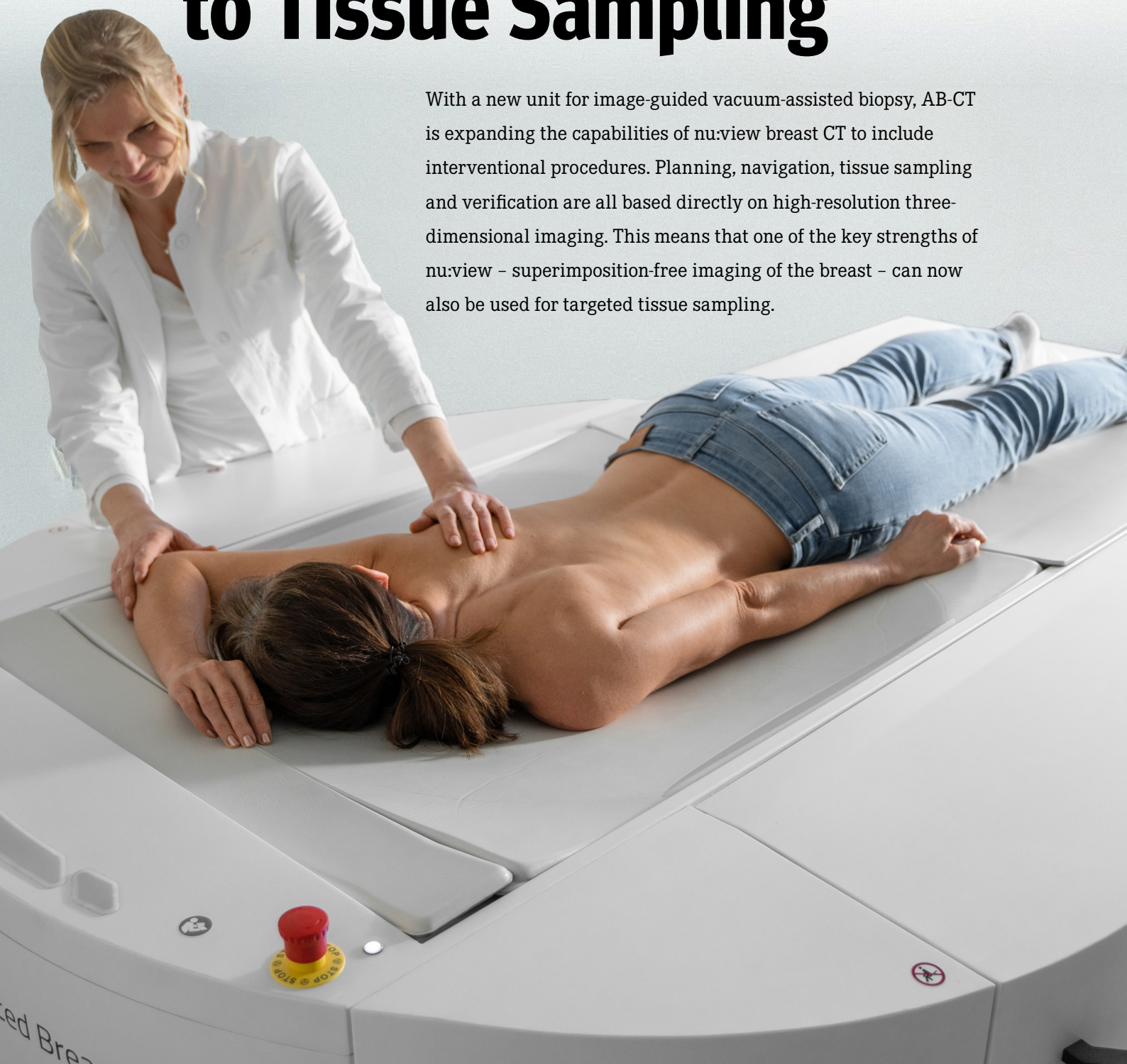


From 3D Imaging directly to Tissue Sampling

With a new unit for image-guided vacuum-assisted biopsy, AB-CT is expanding the capabilities of nu:view breast CT to include interventional procedures. Planning, navigation, tissue sampling and verification are all based directly on high-resolution three-dimensional imaging. This means that one of the key strengths of nu:view – superimposition-free imaging of the breast – can now also be used for targeted tissue sampling.



