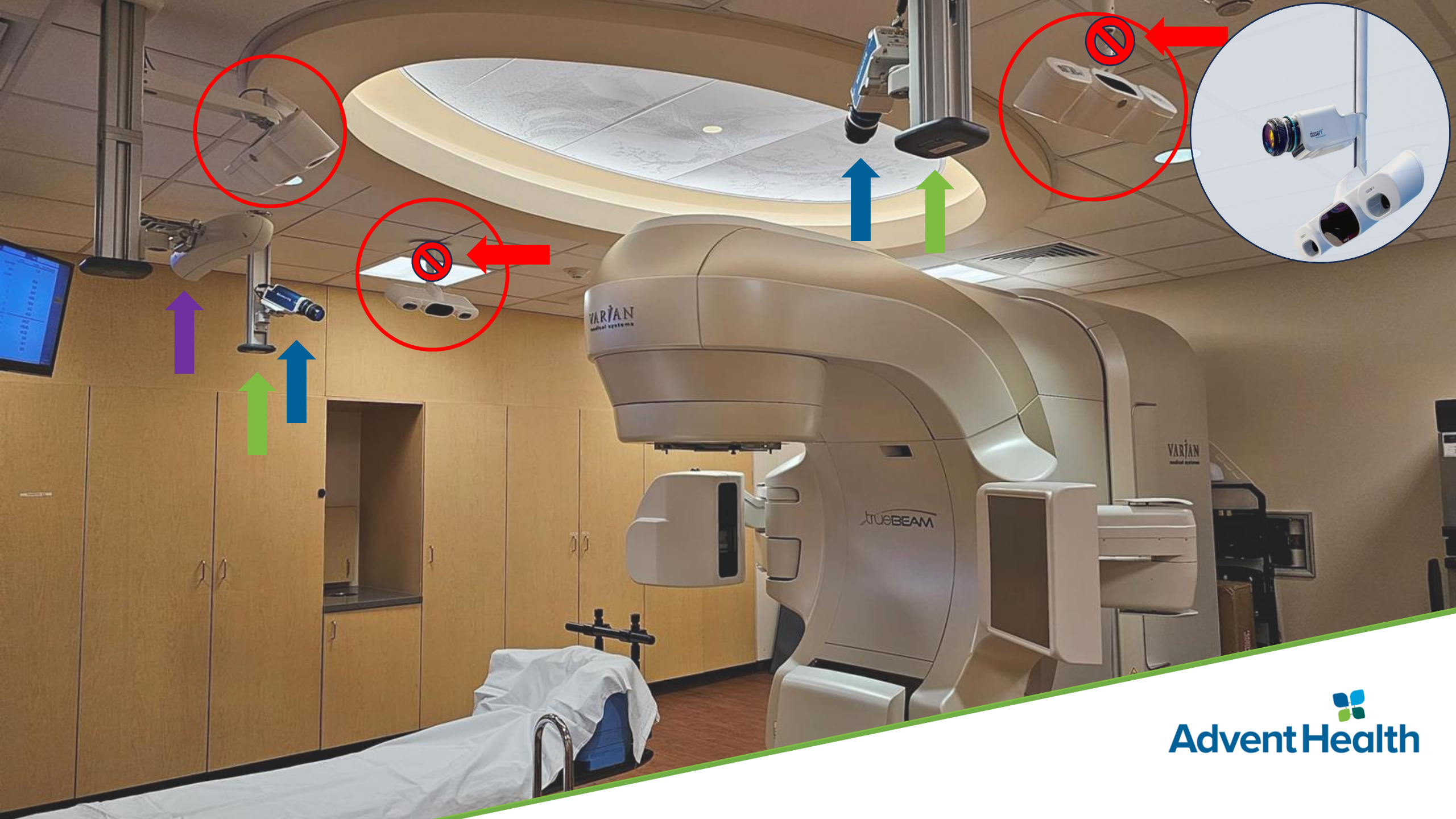


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Our System

DoseOptics BeamSite System Installed
DoseRT Dual Boot Research System Installed
In Research and Testing phase since late October of 2023


