FOR RESEARCH USE ONLY

VueBOX® RESEARCH

Quantification Toolbox For Dynamic Contrast-Enhanced Ultrasound

Analysis of linear data
Cross-platform compatibility

BRACCO

LIFE FROM INSIDE

VueBox® Research is a software application specifically designed for the quantification of tissue perfusion using Dynamic Contrast-Enhanced Ultrasound (DCEUS) techniques. It analyzes DICOM sequences from a wide range of ultrasound systems* and extracts perfusion parameters from time-intensity curves of multiple regions of interest.

VueBox® Research provides comprehensive perfusion assessments, making it an essential tool for advanced research in ultrasound imaging and tissue perfusion studies. It is important to note that VueBox® Research is intended solely for research and is not approved for clinical diagnosis.

What sets VueBox® Research apart is its unique Bracco-patented technology of linearization process, which enables precise quantitative assessments of tissue perfusion. This advanced capability allows researchers to gain deeper insights and make more accurate quantitative evaluations in their studies in tissue perfusion and related fields.

KEY FEATURES

- Solution to analyze DICOM clips from different ultrasound systems*
- Linearization of video data for accurate measurements
- Fully automatic motion compensation
- Optimized curve fitting based on Bracco-patented technology
- Compatible with bolus and replenishment kinetics
- Parameters trend tool
- Multiple parametric images
- Optimized graphical user interface
- Customizable layout
- True pixel-level analysis for any zoom factors using speckle size detection

* The list of ultrasound systems with calibration files is available on https://www.vuebox-research.com

Vuebox® Research is a quantification software for research use only. It is designed for Clinicians and Researchers interested in**

- Assessing perfusion parameters in soft tissues and in vessels based on 2D DICOM clips acquired from DCEUS
- Processing data acquired with different ultrasound platforms
- Documenting analyses in a synthetic report
- Retrieving and comparing examinations performed at different dates
- Documenting their work for publication purposes

The Advanced System Recognition (ASR)* capability

VueBox® Research recognizes the ASR-compatible ultrasound systems and automatically detects the required linearization information contained in the DICOM clips to ensure a proper perfusion quantification.

ASR improves the processing workflow by removing several manual steps and makes the analysis for the user as simple as a double click.

Screen capture of the VueBox® Research quadrant view in bolus analysis mode.

**Before use, please consult the Operator Manual, which will be made available upon request.

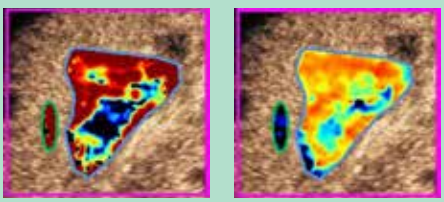
VueBox® Research is composed of three quantification modules, each adapted to a specific context.

Tissue Perfusion Module

The Tissue Perfusion module is designed for research into tissue perfusion. It contains generic perfusion quantification tools, including the Bolus and Replenishment perfusion models, for extracting perfusion parameters. It provides time-intensity curves of ROIs and the related perfusion parameters, ensuring researchers have the necessary data to conduct thorough and accurate analyses.

Additional features

- Parametric images
- Easy-to-use clip editor
- Concatenation of multiple clips
- Automatic detection of contrast arrival
- Fully automatic motion compensation
- Saving and retrieving of user-drawn Regions of Interest
- Automatic management of side-by-side display (contrast and B-mode)
- Length and area measurements with automatic calibration
- Real time clip player
- Clip anonymization



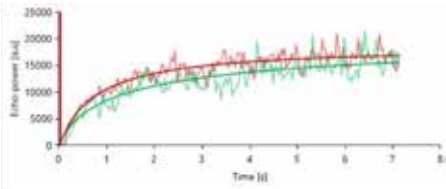
WiWoAUC and TTP Parametric Images

Bolus model Perfusion parameters

PE	Peak Enhancement
WiAUC	Area Under the Curve (Wash-in)
RT	Rise Time
mTTI	mean Transit Time (local)
TTP	Time To Peak
WiR	Wash-in Rate
WiPI	Wash-in Perfusion Index (WiAUC/RT)
WoAUC	Wash-out AUC
WiWoAUC	Wash-in and Wash-out AUC
FT	Fall Time
WoR	Wash-out Rate

Management of analysis results

- Saving and retrieving of analysis results and context
- Export of graphs and images (BMP, TIF, JPEG), data (Excel compatible) and clips (WMV)
- Generator of customizable and easy-to-read analysis report



Optimized curve fitting in replenishment mode.

