



# M2M CAPTURE V4.0

## NEW FEATURES DESCRIPTION

This document introduces the new features in M2M Capture version 4.0 released on June 2022.

Capture v4.0 is compatible with all Gekko, Mantis, PC and Panther under a subscription plan.

Please refer to the release note for more information.

For any question or support, please contact us at [support@eddyfi.com](mailto:support@eddyfi.com)



# New features list

## CAPTURE 4.0

### ANALYSIS PRODUCTIVITY

- Assisted analysis
- Indication table management
- Improved reporting workflow
- Reduced C-scan export

### SETUP & ERGONOMICS

- Height cal. for L0° wedge
- Beam balancing all
- Continuous acquisition mode
- PC UI optimization
- Reporting and procedure compliancy

### TFM INNOVATION

- Indirect modes available with PWI
- Advanced TFM modes
- TFM range adjustment

### PLATFORM EVOLUTION

Panther compatibility – Capture drives Panther & read Acquire data files



## **Analysis productivity**

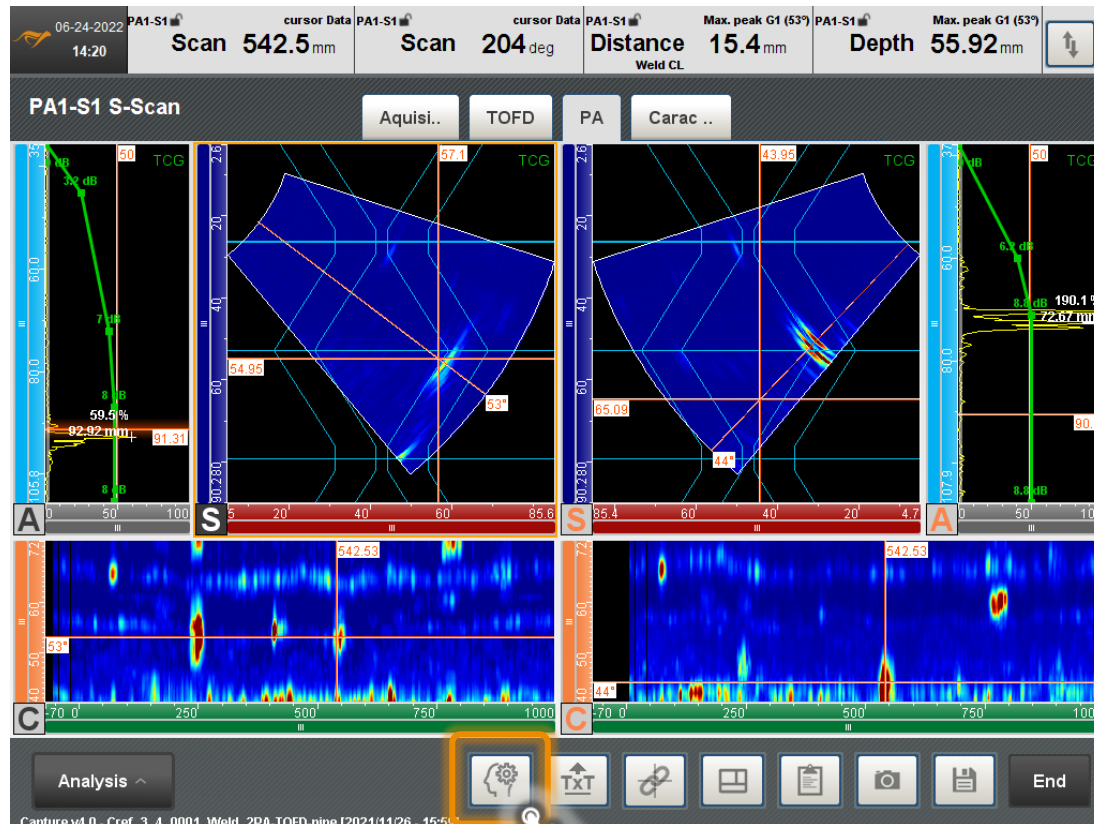
*Capture v4.0 introduces an assisted analysis tool to improve productivity. Available onboard or with Capture PRO, it allows to save valuable time to get a quick diagnosis on site.*



# Analysis #1

## ASSISTED ANALYSIS (1/6)

Capture 4.0 offers an assisted analysis module dedicated to butt weld inspection with PAUT. The aim of this feature is to increase analysis productivity by providing automatic detection, filtering and classification of indications.



### When assisted analysis can be used


The button appears only if these following requirements are met:

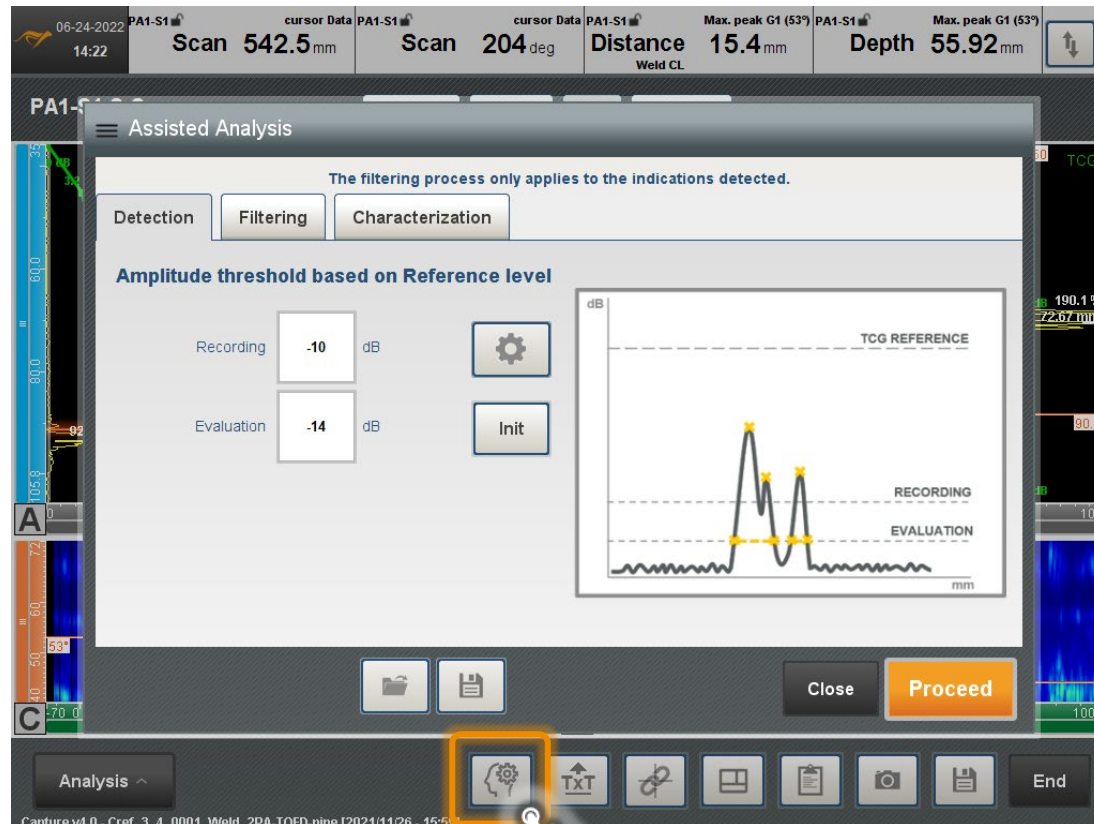
- Welded pipe or plate with a V or X bevel, thickness between 3.2 and 50 mm (1/8" to 2")
- At least one PAUT group on each side of the weld
- Sectorial, linear and/or compound scanning
- Amplitude calibration for each PA group (TCG)
- 1-axis trajectory

To get access to the assisted analysis feature, update your license by connecting your PC or unit to internet. Refer to the **Assisted Analysis starting guide** for more information

# Analysis #1

## ASSISTED ANALYSIS (2/6)

When an inspection is compatible, a button appears in the bottom banner to open an assisted analysis menu. Pressing the  button will open a popup window. It contains the 3 steps required to define the parameters.