Advent Health





System Challenges

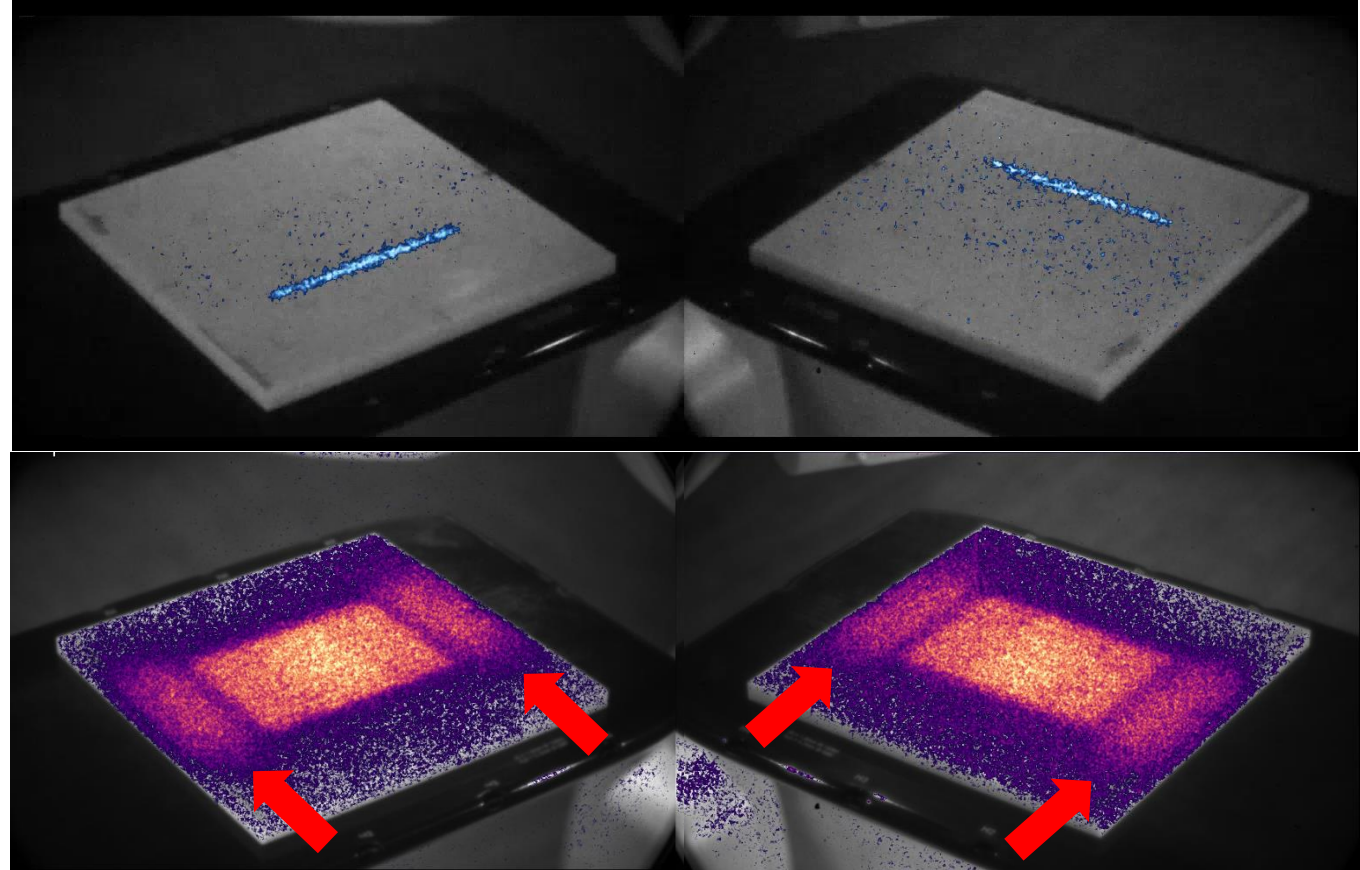
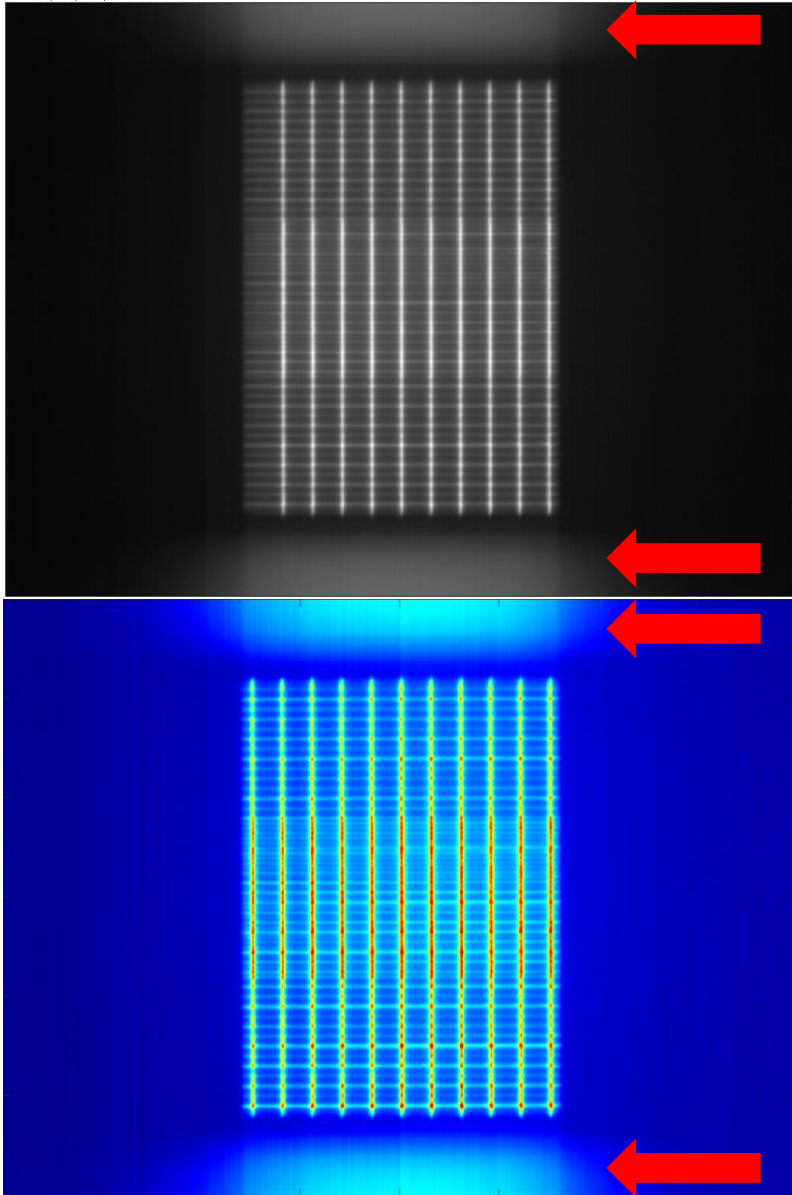
The BeamSite cameras are very sensitive to room lighting conditions. Compromises may need to be made with other camera-based patient monitoring systems (i.e. LiveView Camera for TrueBeam)