Replenishment mode Perfusion parameters

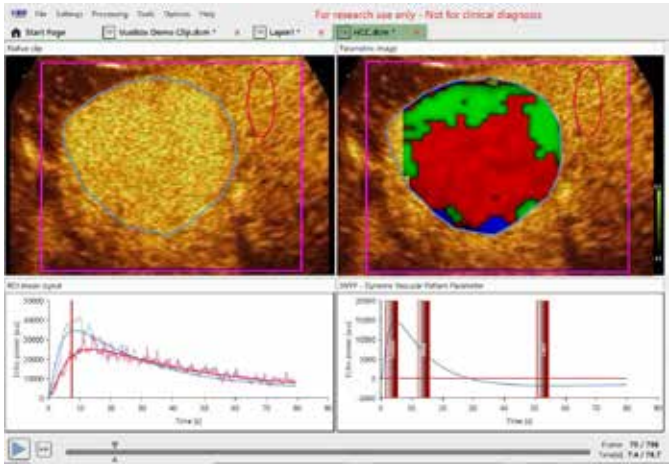
rBV	relative Blood Volume
mTT	mean Transit Time
PI	PI Perfusion Index (rBV/mTT)
WiR	Wash-in Rate

Tissue Normalization Module

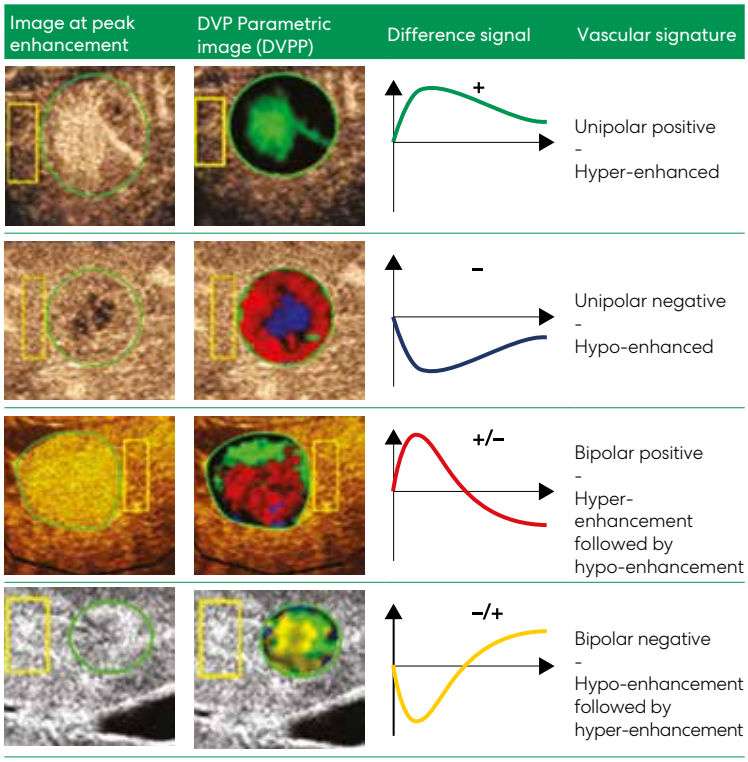
By activating the Tissue Normalization module, a specific region of interest (ROI) is selected as a reference. The differences in echo power signals between the ROI and the reference ROI are calculated and displayed in a specific graph called the dynamic vascular pattern (DVP).

The DVP graph can be used to highlight how the contrast agent is distributed in a specific area in relation to the surrounding tissue.

The DVP information over time is summarized in a single parametric image defined as Dynamic Vascular Pattern Parameter (DVPP).



DVPP image is displayed in the upper right quadrant. The DVP difference signals are plotted in the lower right quadrant.



Dynamic Vascular Pagern Parametric (DVPP)

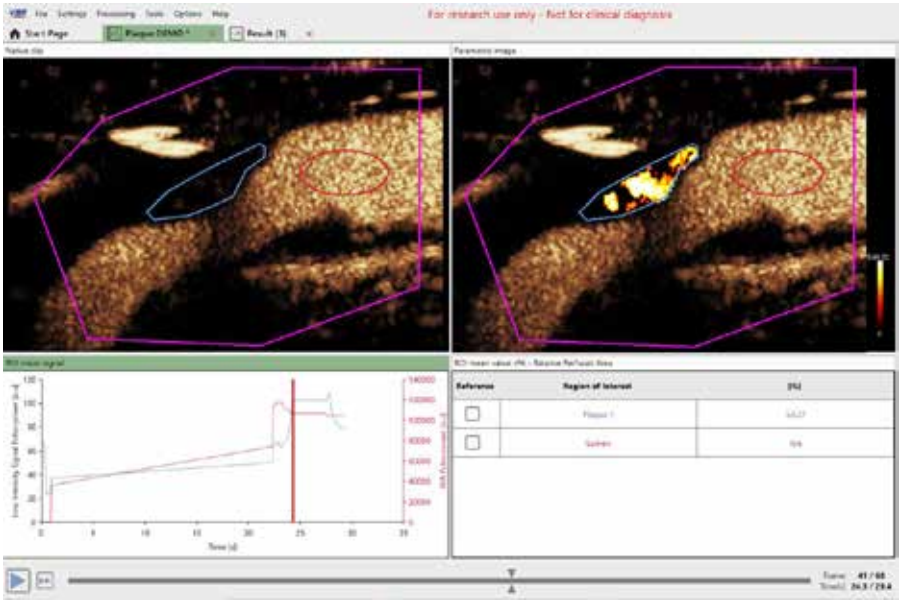
Using DVP signals, a pixel-level classification is performed, categorizing each pixel into four classes based on the polarity of its difference signal over time. This process results in the creation of a DVPP image, which is displayed as a color-coded map.