Developed specifically for breast imaging, nu:view from AB-CT uses photon-counting spiral CT acquisition. The patient lies prone on the examination table and positions the breast in the dedicated opening. The imaging system rotates beneath the table around the freely suspended breast. Unlike mammography, no breast compression is required.

Up to 2,000 projections are acquired during a single 360° rotation, while a complete scan takes only seven to twelve seconds. Depending on the reconstruction, isotropic voxel sizes ranging from 90 to 300 µm are possible. The result is a true three-dimensional dataset without tissue superimposition and with excellent visualization of fine structures, including microcalcifications.

From Diagnosis to Biopsy

With the new biopsy option, this three-dimensional imaging capability is extended to interventional procedures. AB-CT is extending the capabilities of nu:view with an image-guided vacuum-assisted biopsy unit. A specially designed mounting structure enables a seamless transition between diagnostic scan mode and biopsy mode in just two steps.

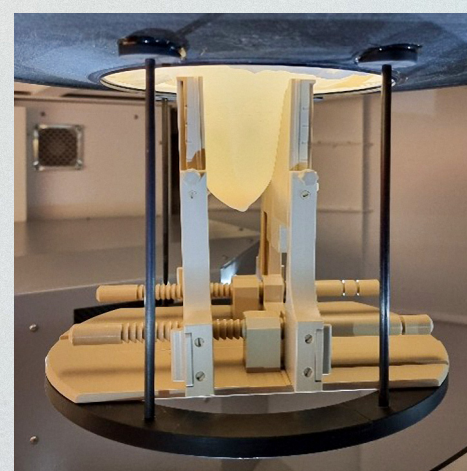
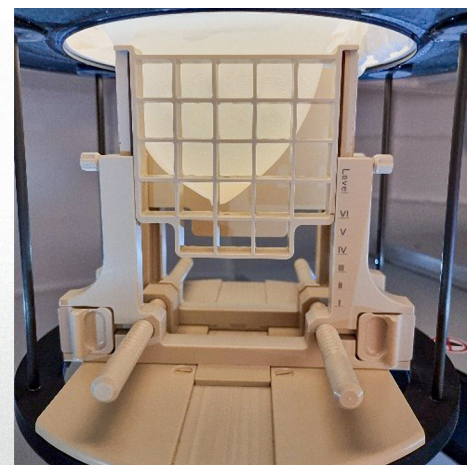
A key element of the procedure is the interaction between the imaging system, biopsy unit and navigation software. The workflow begins with a planning scan covering the entire biopsy grid. The radiologist then selects the target region within the three-dimensional dataset. Based on this selection, the software automatically calculates the optimal insertion point as well as the position and orientation of the cube within the grid.

In addition, the system displays the needle position within the cube and the required insertion depth. The predefined insertion positions of the grid-and-cube system also allow any potential offset between the needle guide and the target region to be visualized. The position can therefore be verified before tissue sampling and adjusted if necessary.

This is where the advantages of nu:view's 3D imaging become particularly evident: rather than deriving the spatial location of a lesion from different projection images, the lesion is localized directly within the isotropic 3D dataset. Distances, such as that between the skin and the target region, can also be determined directly.

From Planning Scan to Tissue Sampling

The biopsy workflow follows a clearly defined sequence. Following the plan-

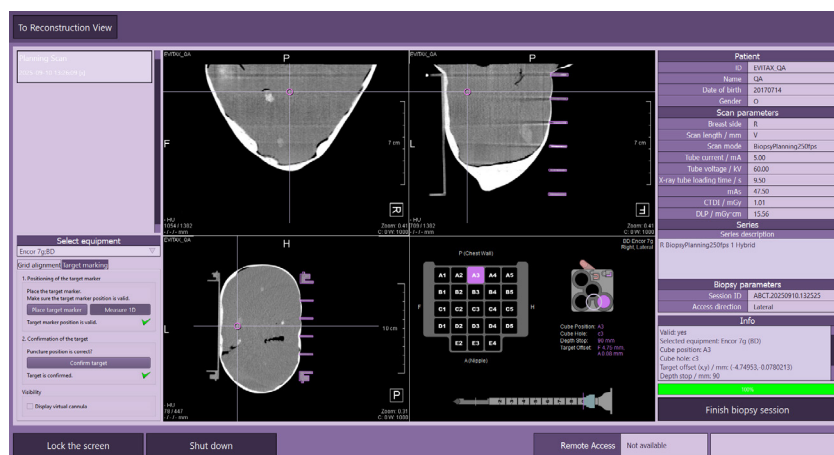


nu:view spiral breast CT with photon-counting technology, now features an image-guided biopsy option. A specially designed mounting structure allows users to switch between diagnostic scan mode and biopsy mode in just two steps.