### How it works

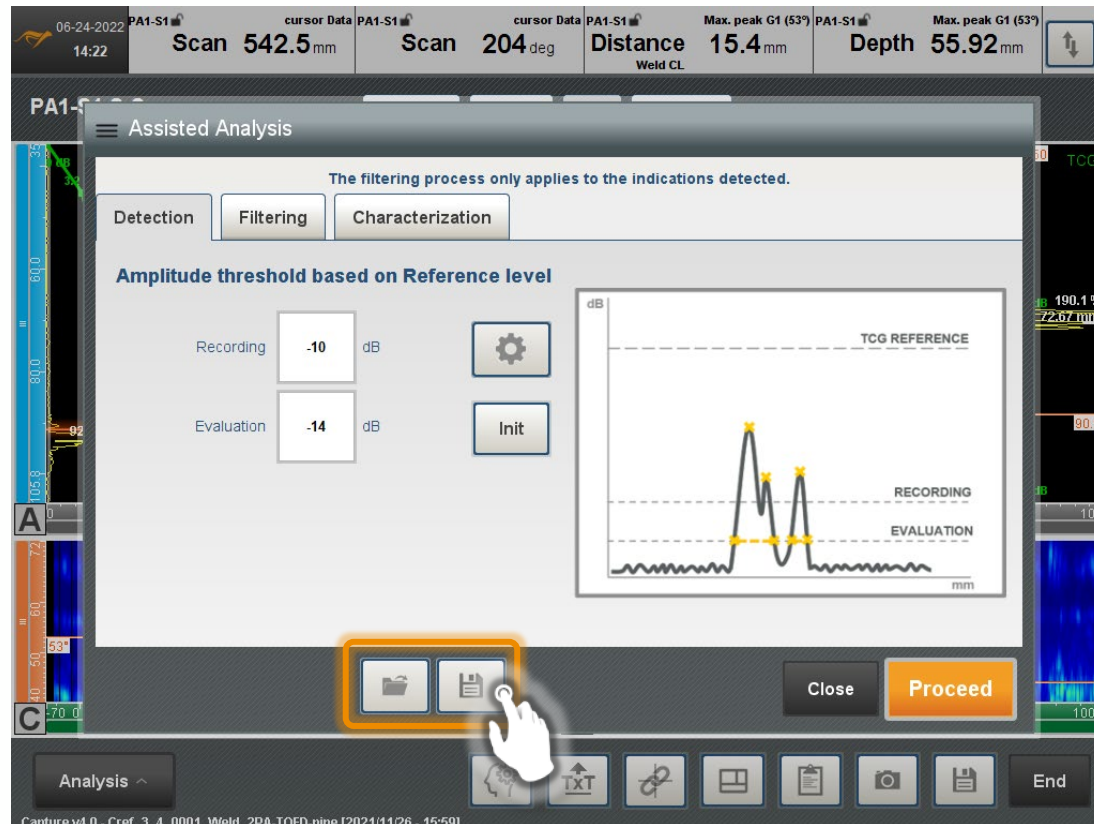
- Three configuration steps to be filled : Detection, Filtering and Characterization
- Several standards are available setting automatically the detection levels
- Custom sets of parameters can be saved

Once the Proceed button is pressed, the three steps of the workflow are immediately applied. Please check all your parameters before proceeding


# Analysis #1

## ASSISTED ANALYSIS (3/6)

The first step of the workflow is the detection of indications based on amplitude criteria in relation with the TCG reference level defined in the preference panel.



### How to adjust thresholds

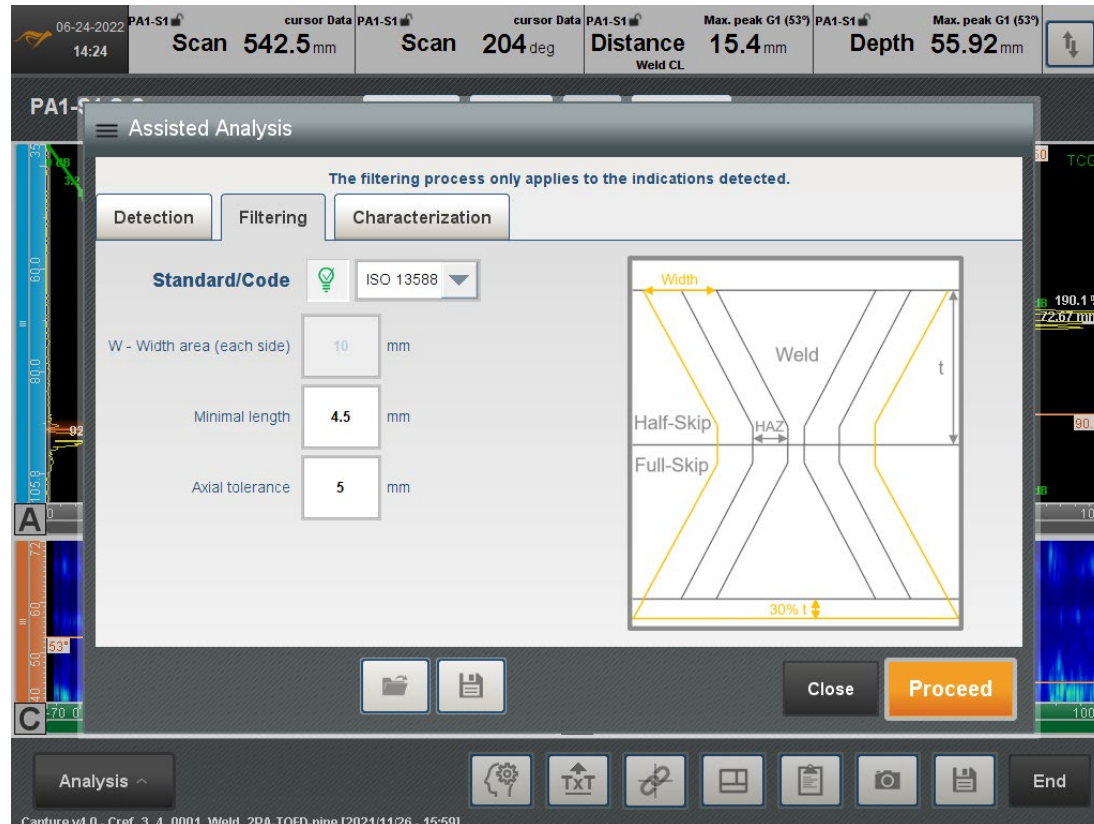
- Recording level means that any indications with an amplitude greater will be recorded by the analysis
- Evaluation level indicates the threshold used for measuring the length of the defect
- Init button resets all parameters to the most adapted configuration.
- Press  to access the advanced parameters

The default threshold setup refers to the ISO13588 code

# Analysis #1

## ASSISTED ANALYSIS (4/6)

The second step is the filtering of the indications in order to exclude those outside the region of interest or those too short to be taken account. This step gives also a tolerance in the index offset of the probes during the scan.



### How to filter and characterize indications

- Conditions of filtering are initialized following the ISO 13588 standard but a manual mode exists.
- The width area corresponds to the area on each side of the weld cap.
- The minimal length corresponds to the minimal indication length detected. This avoids detecting and classifying small indications
- The axial tolerance refers to the maximum scanner error offset accepted while scanning

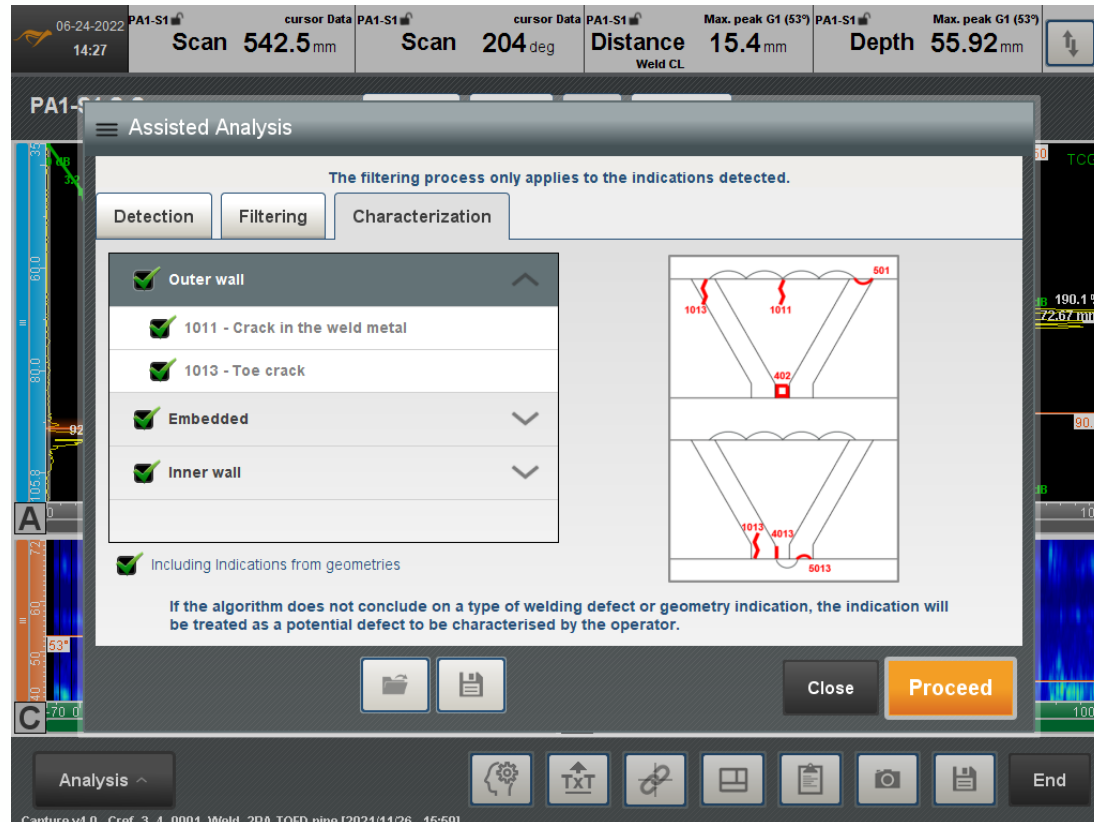
The specimen geometry, the weld prep and the probes offsets are inputs for the assisted analysis



# Analysis #1

## ASSISTED ANALYSIS (5/6)

Characterization is done at the third and finale step. It sorts indication into different pre-selected categories in function of the reflectivity and the position into the weld.