The LOW-INTENSITY SIGNAL (LIS) Module

This tool is designed to depict Maximum Intensity Projection of a Low-Intensity Signal in a ROI adjacent to or surrounded by a high-intensity background.

It is particularly adapted in case of:

- Risk of signal contamination by a high-energy surrounding milieu
- Very low Signal-to-noise ratio in the studied Region of Interest
- Need for a double-scale display to better distinguish the ROI signal from surrounding area signals
- Need of eliminating the background noise to measure low intensity signal



Time window selection on the double-scale graph, showing TICs for a low-intensity region and a high-intensity region respectively.

The detection of signal enhancement in low energy area by LIS relies on an automatic and adaptive threshold based on noise level making the measurements independent from settings and users.

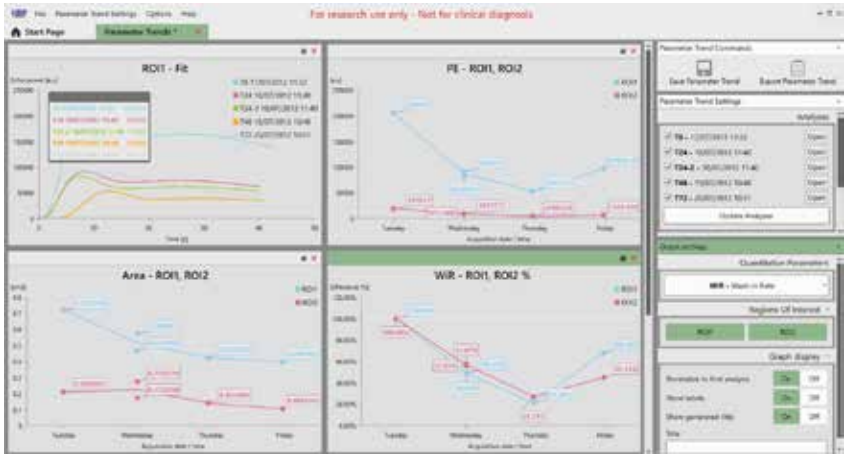
The LIS module provides a MIP-based assessment of vascularized areas and specific quantitative perfusion parameters like:

- Perfused area segment
- Relative perfused area
- Mean MIP opacification

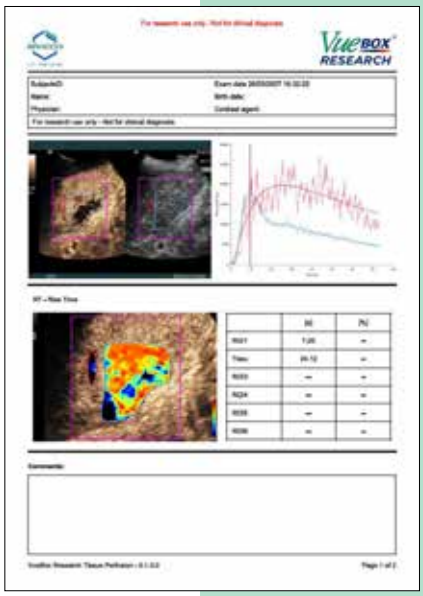
The Parameter Trend Tool (PTT) of the Perfusion Parameters

The purpose of the PTT is designed to compare perfusion parameter values across multiple examinations of the same subject.

This tool features a dashboard with graphs that display the evolution of these parameters over time, providing a clear visual representation of changes and trends in tissue perfusion.



- Selection of successive analysis of DICOM clips of a same subject
- Automatic check of subject identity
- Selection and display of a perfusion parameter over time
- Automatic check confirming that key acquisition parameters have remained consistent between each measurement.
- Display of the absolute value or relative change of a perfusion parameter



A comprehensive, fully automatic report

The body of the report contains the following information:

- An image of the analyzed clip including ROI
- Parametric images
- Free selection of perfusion parameters
- A chart representing the average signal within available ROI
- A chart representing the average difference signal within available ROI (for Liver DVP)
- An editable comment field

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To get a free trial version, visit:
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