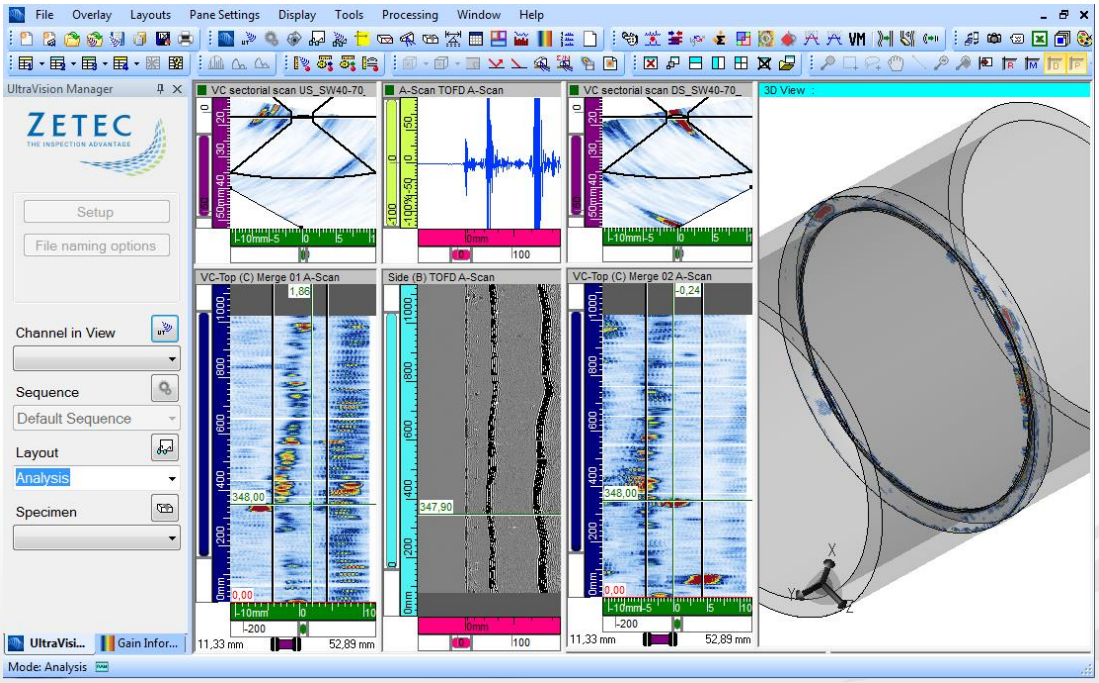
UltraVision 3.11R4

Classic, Touch and Analysis versions

Product Bulletin



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UltraVision Touch 3.11R4

Zetec has just released UltraVision Touch version 3.11R4. This software version can be used on the TOPΔZ16, TOPΔZ32 and TOPΔZ64 models as well as on a PC running Windows® 10. This product bulletin presents an overview of the new features and changes that are included in the new UltraVision Touch 3.11R4 software release.
UltraVision Touch 3.11R4 is available in three embedded versions for the TOPΔZ product family:

- **Topaz16 3.11R4** for TOPΔZ16 instruments
- **Topaz32 3.11R4 (x64)** for TOPΔZ32 instruments
- **Topaz64 3.11R4 (x64)** for TOPΔZ64 instruments

As well, UltraVision Touch 3.11R4 is available in two PC versions:

- **UltraVision Touch 3.11R4** for 32-bit version environments
- **UltraVision Touch 3.11R4(x64)** for 64-bit version environments

To download UltraVision Touch 3.11R4 or any other UltraVision version, and to obtain access to the latest software documentation, please visit www.zetec.com

Note: TOPΔZ (1st generation) instruments are not supported by UltraVision 3.11R4 and cannot be upgraded to this version; the latest available version for this instrument is 3.10R20.

Purpose of UltraVision Touch 3.11R4

UltraVision Touch 3.11R4 is Zetec's latest upgrade for Zetec's UltraVision software. This software release includes several new features and improvements. Zetec's hardware and software development process is performed according to a quality system that is certified ISO 9001-2015.