### How to set characterization info

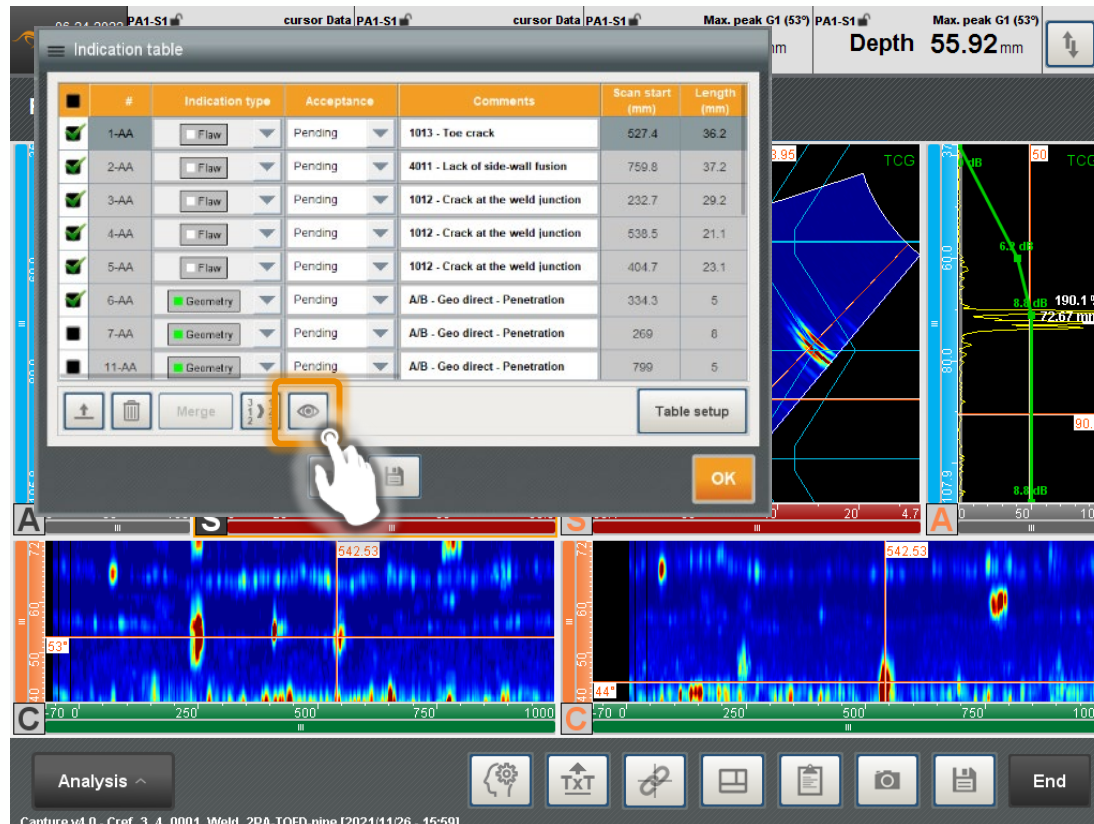
- Classification uses information based on position and amplitude from each PAUT group located on each side of the weld
- The tag for each type of defect corresponds to the international codes defined in ISO6520
- Categories of defects or geometry indications can be excluded from the process

By default, geometry indication are included and can be removed by unchecking the last checkbox

# Analysis #1

## ASSISTED ANALYSIS (6/6)

At the end of the analysis, the indications are directly highlighted in the views and the indication table is automatically filled.



### How to review the analysis results:

- Defects classified by the algorithm are highlighted in white with the type of defect. If the algorithm is not able to classify an indication as a type of flaw or geometry, it is considered as a "potential defect" and highlighted in red
- Geometry echoes are highlighted in green
- The user remains responsible for modifying, completing, accepting or rejecting the results. The goal is not to replace the operator but help him

To avoid reporting an indication twice, the indication is only shown on the most reflective side/group

# Analysis #1

## INDICATION TABLE MANAGEMENT

It is possible to reorganize the indications, delete them, merge them and export them to CSV.

The screenshot shows a software interface titled 'Indication table'. It contains a table with the following columns: #, Scan start (mm), Length (mm), Index start (mm), Width (mm), Depth min (mm), Material loss (%), and Measurement type. The table lists 7 rows of data. Below the table is a control bar with several icons: an up arrow (3), a trash can (1), a 'Merge' button (2), a reorder icon (2), an eye icon, and a settings icon (4). At the bottom right, there are 'OK' and 'Cancel' buttons.

#	Scan start (mm)	Length (mm)	Index start (mm)	Width (mm)	Depth min (mm)	Material loss (%)	Measurement type
1	4.6	13.2	18.5	13	4.56	42.6	First flank
2	6.6	27.3	125.5	10	4.56	42.6	First flank
3	81.5	44.5	105.5	35	4.56	42.6	First flank
4	115.9	4	116.5	4	5.13	35.5	First flank
5	137.2	36.4	35.5	27	4.56	42.6	First flank
6	154.4	38.5	95.5	37	4.56	42.6	First flank
7	182.7	19.2	-0.5	152	4.56	42.6	First flank

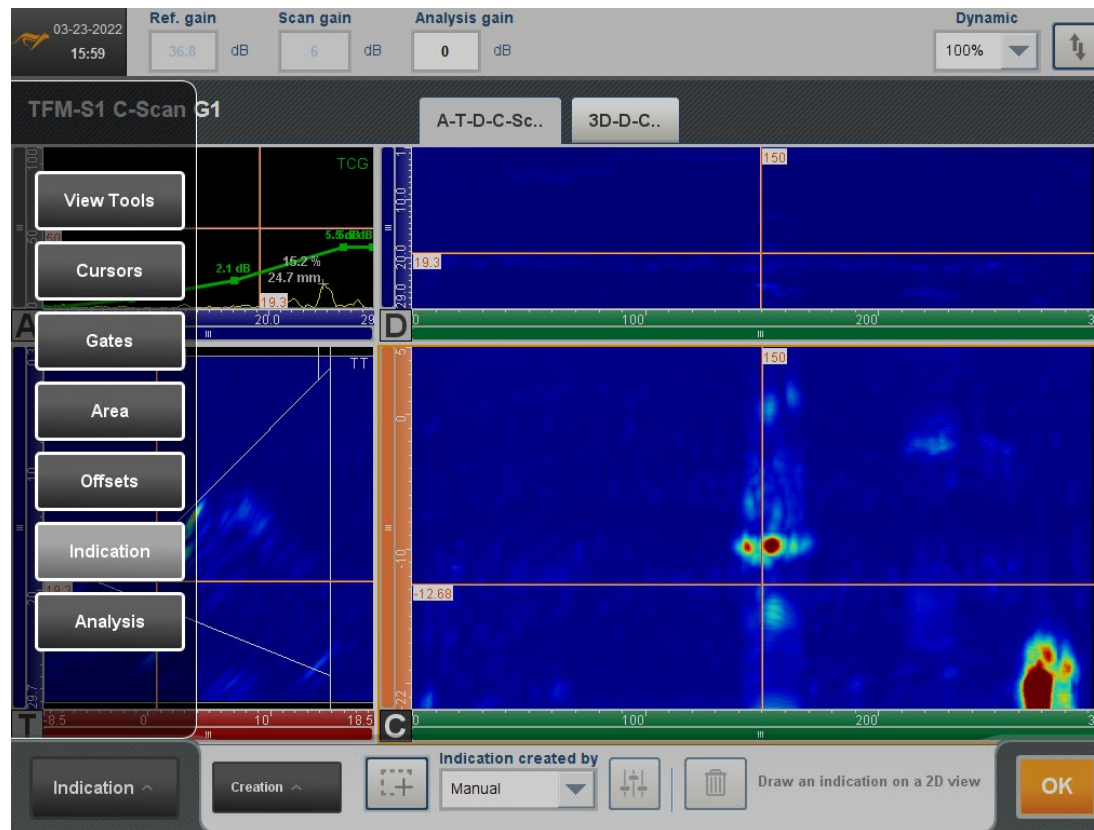
### How to manage the indication table

1. If two or more indications of the same group are selected, then it is possible to merge them. This creates a new indication (tagged '-M'). The former indications reappear by deleting the new one or by pressing the eye button
2. Reordering: please press the columns title to sort the table. The button 2. reorder the number of each indication
3. The button exports all the selected indication in .csv format. The column are those present in the indication table (customize them with the button 4.)

# Analysis #2

## IMPROVED REPORTING WORKFLOW (1/2)

The former “Sizing” mode is renamed “Indication” and improves analysis workflow for PC, Gekko and Mantis. The user can create an indication before assessing it.



