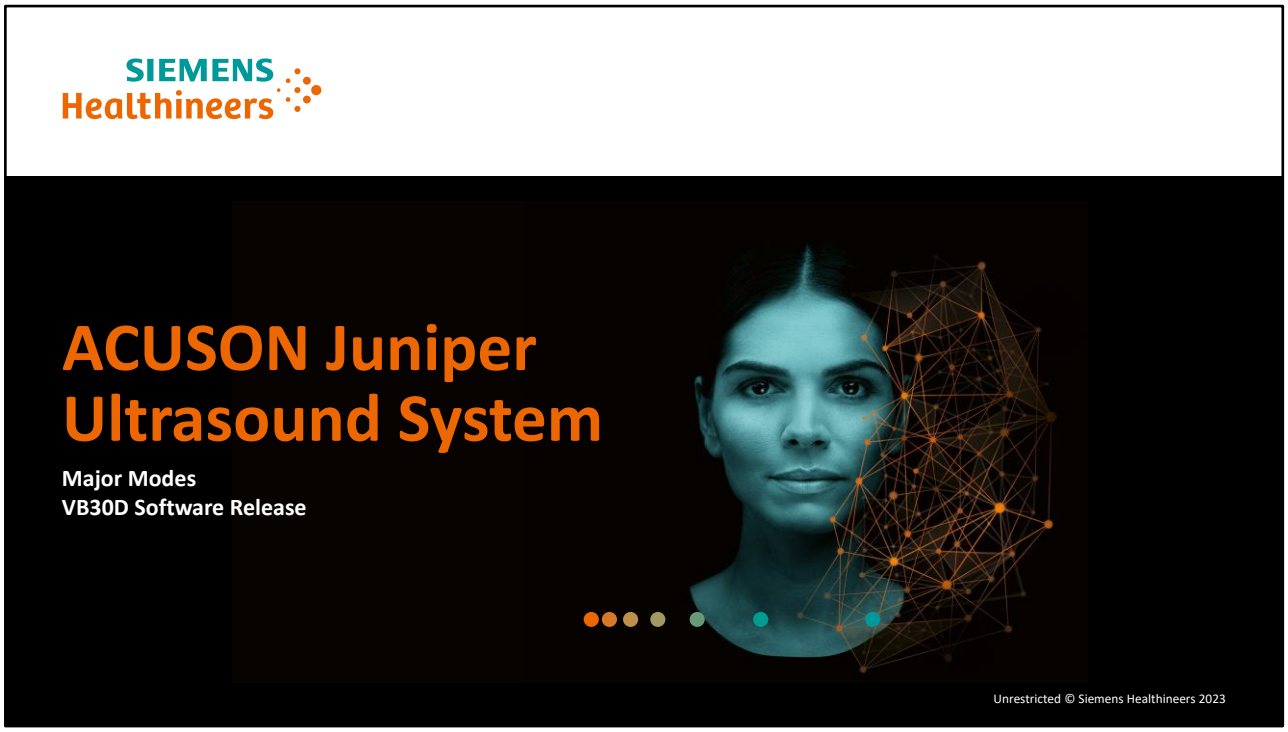


Speaker Notes:

In this presentation we will discuss the Major Modes for the ACUSON Juniper ultrasound system.

Digitally signed by Belan Irina
Date: 2025.06.11 17:43:45 EEST
Reason: MoldSign Signature
Location: Moldova
MOLDOVA EUROPEANĂ

Objectives

SIEMENS Healthineers

- Review B-mode and M-mode controls
- Describe B-mode and M-mode optimization features
- Explain display modes
- Review Doppler controls
- Describe Doppler optimization features

Speaker Notes:

Here are the objectives for this presentation. We will begin with reviewing the B-Mode and M-Mode controls.

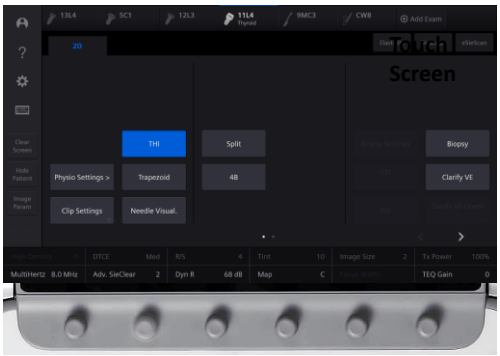
B-mode controls

SIEMENS Healthineers

Control Panel

Touch Screen

Soft keys

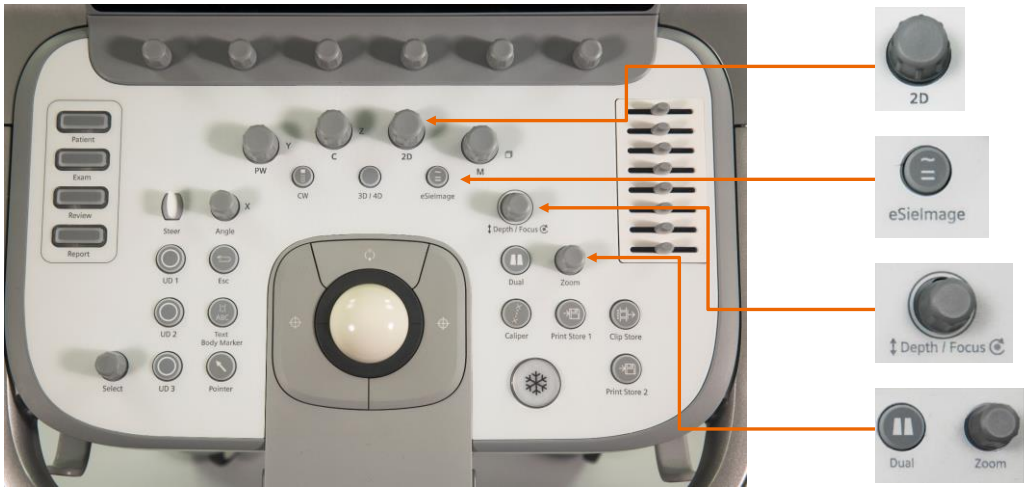


Speaker Notes:

The B-mode image may be optimized using three different methods:

1. Control Panel
2. Soft keys
3. Touch Screen

B-mode controls on the Control Panel



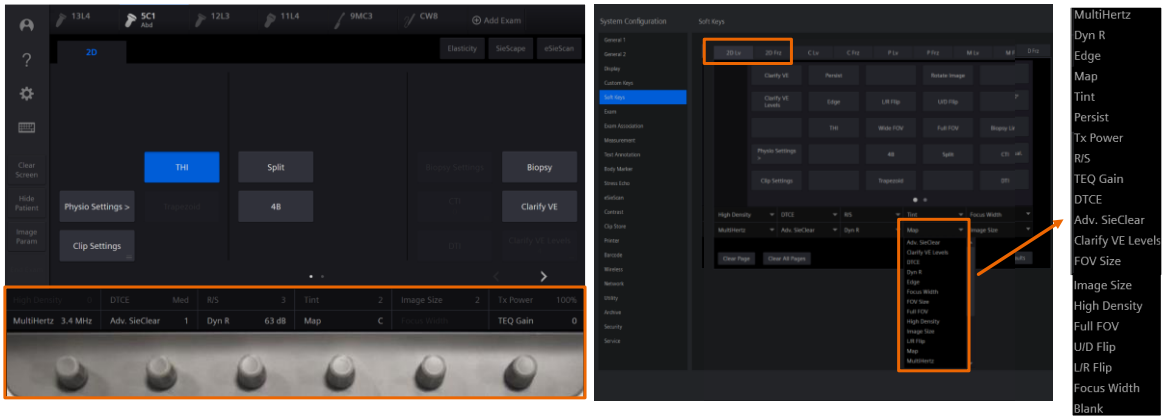
Speaker Notes:

The primary B-mode imaging controls on the Control Panel are:

- 2D activates or returns to B-mode imaging; rotate 2D to change the overall B-mode gain/brightness
- eSieImage™ multiparametric optimization automatically optimizes gain, DGC (depth-gain compensation) and suppresses noise in B-mode imaging
- Depth changes the depth of the field of view (FOV) and is adjustable using the multi-function Depth/Focus toggle control (customizable functionality under System Configuration > Custom Keys > Depth/Focus)
- Focus repositions the focal zone(s) and changes the number of focal zones displayed; it is adjustable using the multi-function Depth/Focus toggle control and its functionality is customizable under System Configuration > Custom Keys > Depth/Focus
- Dual displays two different images side by side
- Zoom activates either Zoom (read) or HD Zoom (write)

B-mode controls on the soft keys

SIEMENS Healthineers

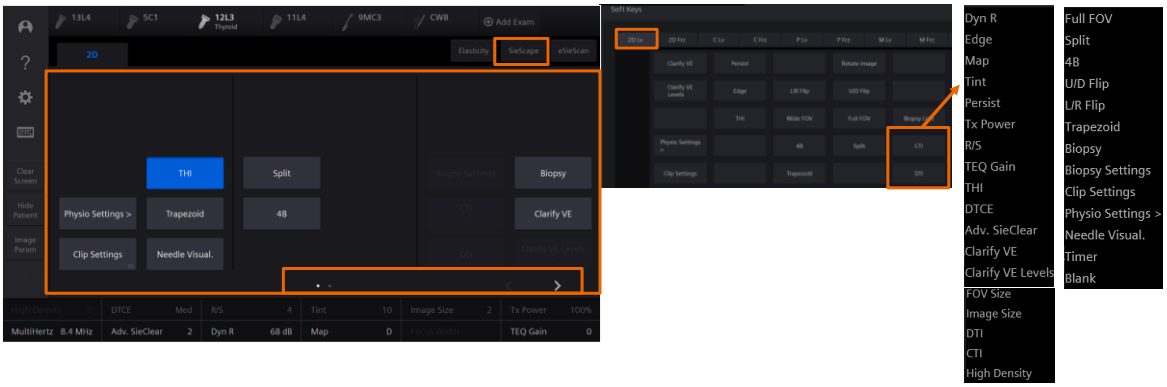


Speaker Notes:

- The B-mode soft key rotary controls are located on the Control Panel and are located beneath and correspond to the controls listed on the bottom two rows of the Touch Screen
- These controls are customizable for live imaging and when frozen, in System Configuration > Soft Keys. The available control options are displayed above on the slide; alternatively, all B-mode soft key optimization controls, except for MultiHertz and Focus Width, can be configured to the Touch Screen
- The active control is highlighted in white. To alternate activation between the first and second row controls, push the corresponding rotary control OR touch the desired control; once activated, turn the rotary control clockwise/counterclockwise to adjust
- If the system is frozen, only those controls available in freeze will be available; controls that are not available will appear dithered out
- Soft key controls do not change when navigating pages

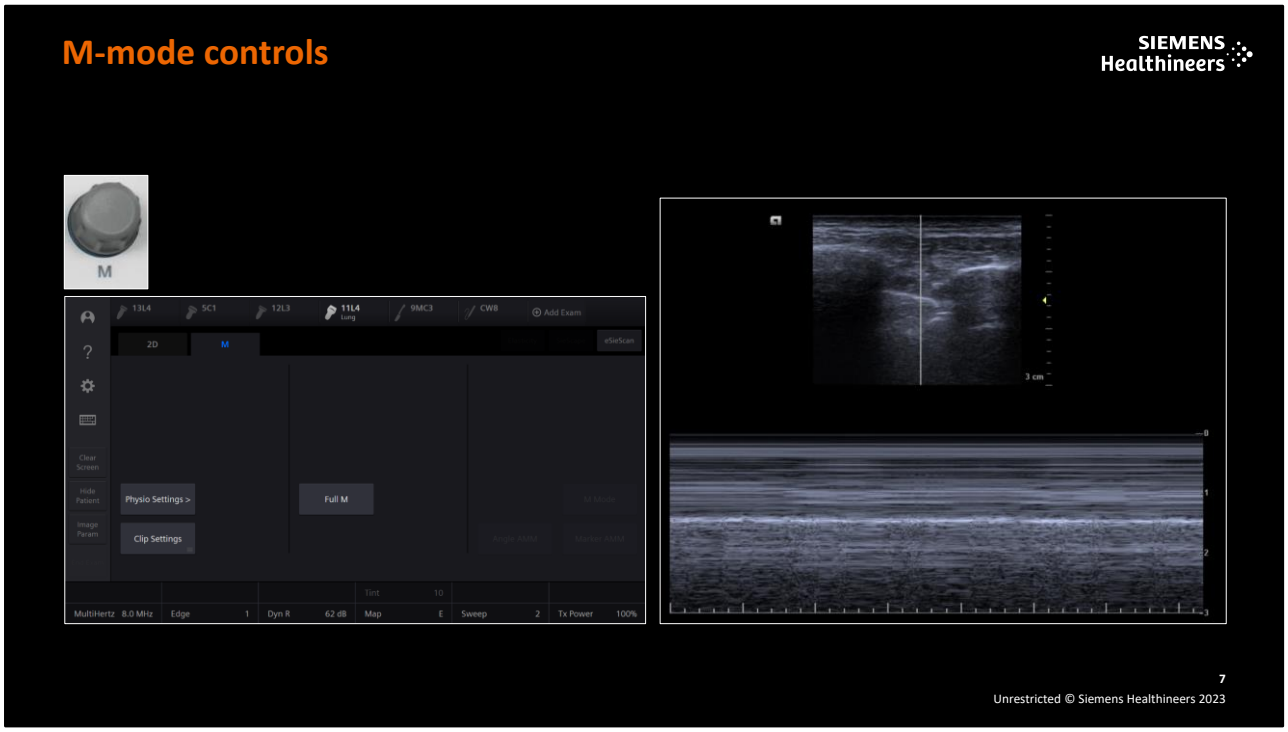
B-mode controls on the Touch Screen

SIEMENS Healthineers



Speaker Notes:

- The B-mode imaging Touch Screen controls are customizable for live imaging and when frozen in System Configuration > Soft Keys and the available control options are displayed above on the slide; alternatively, all B-mode Touch Screen optimization controls, except for THI, Clarify VE, CTI, Split and 4B can be configured to the soft keys
- SieScape™ panoramic imaging controls are available under the tab labeled SieScape with linear and curved array transducers
- A control is highlighted in blue when it is active, and gray when it is unactive or dithered out
- Touch the control to activate/deactivate or open a menu selection; if the system is frozen, only those controls available in freeze will be available
- Select the arrowhead in the lower right corner to view the second page



Speaker Notes:

M-mode (or motion mode) displays a B-mode reference image and an M-mode sweep. M-mode allows a graphic display of motion, such as tracing a fetal heart rate or, in the example shown, a lung ultrasound to check for pneumothorax. The cursor or M-line indicates the path used to obtain the M-mode tracing. Anatomy that remains stationary displays as a straight line, while curved or peaked lines mirror the moving anatomy.

To activate M-mode:

- Press **M** on the Control Panel to access the B-mode image/M-mode sweep on the imaging screen and the M-mode menu on the Touch Screen
- Roll the trackball to position the M cursor
- If desired, select **Full M** on the Touch Screen to enter/exit full screen sweep
- Rotate **M** to change the overall M-mode gain
- To exit, press the **M** or **2D** control on the Control Panel

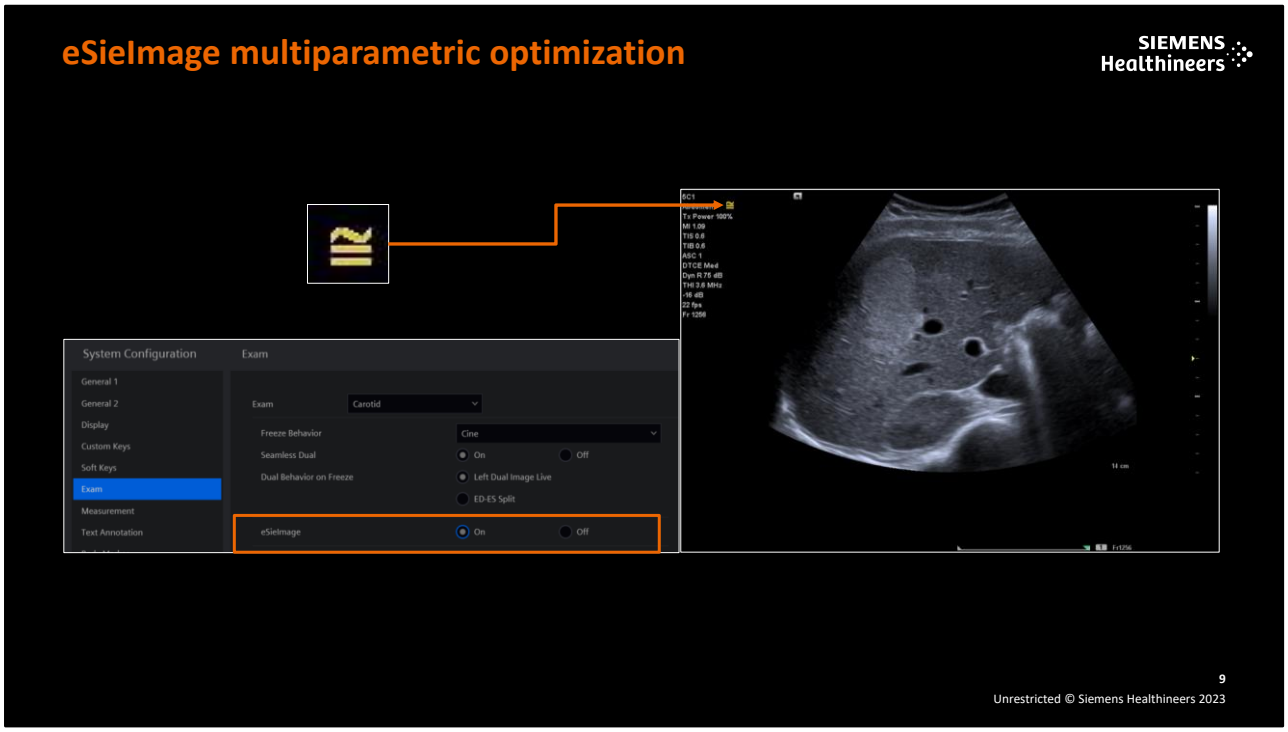
The M-mode soft key and Touch Screen controls are customizable for live imaging and when the image is frozen in System Configuration > Soft Keys. The 2D/M-mode imaging formats are (1/2 2D, 1/2 trace; 1/3 2D, 2/3 trace; 2/3 2D, 1/3 trace; Side-by-Side) configurable under System Configuration Exam > 2D/M & 2D Doppler Display Format. For M-mode functionality, the user has the option to bypass the cursor. This is selected in System Configuration > Display > Doppler/M-mode > Bypass Cursor Mode. Uncheck to display full screen B-mode display with the M cursor after pressing M. Check to bypass initial full screen B-mode display with the M cursor and immediately activate in B-mode/M-mode sweep format.

Objectives

- Review B-mode and M-mode controls
- Describe B-mode and M-mode optimization features
- Explain display modes
- Review Doppler controls
- Describe Doppler optimization features

Speaker Notes:

Next, we will discuss the B-Mode and M-mode optimization features.



Speaker Notes:

eSieImage™ multiparametric optimization automatically and intelligently optimizes key imaging parameters in real-time B-mode imaging, reducing scan time and operator effort. This allows the user to smoothly navigate from one scan window to another with little to no adjustment while maintaining image quality, uniformity and contrast resolution throughout the entire field of view (as displayed in this image of a large liver hemangioma).

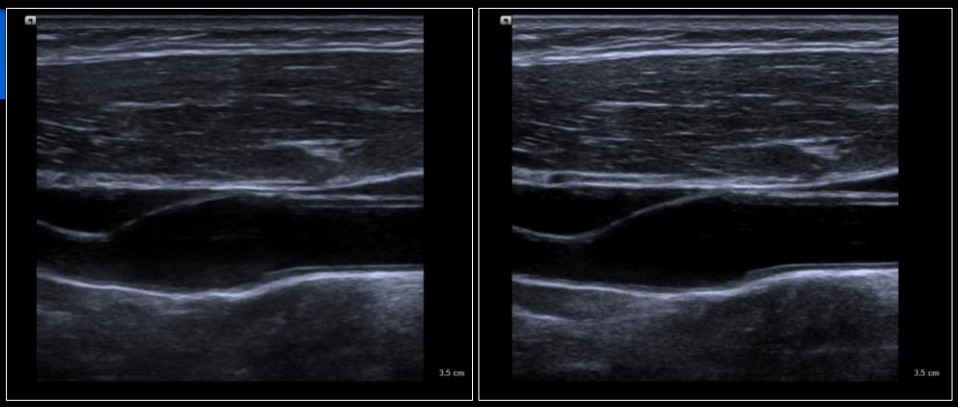
eSieImage optimization continuously adjusts overall gain and depth gain compensation (DGC) and performs continuous noise analysis and correction. It automatically tracks tissue on a frame-by-frame basis, identifying tissue versus noise, ensuring that B-mode image quality, uniformity and contrast resolution are optimally maintained across different tissue types.