With this certified software development process, Zetec guarantees that the changes between the previous UltraVision Touch versions (3.5R10, 3.6R1, 3.6R5, 3.7R1, 3.7R21, 3.8R7, 3.8R11, 3.8R13, 3.8R16, 3.8R30. 3.9R9, 3.9R20, 3.10R2, 3.10R7 and 3.10R20) and UltraVision Touch 3.11R4 have no consequences on the sensitivity and the accuracy of the signal amplitude and flight time outputs displayed, recorded, or automatically processed by the software. This also includes additions of mathematical modules used for the positioning of indications or for geometric conditions adjustments.

UltraVision Classic 3.11R4

UltraVision Classic 3.11R4 can be used on a PC running Windows® 10 and is available in two versions:

- **UltraVision 3.11R4** for 32-bit version environments
- **UltraVision 3.11R4(x64)** for 64-bit version environments

UltraVision Analysis 3.11R4 can be used on a PC running Windows® 10 and is available in two versions:

- **UltraVision Analysis 3.11R4** for 32-bit version environments
- **UltraVision Analysis 3.11R4(x64)** for 64-bit version environments

Purpose of UltraVision Classic 3.11R4

UltraVision 3.11R4 is Zetec's latest upgrade for Zetec's UltraVision software. This software release includes several new features and improvements. Zetec's hardware and software development process is performed according to a quality system that is certified ISO 9001-2015.

With this certified software development process, Zetec guarantees that the changes between the previous UltraVision Classic versions (3.5R10, 3.6R1, 3.6R5, 3.7R1, 3.7R21, 3.8R7, 3.8R11, 3.8R13,3.8R16, 3.8R30, 3.9R9, 3.9R20, 3.10R7 and 3.10R20) to UltraVision Classic 3.11R4 have no consequences on the sensitivity and the accuracy of the signal amplitude and flight time outputs displayed, recorded, or automatically processed by the software. This also includes additions of mathematical modules used for the positioning of indications or for geometric conditions adjustments.

New Features and Improvements

EMERALD Support

UltraVision 3.11R4 supports the new EMERΔLD phased array unit. When an EMERΔLD unit is connected to a PC with UltraVision 3.11R4 installed, it will be detected and able to connect.

If UltraVision is already running and the instrument connection window opens when the user starts the instrument, the following screen becomes visible:

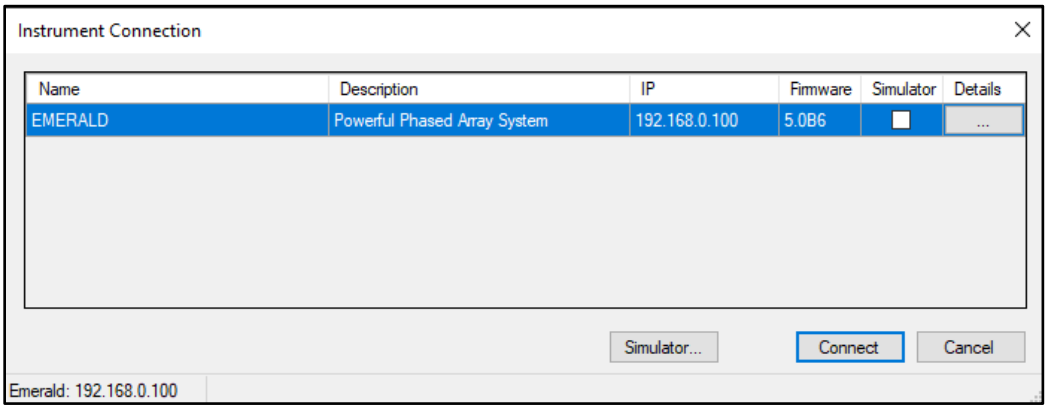

Figure 1: Instrument connection window with the EMERΔLD connected

The correct firmware version to work with this version is 5.0B6.

For help on how to connect EMERΔLD to your workstation please consult the document "Guidelines EMERΔLD Connection and Firmware Update" available on the website.

ULTRAVISION PC recommended specifications (for EMERALD connection)

To be able to experience EMERΔLD at its best possible performance, without lag and to its maximum data throughput settings, ZETEC recommends connecting it with a PC having at least the following specifications:

- Processor: 11th Gen Intel Core Processor i7-11800H (8 Core, 24MB Cache, 2.30GHz to 4.60GHz)
- RAM: 16 GB, DDR4, 3200MHz
- Hard Drive: M.2 2280 1TB, Gen 3 PCIe x4 NVMe, Solid State Drive
- Graphics Card: NVIDIA T1200 w/4 GB GDDR6
- High-speed (2.5 Gb/s) Ethernet link

Supporting licences: All UltraVision Classic and UltraVision Touch versions.