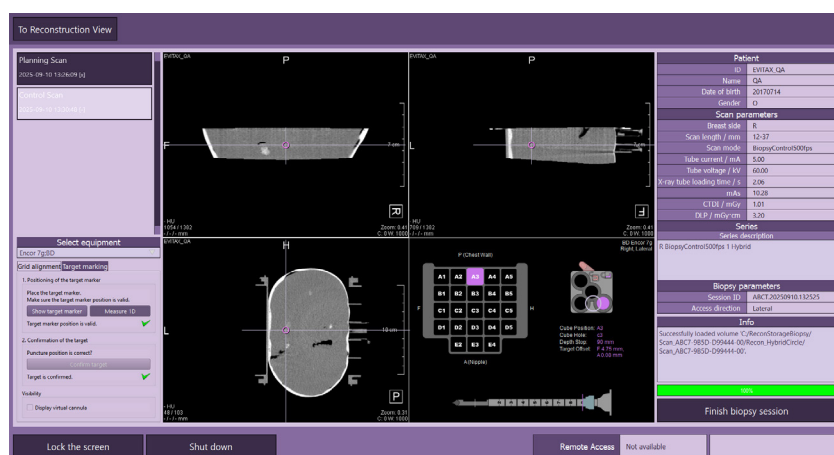
ning scan and calculation of the insertion trajectory, the trocar with cannula is inserted. A control scan is then performed to verify the cannula position before the biopsy needle is advanced through the cannula and the tissue sample is obtained.

Additional control scans can document the situation following tissue sampling. A marker or clip may also be placed and its position subsequently verified.

Importantly, these control scans do not require the entire breast volume ➔



Target selection and parameter calculation in the planning scan (phantom)



Circular control scan focused on the target (phantom)

to be scanned again. nu:view enables circular control scans focused directly on the target region.

The position and length of the planning and control scans are calculated automatically based on the grid and target coordinates. The entire biopsy procedure takes approximately 10 minutes. According to AB-CT, the radiation dose of a diagnostic nu:view examination is in the range of mammography. For image-guided vacuum-assisted biopsy, the manufacturer specifies a radiation dose of less than 15 mGy.

The biopsy unit is fully sterilizable and features interchangeable grids. An integrated lighting system provides optimal illumination of the biopsy area.

3D Imaging as the Basis

The new application builds directly on the technological capabilities of nu:view. Its photon-counting CdTe detector has a pixel size of 100 μm and directly converts incoming X-ray photons into electrical signals. The combination of high spatial resolution and superimposition-free volumetric imaging enables precise visualization of small structures and microcalcifications.

Clinical examples also demonstrate applications in women with dense breast tissue, scars and implants, as well as in multicentric findings. Contrast-enhanced examinations can complement morphological 3D imaging with information on contrast enhancement

characteristics and, for example, support the visualization of multicentric tumors.

For patients, examination without breast compression remains an important advantage. During image acquisition, the breast remains in its natural shape. This can be particularly relevant for women with sensitive breasts or mastodynia; patients with breast implants can also be examined.

Imaging and Intervention in One Workflow

With the biopsy unit, nu:view evolves from a diagnostic breast imaging system into a platform that extends from imaging to tissue sampling. The key advantage lies not so much in any individual component, but rather in the continuous use of the same three-dimensional imaging throughout the workflow.

A suspicious finding is visualized and precisely localized with nu:view. The software calculates the optimal insertion trajectory, while control scans verify the position of the cannula and the virtually displayed needle before the tissue sample is obtained. Optionally, a marker clip can be placed and its position verified with a final control scan. High-resolution 3D imaging therefore serves not only as the basis for diagnosis, but also as the geometric basis for the intervention.

In this way, visualization leads directly to targeting, creating a seamless workflow with nu:view from lesion visualization to tissue sampling.