- When active, the eSieImage optimization control on the Control Panel is backlit in blue and a gold icon appears on the image screen. Press **eSieImage** once on the Control Panel to activate or press twice to deactivate
- Automatic activation with exam selection is customizable under **System Configuration > Exam > eSieImage > On/Off**

Tissue harmonic imaging (THI)

SIEMENS Healthineers

THI



Without THI

With THI

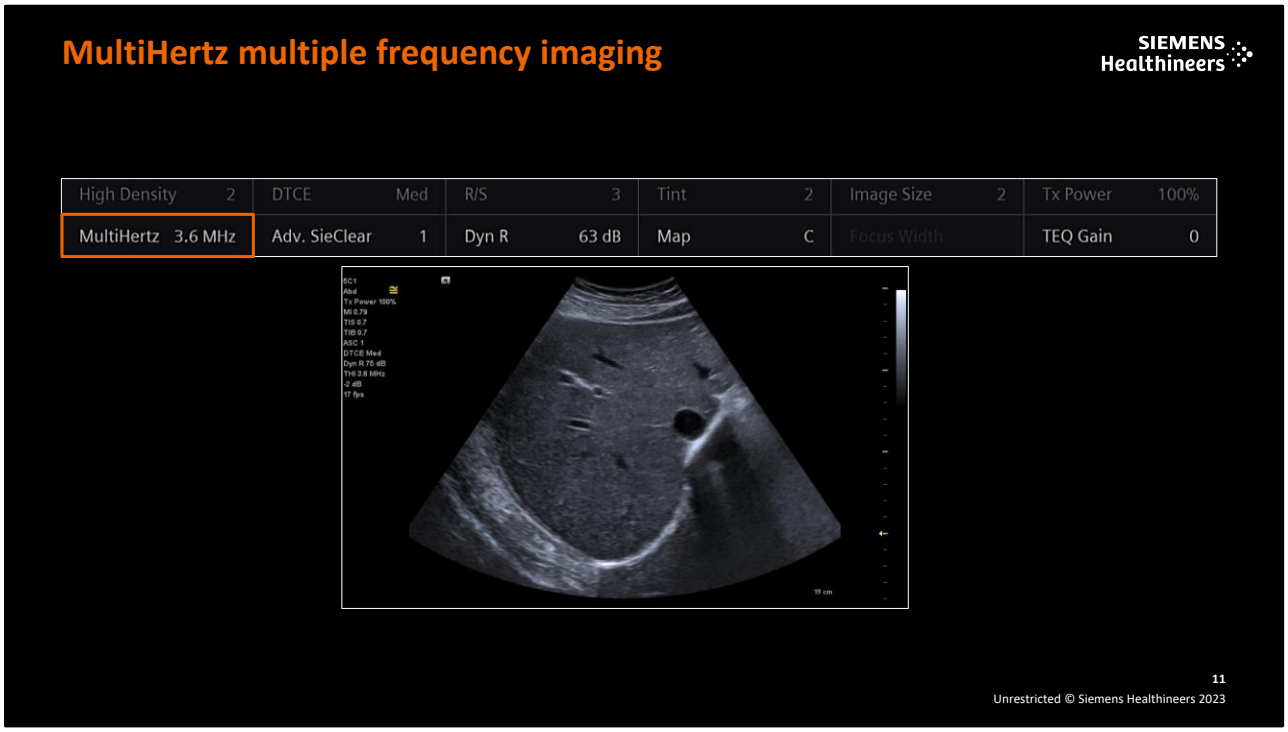
Speaker Notes:

Tissue harmonic imaging (THI) improves contrast and spatial resolution by reducing noise and clutter within cysts and vessels and is especially helpful in reducing noise in large, difficult-to-image patients.

THI is generated within the tissue beyond the window that causes beam distortion and scattering; therefore, the undesirable effects of the acoustic window are generally reduced. The harmonic frequency received is twice the fundamental frequency (e.g., if a 2 MHz fundamental signal is sent into the body, the ultrasound system uses the 4 MHz harmonics signal that returns from the body to form the image).

THI can be used to decrease artifacts, such as haze, noise and clutter in vessels (as displayed here in the carotid bulb) or from large, difficult-to-image patients. THI can help reduce grating lobes and side lobe artifacts (low-intensity weak echoes outside of the main ultrasound beam) typically seen near the diaphragm or near large cystic structures. It can also reduce reverberation artifacts (linear equally spaced echoes) on the anterior portion of cystic structures, such as the urinary bladder or gallbladder.

- To activate/deactivate, select **THI** on the Touch Screen



Speaker Notes:

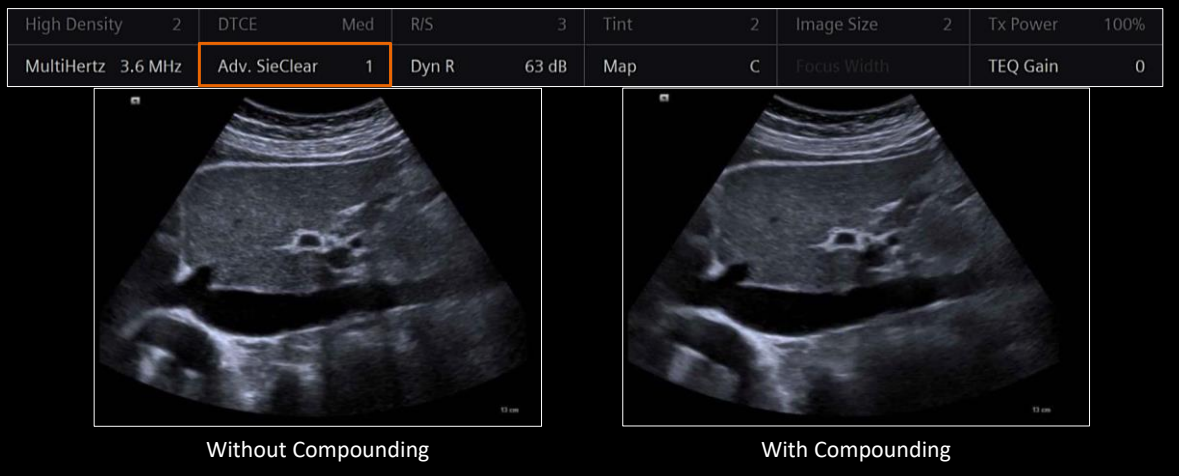
MultiHertz™ multiple frequency imaging enables the user to adjust the center frequency of the transducer to improve resolution (higher frequency setting) or increase depth of penetration (lower frequency setting) to clearly visualize the entire FOV from near field to far field in B-mode (as displayed in this image of the liver).

MultiHertz imaging allows the user to independently select B-mode fundamental and harmonic frequencies. In color Doppler and spectral Doppler, the user can independently select the center frequencies (e.g., the Doppler frequency can be adjusted without changing the B-mode frequency). Each imaging mode has its own frequency settings to achieve the highest resolution, penetration and sensitivity for the structure being imaged.

Multiple fundamental and harmonic frequencies are available on each transducer via the corresponding soft key rotary control.

- Rotate the **MultiHertz** soft key rotary control to change the frequency

Advanced SieClear spatial compounding



Speaker Notes:

Advanced SieClear™ spatial compounding combines multiple images acquired at different steering angles (multiple lines of site) to produce a compounded image with less noise, increased contrast resolution and improved border delineation. Setting selections include Off, SC2, 1, 2, 3; they are transducer- and mode-dependent.

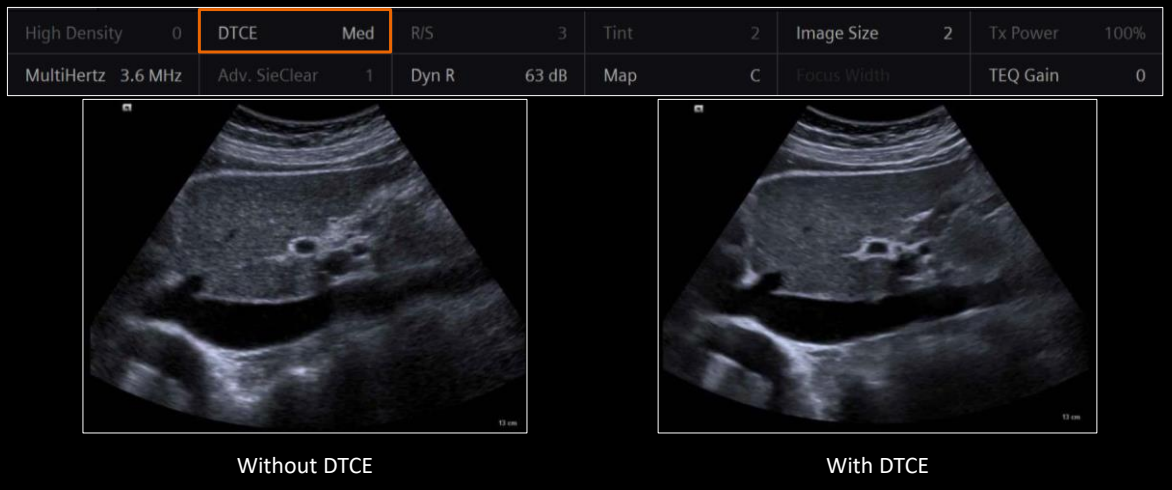
Increase Advanced SieClear compounding to add to the number of steering angles for a smoother/softer appearing image (as displayed in this sagittal image of the liver/IVC).

Advanced SieClear provides greater vascular delineation, musculoskeletal tissue definition or enhancement to structures with curved or irregular borders (a stronger reflection occurs with a perpendicular angle of incidence).

Decrease Advanced SieClear compounding for a more granular appearance or to enhance clinical markers such as cysts or calcifications.

- Rotate the **Adv. SieClear** soft key rotary control to change the Advanced SieClear compounding

Dynamic TCE tissue contrast enhancement technology (DTCE)



Without DTCE

With DTCE

13

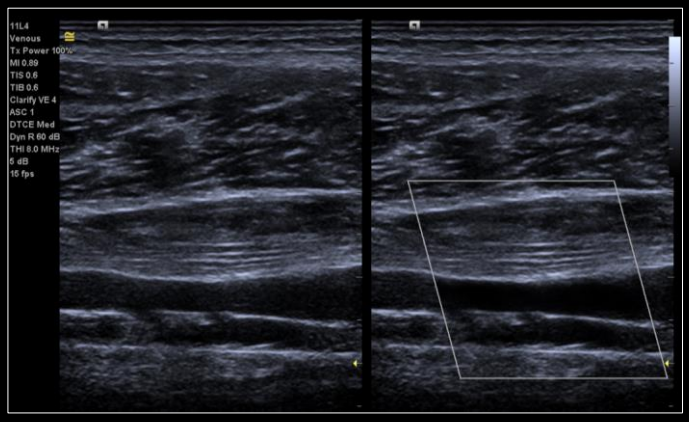
Speaker Notes:

Dynamic TCE tissue contrast enhancement technology (DTCE) reduces image speckle (as displayed in this sagittal image of the liver/IVC), while maintaining detail resolution for improved tissue contrast.

Dynamic TCE technology is a Siemens Healthineers proprietary advanced method for speckle reduction. Speckle is displayed as a granular pattern formed from interferences of backscattered ultrasound waves which substantially lowers contrast and obscures image details. Its suppression must be balanced, as it can also contain diagnostic information.

Select one of four levels of Dynamic TCE technology (Off, Low, Med and High) to apply to the image. Dynamic TCE technology can be used with Advanced SieClear compounding to enhance visualization of tissue texture, subtle tissue contrast differences, border definition and pathology.

Clarify vascular enhancement (VE) technology



Without Clarify VE With Clarify VE

Speaker Notes:

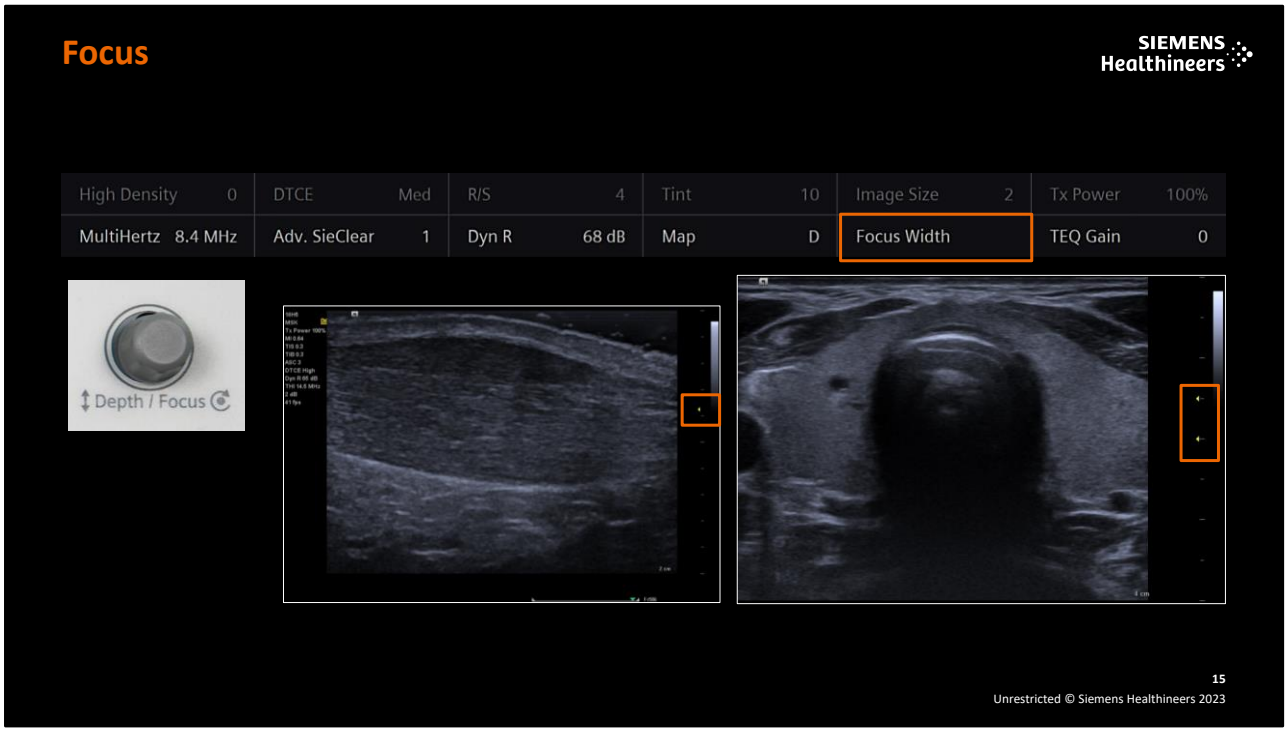
Clarify™ vascular enhancement (VE) technology is a real-time, adaptive, pixel-by-pixel analysis which provides exceptional contrast resolution for clear delineation of vessels. It reduces noise and artifacts (as displayed here in the mid superficial femoral artery). It improves visualization of micro and macro-vasculature and increases contrast resolution within tissue and between tissues. It is a patented technology that uniquely utilizes power Doppler flow information to enhance B-mode imaging.

Use Clarify VE technology to reduce noise and artifacts within macro-vascular structures (larger vessels), such as the carotid artery, aorta and femoral vein. Also use it in micro-vascular structures, such as the small vessels found in the thyroid, testicle and kidney. Use it on vessels to help delineate surrounding structures (e.g., on the splenic vein and portal confluence to help delineate the pancreas). Clarify VE technology does not change the B-mode image in nonvascular structures (e.g., within the gallbladder or urinary bladder).

To activate/deactivate, select **Clarify VE** on the Touch Screen. Select Clarify VE Levels (1-7) to adjust Clarify VE technology sensitivity levels:

- Select a higher level to increase sensitivity
- Select a lower level to decrease sensitivity

Note: To display Clarify VE on the Touch Screen, go to **System Configuration > Soft Keys**, select an area on the Touch Screen and select Clarify VE from the drop-down menu. Repeat to add Clarify VE technology Levels to the Touch Screen or add it to the soft key rotary controls.



Speaker Notes:

The Focus control repositions the focal zone(s) and changes the number of focal zones displayed. The sagittal view of the diffusely inflamed Achilles tendon on the left displays one focal zone, while the image of the small complex thyroid nodule on the right displays two focal zones spaced closely together.

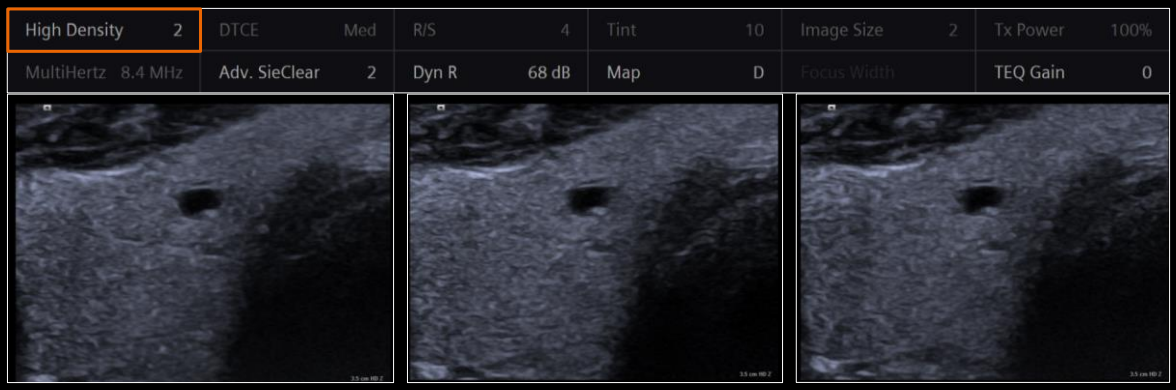
The lateral resolution of the image is best within the focal zone area. It is recommended to place the focal zone at or below the area of interest.

Focus is adjustable using the multi-function **Depth/Focus** toggle control located on the Control Panel.

- Rotate the toggle control clockwise or counterclockwise to reposition the focal zone(s)
- Press the toggle control to increase/decrease the number of focal zones (available with Adv. SieClear <2)
- Focus is customizable under **System Configuration > Custom Keys > Depth/Focus**

Focus Width is a soft key control that can be rotated to increase/decrease the distance between multiple focal zones.