TOPAZ64-IPEX Support

UltraVision 3.11R4 supports the new version of the TOPΔZ64 with the IPEX connector. With this version, the TOPΔZ64 will benefit of all the new features and improvements listed in this document.

Supporting licences: All UltraVision Touch versions.

Plane Wave Imaging (PWI)

With the software version 3.11R4, both the new EMERΔLD remote data acquisition unit, and the TOPΔZ64 integrated phased array unit (HR and HR-D models) have the capability to perform Plane Wave Imaging (PWI) data recording.

Plane Wave Imaging (PWI) is an alternative firing technique that uses a multi-element aperture for pulsing, instead of firing each element individually like Full Matrix Capture (FMC).

The PWI firing sequence consists of one or more focal laws, with varying angle and/or aperture.

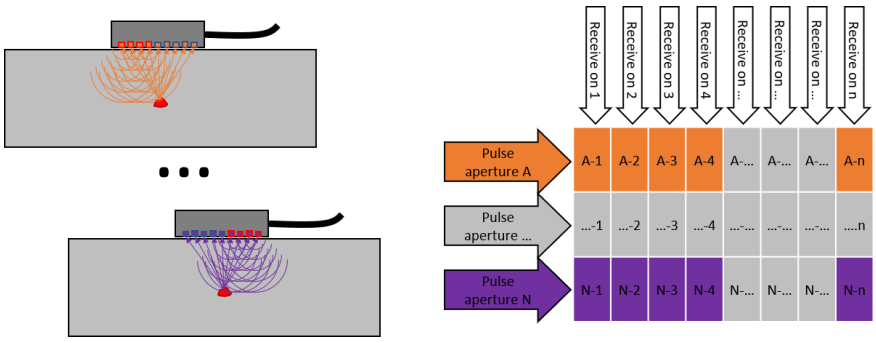

Figure 2: Plane Wave Imaging Concept

The receiving process is done with each element individually, and a TFM frame is processed from the raw data. Live PWI/TFM imaging is done during inspection, and the encoded data can be saved just like for regular phased array UT or live TFM.

PWI data recording has several benefits compared to FMC data recording:

- The emitted pulse from the full aperture has more energy and is more directional than a single element excitation; therefore, it provides greater sensitivity and potentially better SNR
- The firing sequence is significantly shorter (# pulses vs. # probe elements), which results in a higher PRF and scanning speed
- Less elementary A-scans need to be recorded and processed

To start using the PWI technique in UltraVision Classic, select **Configuration PWI Pulse-Echo** in the **Probe tab** of the Advanced Calculator, and the dedicated tabs for PWI will appear.

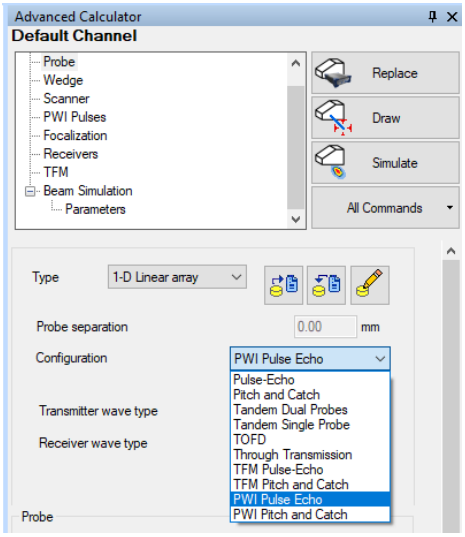

Figure 3: Advanced Calculator PWI configuration selection

To start using the PWI technique in UltraVision Touch, select **Configuration PWI Pulse-Echo** in the **Channels/Configuration menu**, and the dedicated tabs for PWI will appear.

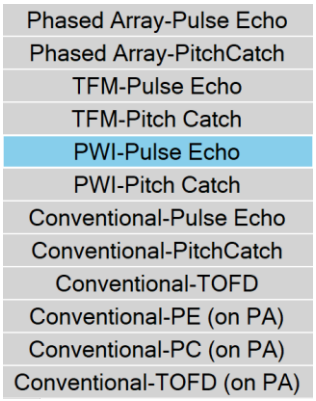

Figure 4: UV Touch PWI configuration selection

Note: The **Configuration PWI Pitch & Catch** is not implemented yet for live PWI.