The current system is not mounted with the AlignRT cameras which may require vault modification (i.e. moving HVAC or other lighting fixtures) to accommodate the extra camera mounts.

There may not be a workable compromise with other systems depending on your setup (i.e. Some monitors and lights may need to be on a door switch).

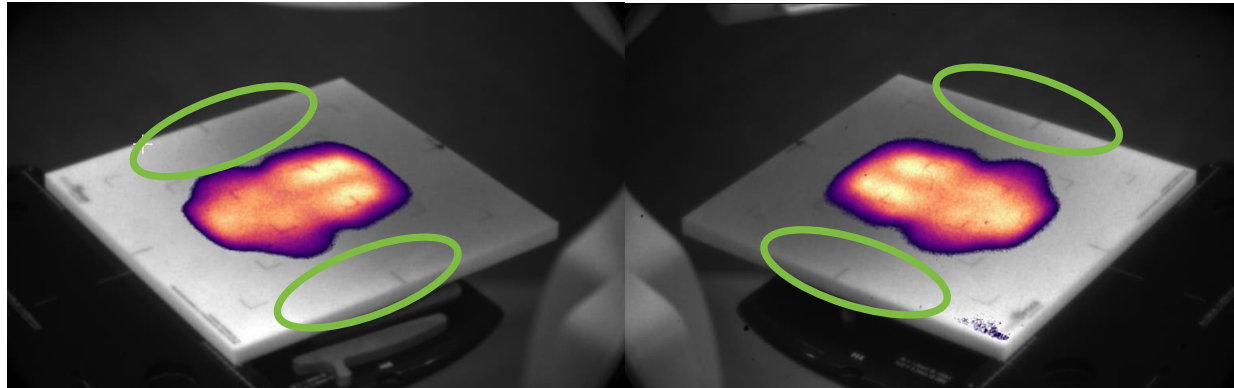
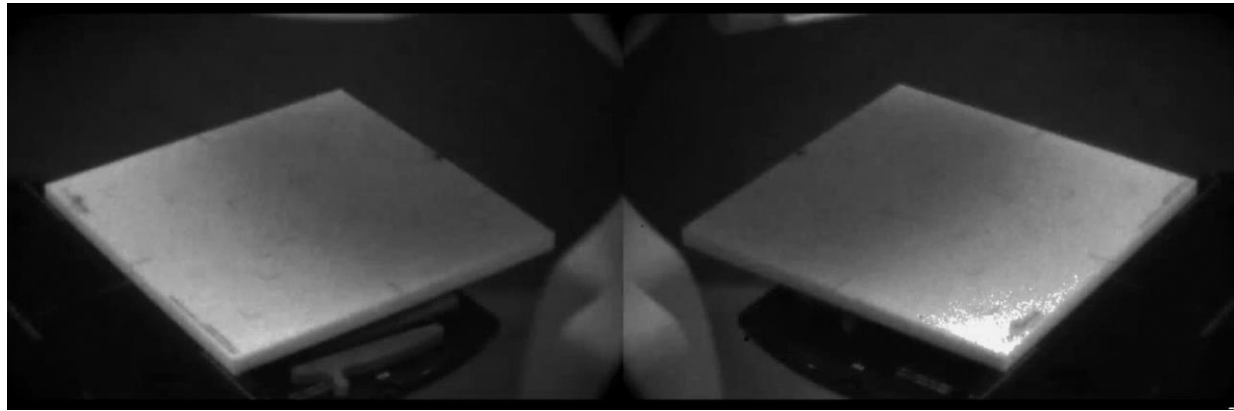


