Image with confidence. Treat with confidence.
Addressing the effects of motion remains one of the significant challenges facing clinicians when delivering radiation to moving targets. As radiotherapy shifts more to hypofractionated (SRS/SBRT) treatment regimens, initial patient setup and during-treatment monitoring is becoming more important. Real-time visualization of targets of interest and surrounding normal tissue during beam-on plays a vital role in these cases. To address this challenge, Varian has developed a set of tools to provide meaningful information at patient setup and treatment delivery — the Advanced IGRT & Motion package. The package adds new capabilities to the TrueBeam portfolio of robust imaging modalities, giving you added confidence that the treatment stays on target.

Pretreatment fluoro features
- Gated or non-gated overlay of planning structures on fluoro image
- MLC, jaws and block field aperture definitions
- Gating thresholds can be verified for gated treatments

Orthogonal 2D/2D image pairs play an important role in patient positioning. They can be acquired quickly and contribute less dose to total treatment than CBCT. Use with 2D/3D auto-match for improved accuracy.

2D/3D auto-match
- Algorithm searches over a larger anatomic range
- Robust to out-of-plane rotations
- Calculates pitch and roll positioning values
- May reduce intra and inter-user variability
- Automatically generates DRR — less preparation time

For increased efficiency and reduced offline review time, image matching can now be approved online at the TrueBeam treatment console.

Imaging During Treatment
Much effort goes into outlining a patient’s key anatomical structures during treatment planning so that clinicians can customize treatment.
- The outline of these 3D structures can be projected onto real-time triggered kV for assurance of targeting accuracy
- Planning structure projections are available with all triggered imaging options
- Confirm that the target is within acceptable location by adding circular tolerance overlays to triggered images when markers have been identified in the treatment plan

Triggering Options
- Additional kV image triggers based on MU delivered, gantry angle, or elapsed time options for flexibility in addressing motion challenges
- Overlay of structures on triggered images confirms target location without holding beam delivery

Advanced IGRT puts imaging control in the hands of users at the point of treatment. Using Instant DRRs, you can acquire and match images acquired at any gantry position during the treatment session. You are no longer constrained to image according to what was planned.

1 Not possible to set image status to “reviewed,” only “approved.”
Instant DRR
- Pause the treatment and acquire image
- Use Instant DRRs for matching
- Generate DRRs at the gantry imaging angle

Post treatment
Treating moving targets, such as in the lung, can be challenging. Analyzing target motion, and verifying that it stays consistent during the treatment course, is vital to successfully treating many clinical cases.

4D Cone Beam CT
- Post treatment visualization of target motion
- Generate 4D Cone Beam CT dataset that can be compared with the 4D CT in Eclipse
- Improved 4D CBCT image quality

Extended CBCT
There are treatment cases that require large field images, beyond what can be captured in one image rotation. The Advanced Reconstructor allows users to construct and stitch as many CBCTs as needed to create one extended length CBCT scan.

- Users can construct and stitch many CBCTs to create one extended length CBCT scan.
- The extended CBCT can be reviewed in Eclipse™

2 Extended length CBCT cannot be used for patient repositioning during the treatment

Extended Cone Beam CTs of a Thoracic Phantom