To configure the PWI configuration, user will need to define the pulses' part first, by choosing the sweep of refracted angles and the active aperture:

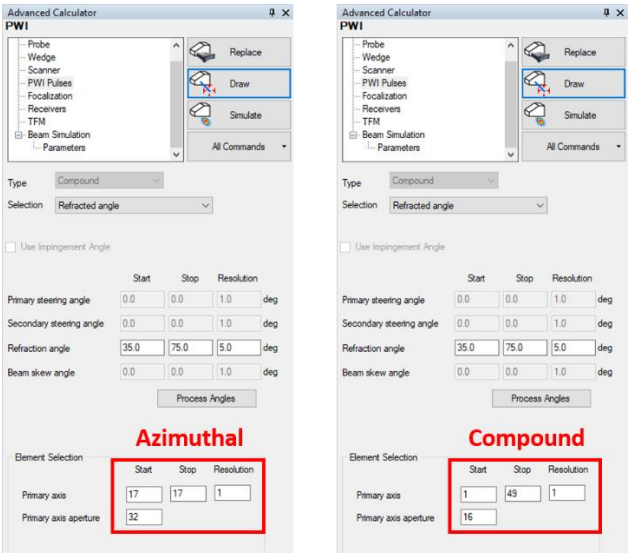

Figure 5: Advanced Calculator PWI pulses configuration

The receiving aperture also needs to be defined, i.e. the elements that will contribute to the generation of the live TFM image. By default, the complete aperture of the probe is used in the receiving process, because in most cases this leads to the best image quality (resolution).

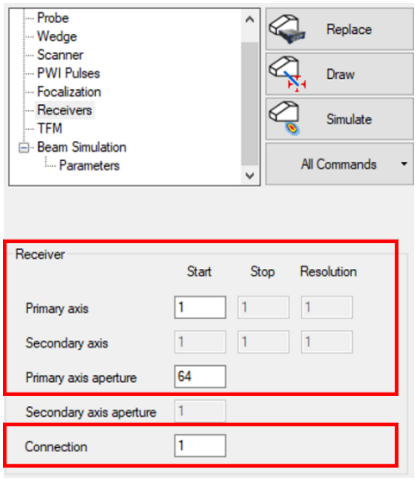

Figure 6: Advanced Calculator PWI receiver configuration

Finally, the TFM processing parameters have to be set which is very similar to the regular live FMC/TFM technique.

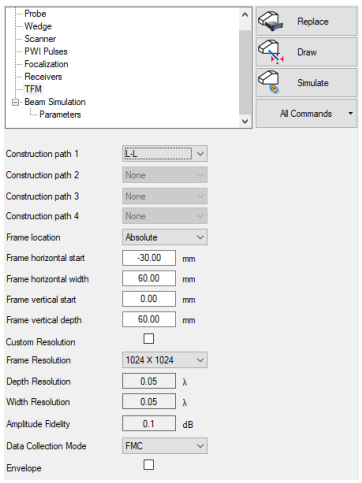

Figure 7: Advanced Calculator PWI TFM configuration

The PWI configuration offers the same possibilities as a TFM configuration. It is possible to set two (2) different channels with PWI and/or TFM configuration at the same time. Those two channels can be set on the same probe or on two different probes. It is also possible to use a PWI channel combined with a Phased Array, Conventional UT or TOFD channel.

For more information on how to use Plane Wave Imaging with UltraVision Classic, please refer to the "UVC_How To Guide_Live PWI_Rev1" document available on the website.

Live Envelope for TFM configuration

With the software version 3.11R4, it is possible to use the Envelope feature for the live TFM reconstruction. The Envelope can be activated in the advanced calculator or in the UT settings. A **Replace** needs to be done to activate the Envelope.