High Density



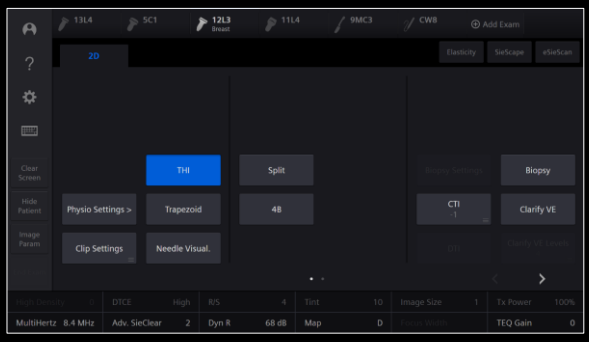
High Density 0 | High Density 1 | High Density 2

Speaker Notes:

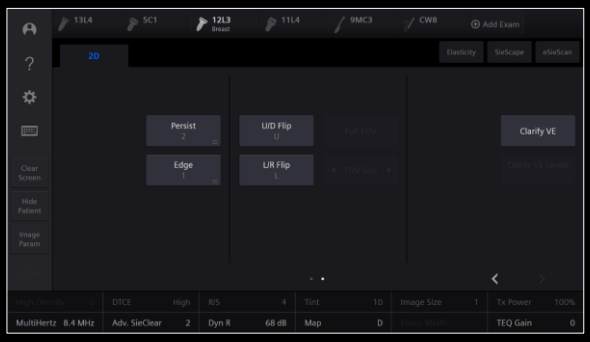
- High Density increases/decreases line density (higher levels = higher resolution) when HD Zoom is activated
- The septation and echogenic focus within the small complex thyroid nodule displayed here is most visible at a High Density level of 2

Additional optimization features

SIEMENS Healthineers



Page 1



Page 2

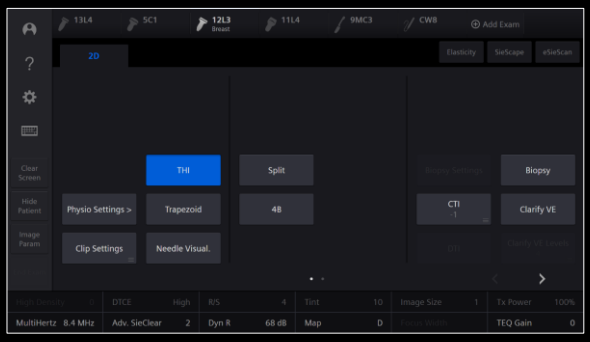
Speaker Notes:

Additional B-mode and M-mode optimization features include:

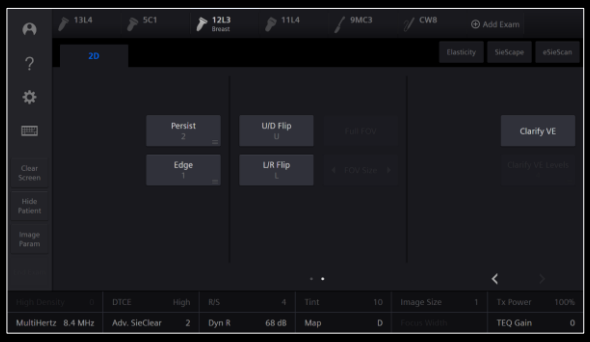
- CTI (Custom Tissue Imaging): Optimizes the B-mode image by adjusting the speed of sound resulting in improved lateral resolution and boundary definition. User-selectable levels provide a higher quality image, based on the speed of sound appropriate for a specific tissue type. CTI corrects for phase aberrations caused by the speed of sound mismatch and optimizes the image in real-time. CTI can be used in breast exams to improve the image quality in fatty or dense tissues
- R/S (Res/Speed) adjusts the balance between the image line density (resolution) and the frame rate (speed); the settings are 0 (low resolution/high frame rate) to 5 (high resolution/low frame rate)
- DynR (Dynamic Range) affects the number of gray shades that are displayed; increase the Dynamic Range to produce a “softer” B-mode image; decrease the settings to produce an image with more contrast; Dynamic Range is available on a live or frozen image (settings range from 10 – 90)
- Tint individually colorizes the grayscale image to aid in visualization of subtle tissue differences; clinical uses may include nerve imaging and fetal echocardiography; Tint can be adjusted on a live or frozen image and are numbered 0-15
- Map enhances aesthetics by adjusting greyscale assignments to modify image contrast (only aesthetics change, as maps do not affect data content); Map may be adjusted on a live or frozen image and determines how dark or light you prefer to show each level of white/gray/black based upon the strength of the ultrasound signal; settings range from A - G

Additional optimization features (Cont'd)

SIEMENS Healthineers



Page 1



Page 2

Speaker Notes:

Additional B-mode and M-mode optimization features include (cont'd):

- Tx Power (transmit power) allows manual adjustment of the acoustic energy delivered to the patient (settings range from .20 to 100%)
- TEQ Gain is a user-definable threshold that accommodates different user preferences for gain settings and various room lighting conditions (settings range from -5 to 5)
- Persist (Persistence) controls the number of images the system will average per frame; increasing the persistence increases the number of images averaged, reducing noise and making the image appear smoother; an average persistence setting is 2 or 3 (settings range from 0-4)
- Edge (Edge Enhancement) enhances or smooths edges or borders; increasing Edge will enhance/sharpen borders whereas decreasing Edge will smooth borders; settings range from 0-3

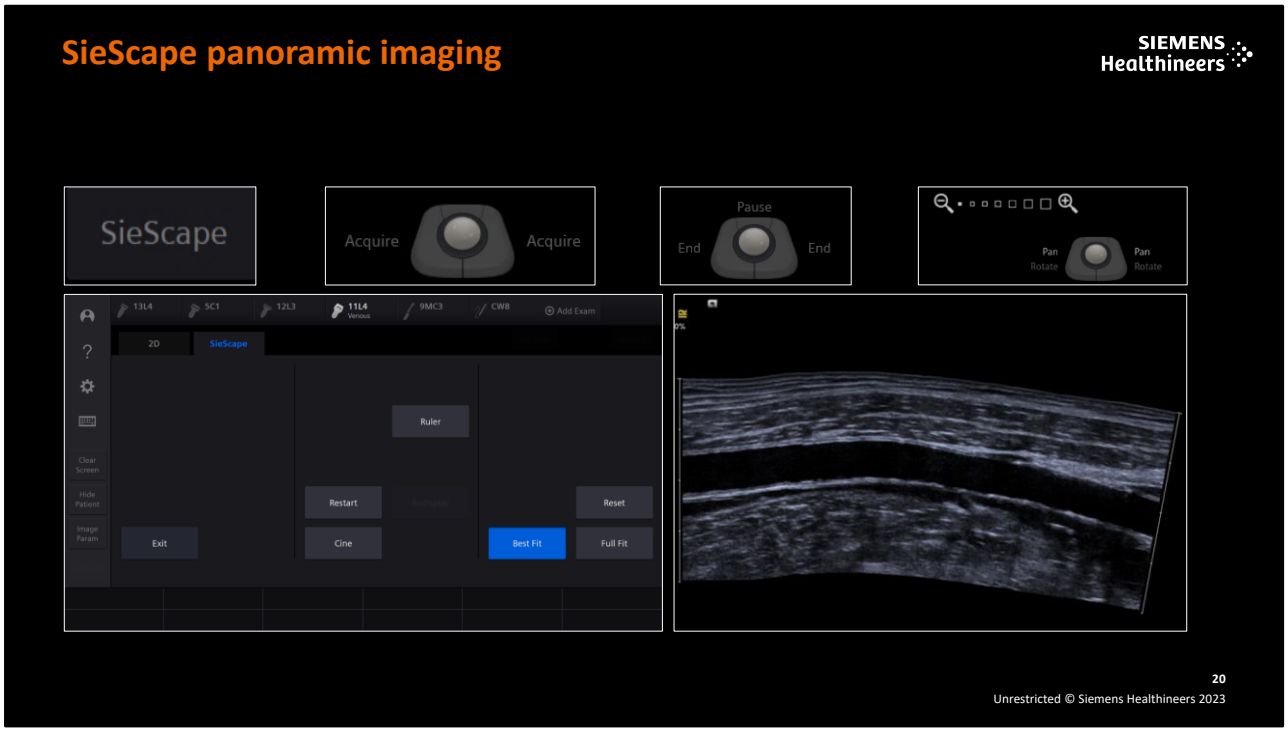
Objectives

SIEMENS Healthineers

- Review B-mode and M-mode controls
- Describe B-mode and M-mode optimization features
- Explain display modes
- Review Doppler controls
- Describe Doppler optimization features

Speaker Notes:

Next, we will discuss the display modes.



Speaker Notes:

SieScape™ panoramic imaging offers a larger field of view (FOV) to visualize and measure structures in their entirety or to better visualize and understand spatial relationships between anatomy (or between anatomy and pathology).

SieScape imaging is a technique where the transducer is moved along a patient's anatomy while the system blends the multiple images together to form one long image with an extremely wide field of view (as displayed here in the longitudinal image of the femoral artery). It compares consecutive images, rotating and stitching them together to form the final image. SieScape imaging Cine can be used to recall single frames for review.

SieScape imaging allows acquisition and display of grayscale images up to 240 cm in length to a maximum curvature of 180 degrees. It is available on curved and linear transducers. Clinical applications for use may include: Thyroid (nodules, goiters), Breast (masses, areas of inflammation, reference anatomy), Musculoskeletal (Baker's cysts), Vascular (anastomoses, varicose veins).

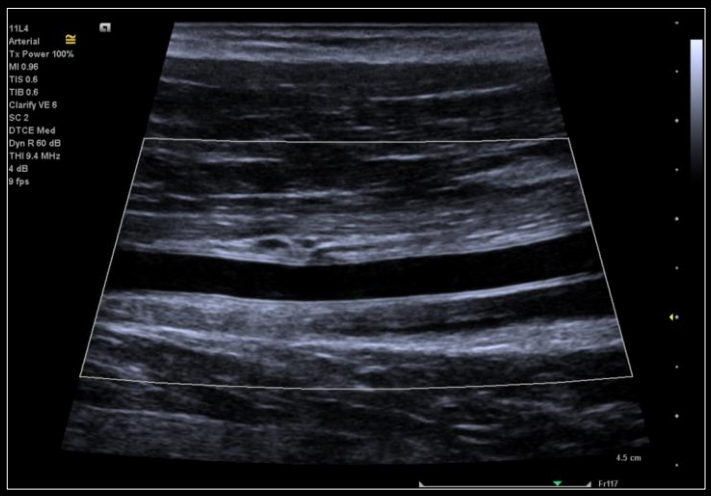
To activate, select the **SieScape** tab (appears on the Touch Screen when a linear or curved array transducer is active, and the system is unfrozen).

- Press one of the **Set** keys to acquire the image and press **Freeze** or one of the **Set** keys to end acquisition
- Unfreeze to reactivate acquisition if desired
- Use the Panoramic Review controls after completing the acquisition to size, rotate, pan, zoom or measure the SieScape image
- Press the **Panoramic Cine** function on the Touch Screen to recall single frames for review and use the trackball to change the Cine image displayed
- Press **Redisplay** to return to the full SieScape image
- Select **Exit** to exit SieScape imaging review

Trapezoid

SIEMENS Healthineers

Trapezoid



Speaker Notes:

Trapezoid angles the outer edges of the image on linear transducers to extend the far-field display.

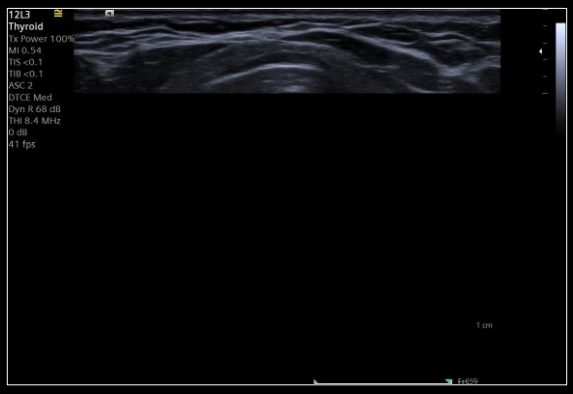
Some common areas where trapezoid imaging is clinically used include:
- Thyroid imaging to show a large nodule
- Testicular imaging for pathology (e.g., hydrocele)
- Pediatric imaging when higher frequency is needed
- Early OB imaging
- Vascular imaging (as displayed here in the longitudinal image of the femoral artery)
- Appendix

To activate/deactivate Trapezoid imaging, select **Trapezoid** on the Touch Screen.

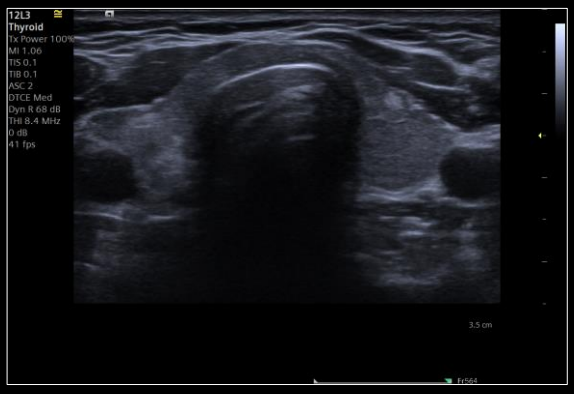
Please note: The 13L4 transducer has a different behavior than the other linear transducers, which will be discussed in the following slides.

Linear depth behavior – 12L3

SIEMENS Healthineers



1.0 cm



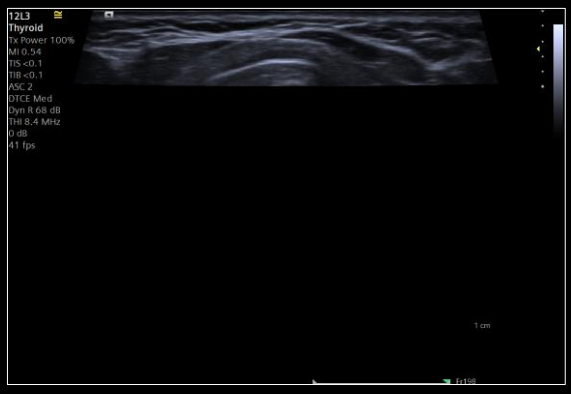
3.5 cm

Speaker Notes:

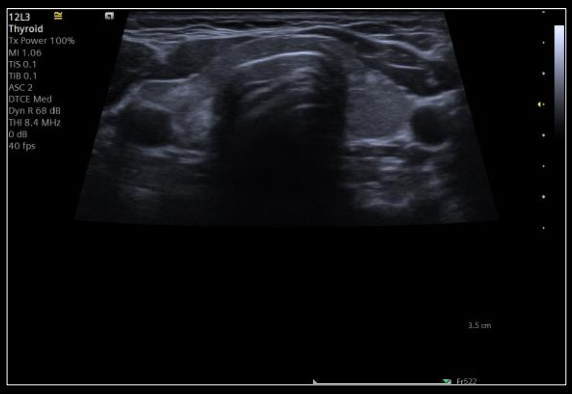
- All linear transducers will function as the 12L3, except the 13L4
- Here is the 12L3 in regular linear format at 1.0 cm and 3.5 cm
- The entire near FOV is displayed at any depth

Trapezoid depth behaviors – 12L3

SIEMENS Healthineers



1.0 cm



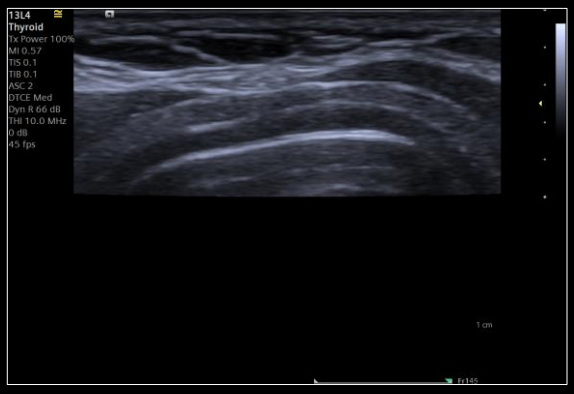
3.5 cm

Speaker Notes:

- Here is the 12L3 in Trapezoid format at 1.0 cm and 3.5 cm.
- The entire near FOV is displayed at any depth

Linear depth behavior – 13L4

SIEMENS Healthineers



1.0 cm

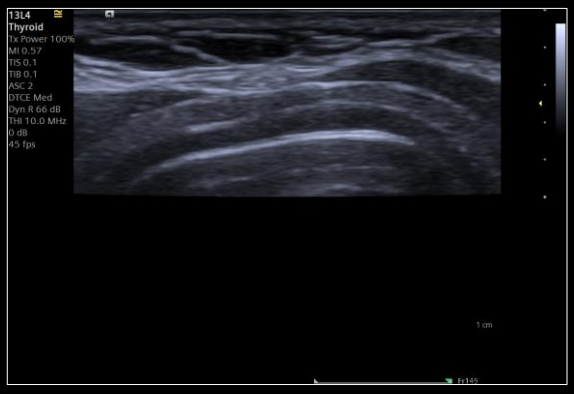
3.5 cm

Speaker Notes:

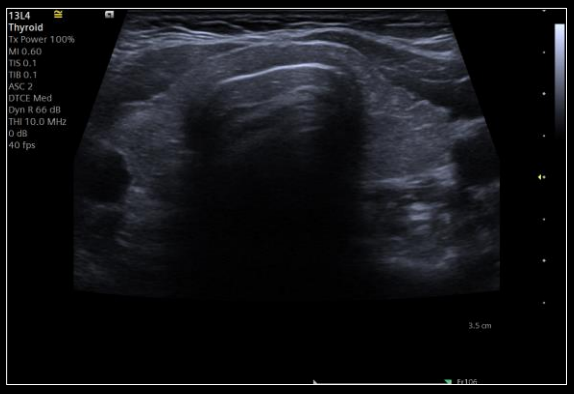
- Here is the 13L4 in regular linear format at 1.0 cm and 3.5 cm
- The near FOV width decreases and increases the image size as the depth is decreased
- The near FOV width will continue to decrease (narrow) at depths less than 3 cm

Trapezoid depth behavior – 13L4

SIEMENS Healthineers



1.0 cm



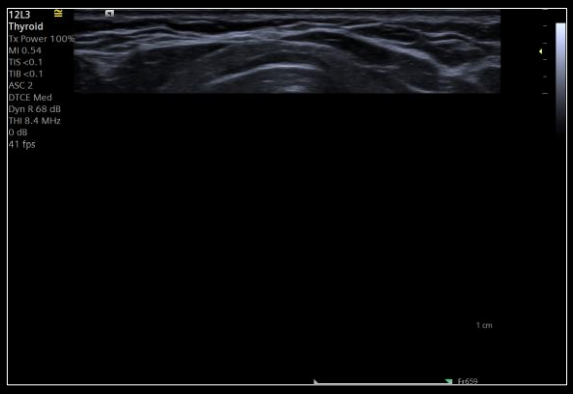
3.5 cm

Speaker Notes:

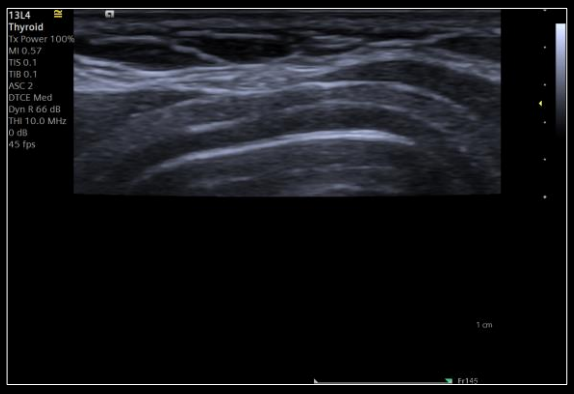
- Here is the 13L4 in Trapezoid format at 1.0 cm and 3.5 cm
- Note the Trapezoid format is not visible at 1.0 cm
- The near FOV width decreases (narrows) and increases the image size as the depth is decreased
- Any image depth less than 3.0 cm will not show the Trapezoid

Linear depth behavior – 12L3 vs. 13L4

SIEMENS Healthineers



12L3 – 1.0 cm



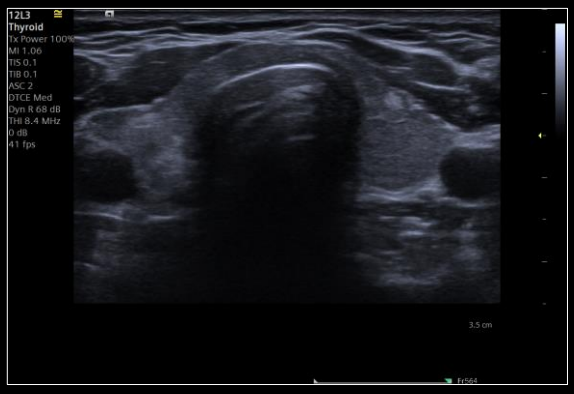
13L4 – 1.0 cm

Speaker Notes:

- Here is a comparison of the 12L3 and 13L4 transducers at 1.0 cm
- Note the entire near FOV is maintained on the 12L3
- On the 13L4, the near FOV width decreases (narrows) and increases the image size as the depth is decreased

Linear depth behavior – 12L3 vs. 13L4

SIEMENS Healthineers



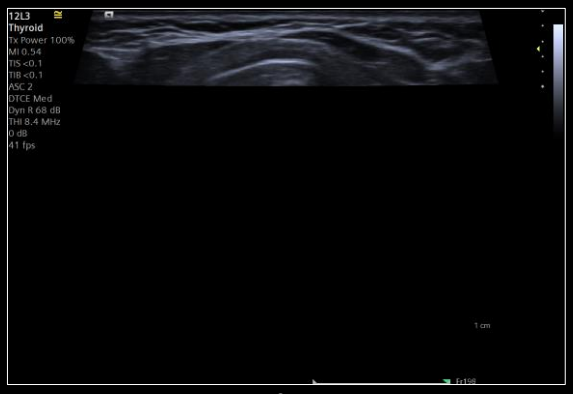
12L3 – 3.5 cm

13L4 – 3.5 cm

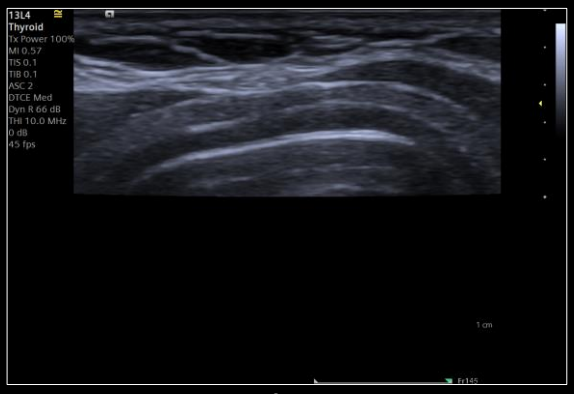
Speaker Notes:

- Here a comparison of the 12L3 and 13L4 transducers at 3.5 cm
- Note the entire near FOV is maintained on the 12L3
- On the 13L4, the near FOV width will continue to decrease (narrow) at depths less than 3 cm