### How to create an indication:

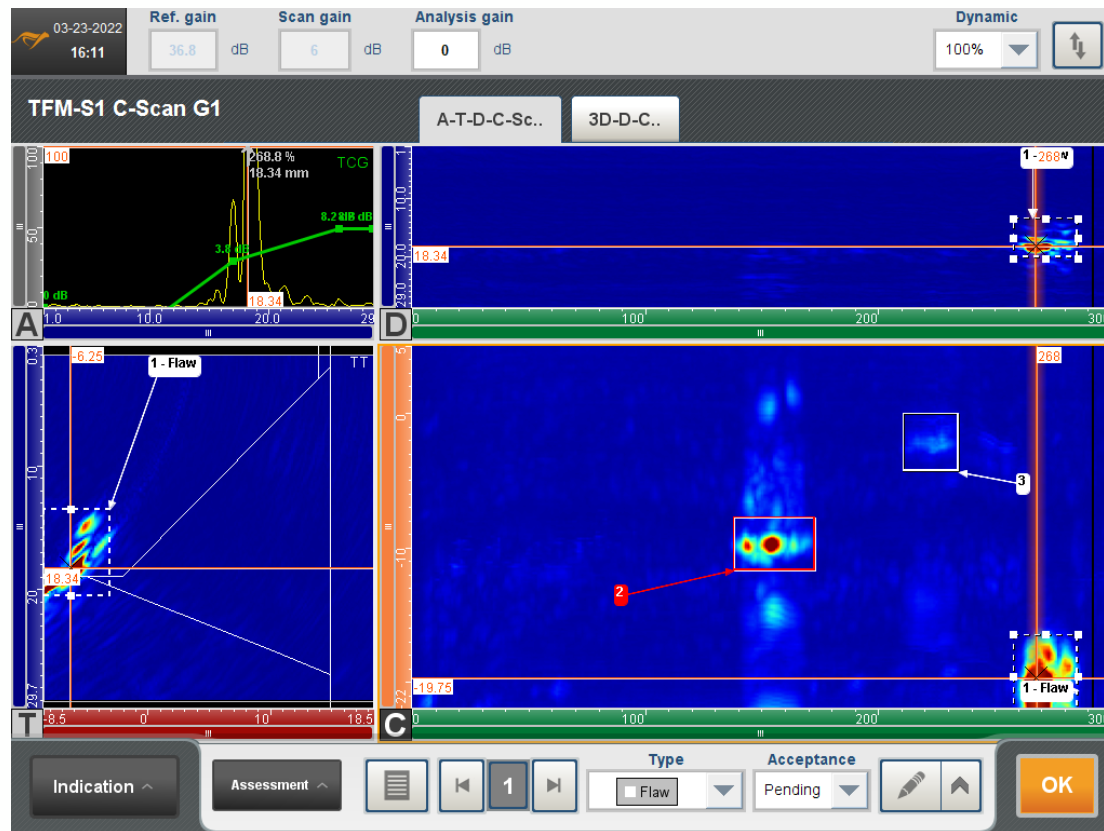
- Three modes of creation can be chosen in the combobox: manual, cursors and auto-sizing.
- Auto-sizing criteria can be adjusted through the settings button.
- A short message explains what to do to help users.

Indication creation from cursors is still possible from the cursor menu


# Analysis #2

## IMPROVED REPORTING WORKFLOW (2/2)

The assessment banner is an easy way to fill and to add info on indications without open the indication table. Hence, characterization and comments are added without losing the analysis views.



### How to assess indications

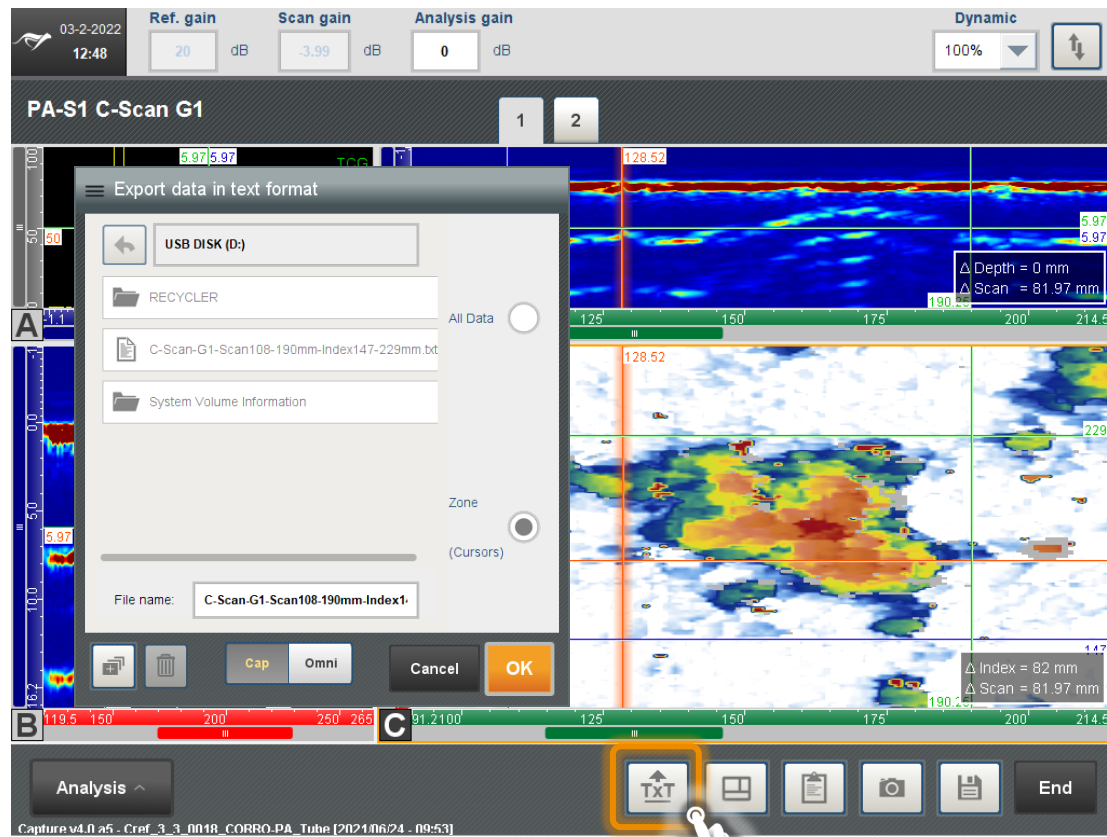
- Indication table and navigation arrows of the former mode **Sizing** are now in the **Indication/Assessment** mode banner
- The type of indication can be 'Flaw', 'Indication', 'Geometry' and 'Unknown'
- Acceptance can be 'Rejected', 'Pending' or 'Accepted'
- The icon  allows deletion, merge of indications, comments and screenshots

Hold CTRL to select multiple indications and to manage them in batch. Keyboard SUPPR is now enabled to quickly delete indications

# Analysis #3

## REDUCED C-SCAN EXPORT

Export all the C-scan as .csv is not always required. With Capture 4.0, a partial area of the Cscan drawn by the cursor Mes and Ref can be exported as a csv file.



### How to export a reduce area of a C-scan

- Move the Measure and Reference cursors to draw a rectangle
- Press the text export button of the current view.
- Select the export mode, all the C-scan or only the limited area
- Cap (only the data) and Omni (data and context) modes are available

The name of the csv file contains the size of the area exported

## Setup & ergonomics

*Capture v4.0 brings various new features to improve calibration, ergonomics and reporting.*

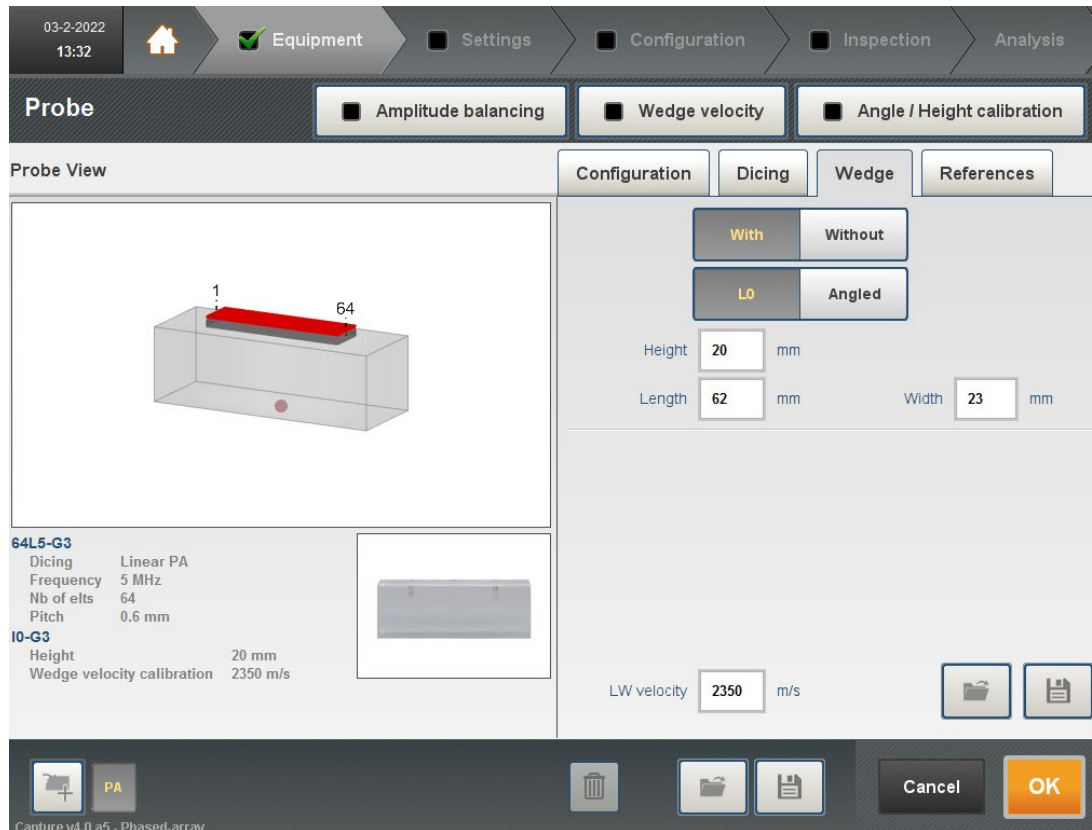
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# Setup & ergonomics #1

## HEIGHT CALIBRATION FOR L0° WEDGE

Probe assistants (amplitude balancing, wedge velocity and angle/height calibration) are available at all time allowing quick access and to see which of them have been done. Height calibration is now available for L0° wedges.