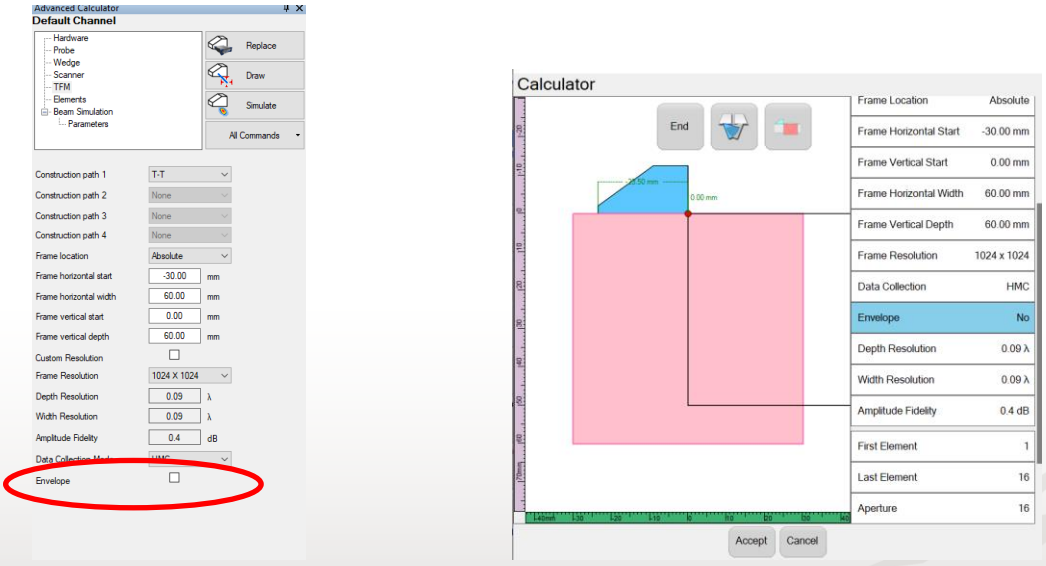

Figure 8: Envelope accessible in the Advanced calculator for both Classic and Touch versions

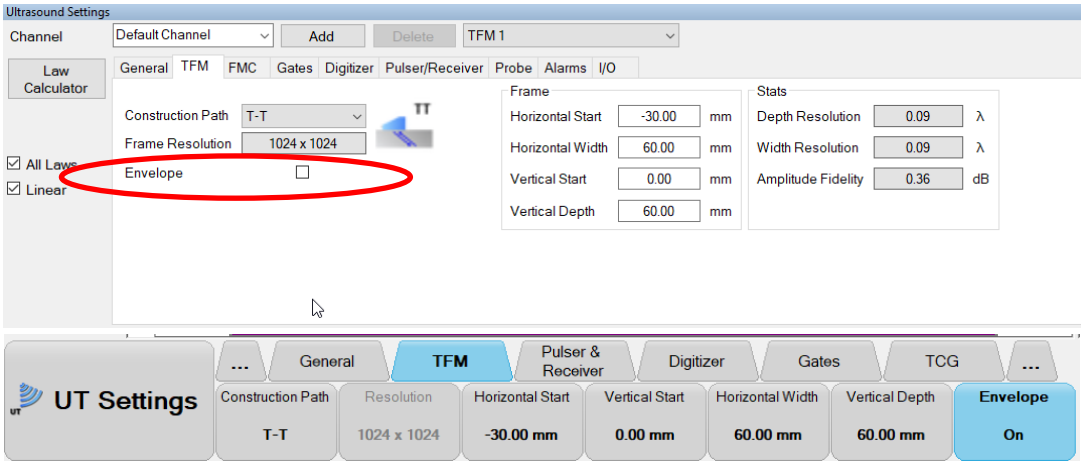

Figure 9: Envelope accessible in the UT settings menu for both Classic and Touch versions

The Envelope algorithm processes analytic signals obtained from the pulser-receiver A-Scans, using the Hilbert Transform. This results in live TFM images that look like phased array signals with a smoothing filter applied.

But more important, the Envelope algorithm delivers the same Amplitude Fidelity as standard TFM reconstruction, while using a larger pixel size. Larger pixel size means that a lower resolution can be used, therefore increasing the scanning speed with any loss in inspection quality. Typically, the use of the Envelope will allow a reduction of the frame size by a factor 4, e.g. 256 x 256 instead of 512 x 512. In the case of the figure below, the scanning speed is increased by a factor 2.