Trapezoid depth behavior – 12L3 vs. 13L4



1.0 cm

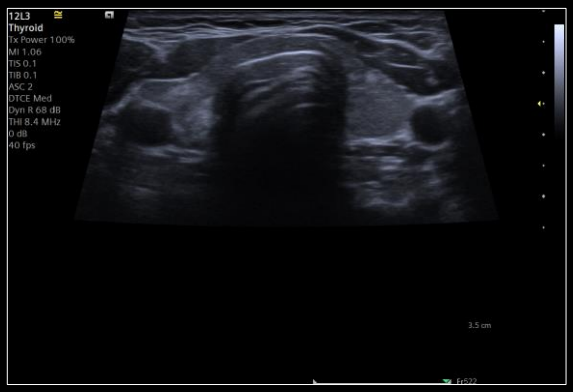


1.0 cm

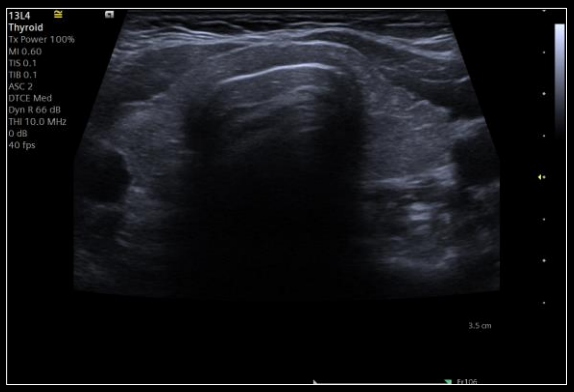
Speaker Notes:

- Here is the 12L3 and 13L4 comparison at 1.0 cm in Trapezoid format
- Note the entire FOV is maintained on the 12L3
- On the 13L4, the near FOV width decreases (narrows) and increases the image size as the depth is decreased
- Any image depth less than 3.0 cm will not show the Trapezoid

Trapezoid depth behavior – 12L3 vs. 13L4



12L3 – 3.5 cm



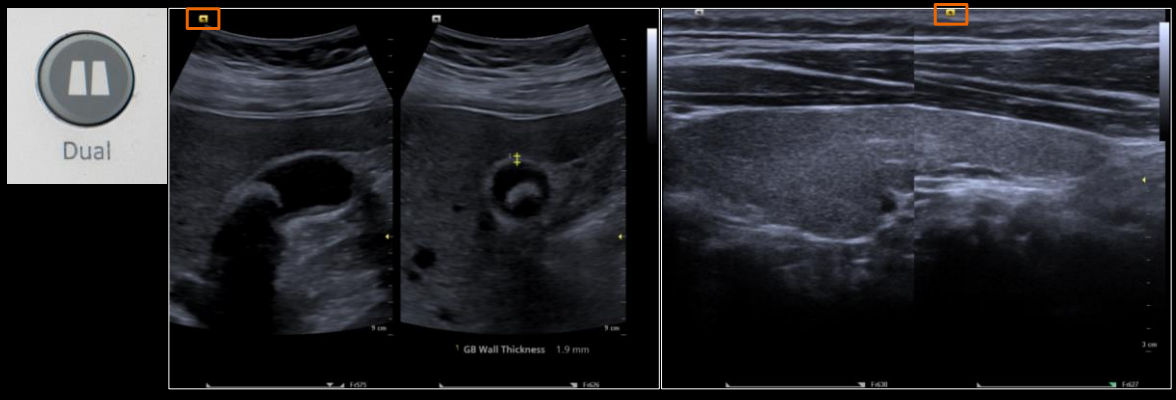
13L4 – 3.5 cm

29

Speaker Notes:

- Here is a comparison of the 12L3 and 13L4 transducers at 3.5 cm in Trapezoid format
- Note the entire FOV is maintained on the 12L3
- On the 13L4, the near FOV width decreases (narrows) and increases the image size as the depth is decreased
- Any image depth less than 3.0 cm will not show the trapezoid

Dual



Conventional Dual

Seamless Dual

30

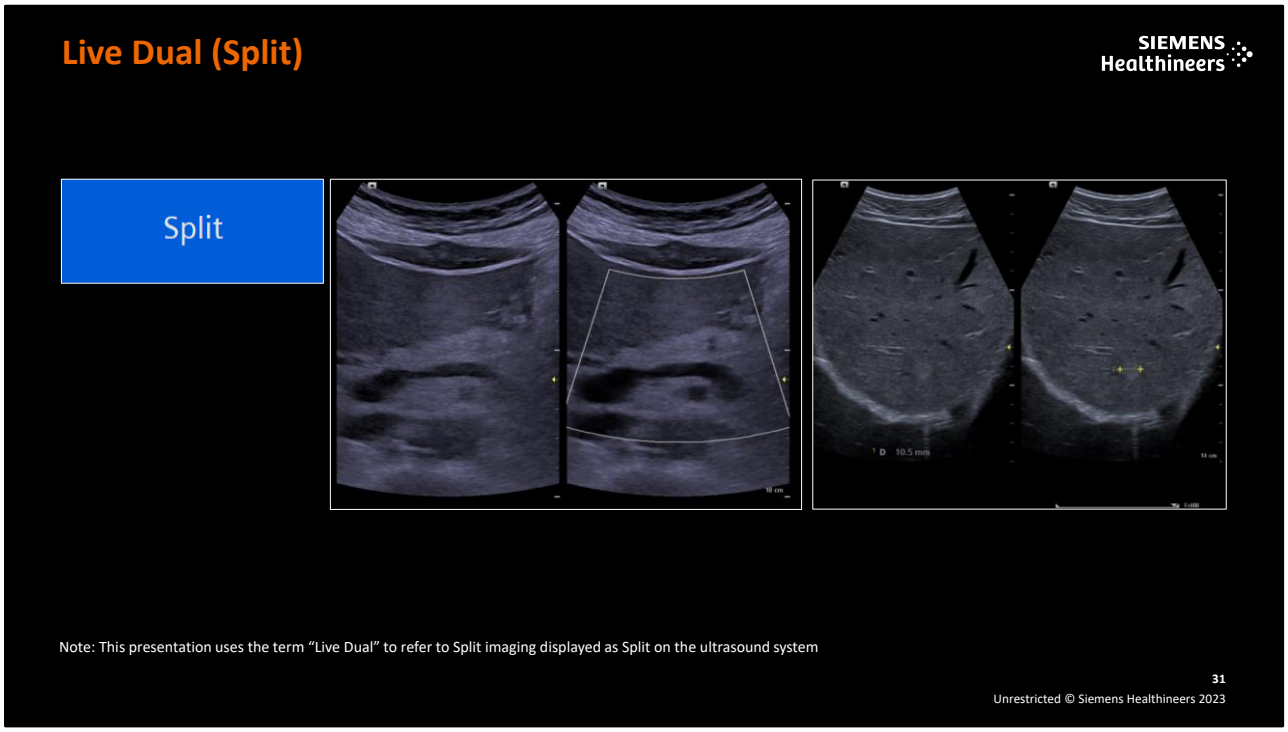
Speaker Notes:

Dual displays two separately acquired images side-by-side. In Dual, the user can both annotate and measure. The image on the left is of a conventional dual display of the sagittal gallbladder next to a transverse image and measurement of the gallbladder wall thickness. Body markers are also available in dual for each image.

Press **Dual** to activate and toggle between images. Press **2D** to exit Dual. The gold “a” denotes the active side.

The system can be configured for conventional dual or seamless dual (e.g., image on right seamlessly connects the upper and lower poles of the sagittal thyroid). Go to **System Configuration > Soft Keys > Exam > Seamless Dual > On/Off**.

Conventional Dual allows measurements on either the right or left image. Seamless Dual allows for measurement across the center where both of the images meet.



Speaker Notes:

Live Dual (Split) displays the same image side-by-side.

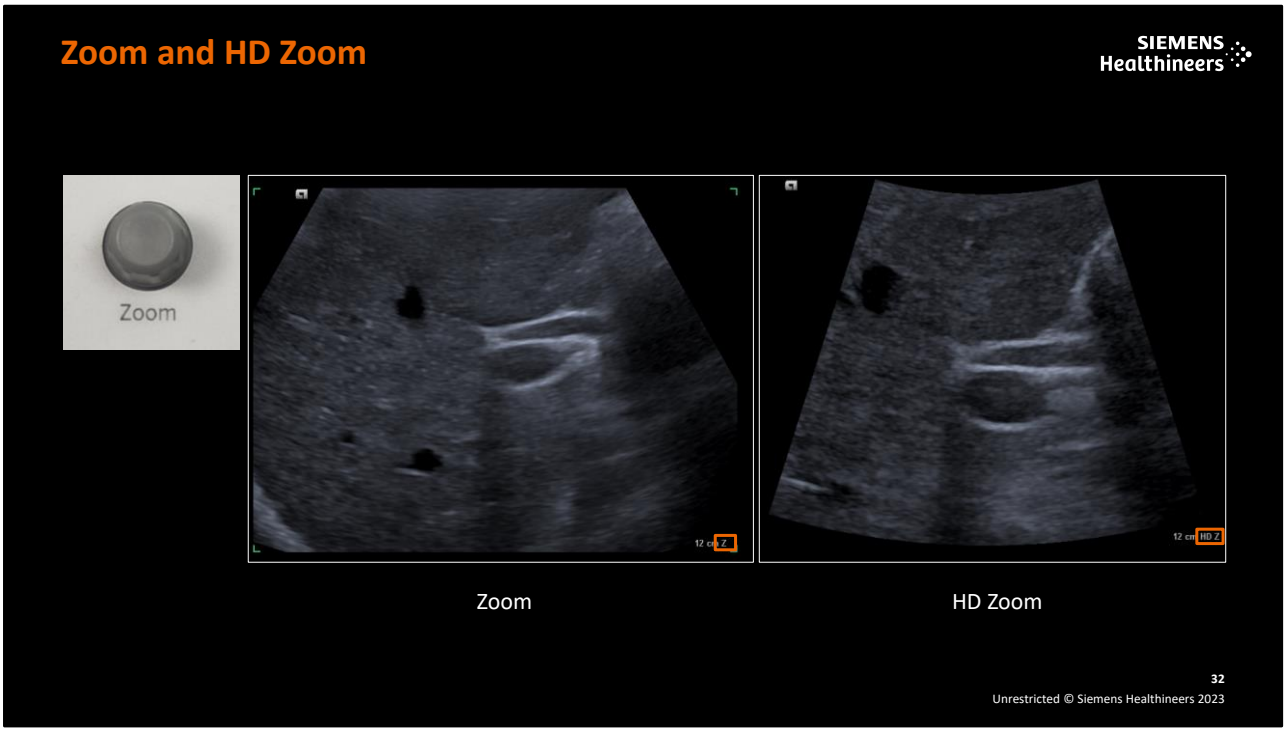
Comparisons may include: B-mode, B-mode with Clarify VE (as displayed here in the image on the left of the splenic vein delineating the pancreas). Also, B-mode and B-mode with color/power Doppler or an image with and without measurements (as displayed here in the image on the right of a liver hemangioma).

Live Dual is often used to compare the B-mode image next to the color Doppler image to evaluate both the hemodynamics and the underlying B-mode image.

On a live image, select **Split** to activate/deactivate.

Please note: This presentation uses the term “Live Dual” to refer to Split imaging displayed as Split on the ultrasound system.

Zoom and HD Zoom



Speaker Notes:

Zoom activates either Zoom (read) or HD Zoom (write).

Zoom magnifies the image on a live or frozen image. A “Z” is displayed on the image screen (as displayed here in the image of the common bile duct on the left).

- Rotate **Zoom** to increase/decrease magnification of the image and roll the trackball to pan the image
- Rotation is customizable under **System Configuration > Custom Keys > Increase Zoom > Clockwise/Counterclockwise**
- Zoom is also available in color Doppler in Split. The B-mode/color Doppler image can also be Zoomed

HD Zoom (write) increases image size, detail resolution and frame rate in a region of interest (ROI). Available on live image only. When selected, “HD Z” displays on the image screen (as displayed here in the image of the CBD on the right).

- Press **Zoom** once to display the ROI
- Rotate **Zoom** to resize the ROI
- Roll trackball to position the ROI
- Press **Zoom** a second time to activate
- Press **Zoom** a third time to deactivate

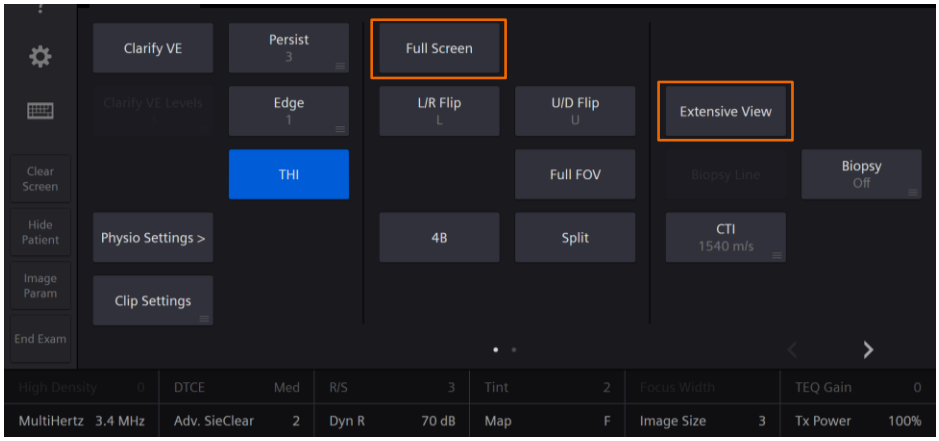
Speaker Notes:

Image Size changes the size of the image. The default Image Size is 2. Increase or decrease Image Size for personal display preference. Pixels may appear tighter when using a smaller Image Size (as displayed in the image on the left of the hepatic veins).

The field of view (FOV) width is not affected when the image size is changed (settings range from 0-4).

Extensive View

SIEMENS Healthineers



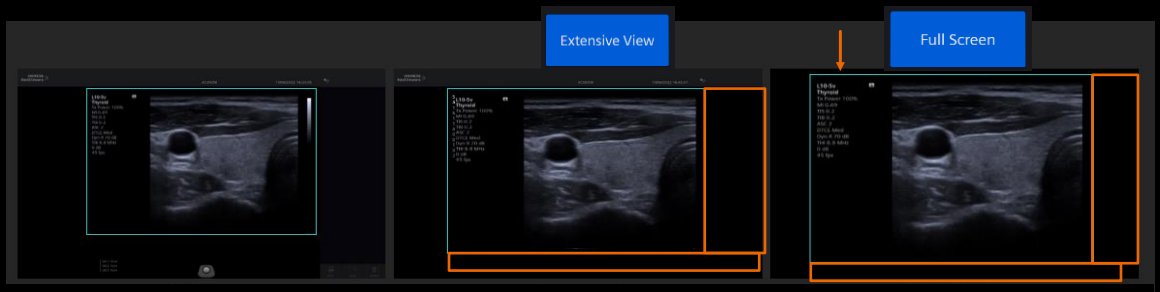
Speaker Notes:

There are three different display options. The default image size will be Normal. This is indicated by the Extensive View and the Full Screen view soft keys not backlit in blue.

The image sizes are not available in 3D/4D or review modes.

Extensive View

SIEMENS Healthineers



Normal View	Extensive View	Full View
• Captures patient information, patient banner, thumbnails and trackball legend	• Captures patient information and banner • Hides thumbnails • Hides trackball legend	• Does not capture patient information and banner • Hides thumbnails • Hides trackball legend

35

Speaker Notes:

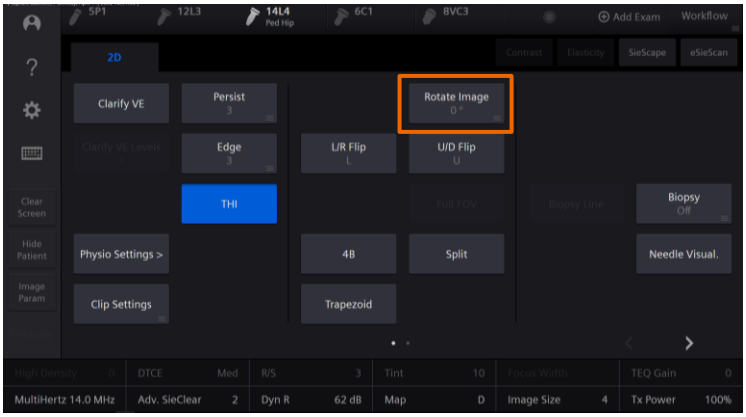
The three image displays can be changed through out an exam and will stay in the size the user determines. When the system is rebooted, the view size will return to the default Normal View.

- The Normal View will capture the patient information, patient banner, thumbnails and the trackball legend
- The Extensive View will capture the patient information and the patient banner, although it hides the thumbnails and the trackball legend
- The Full Screen view will display the largest diagnostic image on the monitor and will not capture the patient information or the patient banner and will also hide the thumbnails and the trackball legend

Image Rotation

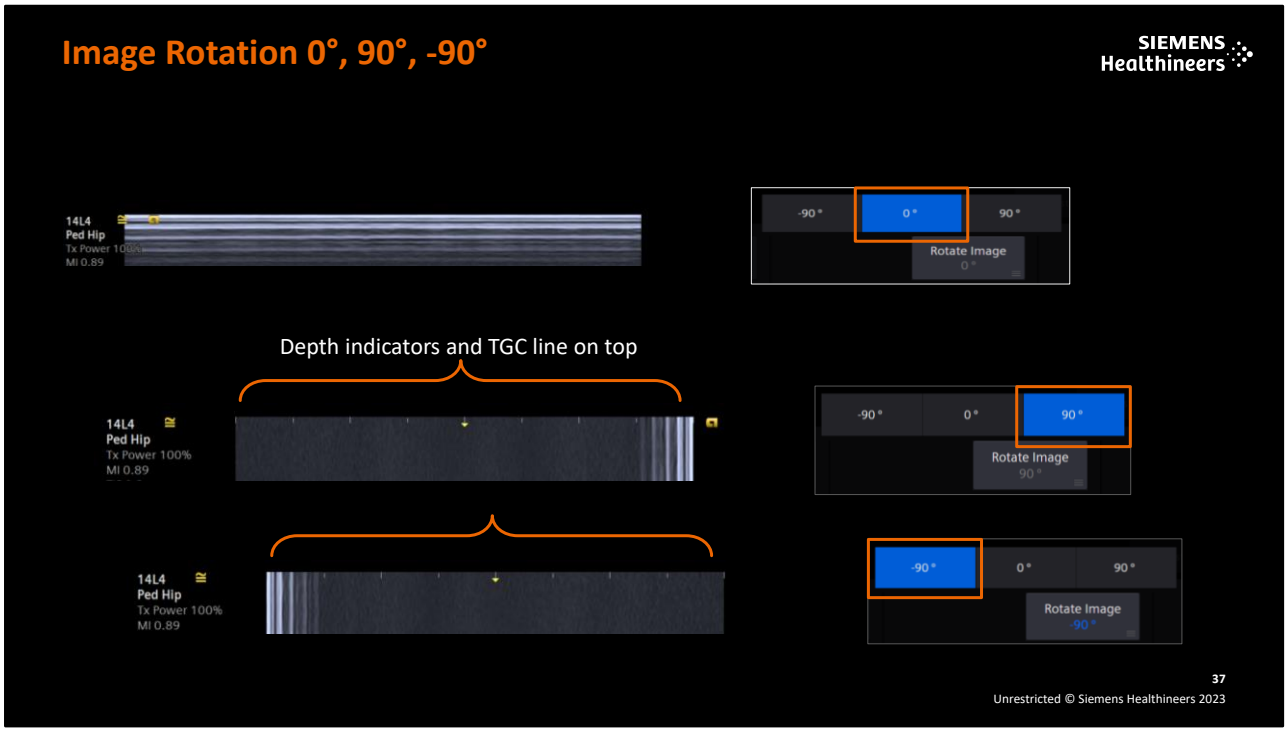
SIEMENS Healthineers

- Rotate Image button on 2D live Touch Screen
- Available on linear transducers
- Rotates image -90°, 0°, 90°
- Does not work with trapezoid, dual or zoom



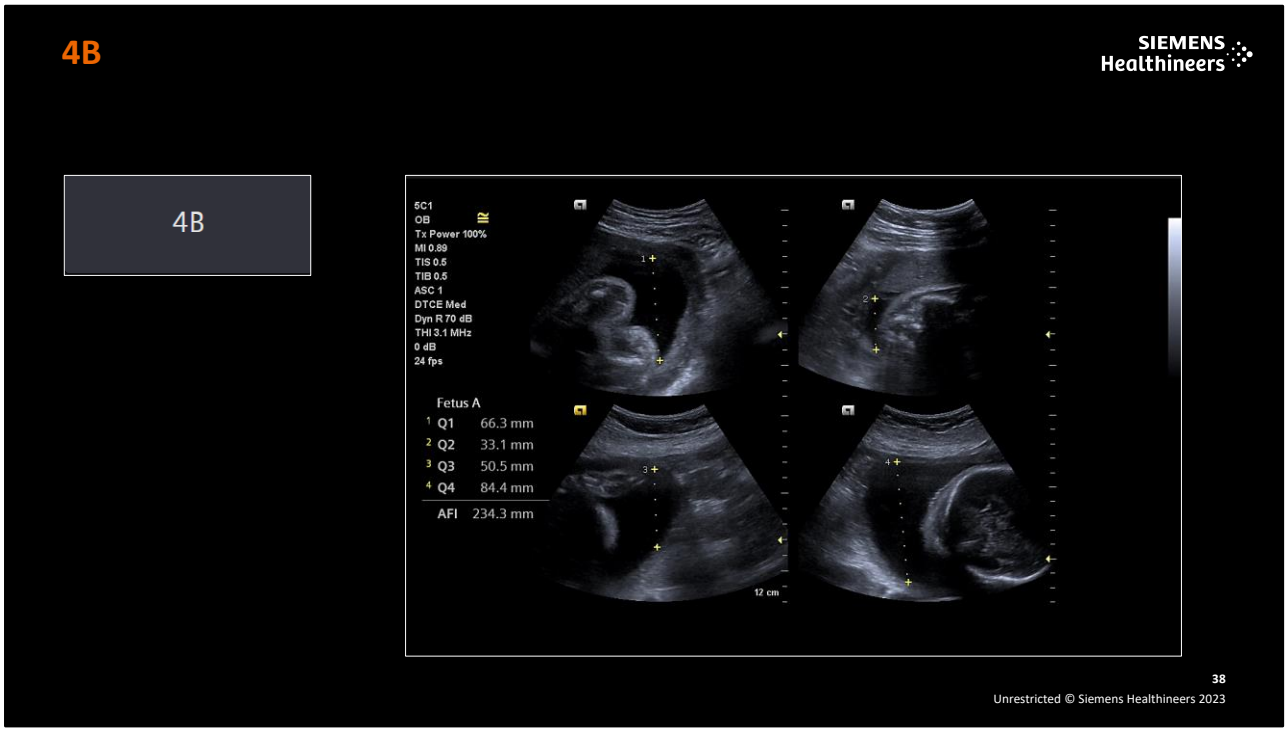
Speaker Notes:

Image Rotation is available on linear transducers when in live 2D and is located on the Touch Screen. This is beneficial when scanning pediatric hips. The user can rotate the image -90°, 0°, 90°, although it will not be available in trapezoid, dual mode or zoom.