Visualizing Known Stray Radiation

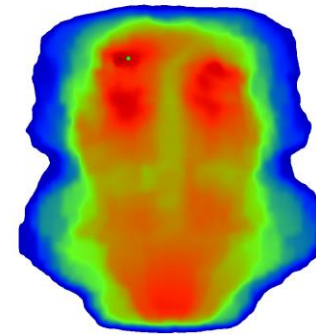


Varian CTB updated in Customer Release Note
(2013) P/N 100020576-10

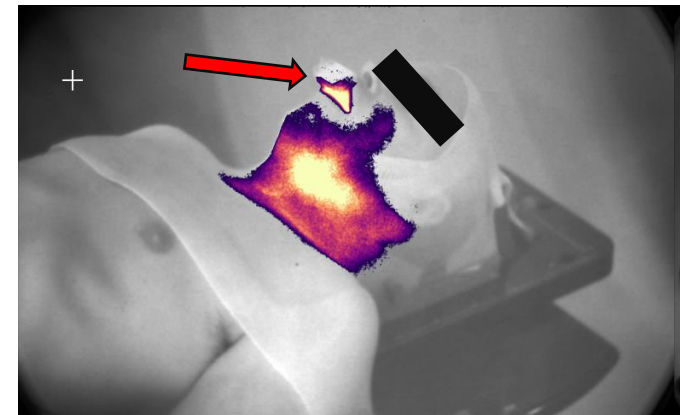
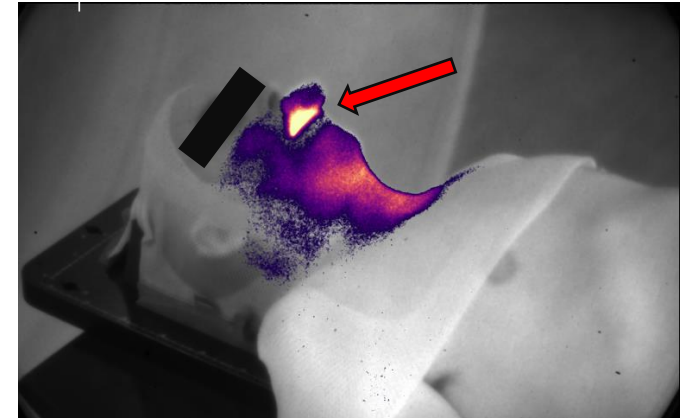
Potential Qualitative Applications



Visual Verification of Suspected Over Modulation of Plan
(Check can be performed in QA mode prior to plan finalization)