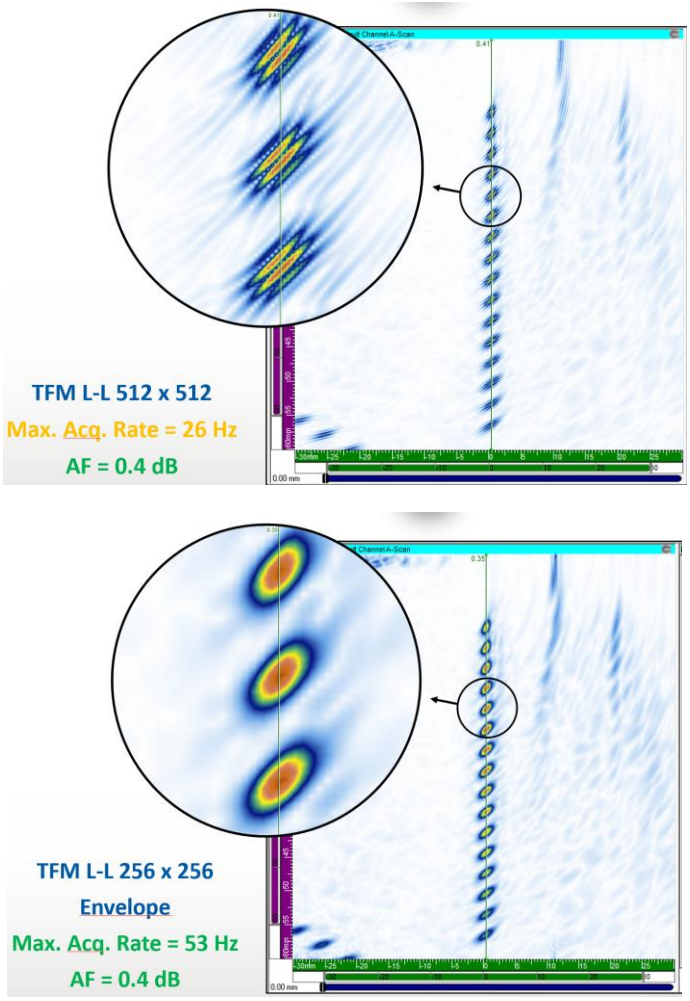

Figure 10: Comparison between a TFM image without (top) and with (bottom) the Envelope

Supporting licences: All UltraVision Classic and UltraVision Touch versions.

Multiple reconstruction paths for a TFM channel

UltraVision 3.11R4 also offers the possibility to set multiple reconstruction paths for each TFM channel (two TFM channels maximum). You can access this new feature in the Advanced Calculator in the TFM tab.

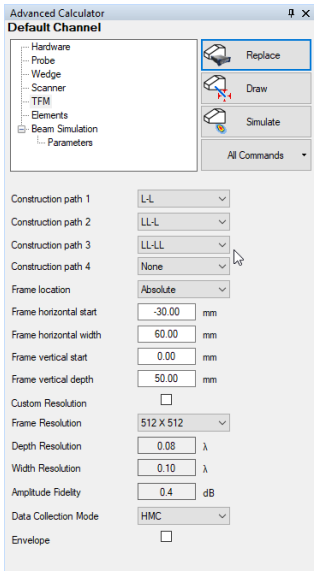

Figure 11: Advanced calculator interface with the multiple reconstruction paths

Up to four (4) reconstruction paths on the same channel can be generated at the same time. For each channel the limit is still of one million (1M) pixels whatever the number of reconstruction paths chosen. It means that only one (1) reconstruction path of 1024 x 1024 frame resolution can be generated, but up to four (4) reconstruction paths for any other frame resolution.

The first reconstruction path (Construction path 1) is called the “master channel” and all the other ones are called the “subchannels”. Each reconstruction path has shared parameters which are common for all, and unique parameters that are set for each of the reconstruction paths of the channel. The list can be found in the table below. As stated by their name, the master channel is the one that must be used to set the common parameters.

Common Parameters	Unique Parameters
Frame location	TFM Gain
Frame horizontal start	TCG calibration
Frame horizontal width	
Frame vertical start	
Frame vertical depth	
Frame resolution	
Envelope	
Velocity calibration	
Wedge Delay calibration	

Once the multiple reconstruction paths are set in the Advanced Calculator, each of the master and subchannels will behave like a standard channel in UltraVision. They will each have their views to be displayed and can be managed independently.

