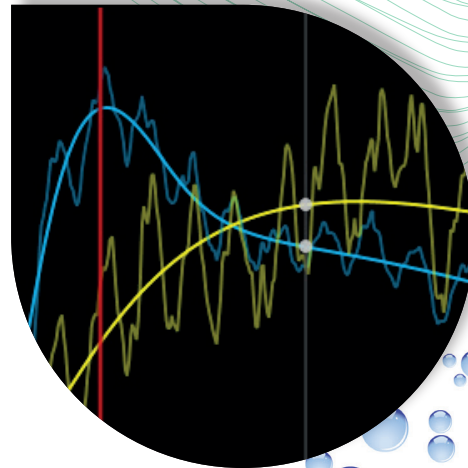# Vue BOX ®

version 7

Quantification Toolbox for Contrast Ultrasound

Analysis of linear data

Cross-platform compatibility

Comparison tool

Committed **to Science,**
Committed **to You.**™

CE 2797

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VueBox® is a general-purpose software application for quantifying perfusion using Dynamic Contrast-Enhanced Ultrasound (DCE-US)

based on DICOM clips obtained with a wide range of ultrasound systems.*

Its unique Bracco-patented technology and linearization process allow quantitative assessment of perfusion.
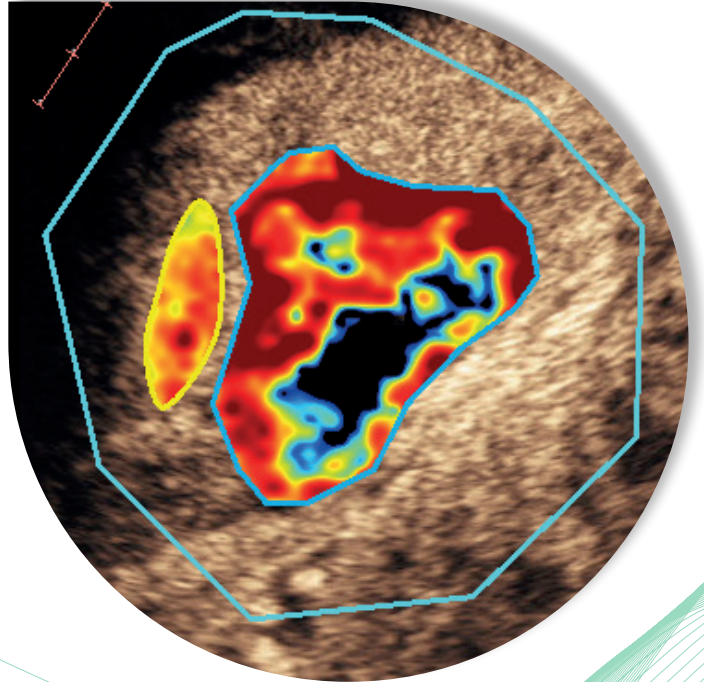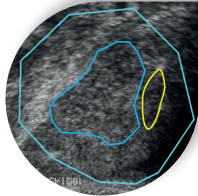
Key features

- 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 follow-up 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 http://vuebox.bracco.com
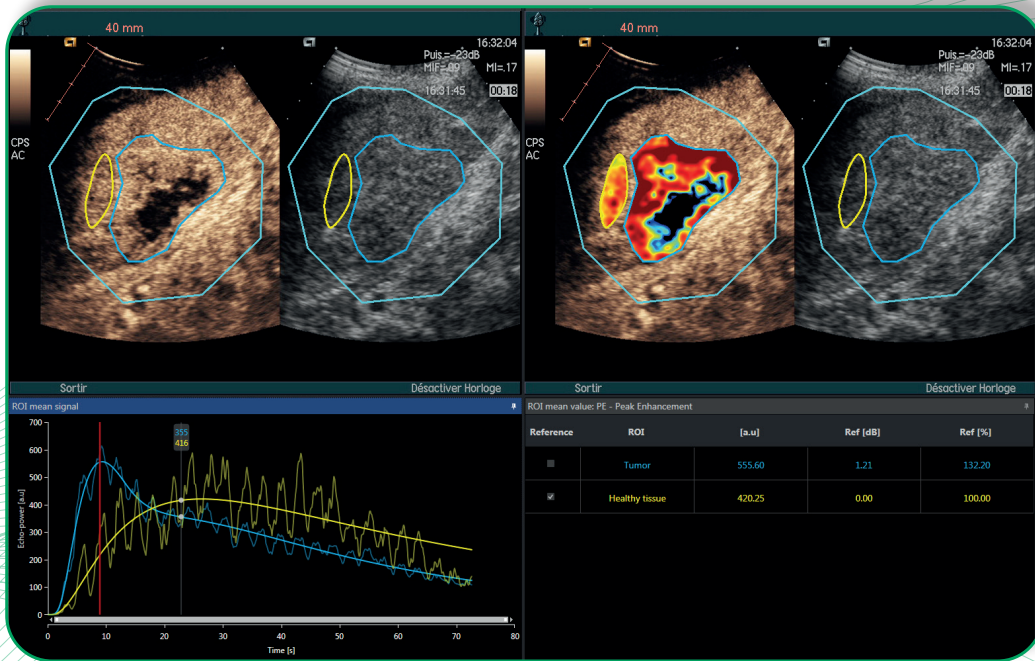
Screen capture of the VueBox® quadrant view during a bolus analysis