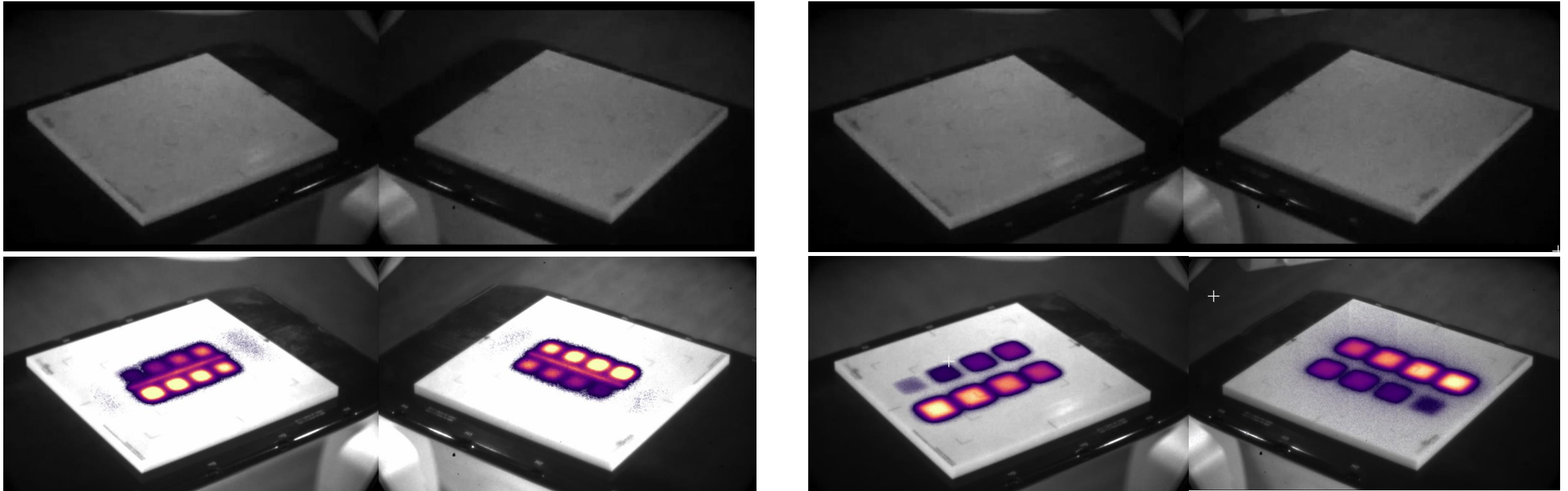


Perform Standard QA
(Pre Tx Verification)



Deliver

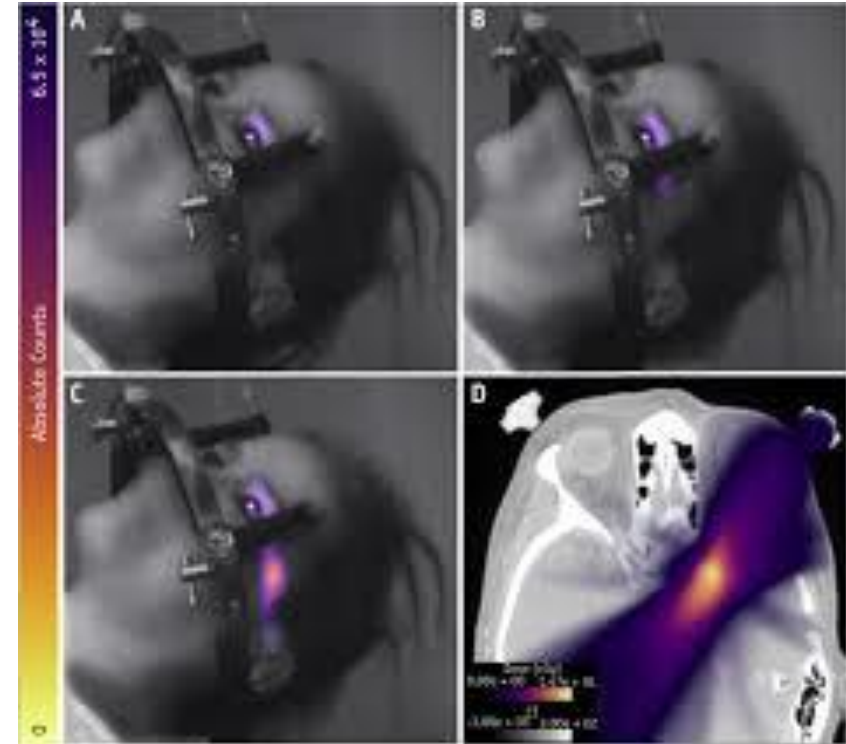
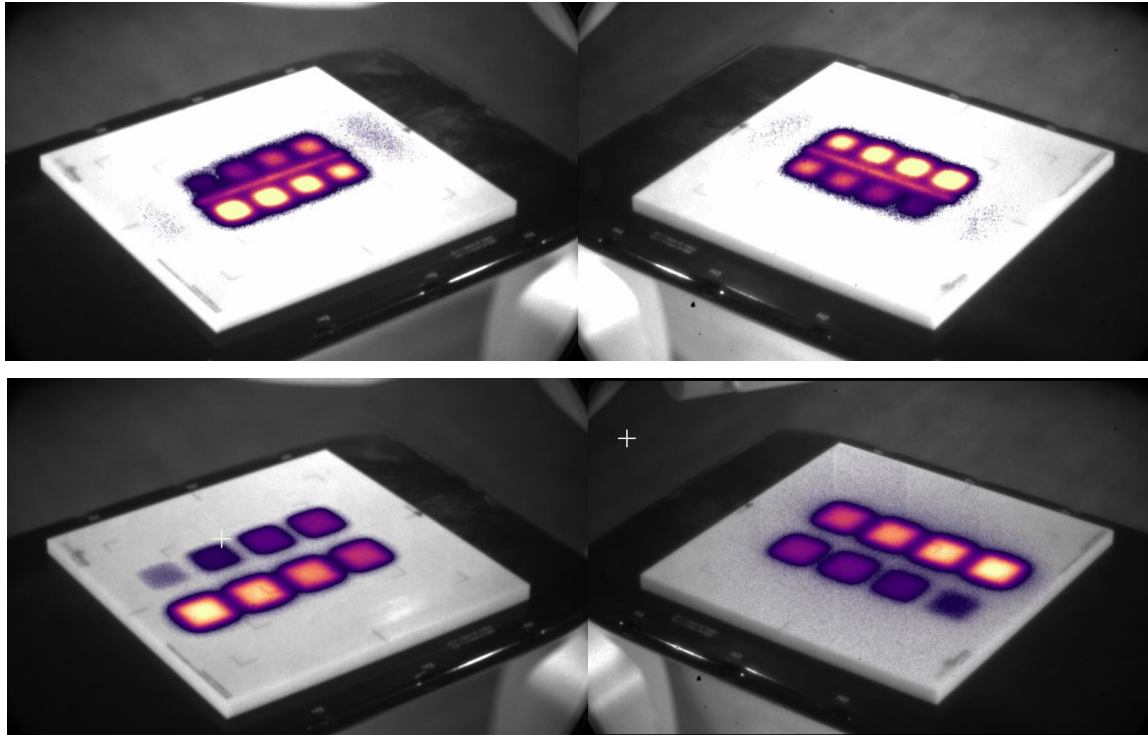
Potential Quantitative Applications