### How to calibrate a L0° wedge

- Select Angle/Height calibration as usual
- If the measured angle is more than 1°, then is suggested to switch the wedge type to angled with calibrated angle and wedge.
- If L0° wedge type is kept, only the height is calibrated (mean of the height of each elements).

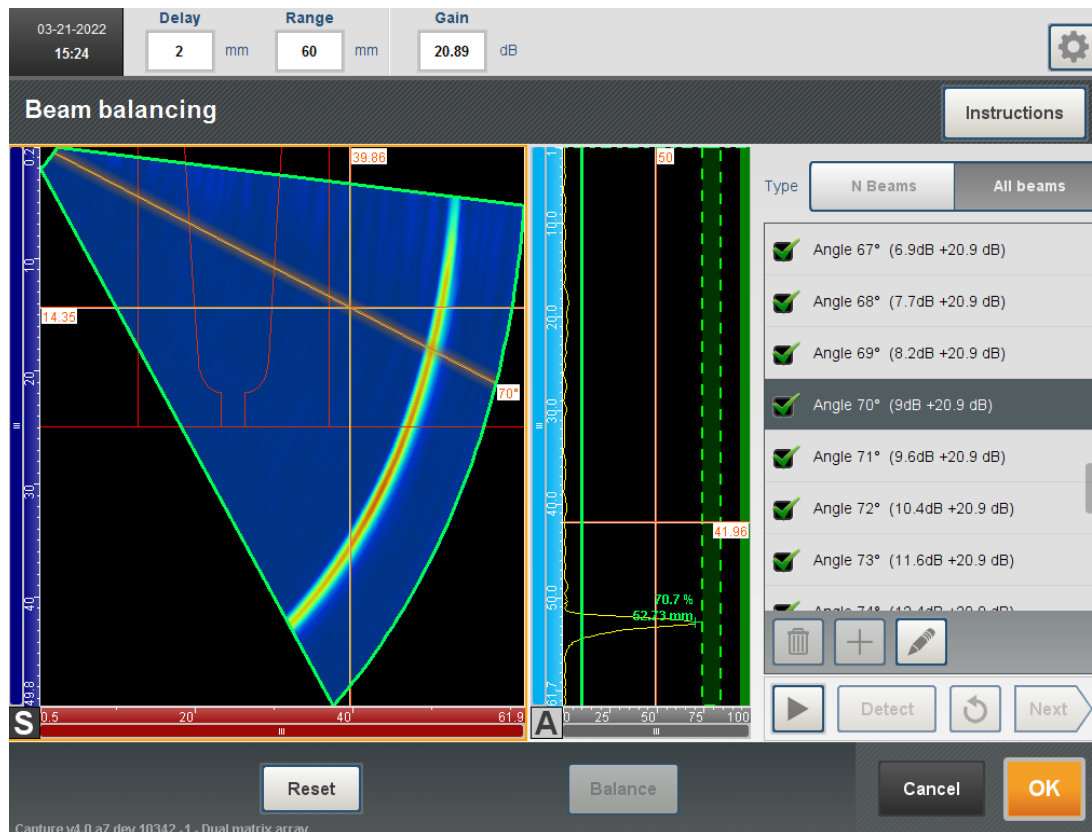
The angle/height calibration tool is available only for the linear array probes



# Setup & ergonomics #2

## BEAM BALANCING ALL

“All beams” balancing mode is now available and allows sensitivity correction for all angles. This feature is an extension of the beam balancing that was only available for a couple of angles.



### How to balance all shots simultaneously

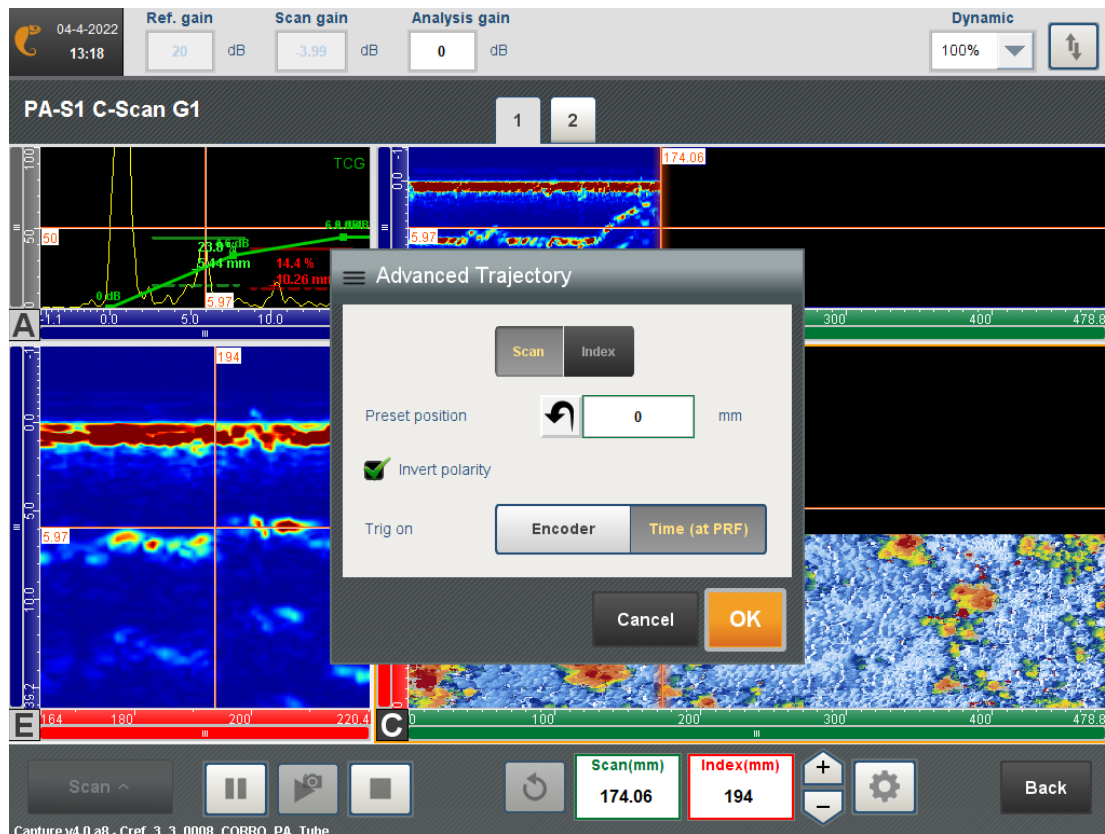
- Press play to start the remanence on all beams and recording of the echo for all angles
- Adjust the gate to capture the echo for all angles.
- Click detect
- Click Balance to apply the sensitivity compensation
- If no echo is detected for an angle, the compensation is averaged from neighbor angles or latest compensation values are applied

This assistant can be very useful for DMA or sensitivity calibration for corrosion applications

# Setup & ergonomics #3

## CONTINUOUS ACQUISITION MODE

In addition to the encoder trigger mode, Capture 4.0 offers the possibility to use a time trigger with a scanner at the PRF rate. This feature allows operators to see a live signal (Ascan) when using a scanner rather than to wait for the next mechanical position for the views to refresh.