VueBox® is intended for Clinicians and Researchers interested in**

- Assessing perfusion parameters in general imaging radiology applications of soft tissues, excluding cardiology, based on 2D DICOM datasets acquired from DCE-US

- 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

Advanced System Recognition - ASR

With ASR-compatible ultrasound systems*, VueBox® detects and applies automatically the optimal parameters so as to ensure a proper perfusion quantification thanks to the dedicated information contained in DICOM clips.

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

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

Additional features

- Parametric images
- Easy-to-use clip editor
- Optimized memory handling for 64-bit processors
- Concatenation of multiple clips
- Automatic detection of contrast arrival
- 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
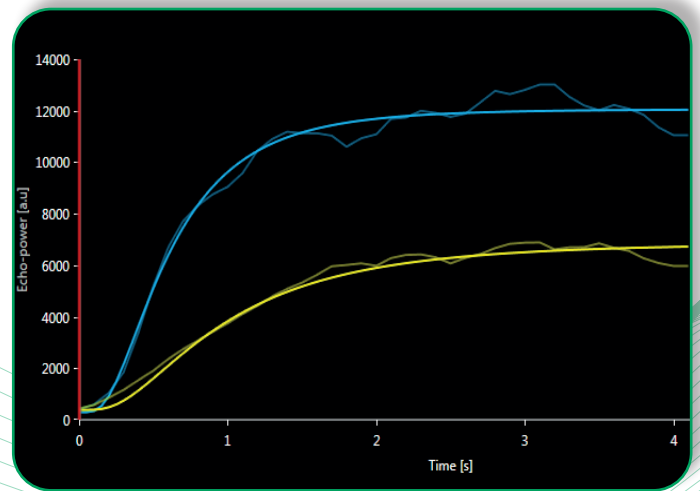- Real time clip player
- Clip anonymization
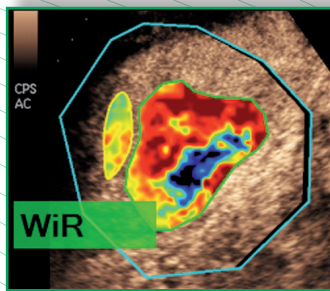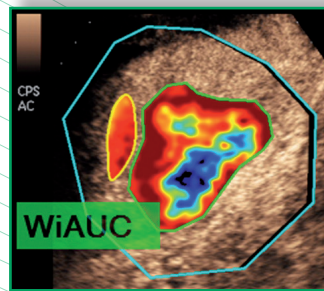
Management of analysis results

- 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

Parametric Images

Optimized curve fitting in replenishment mode

Bolus model parameters

PE	Peak Enhancement
WiAUC	Area Under the Curve (Wash-in)
RT	Rise Time
mTTl	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

Replenishment model parameters

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

The Liver DVP package, a specific application dedicated to liver tissue analysis

Liver DVP is intended to identify dynamic vascular patterns within the liver after bolus administration. It uses healthy tissue as reference and displays the hyper-enhanced and hypo-enhanced pixels over time by using warm and cold colour hues.
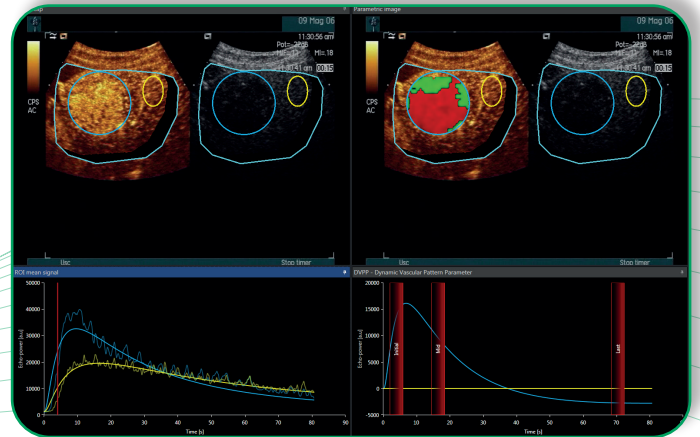
DVPP image is displayed in the upper right quadrant. The DVP difference signals are plotted in the lower right quadrant

A better interobserver agreement

"Liver DVP offers objective parameters to increase diagnostic performance of CEUS and provide excellent interobserver agreement" (Anaye et al. Radiology vol. 261: Number 1 – Oct. 2011)

Image at peak enhancement	DVP Parametric image (DVPP)	Difference signal	Vascular signature
		+	Unipolar positive - Hyper-enhanced
		−	Unipolar negative - Hypo-enhanced
		+/−	Bipolar positive - Hyper-enhancement followed by hypo-enhancement
		−/+	Bipolar negative - Hypo-enhancement followed by hyper-enhancement

Dynamic Vascular Pattern Parametric (DVPP)

Using DVP signals, a classification is performed at the pixel level where each pixel is categorized into four classes according to the polarity of its difference signal over time.