*The amount of Cherenkov light emitted is proportional to the dose delivered to the medium

❖ Ilya Frank and Igor Tamm worked out the mathematics for this and shared the 1958 Nobel Prize with Cherenkov

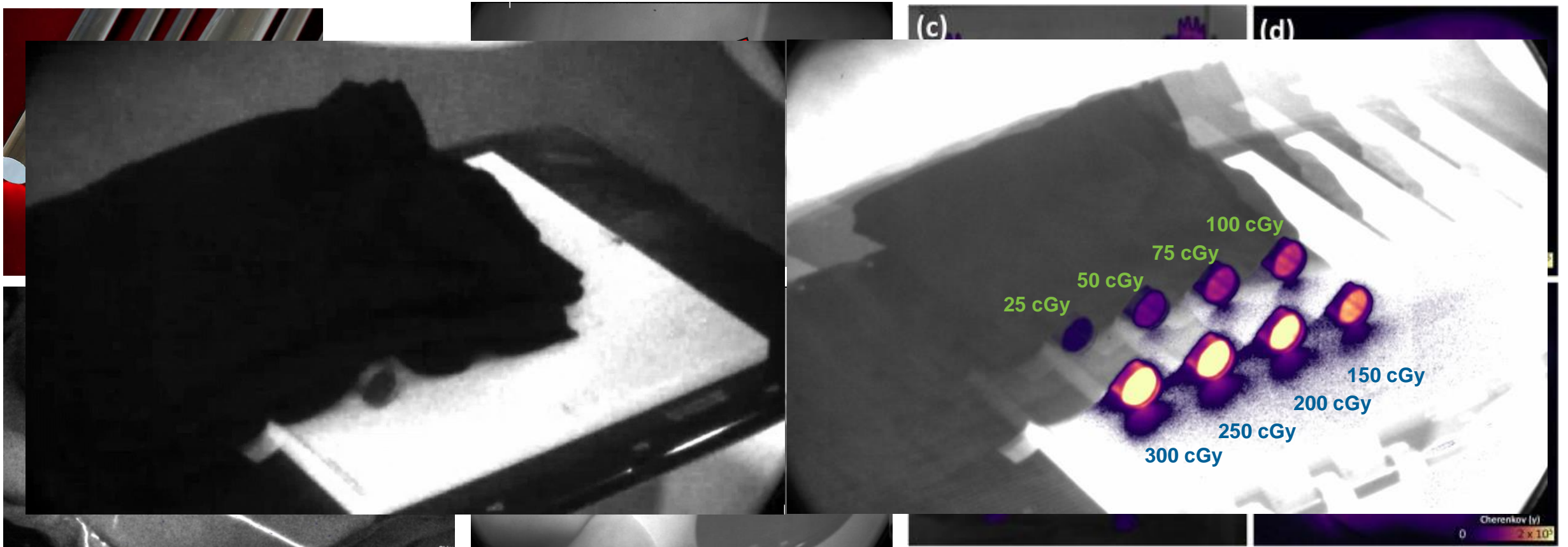
Potential Quantitative Applications



*The amount of Cherenkov light emitted is proportional to the dose delivered to the medium