### How to enable the continuous acquisition mode

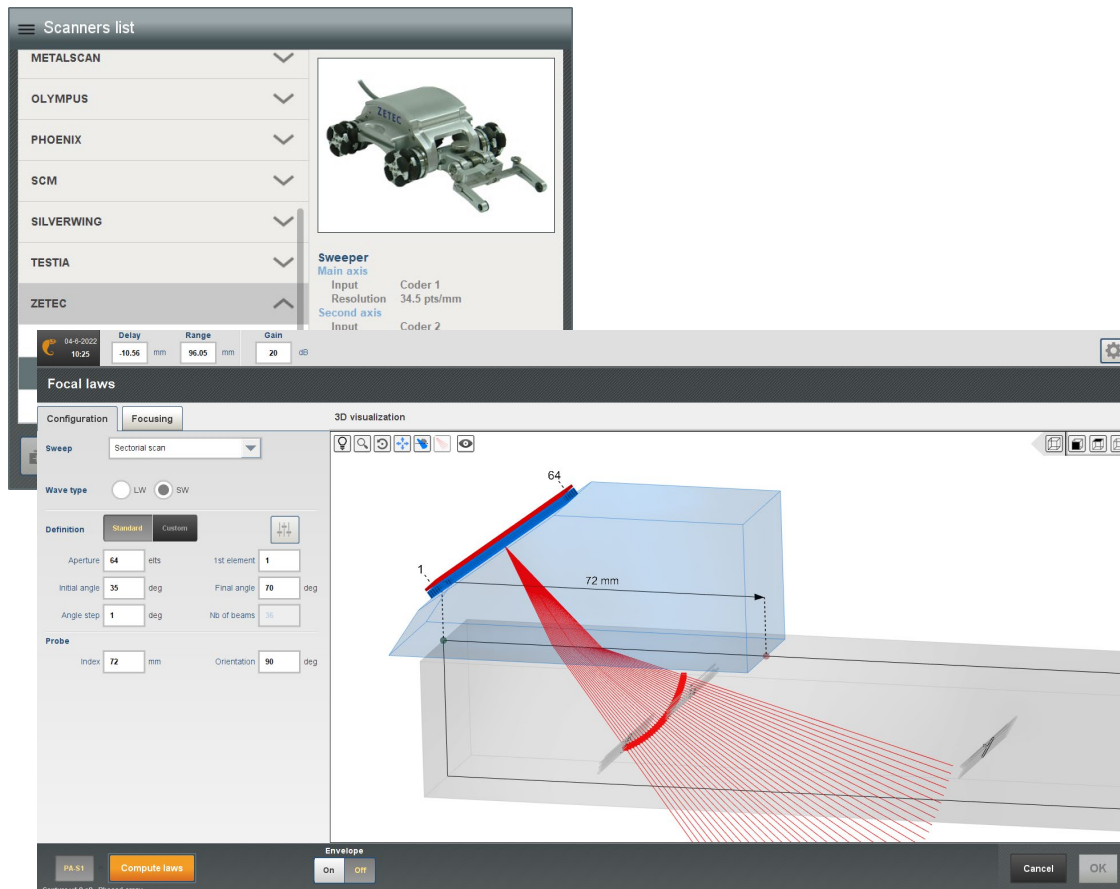
- In the **Advanced trajectory** popup window, two trigger modes can be set with the toggle button:
  - Encoder: the former mode, data is recorded based on encoder position
  - Time: data is recorded using a time trigger

It is recommend to keep the “Data cleanup” feature enabled to avoid creating huge data files

# Setup & ergonomics #4

## PC UI OPTIMIZATION

User interface of Capture v4.0 is optimized for a PC use. Gekko & Mantis also profit of these improvement.



### What is improved on PC with Capture 4.0

- Mouse wheel is now enable in the scrollable list or pop-up window. Mouse is also enabled for Gekko/Mantis
- In full screen mode the 3D view in the assistants is extended while the parameter column keeps its width.

Zetec libraries are updated with Capture v4.0 (probes, wedge and scanners)

# Setup & ergonomics #5

## REPORTING & PROCEDURE COMPLIANCY

Procedures require sometimes formalism in the file naming or specific content in the report. Capture v4.0 brings this sort of customer request.



### New minor features

- Virtual keyboard: Upper/lower cases differentiated. Special characters added:
  - Shift disabled: #, %, @ and \_
  - Shift enabled: ', °, + and =
- It is now possible to time-stamped automatically the name of the inspection files in the recording panel.
- The amplitude balancing results are included in the calibration table of the test report with the calibration table.
- The release notes are available in the versions tab of the System information.

## TFM innovation

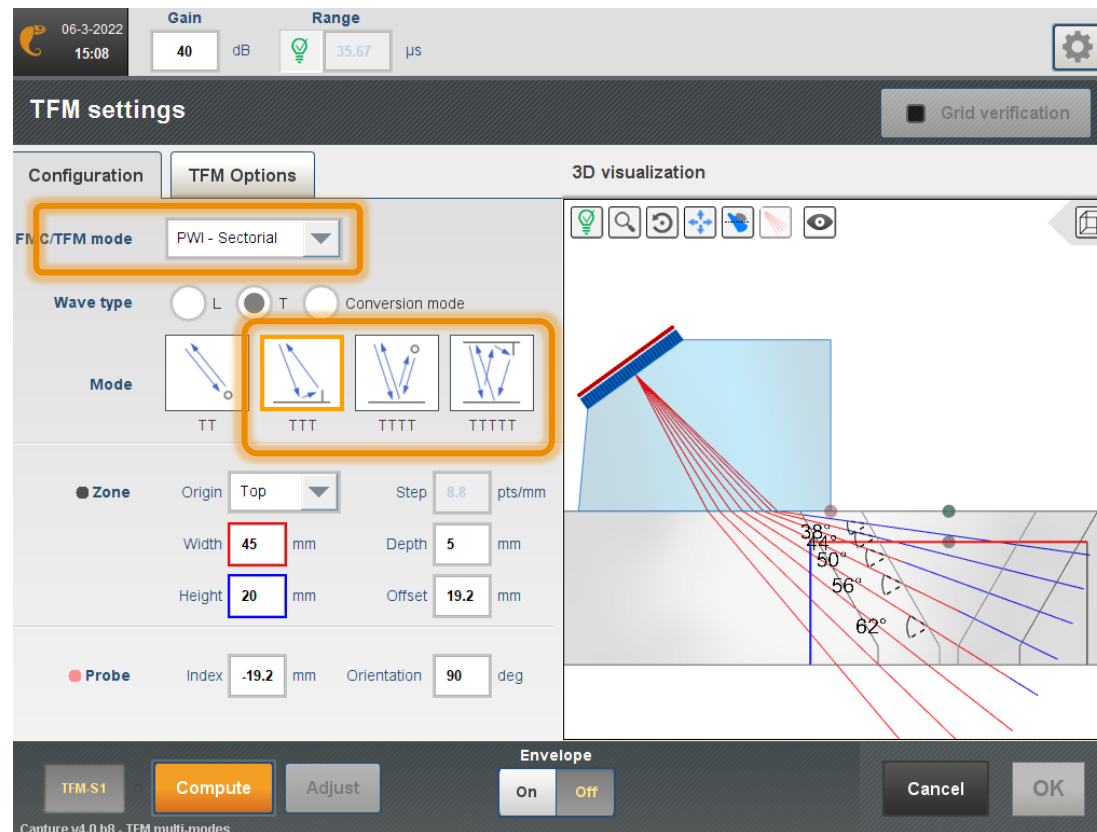
*Capture v4.0 innovates with TFM by adding new reconstruction modes to improve defect characterization and simplify data analysis.*



# TFM innovation #1

## INDIRECT MODES AVAILABLE WITH PWI

All TFM modes are also available for plane wave imaging (PWI) inspection in order to improve the scanning speed or the signal-to-noise ratio (SNR).



### How to use indirect modes with PWI

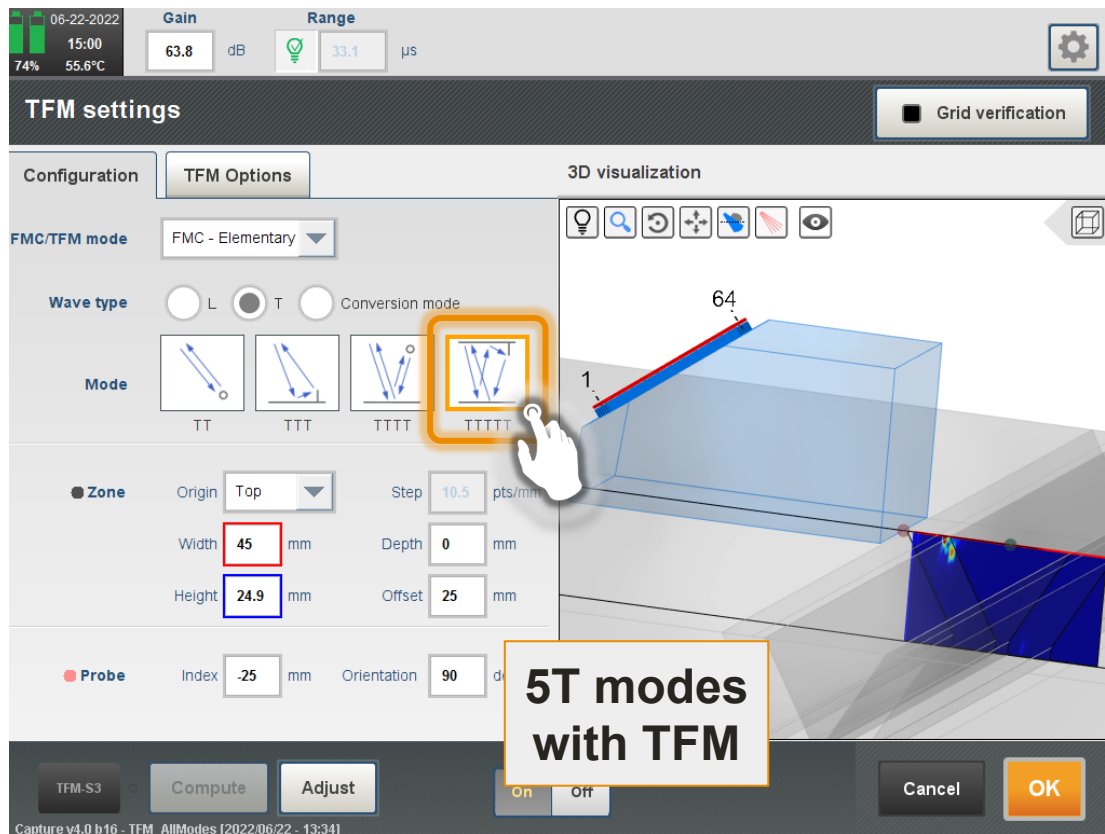
- Select the mode of emission for the TFM imaging
- The indirect modes are now enabled
- Adjust the initial, final angles and the angle step by selecting the “Custom TFM mode” (located in the TFM Options tab)