A DVP image is then built as a color-coded map.

The objective of the Plaque package is to measure the vascularized areas in atherosclerotic plaques

The assessment of intraplaque enhancement encounters several major challenges such as:

- Risk of plaque signal contamination by contrast signals out of the vessel lumen
- Dependence of measured intensity values from system settings
- Very low signal to noise ratio in the plaque
- Specific enhancement kinetics in the plaque vascularization
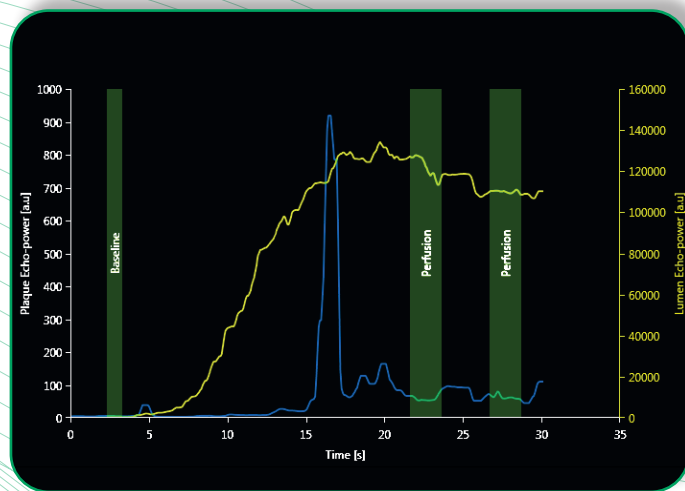
Time windows selection on dual-scale graph, showing TIC from plaque and vascular lumen
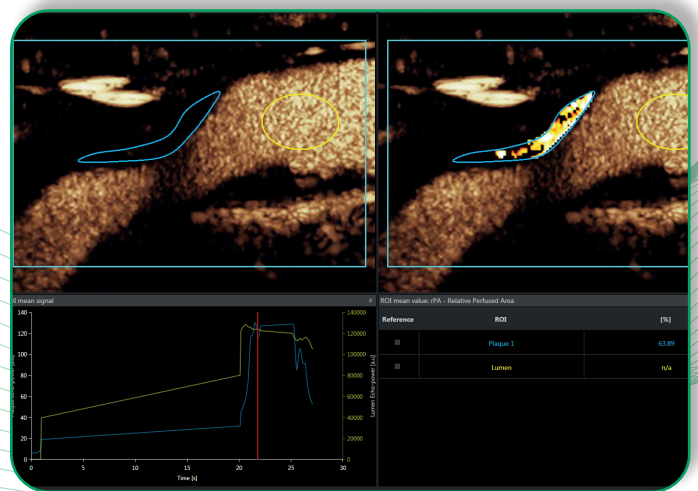
VueBox® screen capture of Plaque package

The detection of plaque enhancement relies on an automatic and adaptive threshold based on noise level making the measurements independent from settings and users.

The plaque package provides a MIP-based assessment of vascularized areas and specific quantitative perfusion parameters.

Key features

- Specific vascularization parameters:
  plaque area, perfused area, relative perfused area, mean opacification
- Adaptative enhancement threshold based on noise level
- Analysis performed in optimal time windows (plateau of maximum plaque enhancement)
- Dual-scale display of time intensity curves of the lumen and plaque signals

A comparison tool of the perfusion parameters

The latest version of VueBox® enables to follow the variation of perfusion parameters over time for the same patient

