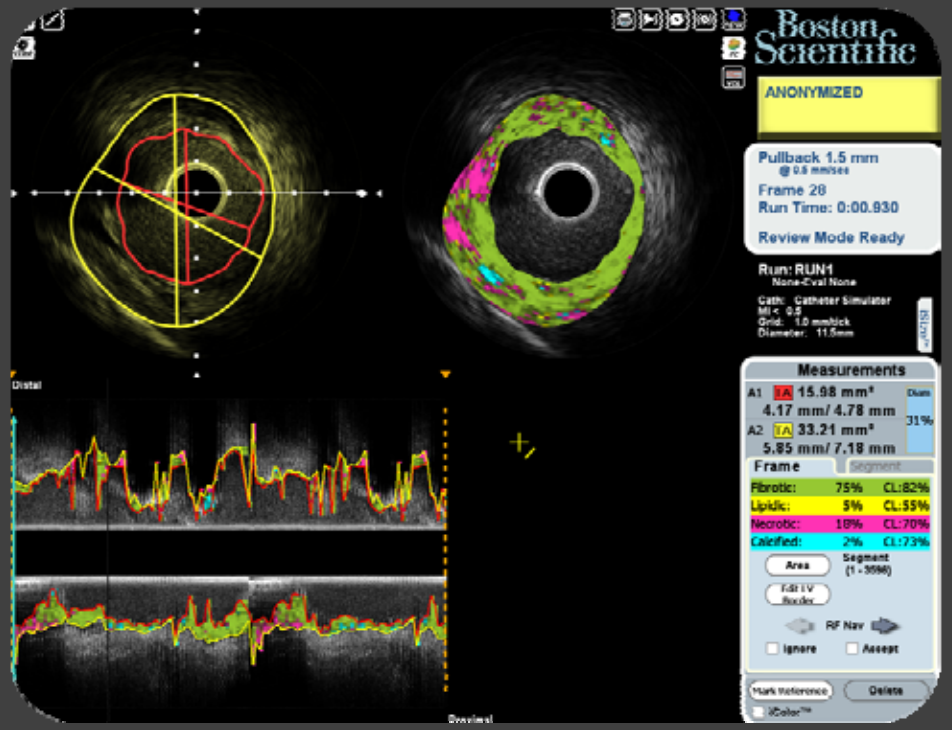
IVUS & Tissue characterization
Real World Experience

Lee Sung Yun
Inje University ilsan Paik Hospital

The iMap™ Feature Overview
"40MHz Tissue Characterization"