The auto angle selection for PWI is only available for direct modes. Custom emission could be required to improve imaging for the other modes

# TFM innovation #2

## ADVANCED TFM MODES

In addition to the former TFM modes, new modes are added in Capture v4.0 for FMC and PWI. Advanced TFM modes as 5T or LLT are often required in procedures because they are extremely sensitive to specific defects.



### How to use this feature

- 5L is available with the wavetype L, and can be used to image vertical surface defects for specific applications (HDPE for which shear wave don't propagate)
- 5T is useful to detect and size defects located along the OD surface
- LLT can be used to image vertical defects in the middle of a sample

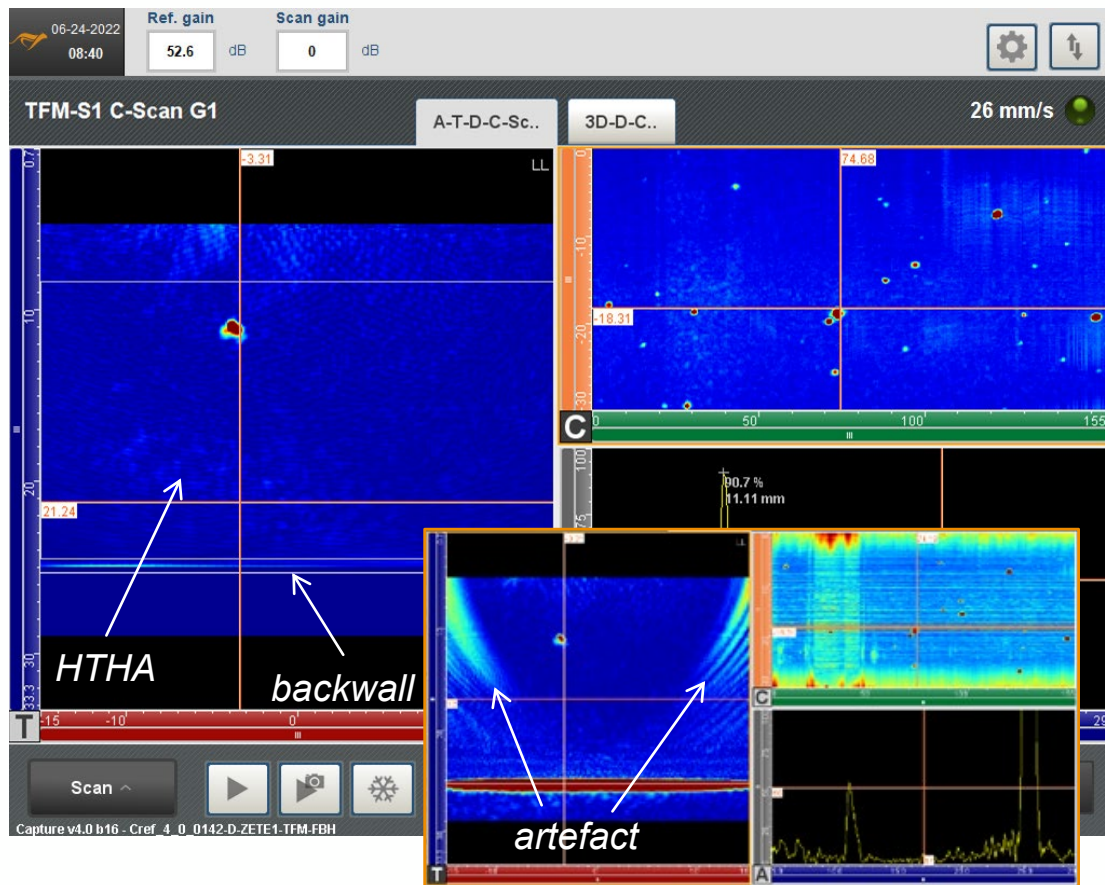
Depending on the TFM zone resolution, 5T and 5L modes computation can take up to 1 min

5T and 5L are disabled for dual array probes

# TFM innovation #3

## RANGE TFM ADJUSTMENT (1/2)

Normal incidence TFM inspections can have artefact echoes that can hide small defects. Those artefacts are due to information coming from the backwall. Signal-to-noise ratio (SNR) can be improved by adjusting the range of the FMC A-scans for TFM.



### How to use the feature

- Smart mode (green light bulb) sets the range to the optimal value adapted to the TFM picture size and position, i.e., to the farthest pixel
- Manual allows operators to adjust the range of the FMC ascan. Reducing it to a value just above the arrival of the backwall echo will remove the artefact echoes
- Only range reduction is possible.

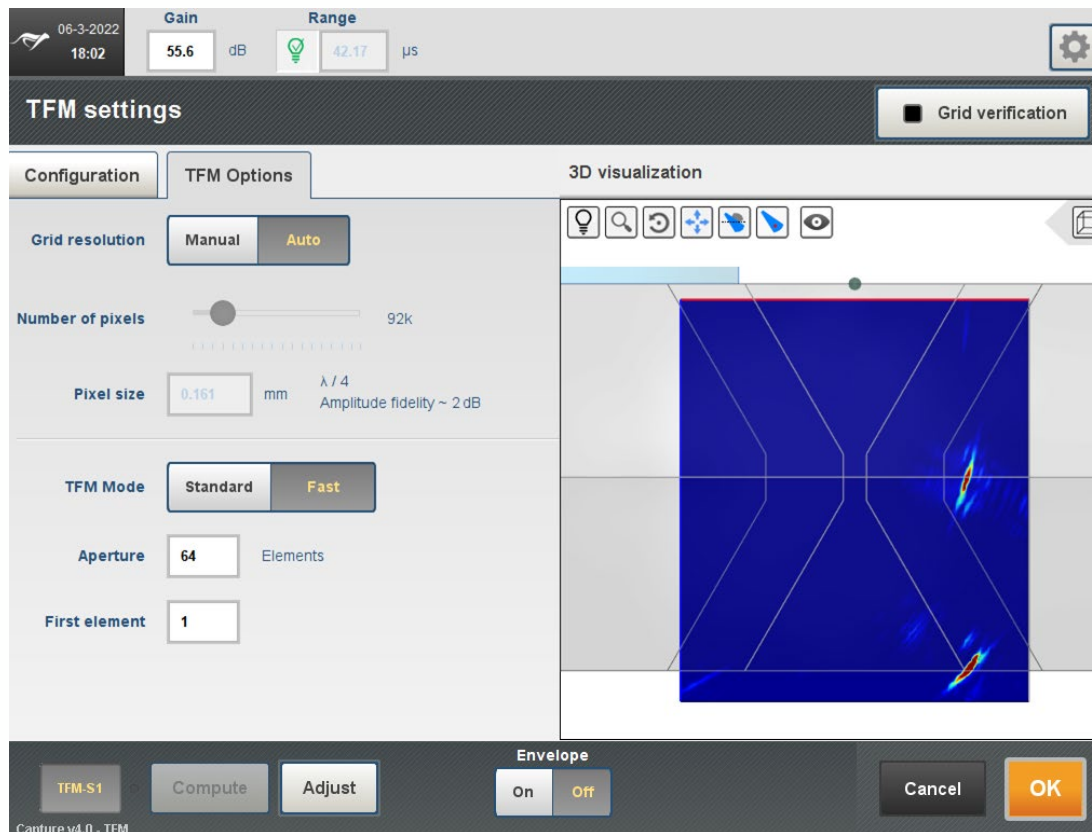
Adjusting the range to remove the artefacts will conduct in disappearance of the backwall and could remove potential indication of the image



# TFM innovation #3

## RANGE TFM ADJUSTMENT (2/2)

When dealing with weld inspection, the opposite side of the probe on the second leg might not be useful as it requires bouncing off the weld root. Those pixels requires a long UT path that can be reduced using this feature



### How to use the reduce the range

- Position the probe on a mock-up to obtain an echo on the bottom right corner of the TFM
- Manually adjust the range to reduce that echo
- Increase the PRF to increase scanning speed

With the Panther as reducing the range reduces the amount of data in the FMC/PWI transferred to the GPU

## Platform improvement

*Capture v4.0 runs the Panther system*

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# Platform #1

## PANTHER WITH CAPTURE (1/3)

M2M Panther™ is a phased array equipment designed for both desktop and industrial applications, offering unparalleled performance in a compact unit. Capture v4.0 allows control of the Panther unit providing an easy-to-use interface with the most powerful PAUT/TFM unit on the market.