Speaker Notes:

Here are examples of each rotation. Notice when the image is in the 90° or -90°, the depth indicators and TGC line are on the top of the image.



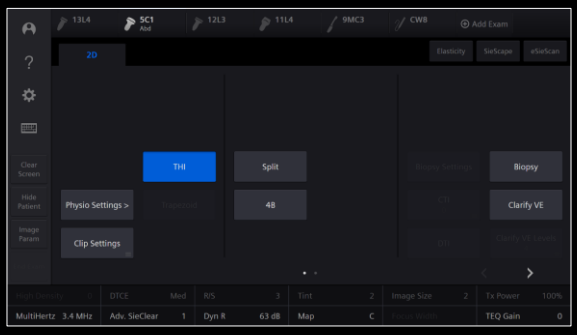
Speaker Notes:

4B displays four separately acquired images in a quadrant. For instance, when performing an AFI, you can display and measure all four quadrants on one image. There are many additional uses for the 4B display.

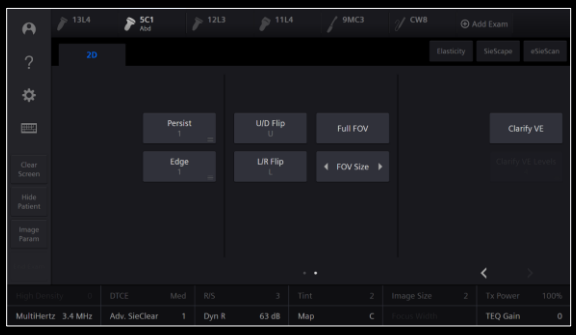
- To activate, select **4B** on the Touch Screen and then select **4B** for the first three quadrants
- Press **Freeze** for the last quadrant

Additional display modes

SIEMENS Healthineers



Page 1



Page 2

Speaker Notes:

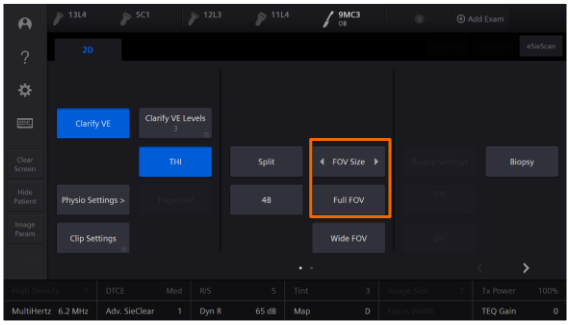
Additional B-mode display modes include:

- L/R Flip and U/D Flip re-orient the image and the gold “a” icon will indicate the active orientation; examples for use include: U/D Flip may be used during prostate imaging and L/R Flip may be used if the transducer position is reversed (e.g., during a biopsy procedure)
- Full FOV maximizes the field of view when the sector size has been decreased
- FOV Size increases/decreases the sector size for transducers displaying a curved array, trapezoid or sector format
- The trackball can be used to increase or decrease the FOV
- The Select Key can be used to toggle between FOV Size and position
- The Touch Screen can be used to change the FOV Size as well

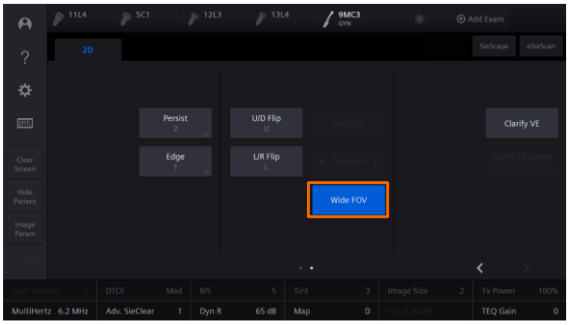
If the setting required is not displayed, go to **System Configuration > Soft Keys** and assign the control to the Touch Screen or soft key.

Additional display modes – Wide FOV

SIEMENS Healthineers



Full FOV on



Wide FOV on

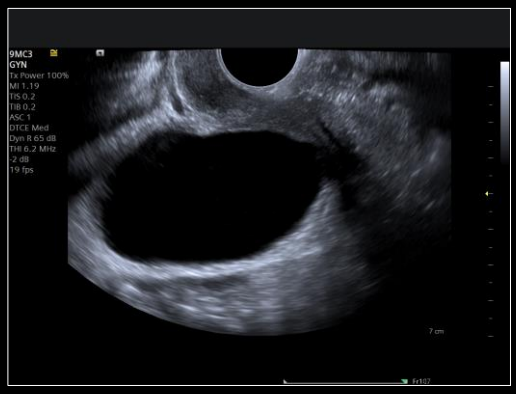
Speaker Notes:

Additional B-mode display modes include:

- Wide FOV is available on the 9MC3 transducer
- The presets will activate various sizes for Full FOV; for example, Early OB will have a smaller FOV than GYN
- Pressing **Wide FOV** will activate the Wide FOV and change the display to a 220° view as demonstrated on the next page
- The trackball or the Touch Screen can not be used to change the FOV when in Wide FOV
- When in Full FOV, the user can quickly adjust the FOV Size by pressing either **Set** Key and using the trackball; the size can also be adjusted by pressing **FOV Size** on the Touch Screen
- The user can toggle between FOV Size and Position by pressing either **Set** Key and use the trackball to adjust both
- Pressing **Full FOV** will change the FOV back to 176°
- Pressing **Wide FOV** will again activate the 220° FOV

Additional display modes – Wide FOV

SIEMENS Healthineers



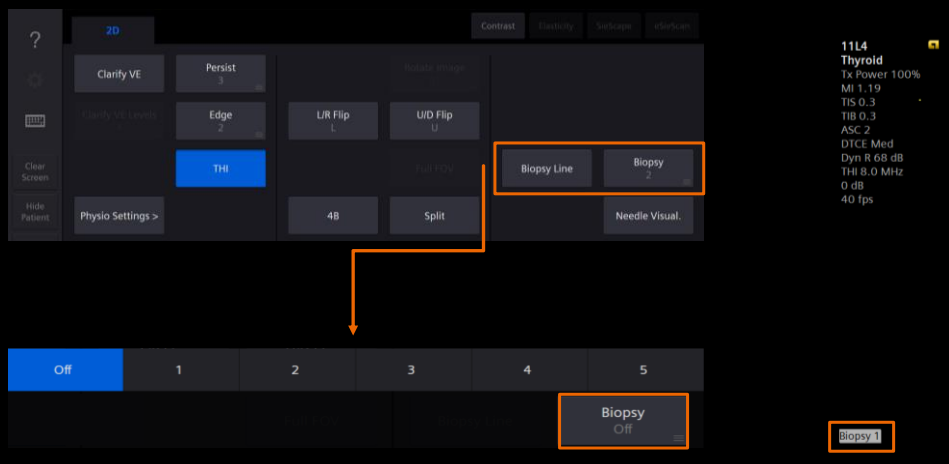
Full FOV 176°

Wide FOV 220°

Speaker Notes:

- The image on the left shows the Full FOV at 176°
- The image on the right shows the Wide FOV at 220°

Additional display modes – Wide FOV biopsy



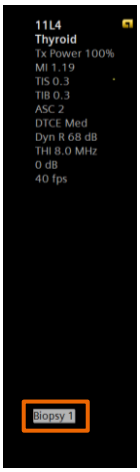
Speaker Notes:

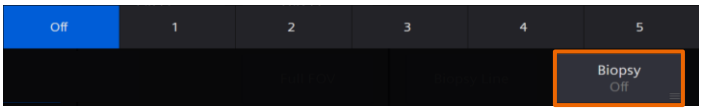
- The biopsy feature is available for use when Wide FOV is active
- Select **Biopsy** on the Touch Screen to activate the mode and display the guidelines on the imaging screen
- When activated, the biopsy mode will display:
    - A single direct biopsy guideline
    - Two +/- tolerance lines for the path where the needle is expected to be seen
- The biopsy line chosen will be displayed on the bottom left corner of the image

Biopsy indicator

SIEMENS Healthineers

Biopsy indicator





Speaker Notes:

The biopsy feature is on the Touch Screen and displays which angle is selected on the monitor. The angle selected is displayed on the lower left side of the image.

Biopsy improvement graphics

SIEMENS Healthineers

Center Line

Ruler

Grid

44

Speaker Notes:

There are biopsy graphics to assist the clinician in locating the needle in both the in plane and out of plane approaches.

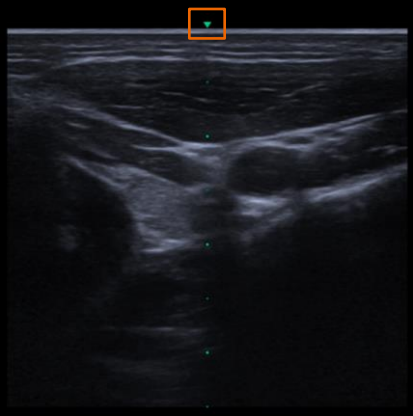
There are three options:

- Center Line – which displays the corresponding center marker on the transducer
- Ruler – which displays distance markers and is located on the skin line of the image
- Grid – which displays a grid of measurement markers

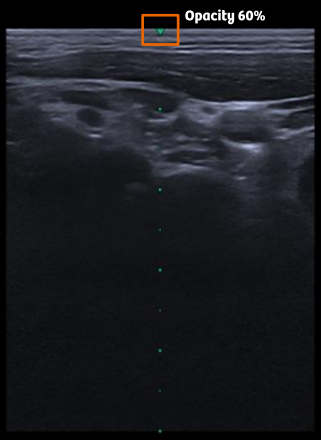
Center line linear transducer

SIEMENS Healthineers

Outside Center Line



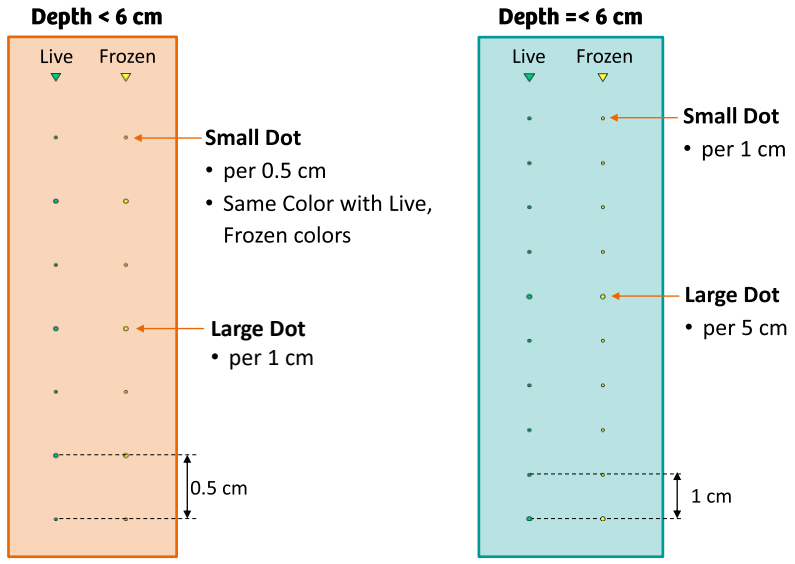
Inside Center Line



Speaker Notes:

For linear transducers, some images have space above the skin line, and some do not; to accommodate for this, the arrow will be either displayed outside or inside the skin line. When the arrow is inside the image, the color opacity will be lowered to 60% to reduce the disturbance of the arrow graphic in the image.

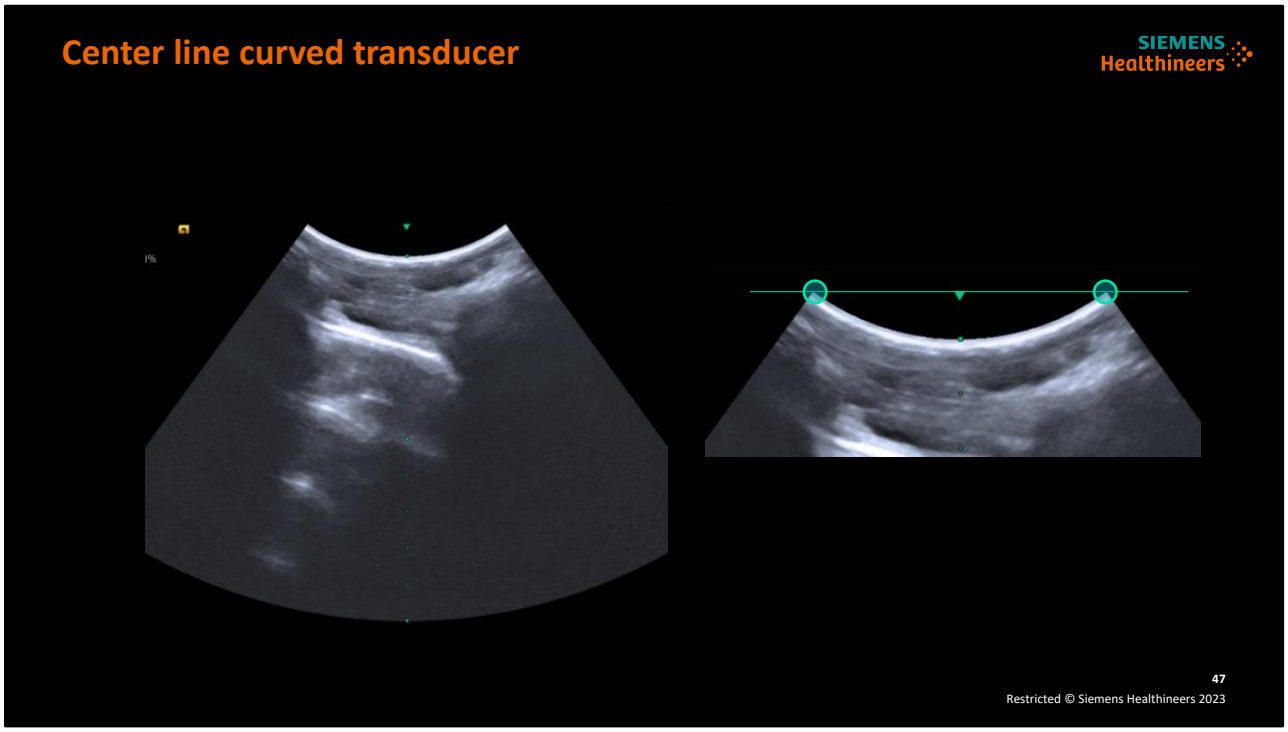
Center line



Speaker Notes:

For linear transducers, the centimeter dot graphics for the line will change depending on the depth of the image. If the image depth is less than 6 cm, the small dot graphic will represent the distance of 0.5 cm between them. The large dot graphic will represent the distance of 1 cm between them.

If the imaging depth is equal to or greater than 6 cm, the centimeter dot graphics will change. The small dot graphic will now represent the distance of 1 cm between them, and the large dot graphic will represent the distance of 5 cm between them.

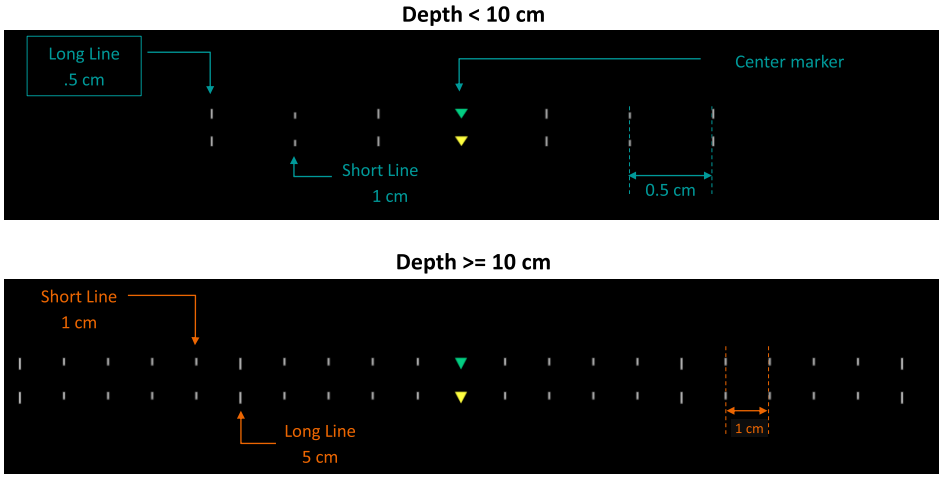


Speaker Notes:

For curved transducers, the center line will be displayed at the center of the image at the level of the top corners of the image. The first dot will start from the top of the image.

Ruler graphics

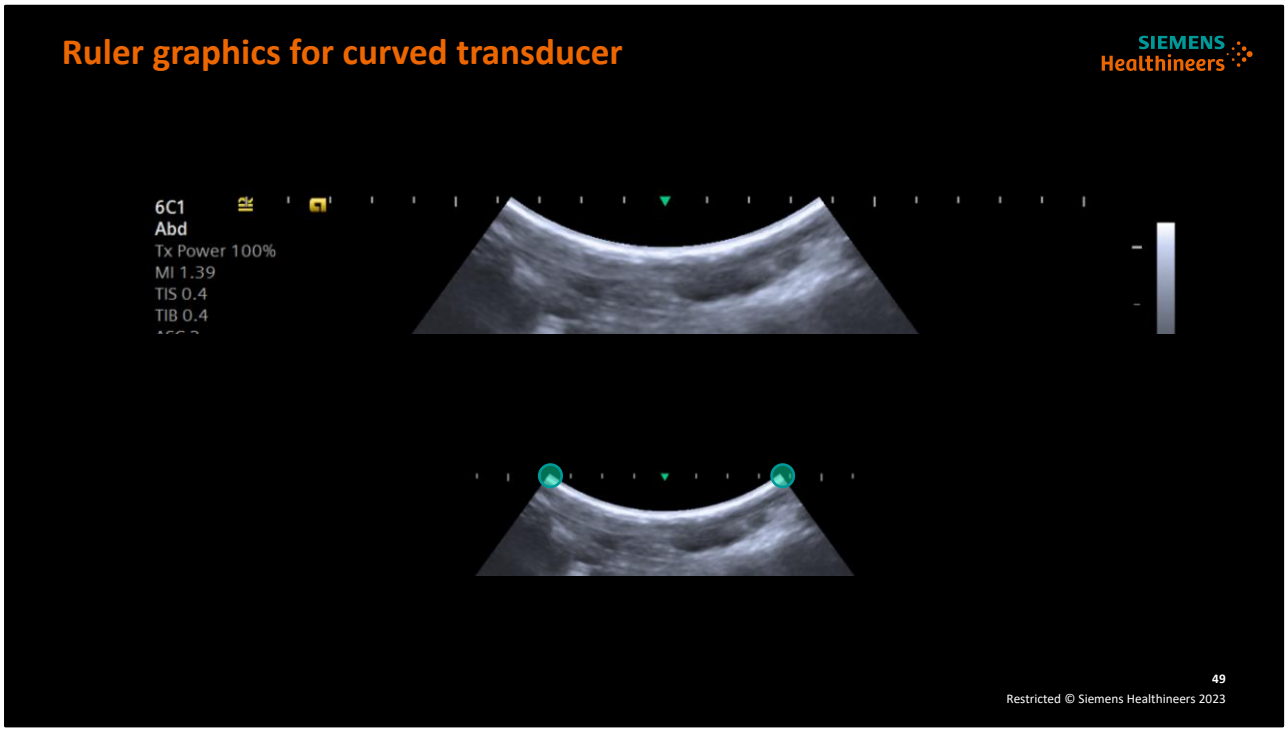
SIEMENS Healthineers



Speaker Notes:

For the ruler graphics, the same method is followed depending on the depth of the image. If the image depth is less than 10 cm, the short line will represent the distance of 0.5 cm between them. The long line will represent the distance of 1 cm between them. Aligned with the center line, the ruler will have the same center marker and color states.