All calibrations need to be performed using the master channel except for the TFM TCG calibration. The TFM TCG calibration can be performed for each of the master and sub-channels independently and will be applied only to the selected reconstruction path.

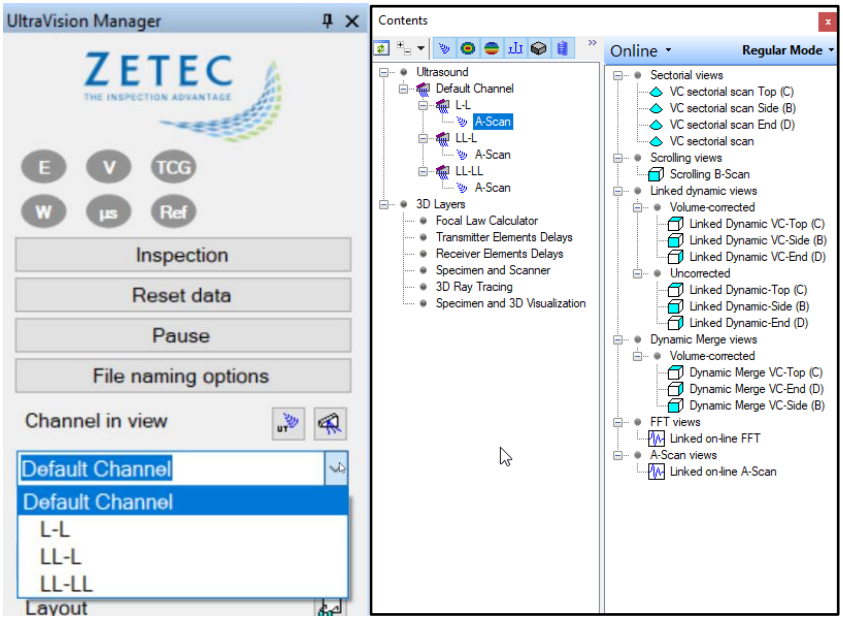

Figure 12: Example of multiple reconstruction path's view management

Supporting licences: All UltraVision Classic and UltraVision Touch versions.

Calibration tools in Classic interface

With the 3.11R4 software version; the user has now access to the user-friendly calibration tools already available in the UltraVision Touch version within the UltraVision Classic interface. To access these new calibration tools, simply click on the calibration drop-down menu:

Figure 13: Calibration drop-down menu

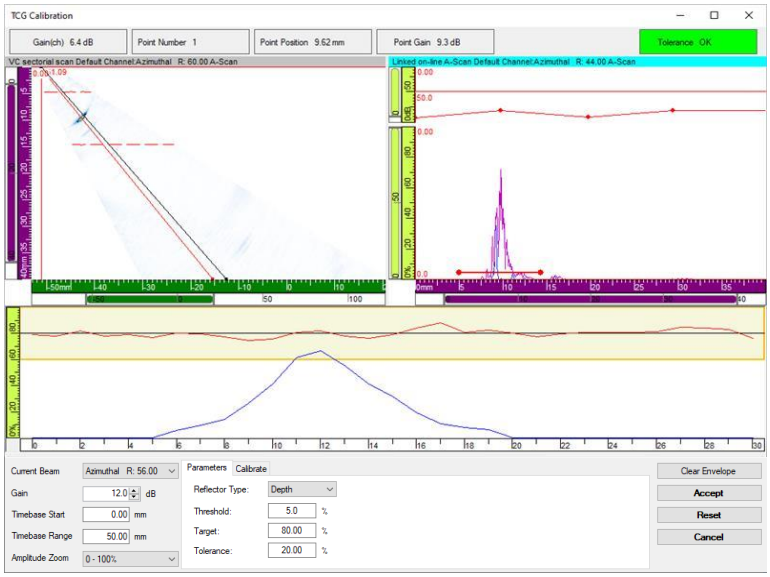

Figure 14: Example of the new calibration tools for Classic interface

Supporting licences: All UltraVision Classic versions.

FMC Raw Data Saving – Changes to the operating mode

EMERΔLD includes the FMC Raw Data Saving as a default option, and TOPΔZ64 includes the FMC Raw Data Saving for all models having the "-D" option in its short description.

With the 3.11R4 software version and the EMERΔLD instrument or TOPΔZ64 instrument, it is now possible to perform FMC Raw Data Saving in "With Data File" mode. This means the raw FMC data (in the UVDataFMC file) is directly saved locally on the connected PC, in the same directory as the UVData file.