- Selection of successive analysis of DICOM clips of a subject
- Automatic check of subject identity
- Selection and display of a perfusion parameter over time
- Display of the absolute value or relative change of a perfusion parameter
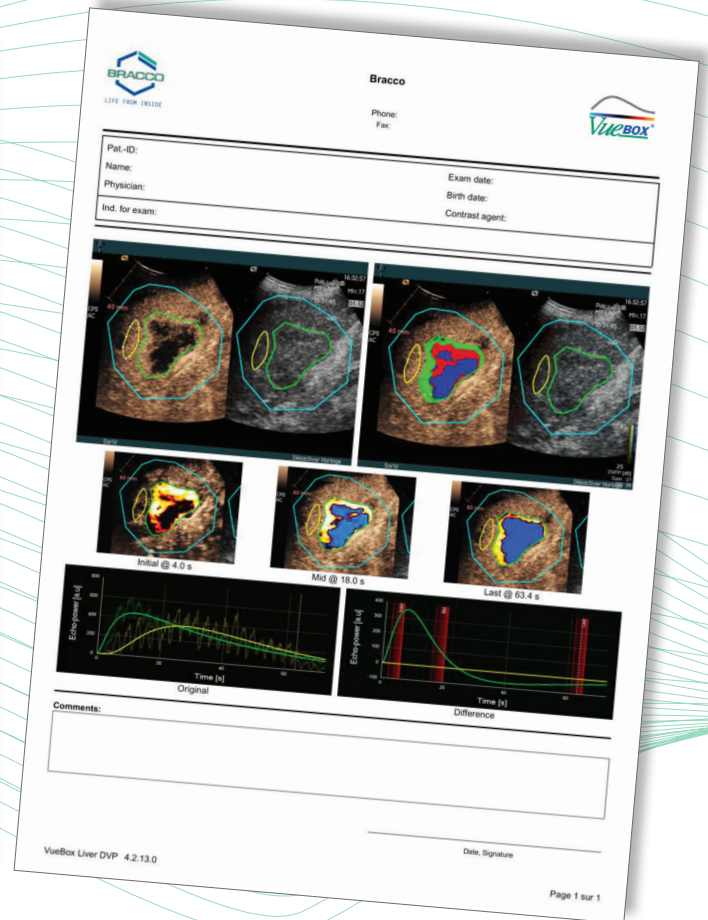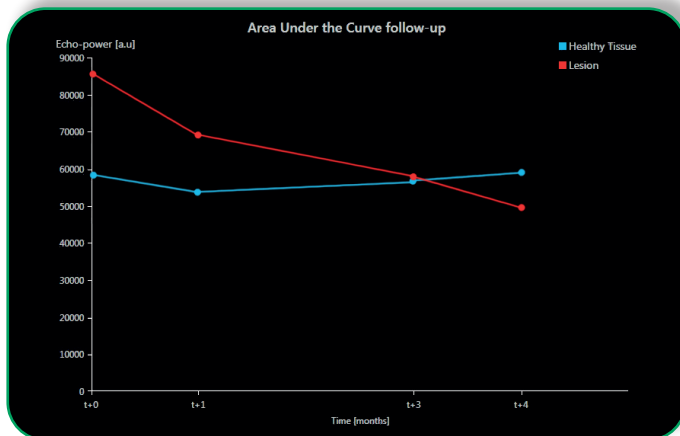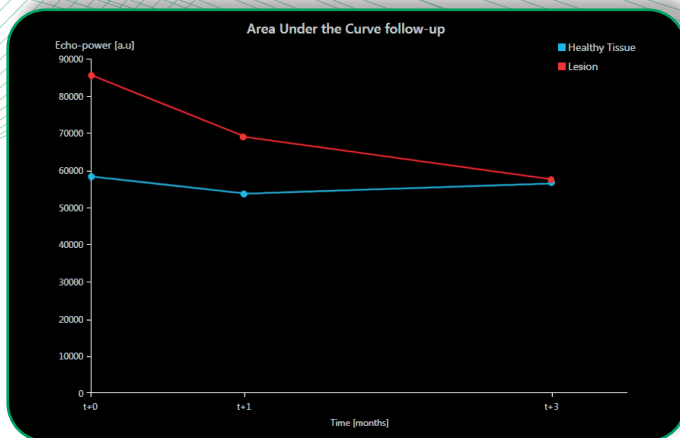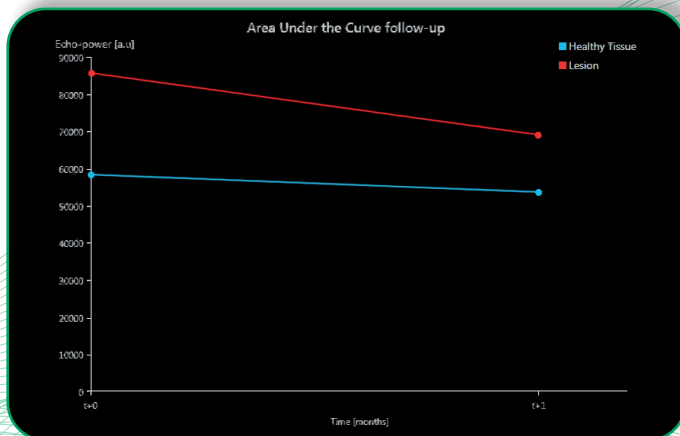
A comprehensive, fully automatic report

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

Quantification Toolbox
for Dynamic Contrast Enhanced Ultrasound

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