If the image depth is equal to or greater than 10 cm, then the short line will represent the distance of 1 cm between them and the long line will be 5 cm between them.

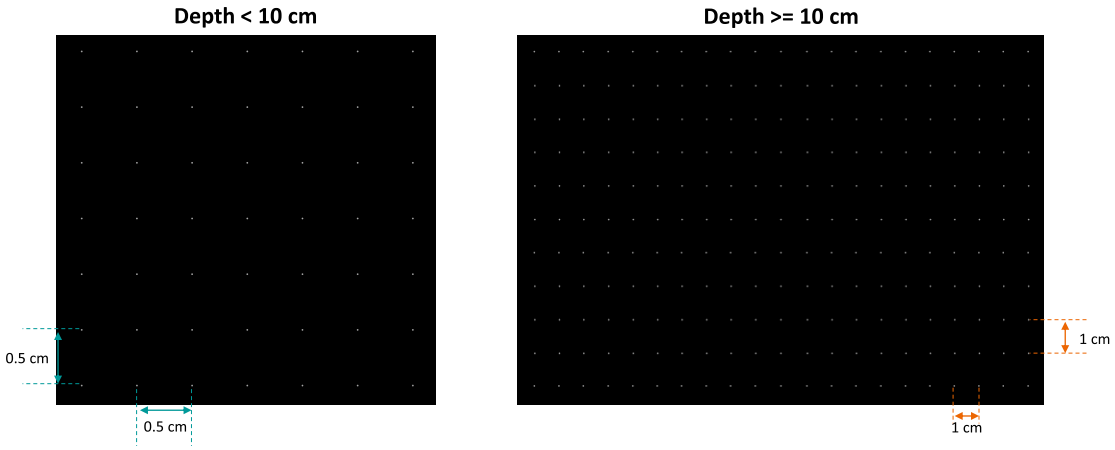


Speaker Notes:

The ruler for curved transducers will be displayed at the top of the image at the level of the top corners of the image.

Grid graphics

SIEMENS Healthineers

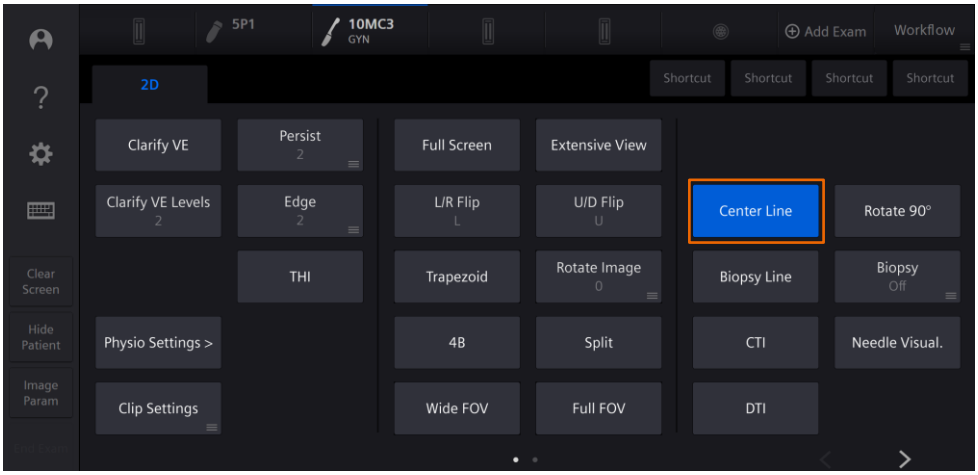


Speaker Notes:

Displayed here is an example of the grid graphics; it also follows the same depth display method. If the depth is under 10 cm, then the dots will represent the distance of 0.5 cm between them. If the depth is equal to or more than 10 cm, then the dots will represent the distance of 1 cm between them.

Center line touch screen

SIEMENS Healthineers



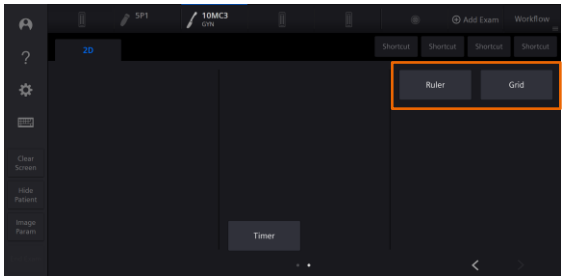
Speaker Notes:

The graphics will be displayed near the biopsy tools on the touch screen. The Center Line will be the default for 2D imaging and can be customized for the User Defined keys and the foot pedal.

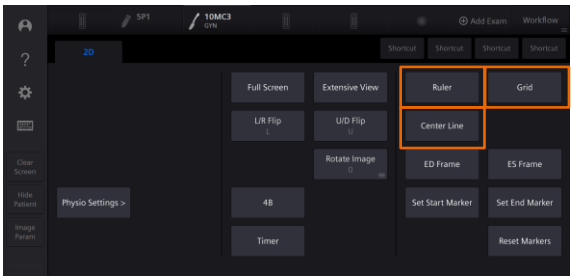
Ruler and Grid Touch Screen

SIEMENS Healthineers

Live Image



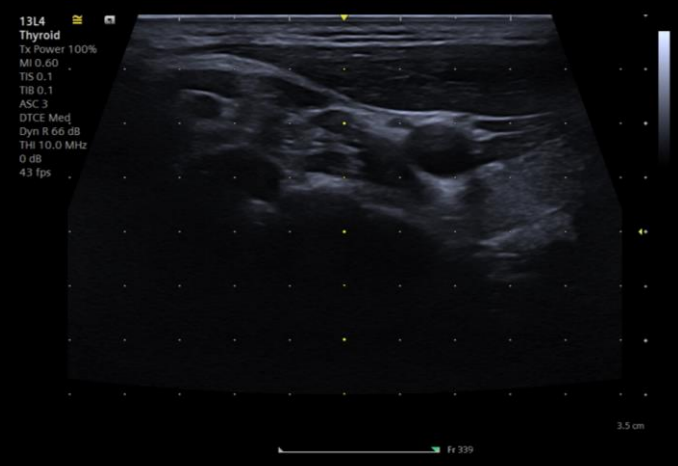
Frozen Image



Speaker Notes:

The Ruler and Grid features will be displayed on the second page of the Touch Screen in live imaging. When an image is frozen, all three features will be on the main Touch Screen.

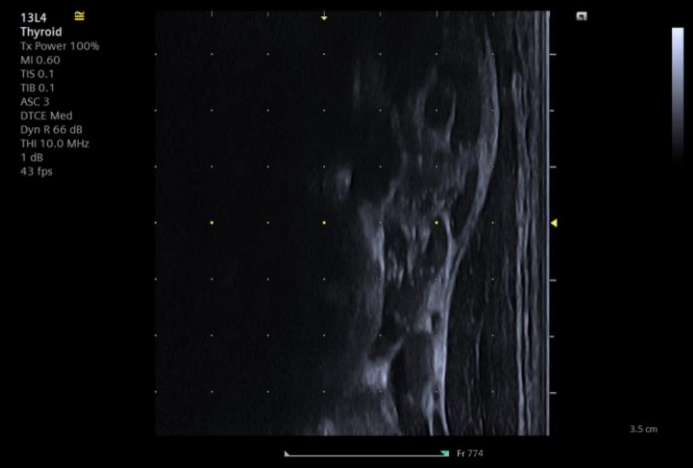
Grid with trapezoid imaging



Speaker Notes:

Displayed here is the grid view when in trapezoid imaging.

Rotating imaging

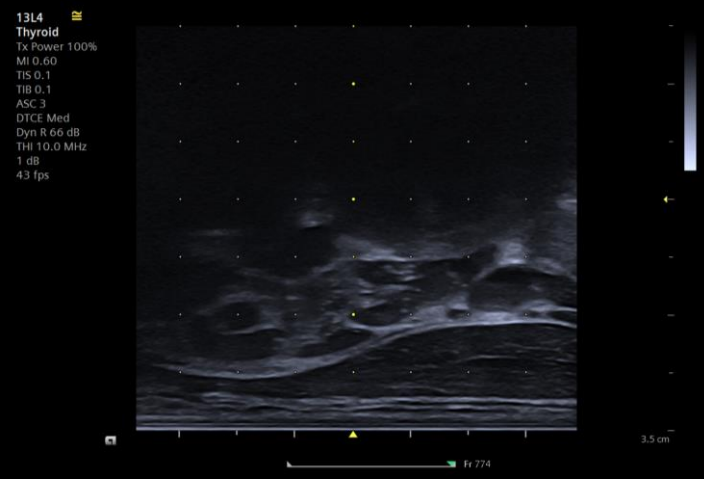


Speaker Notes:

When the image is rotated 90°, the graphics rotate with the image for consistency.

Rotating imaging

SIEMENS Healthineers

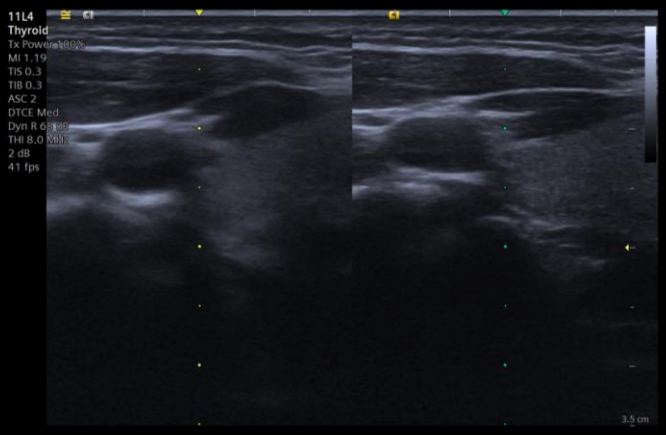


Speaker Notes:

Rotating another 90° displaying the graphics.

Center line with Dual imaging

SIEMENS Healthineers

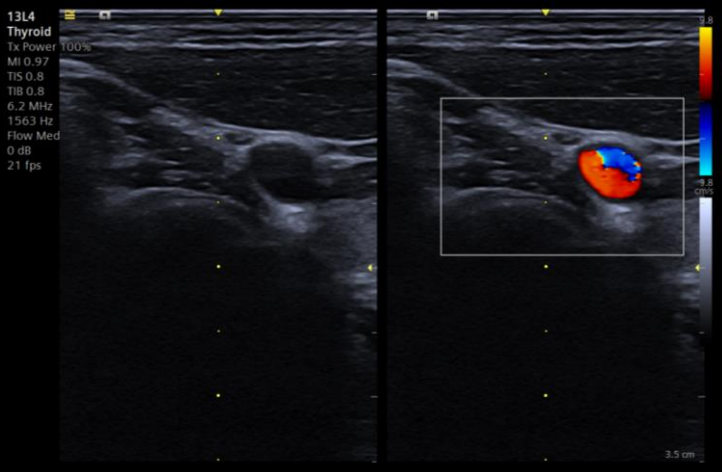


Speaker Notes:

Displayed here is an example of the center line with dual imaging. Notice the live and frozen image color combinations.

Center line with Split imaging

SIEMENS Healthineers



Speaker Notes:

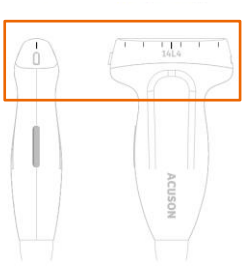
Here is an example of the center line while in split imaging. Notice that both lines are yellow indicating they are both live images.

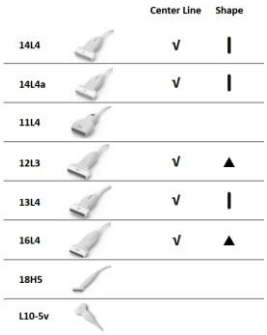
Transducer markings

SIEMENS Healthineers

Linear Transducers

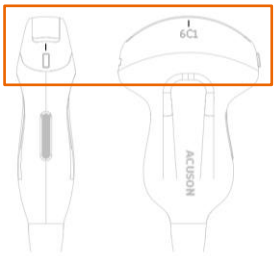
Eight linear transducers will have a center mark and a ruler mark

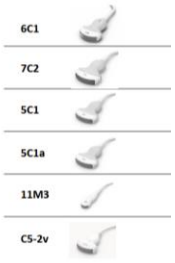




Convex Transducers

Six convex transducers will have the center mark only



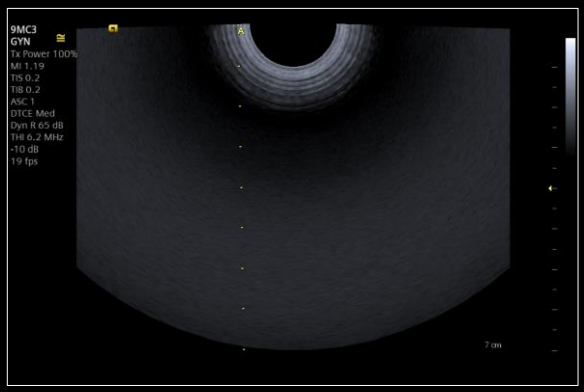


58

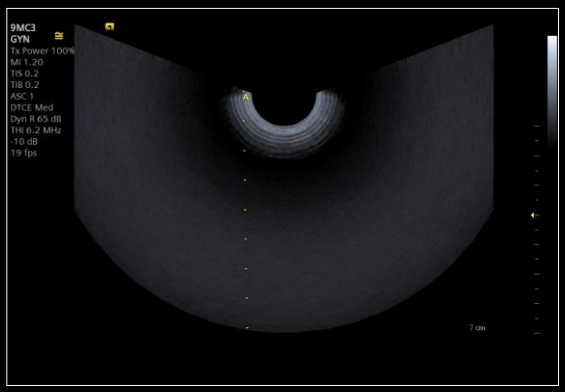
Speaker Notes:

The markings on the transducers will be different depending on the transducer. The five linear transducers listed here have a center mark as well as a ruler mark. The six convex transducers listed here only have the center mark.

Additional display modes – single line biopsy



Biopsy Full FOV 176°



Biopsy Wide FOV 220°

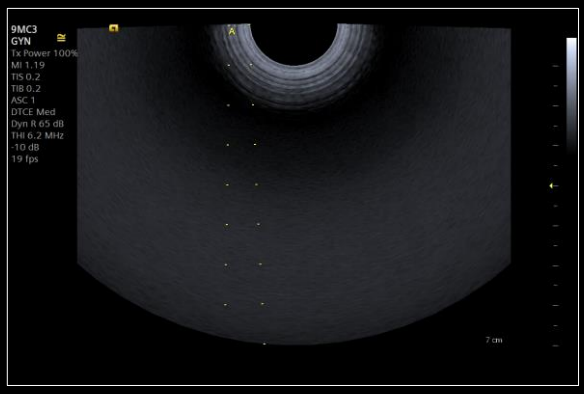
Speaker Notes:

These two images show a single direct biopsy line using Full FOV and Wide FOV.

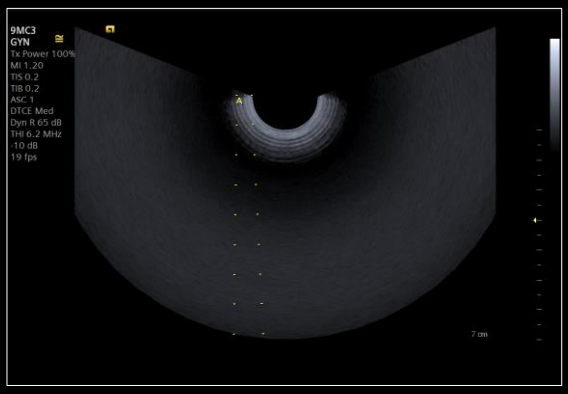
Please note: When using a single direct biopsy line, the needle path may be superimposed on the guide line.

Additional display modes – double line path biopsy

SIEMENS Healthineers



Biopsy Full FOV 176°



Biopsy Wide FOV 220°

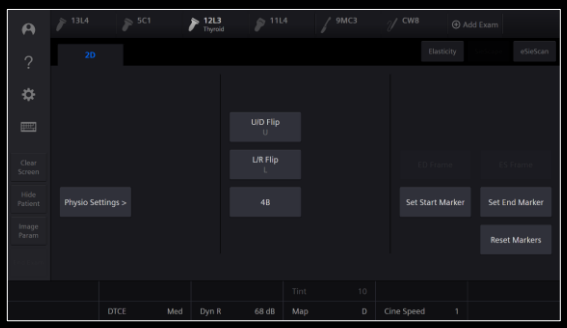
Speaker Notes:

These two images display the double line biopsy needle guidance path with the Full FOV (176°) and Wide FOV (220°).

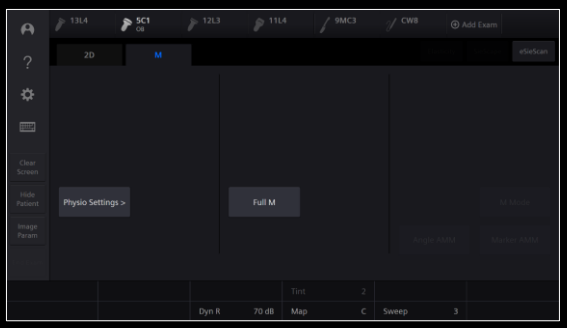
These lines represent the +/- tolerance lines where the needle is expected to be seen once it is deployed.

Post-processing features

SIEMENS Healthineers



B-mode



M-mode

61

Speaker Notes:

When the image is frozen, the available post-processing features will be displayed on the Touch Screen or soft keys. The available post-processing features on the Control Panel will be backlit.

The following optimization controls may be adjusted after the image is frozen:

- Zoom
- B-mode: DTCE, DynR, Tint, Map, L/R Flip, U/D Flip
- M-mode: DynR, Tint, Map, Sweep

Objectives

- Review B-mode and M-mode controls
- Describe B-mode and M-mode optimization features
- Explain display modes
- Review Doppler controls
- Describe Doppler optimization features

Speaker Notes:

Next, we will review the Doppler controls.