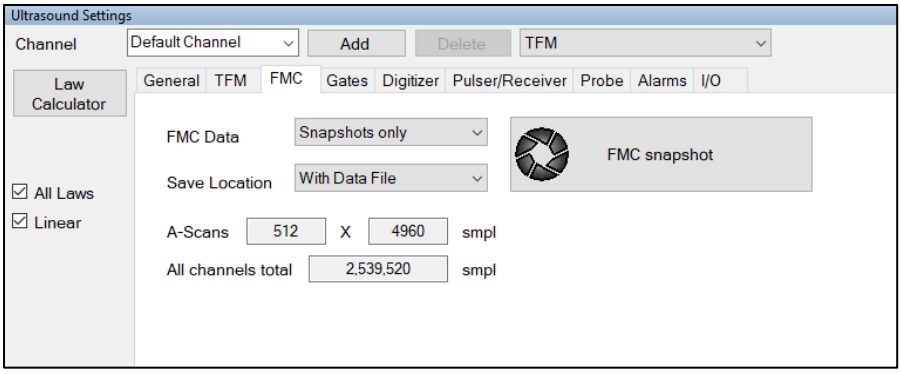

Figure 15: UT Settings - FMC Tab interface

The FMC Raw Data Saving function includes “Snapshot” working in Setup mode and data saving after recording, and “Full data” working in Inspection mode, i.e. using Start and Stop:

- FMC Raw Data Saving is functional for EMERΔLD while saving “With Data File” on the remote PC, in combination with live TFM, STF, or PWI (less elementary A-scans), for pulse-echo probe configurations with all 64 elements (or first 32 elements with no probe reverse)

- FMC Raw Data Saving is functional for TOPΔZ64 while saving “With Data File” on the remote PC and saving “on TOPAZ64 USB”, in combination with live TFM, STF, or PWI (less elementary A-scans), for pulse-echo probe configurations with all 64 elements (or first 32 elements with no probe reverse)

FMC Raw Data Saving should always be combined with single mode live TFM using the direct mode (L-L or T-T), and using a TFM frame that extends from 0 in the Depth direction, and including the complete footprint of the probe assembly in the Width direction; this is to force the software to record all elementary A-scan information close to the probe.

Downloading and installing UltraVision Touch 3.11R4

To upgrade the TOPΔZ product family software to the new 3.11R4 version, please download the appropriate UltraVision Touch version according to your instrument model from our website: www.zetec.com

UltraVision Touch is available in two main versions (embedded or PC-based) and there are several install files available according to the software version and platform:

- *UltraVisionTouch 3.11R4:* Install file of UltraVision Touch for PC in 32-bit version.
- *UltraVisionTouch 3.11R4 (x64):* Install file of UltraVision Touch for PC in 64-bit version.
- *Topaz16 3.11R4:* Install file of UltraVision Touch for TOPAZ16.
- *Topaz32 3.11R4 (x64):* Install file of UltraVision Touch for TOPAZ32.
- *Topaz64 3.11R4 (x64):* Install file of UltraVision Touch for TOPAZ64.

Note: TOPΔZ (1st generation) does not support 3.11R4

To install the downloaded version on your TOPΔZ:

1. Save the file and unzip it on a USB drive.
2. Connect the USB drive to your TOPΔZ.
3. Go to **TOOLS > SYSTEM** and click on **System Update.**
4. In the dialog, you should already see the TOPΔZ 3.11R4 installer from your USB drive, but if not, click on the arrow at the top-right corner of the dialog until you see your USB, and select the TOPΔZ 3.11R4 installer.
5. Click **Install.**

UltraVision PC minimal requirements

The following PC specifications are recommended for running UltraVision software:

- Windows 10 Pro (64 bits edition)
- Quad-core i7 3.6 GHz processor
- Minimum of 16 GBytes RAM
- High-speed (1 Gb/s) Ethernet link
- High performance graphics card (Nvidia® Quadro® M2000M w/4GB GDDR5)
- High performance SSD (Solid State Drive) 256 GB or bigger

Quality

All work is performed in accordance with ZETEC Quality standards program, which complies with 10CFR50 Appendix B, ISO 9001:2015 and ISO/IEC 17025:2015.

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