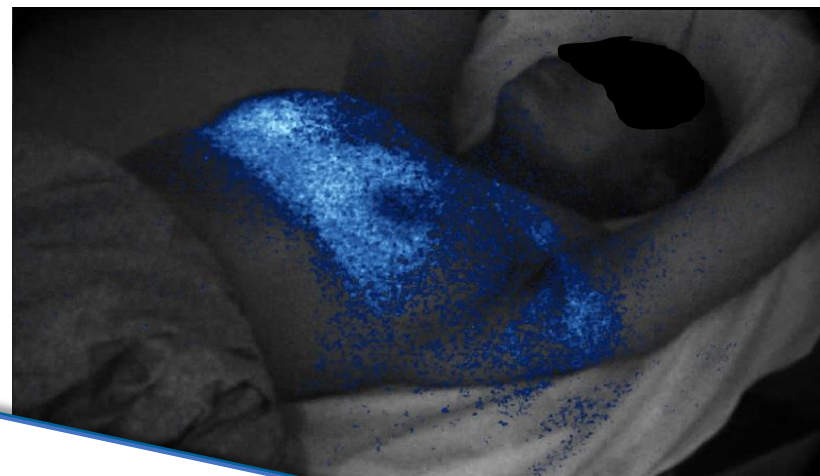
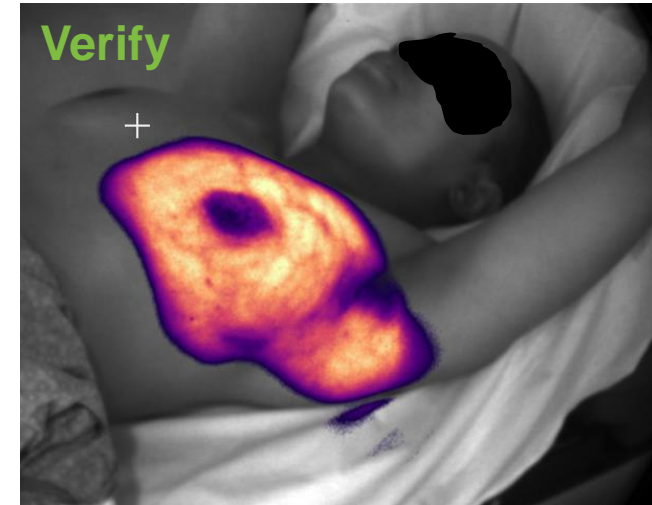
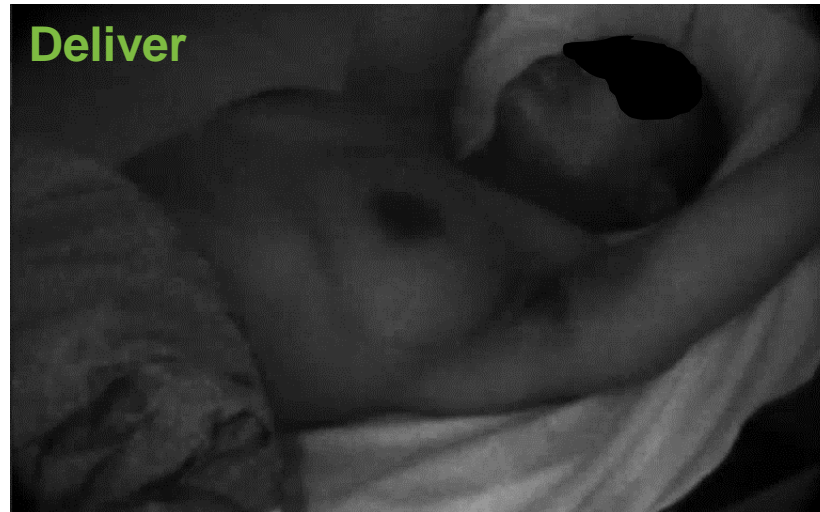
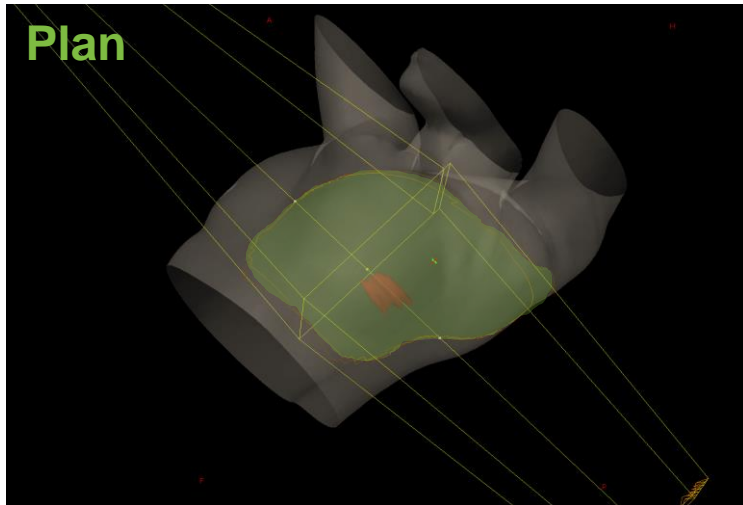
Can we potentially use this as a higher resolution way of verifying dose for very small field as part of our pretreatment checks when only coarse detector arrays are available?