Doppler controls

SIEMENS Healthineers

Control Panel

Touch Screen

Soft keys

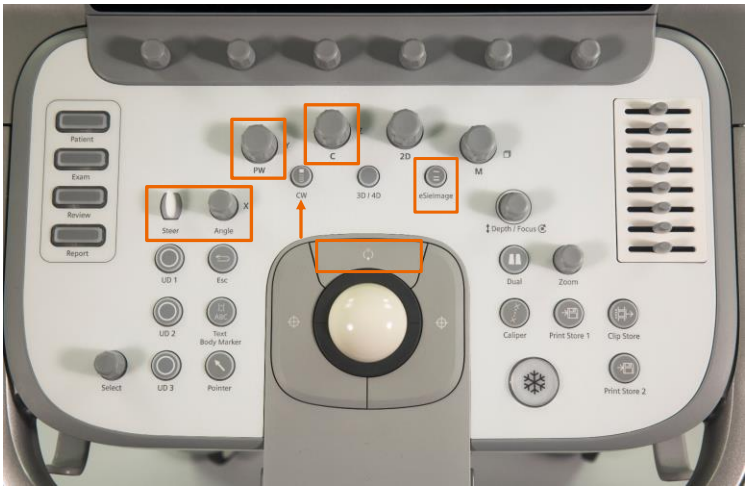
Speaker Notes:

The Doppler image may be optimized using three different methods:

1. Control Panel
2. Soft keys
3. Touch Screen

Doppler controls on the Control Panel

SIEMENS Healthineers



Speaker Notes:

The primary Doppler controls on the Control Panel are:

- C (color) enters/exits color Doppler; rotate C to change overall color Doppler gain
- Press **PW** (pulsed wave) to activate the Doppler cursor and press **PW** again to enter pulsed wave Doppler and rotate **PW** to adjust overall spectral Doppler gain; press **PW** or **2D** to exit or Press **Update** (located above the trackball) to cycle between the image and Doppler spectrum
- CW (continuous wave) activates SCW (steerable continuous wave Doppler) for phased array transducers or for the auxiliary CW pencil transducers
- Steer will steer the color Doppler ROI and the spectral Doppler cursor right/left and steering angles for all linear transducers are: -30, -22.5, -15, -7.5, 0, 7.5, 15, 22.5, 30 degrees
- Angle changes the degrees of angle correction for the Doppler spectrum
- eSieImage optimization activates automatic spectral Doppler optimization
- Roll the trackball and press the right or left **Set** key (located adjacent to the trackball) to perform functions in Doppler such as:
    - Position of the color Doppler ROI
    - Size of the color Doppler ROI
    - Position of the spectral Doppler cursor
    - Cine the Doppler image or spectral Doppler waveform when frozen
    - Position of the Pointer

Please note: Dual, Zoom and HD Zoom are available in color Doppler. Zoom is available for the B-mode reference image while in spectral Doppler.

Doppler controls on the soft keys

SIEMENS Healthineers

Color Doppler

Spectral Doppler

Speaker Notes:

The Doppler soft key rotary controls are located on the Control Panel and lie beneath and correspond to the controls listed on the bottom two rows of the Touch Screen. These controls are customizable for live imaging and when frozen in **System Configuration > Soft Keys**.

All color Doppler soft key optimization controls, except for Frequency, Scale and Baseline, can be configured to the Touch Screen.

All spectral Doppler soft key optimization controls, except for Frequency, Filter, Scale and Baseline, can be configured to the Touch Screen.

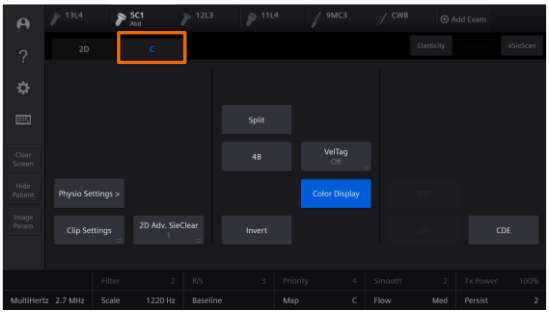
The active control is highlighted in white. To alternate activation between the first and second row controls, push the corresponding rotary control OR touch the desired control. Once activated, turn the rotary control clockwise/counterclockwise to adjust.

If the system is frozen, only those controls available in freeze will be active. Controls that are not available will appear dithered.

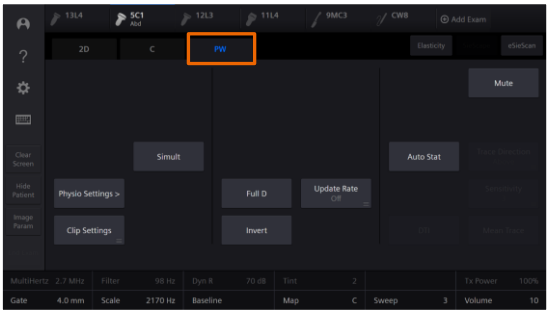
Soft key controls do not change when navigating pages.

Doppler controls on the Touch Screen

SIEMENS Healthineers



Color Doppler



Spectral Doppler

Speaker Notes:

The Doppler Touch Screen controls are customizable for live imaging and when frozen in **System Configuration > Soft Keys**.

Alternatively, all color Doppler Touch Screen optimization controls, except for CDE, Color Display, Invert, 4B and Live Dual (Split), can be configured to the soft keys.

All spectral Doppler Touch Screen optimization controls, except for DTI, Invert, Full D, Auto Stat, Live-Live (triplex), Mute and Mean Trace, can be configured to the soft keys.

A control is highlighted in blue when it is active, gray when it is available and will be dithered out if unavailable.

Touch the control to activate/deactivate or open a menu selection. If the system is frozen, only those controls available in freeze will be available.

Objectives

SIEMENS Healthineers

- Review B-mode and M-mode controls
- Describe B-mode and M-mode optimization features
- Explain display modes
- Review Doppler controls
- Describe Doppler optimization features

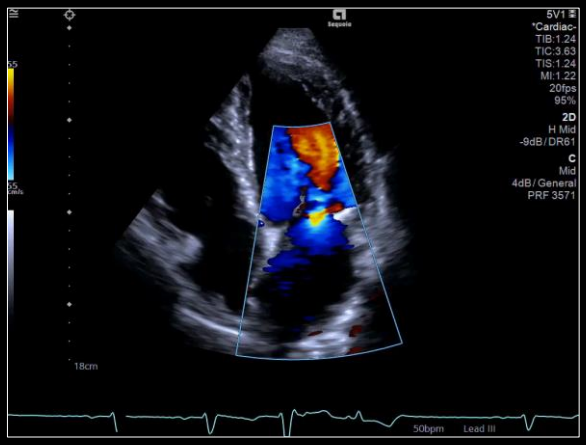
Speaker Notes:

Lastly, we will describe the Doppler optimization features.

Dynamic persistence
Auto flash artifact suppression

SIEMENS Healthineers

- Dynamic persistence adjusts persistence relative to user motion
- Auto flash artifact suppression applies flash suppression relative to user motion



68

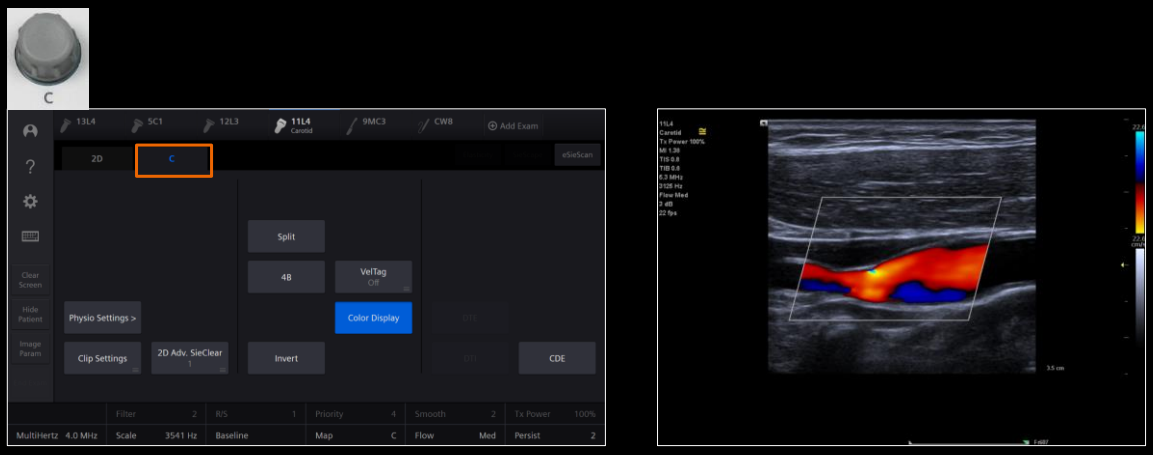
Speaker Notes:

Dynamic persistence and auto flash suppression are two unique technologies for color Doppler.

Dynamic persistence technology:
- Prevents “ghosting” motion in B-mode and color Doppler imaging
- Enhances static color sensitivity
- Reduces static B-mode noise

Color Doppler auto flash artifact suppression:
- Prevents motion artifacts
- Enhances color sensitivity
- Allows high quality scanning at a fast pace
- Notice how the color Doppler, in the video of the heart shown here, displays excellent color sensitivity without motion artifacts

Color Doppler velocity (CDV)



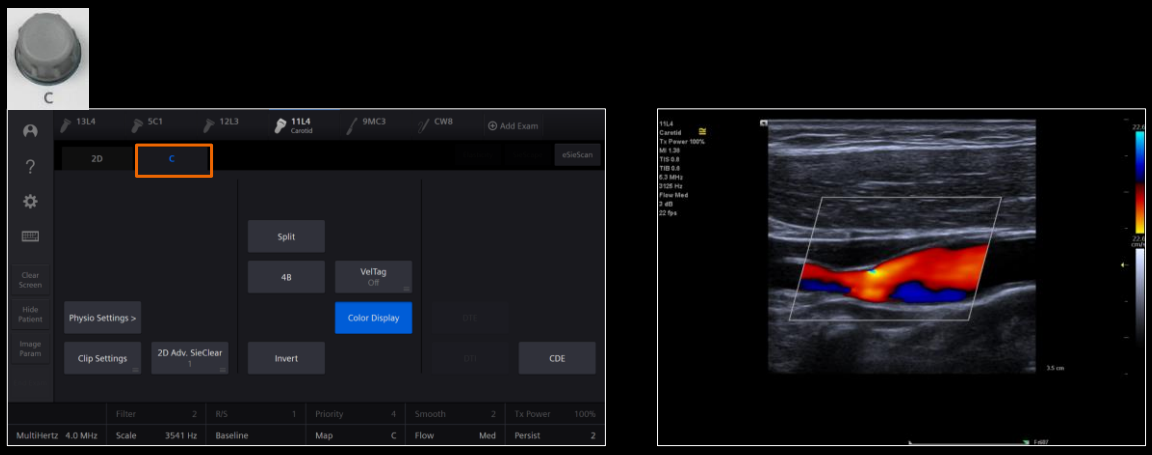
Speaker Notes:

Color Doppler velocity (CDV) applies colors to vascular structures based on velocity and direction of flow (as displayed here in the carotid bulb).

Color Doppler controls include:

- VelTag (velocity tag) designates (or tags) a single (Sngl) blood flow velocity or a range (Rng) of blood flow velocities in a color Doppler image
- Color Display activates/deactivates the color display without unfreezing the image (ROI remains on the image)
- Invert reverses the colors depicting flow towards or away from the transducer in the color ROI and on the color bar (located on the right side of the image)
- CDE or CDV activates color Doppler velocity or color Doppler energy (power Doppler)
- MultiHertz imaging adjusts the color Doppler frequency independent of the B-mode frequency maintaining color flow sensitivity in vessels located in the near, mid and far field
- Filter adjusts the color wall filter; settings are 0-3 (low to high)
- Scale adjusts the pulse repetition frequency (PRF) – the color velocity range or the power frequency range
- R/S (Res/Speed) adjusts the balance between the image line density (resolution) and the frame rate (speed);
  Settings are 0 (low resolution/high frame rate) to 5 (high resolution/low frame rate)

Color Doppler velocity (CDV) cont'd



Speaker Notes:

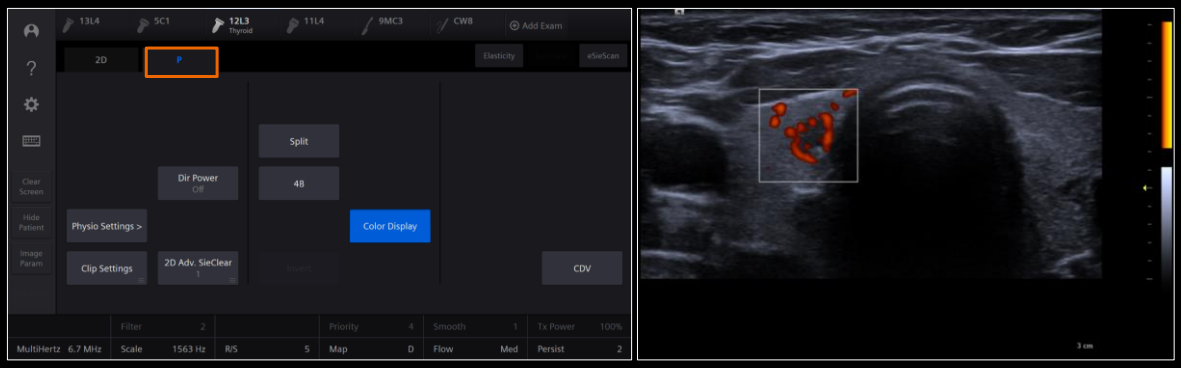
Color Doppler velocity **(CDV)** applies colors to vascular structures based on velocity and direction of flow (as displayed here in the carotid bulb).

Color Doppler controls include (cont'd):

- Baseline adjusts the range of flow velocities displayed above and below the baseline
- Priority adjusts the threshold for overlaying color pixel information on the B-mode image and settings are 0-4
- Map selects a processing curve that assigns the velocity / variance range (for CDV) or flow amplitudes (for CDE) to a range of colors. Choices are A-J
- Smooth adjusts the level of spatial (both axial and lateral) averaging used to smooth the flow pattern display and Settings are 0-3 (low to high)
- Tx Power (transmit power) adjusts the acoustic energy delivered to the patient and settings are .20-100%
- Persist (persistence) adjusts the time that the color flow data remains in the ROI before being replaced by another color and settings are 0-4 (low to high)

Color Doppler energy (CDE)

SIEMENS Healthineers



Speaker Notes:

Color Doppler energy (CDE), or power Doppler, applies colors to vascular structures based on flow amplitude (versus velocity information). CDE demonstrates less angle dependence than CDV and is useful for low volume, low velocity flow states to demonstrate presence or absence of flow (as displayed here on a thyroid nodule).

- To activate CDE imaging, select **CDE** on the Touch Screen and the Touch Screen menu will change to P for power Doppler and the optimization controls will change for power Doppler parameters; to deactivate, select **CDV**

Directional power Doppler applies colors based on amplitude and direction of flow (towards or away from the transducer).

- To activate/deactivate directional power Doppler, select **Dir Power**

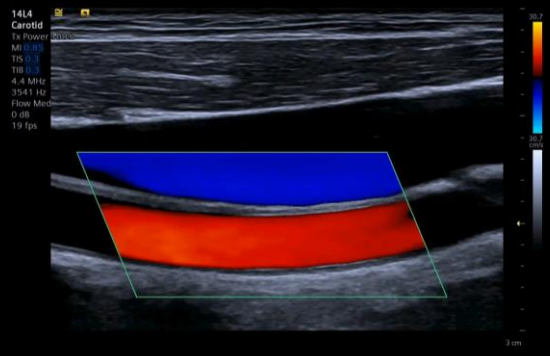
Speaker Notes:

Flow opens the flow state optimization preset selections. In this sagittal view of a multinodular thyroid, the Low Flow setting reveals the greatest color Doppler flow information.

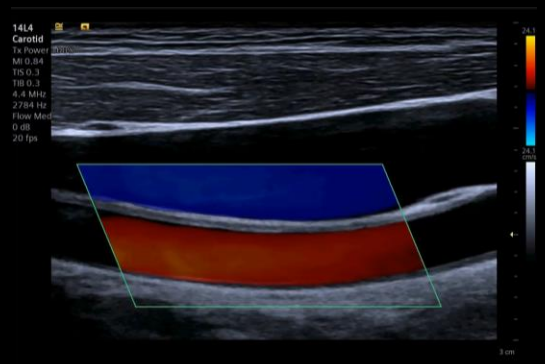
Select **Flow** to quickly optimize the color Doppler flow state without changing multiple controls:

- Flow Low (e.g., renal perfusion, pancreas, small parts, testicular, thyroid, breast, ovarian, calf veins, fetal head, placenta)
- Flow Medium (e.g., liver, splenic vein, portal vein, hepatic veins, peripheral vascular in extremities, OB cord)
- Flow High (e.g., fetal heart, aorta, cardiac)

Color and Color a-Blend (Alpha Blending)



Color Doppler



Color a-Blend (Alpha Blending)

73

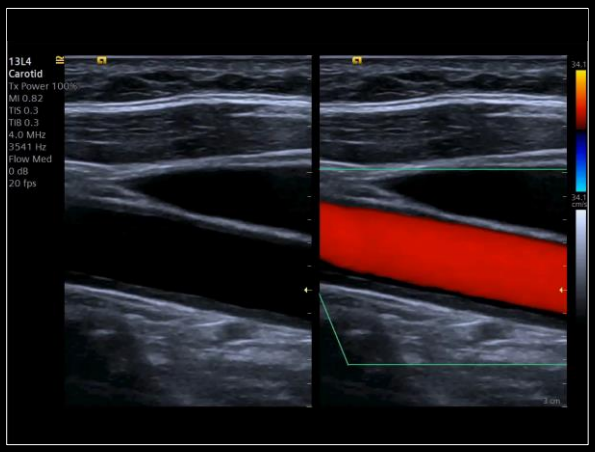
Speaker Notes:

Alpha Blending is a function to adjust the transparency level of Color. As the a-Blend index increases, the color transparency increases, so the resulting image is a blended B-mode and color.

Live Dual (Split)

SIEMENS Healthineers

Split



74

Speaker Notes:

Split displays the same image side-by-side. Split is often used to compare the B-mode image next to the color Doppler image to evaluate both the hemodynamics and the underlying B-mode image (as displayed here on the common carotid artery).

On a live image:

- Select **Split** to activate/deactivate
- Select **Split** in B-mode first and then press **C** on the Control Panel to activate Live Dual with color Doppler

Pulsed wave (PW) Doppler

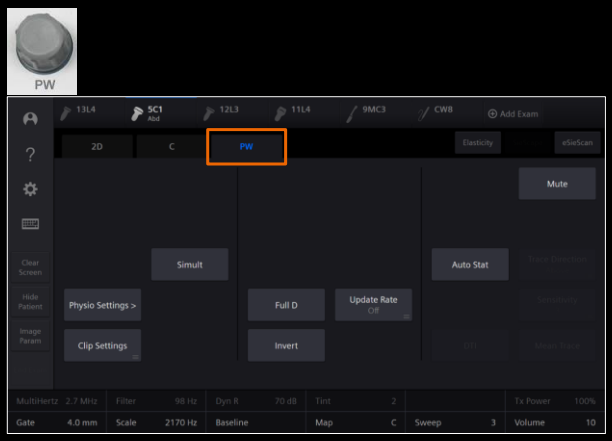
Speaker Notes:

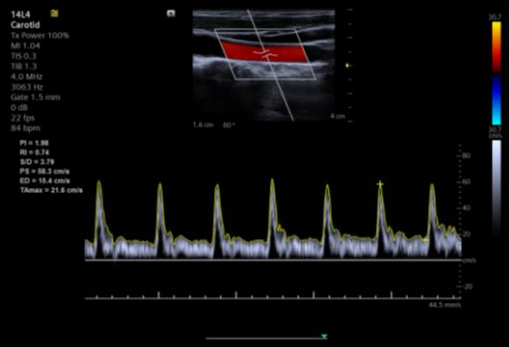
Pulsed wave (PW) Doppler measures flow velocity within a gated sample volume (as displayed here in the carotid artery).

PW Doppler controls include:

- Physio Settings adjusts the ECG controls when in cardiac imaging
- Invert reverses the Doppler spectrum (values display above/below the baseline)
- Mute deactivates the spectral Doppler audio volume
- Update Rate adjusts the interval for refreshing the B-mode image; selections include Off, 1-4 and 8 seconds
- MultiHertz imaging adjusts spectral Doppler frequency independent of the B-mode or color frequency, maintaining spectral Doppler flow sensitivity in vessels located in the near, mid or far field
- Gate adjusts the sample volume size; setting choices are 0.5-15.0 mm
- Filter rejects signals below the selected frequency setting (e.g., signals generally caused by tissue clutter); increase the filter to reduce clutter
- Scale adjusts the PRF for the spectral Doppler frequency range and is dependent on the transmit frequency and depth of the Doppler gate

Pulsed wave (PW) Doppler cont'd





Speaker Notes:

Pulsed wave (PW) Doppler measures flow velocity within a gated sample volume (as displayed here in the portal vein).