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### Panther

The ultimate ultrasound PAUT/TFM imaging machine



**Unparalleled performance in a compact unit for both laboratory and industrial applications**

[See pricing](#) [Request more information](#)

M2M Panther™ combines the speed required for industrial integrated Phased Array Ultrasound (PAUT) solutions, with the most complete set of Total Focusing Method (TFM) imaging techniques, making it the ultimate tool for R&D and procedure qualification.

### What Capture brings to the Panther

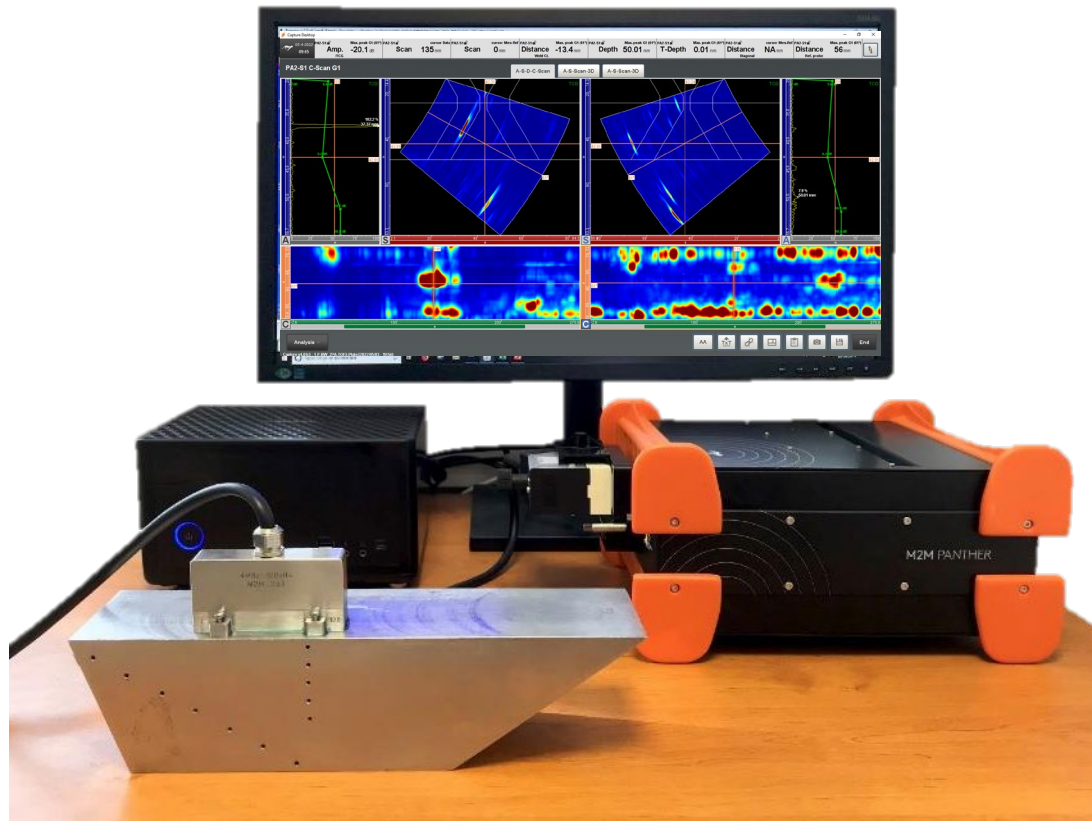
- Easy-to-use interface known by the market
- One UT software from setup to reporting
- Advanced wizard and analysis features
- Procedure preparation for the field
- Frequent update & hotfix for the Panther

Panther is also compatible with Acquire and a SDK can be provided for remote inspection

# Platform #1

## PANTHER WITH CAPTURE (2/3)

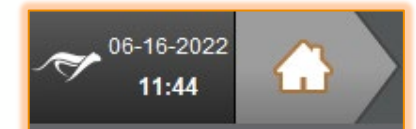
Panther is as desktop instrument requiring an external PC. A standard USB connection is needed for data transfer toward the PC for live processing.



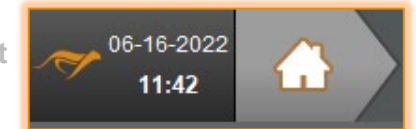
### How to plug & play Capture on a Panther

- Plug the Panther to the PC with a valid USB3 port and start the instrument, they run Capture.
- If the Panther logo is displayed white, use the Panther. orange, refer to the specific procedure.

✓ Panther connected



✗ Panther not connected



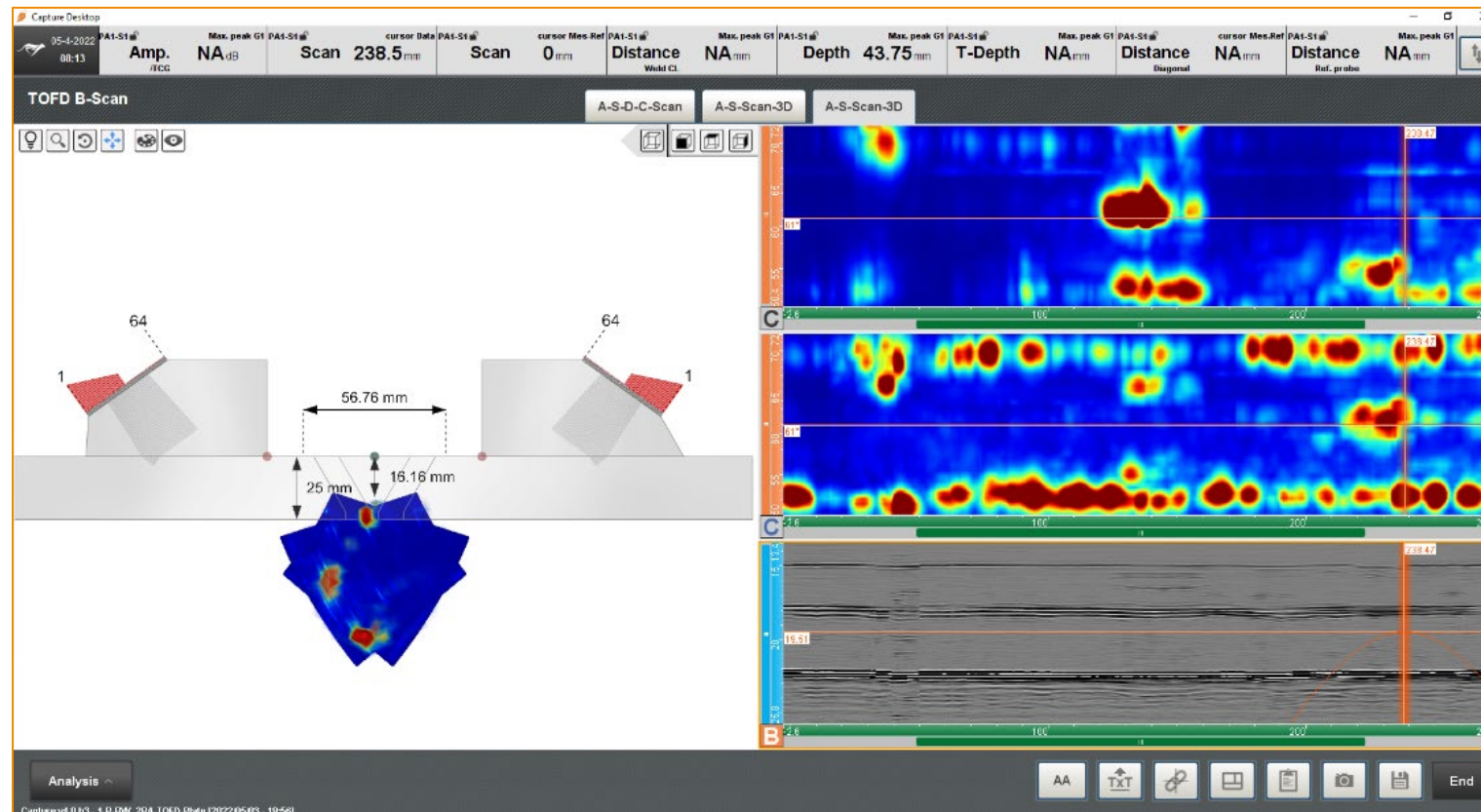
A valid Capture licence is required to use the Panther

# Platform #1

## PANTHER WITH CAPTURE (3/3)



Capture software takes advantage of the Panther and the PC (GPU) to offer superior performance.



### Why use a Panther controlled by Capture

- Up to 4 TFM groups, up to 1Mpi per group
- Very high data throughput allowing to record FMC data at standard scanning speeds
- Apertures up to 128 elements
- Larger screen for better visibility and more powerful CPU (PC) for better application reactivity