Potential Quantitative Applications



Can we use the properties of non-biological materials with high signal potential as real-time dosimeters?

Quality and Safety (improper port technique added)

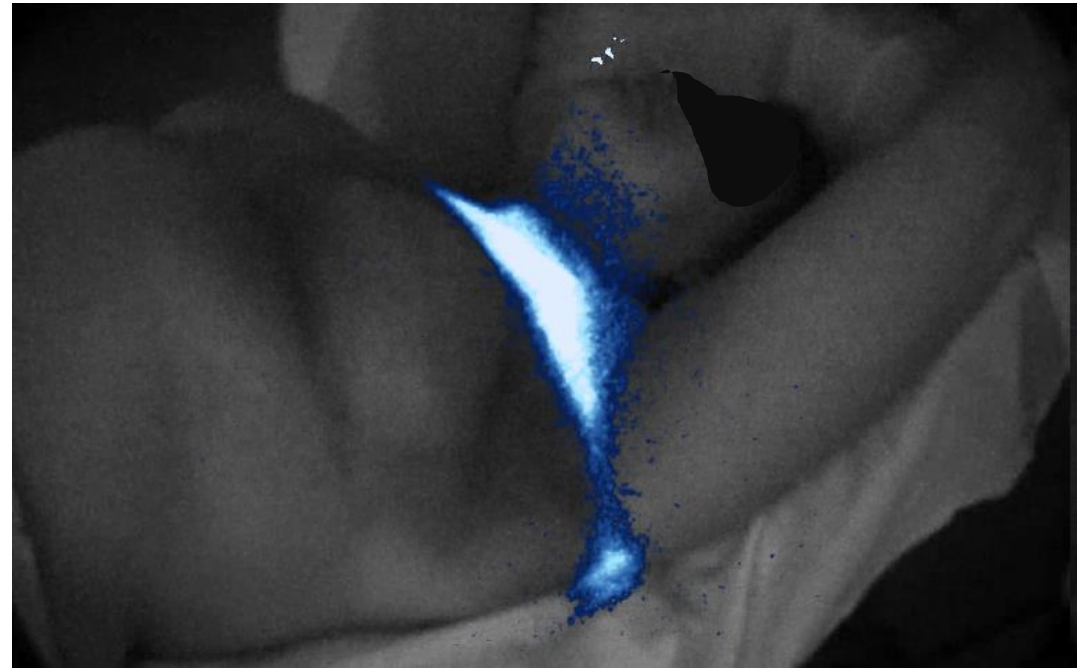


Whole Care Experience

Keep Me Safe


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Quality and Safety (inadequate SGRT tolerances)



First 2 days of Cherenkov imaging: 59 Year old female patient receiving 4 field breast treatment. Presented in chart rounds with greater than normal skin reaction extending under the ipsilateral arm.

PQI project started



Whole Care Experience

Keep Me Safe

Summary

Cherenkov imaging allows for both real-time visualization of dose delivery and post treatment review of anomalous events

Cherenkov imaging allows for identification of day-to-day variation in delivery with the potential for automated interventions in the future

Cherenkov imaging fills a gap left by other patient monitoring systems and allows for faster intervention than traditional approaches.

The technology appears to have similar potential to traditional SGRT in becoming the standard of care in the future.



Thank You.

Anton Eagle (AdventHealth Physics Team)

Wilson Schreiber (DoseOptics)

Rachael, John, Brando and Cesar and the rest of the Vision RT team