PW Doppler controls include (cont'd):

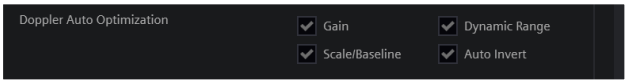
- Dynamic Range adjusts the overall contrast resolution (dynamic range) of the spectral display in 5 dB increments Lower levels are more black/white and higher levels show a greater range of gray shades (settings range from 10 dB to 80 dB)
- Baseline adjusts the range of velocities displayed on either side of the baseline
- Map selects a processing curve that assigns echo amplitudes to gray shades in the Doppler spectrum (settings range from A – G)
- Sweep adjusts the scrolling speed of the Doppler spectrum. Decrease to display more heart cycles and increase to display fewer cycles (settings range from .75 – 12)
- Tx Power (transmit power) allows manual adjustment of the acoustic energy delivered to the patient (settings range from .20 – 100%)
- Volume adjusts the Doppler audio volume

Doppler auto optimization

SIEMENS Healthineers

Automatic spectral Doppler optimization of:

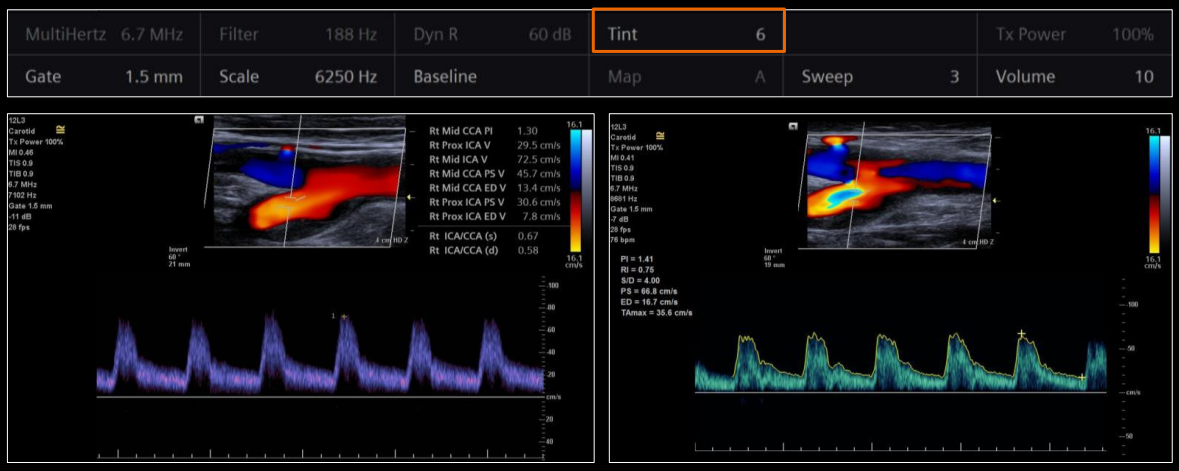
- Gain
- Scale/Baseline
- Dynamic Range
- Auto Invert



Speaker Notes:

- Press **eSieImage** on a live spectral Doppler trace to automatically optimize selected parameter(s)
- Select the System Configuration icon to select optimized parameter(s) under **System Configuration > Display > Doppler/M-Mode > Doppler Auto Optimization**
- Parameters that can be automatically optimized include: Gain, Dynamic Range, Scale/Baseline and Auto Invert

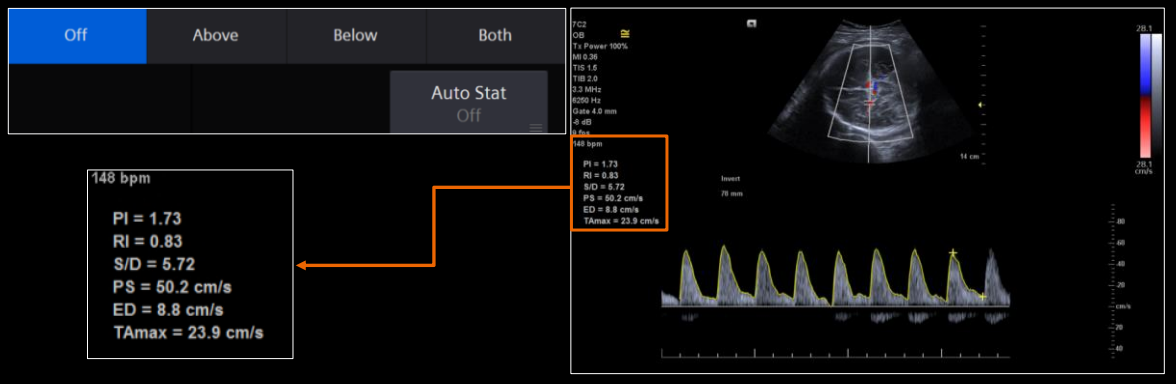
Tint



Speaker Notes:

- Tint – to change the Doppler spectrum color, select 0-11
- Adding a Tint may assist in measurements and spectral evaluation (as displayed here in the internal carotid artery)

Auto Stat



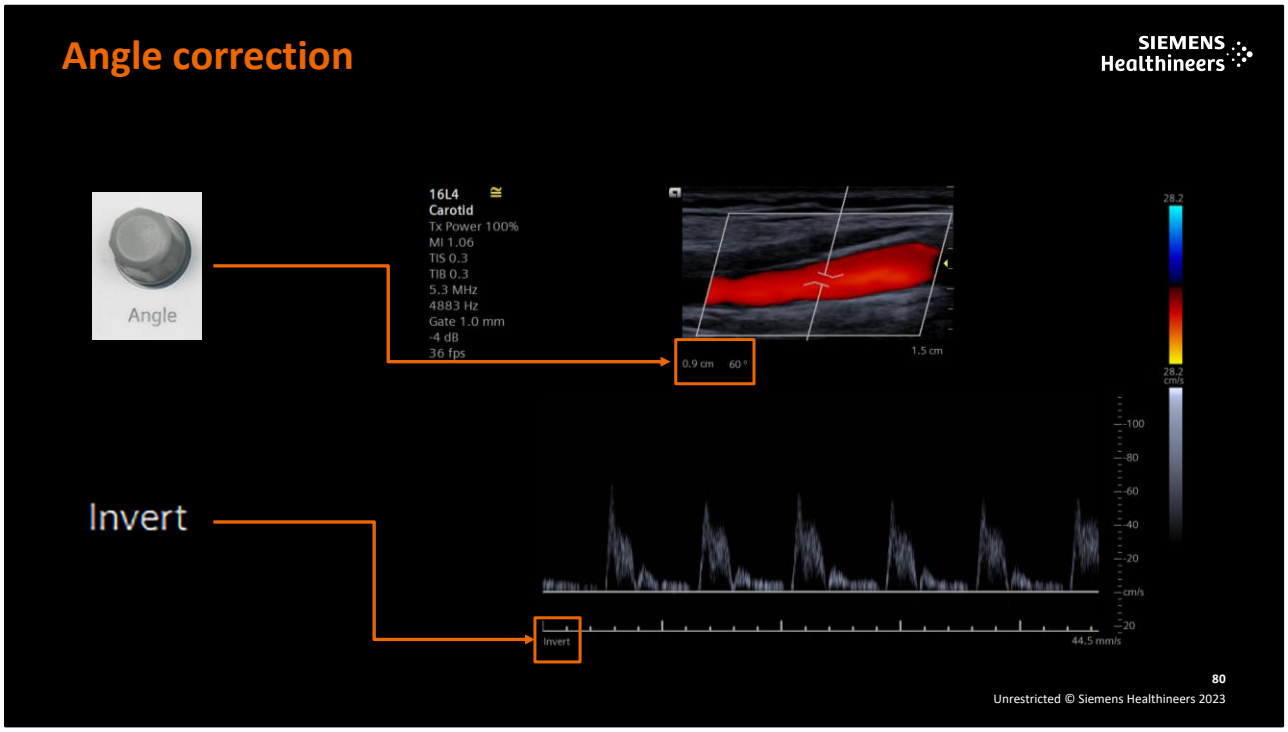
Speaker Notes:

The Auto Stat (statistics) function automatically traces the spectral Doppler waveform and records several measurements in PW Doppler (as displayed here in the fetal brain circle of Willis).

Auto Stat enables the display of Doppler statistics, including beats per minute (bpm), pulsatility index (PI), resistive index (RI), systolic/diastolic ratio (S/D), peak systole (PS), end diastole (ED) and time average max (TAmax). Select settings for data above, below or on both sides of the baseline.

When Auto Stat is enabled, Sensitivity is made available on the Touch Screen to select the required sensitivity level of the trace (settings are 0 - 7).

Auto Stat is available on live and frozen images. It is also available in Caliper mode when PI Auto is selected. Measurements populate to the report once entered into the measurement package.



Speaker Notes:

Angle depicts the degree of angle correction for the Doppler spectrum. The default angle for the carotid exam, as displayed here, is 60 degrees.

- Press **Angle** to adjust the flow angle from -60/0/60 or rotate to adjust the flow angle by one-degree increments

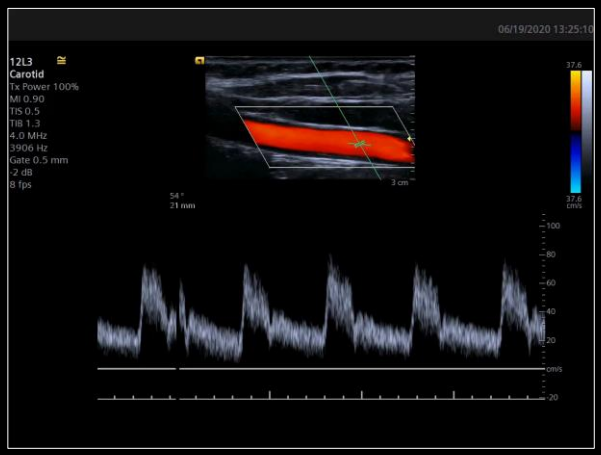
The initial display of the flow angle indicator to the Doppler cursor is exam-dependent.

When the Angle is 61 degrees or greater, the system highlights the value of the angle in green.

Simultaneous Triplex (Simult)

SIEMENS Healthineers

Simult

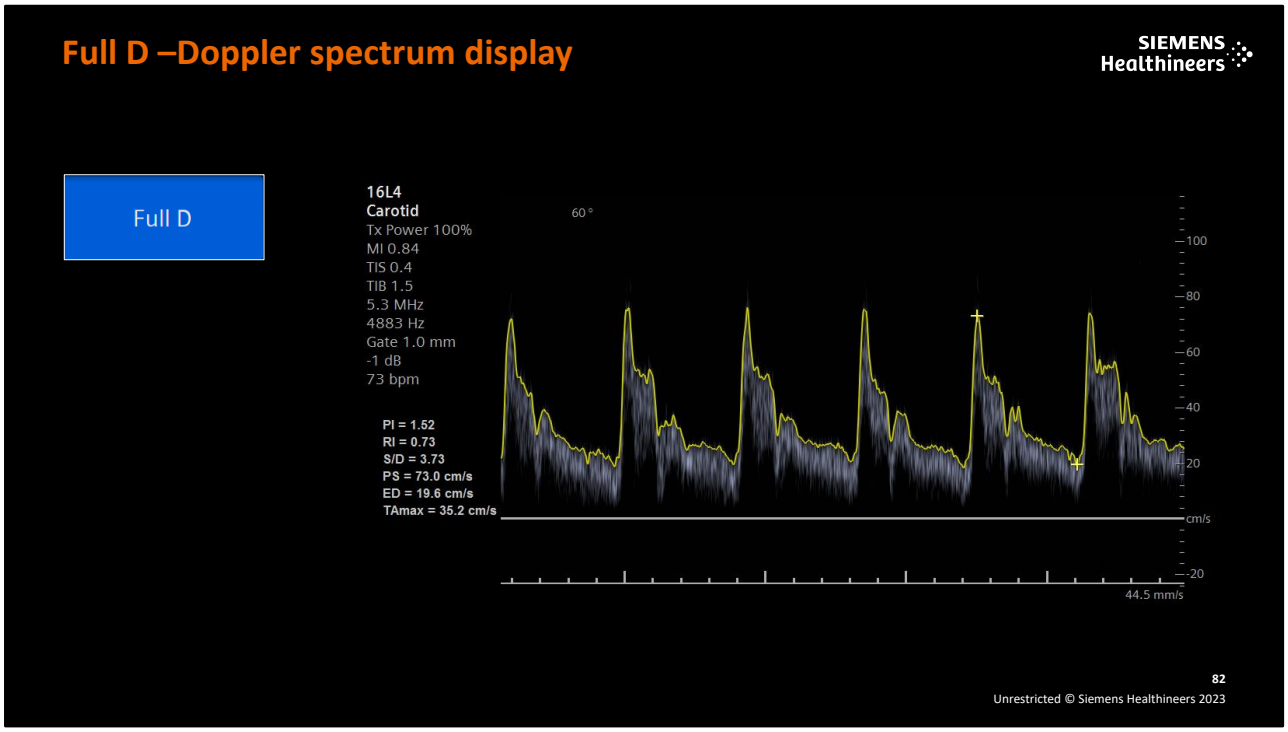


Speaker Notes:

Simult enables or disables the simultaneous live display (i.e., duplex or triplex mode) of the B-mode, color image and/or Doppler spectrum in real time.

- Select **Simult** on the left panel control keys to activate/deactivate

Full D –Doppler spectrum display

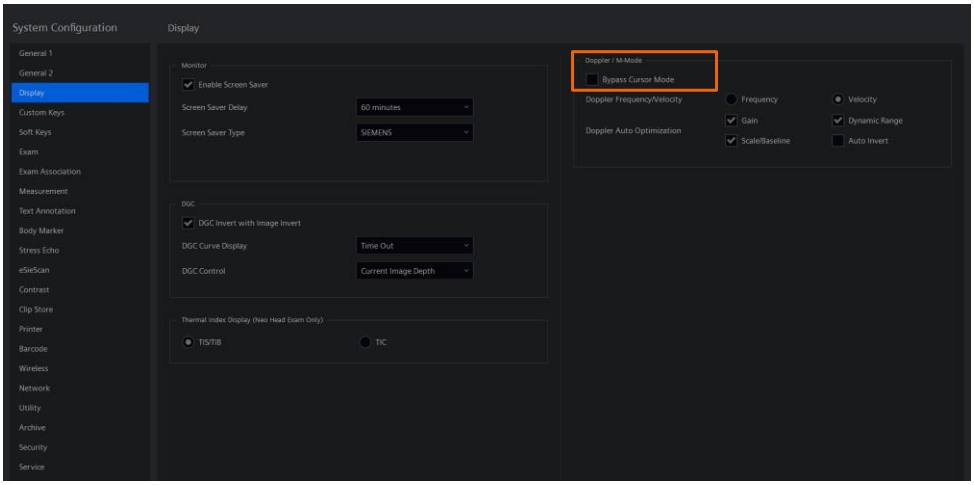


Speaker Notes:

Full D displays only the Doppler spectrum and hides the B-mode image. This image displays a quad-phasic arterial Doppler spectrum using Auto Stat Above and Below the baseline.

Bypass cursor mode

SIEMENS Healthineers



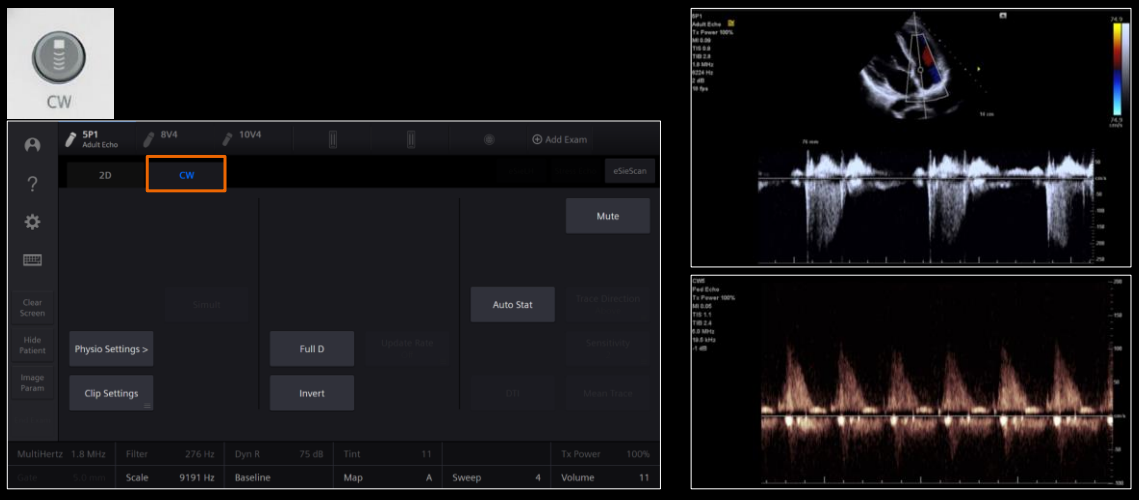
Speaker Notes:

For PW functionality, the user has the option to bypass the cursor. This is selected in **System Configuration > Display > Doppler/M-mode > Bypass Cursor Mode.**

- Uncheck the box to display the full-screen B-mode image with the Doppler cursor after pressing PW

- Check the box to bypass the initial full screen B-mode image with the Doppler cursor and immediately activate the B-mode/Doppler split format

Continuous wave (CW) Doppler



Speaker Notes:

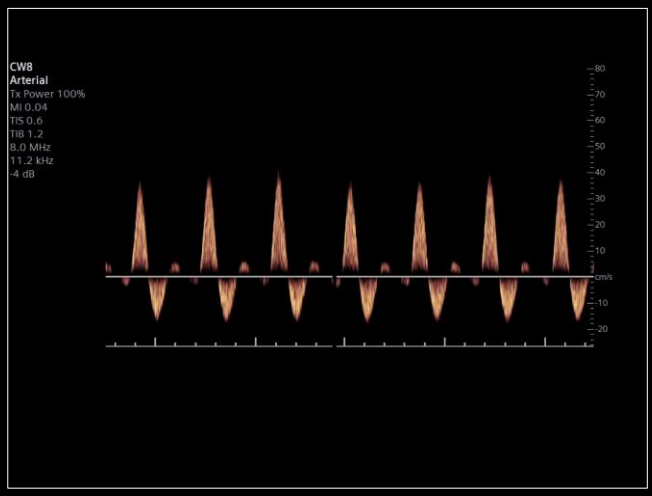
Continuous wave (CW) Doppler is available on the phased array transducers (displayed on the upper image of the adult heart) and on the Aux CW2 pencil probe for adult cardiac (displayed in the lower image) and Aux CW5 and CW8 pencil probes for pediatrics and vascular.

CW Doppler is accessed via the left panel controls but can be assigned to a User Defined key under **System Configuration > Custom Keys** for easier access.

Selecting the AUX CW transducer automatically enables non-imaging CW Doppler.

Continuous wave (CW) Doppler

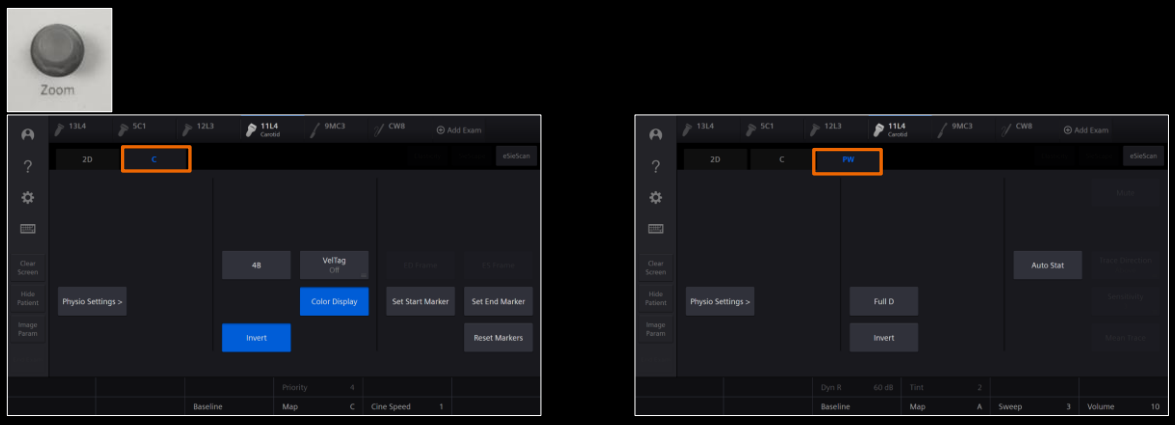
SIEMENS Healthineers



Speaker Notes:

Here is a short clip using the CW8 showing a triphasic waveform of the posterior tibial artery.

Post-processing features



Color Doppler

Spectral Doppler

Speaker Notes:

When the image is frozen, the available post-processing features will be displayed on the Touch Screen or soft keys.

Available post-processing features on the Control Panel will be backlit.

The following optimization controls may be adjusted after the image is frozen:

- Color Doppler: Invert, VelTag, Color Display, Baseline, Priority, Map, Zoom
- Spectral Doppler: Invert, Auto Stat, DynR, Baseline, Tint, Map, Sweep

Trademarks and Disclaimers

SIEMENS Healthineers

ACUSON Juniper, Advanced SieClear spatial compounding, Clarify vascular enhancement (VE) technology, Dynamic TCE tissue contrast enhancement technology, eSieImage multiparametric optimization, MultiHertz multiple frequency imaging and SieScape panoramic imaging are trademarks of Siemens Medical Solutions USA, Inc.

Speaker Notes:

No Speaker Notes.

Thank you for your enthusiasm!

SIEMENS Healthineers

Questions?

Speaker Notes:

No Speaker Notes.