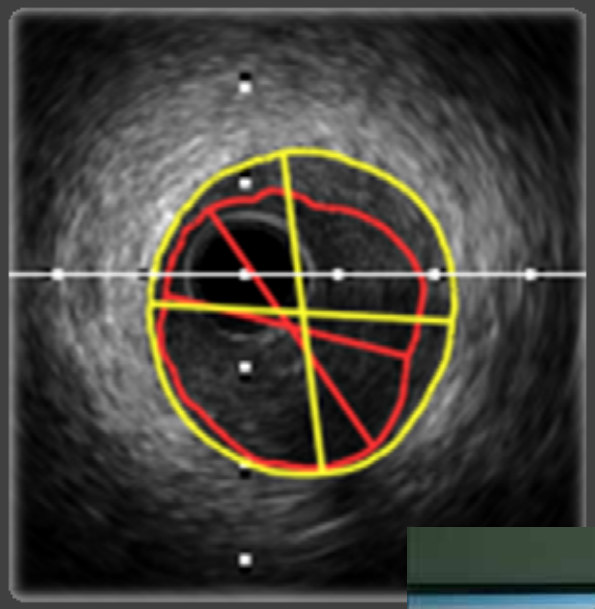
iMap™ Feature Workflow

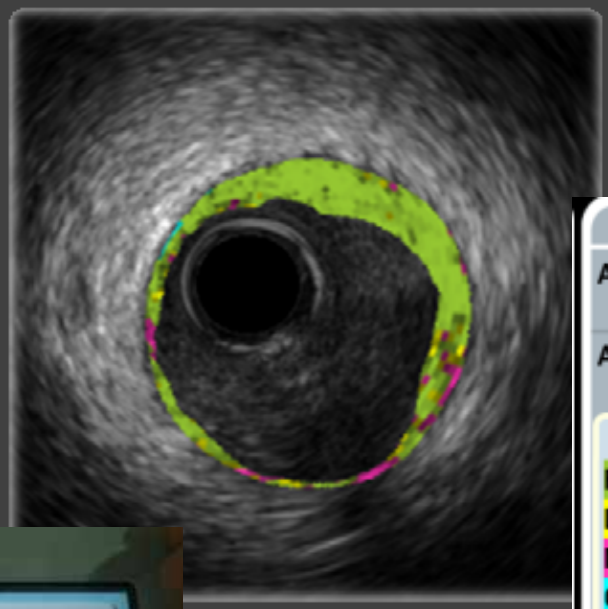
1. Characterization of plaque composition between the lumen and media
2. Confidence label assessment
3. Uninterruption of black and white work flow
4. Provides volume, area and percentage measurements
5. Ability to select areas of interest in the cross sectional and longview for detailed analysis.
6. Automated Trace Assist

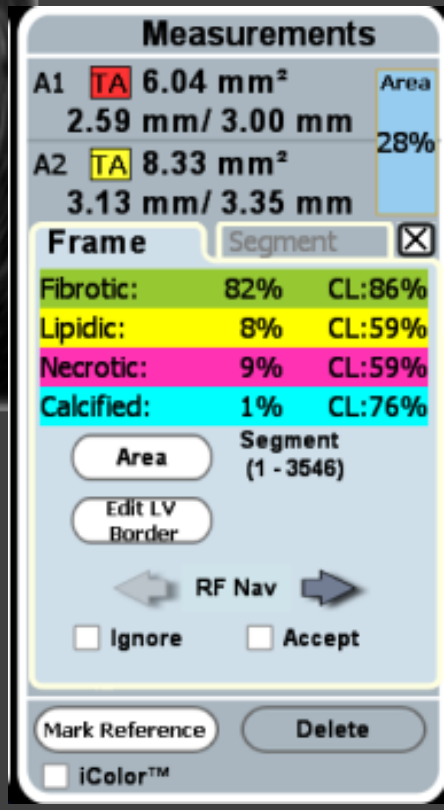


How to get iMAP

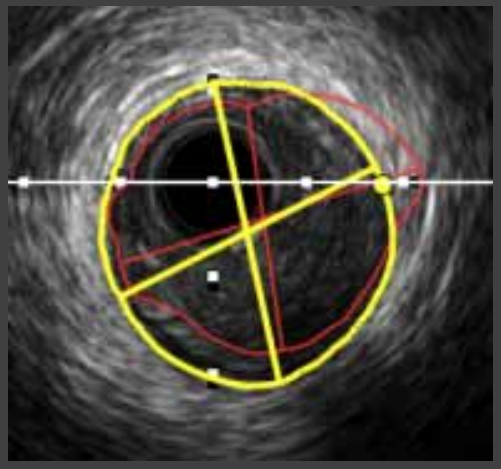
Easy to get with touch-screen button

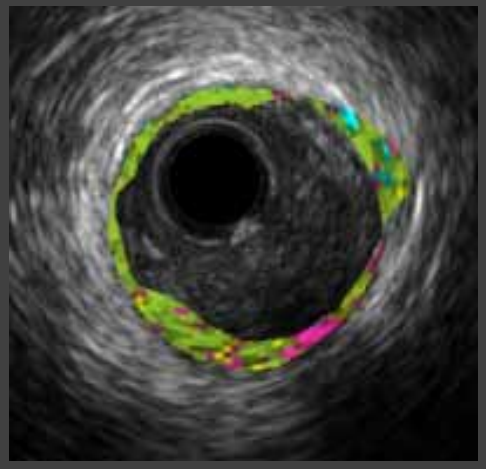


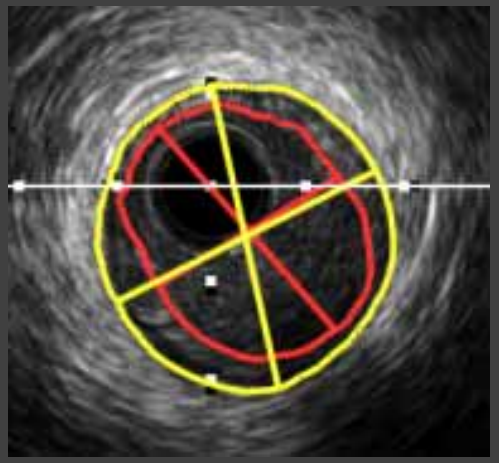


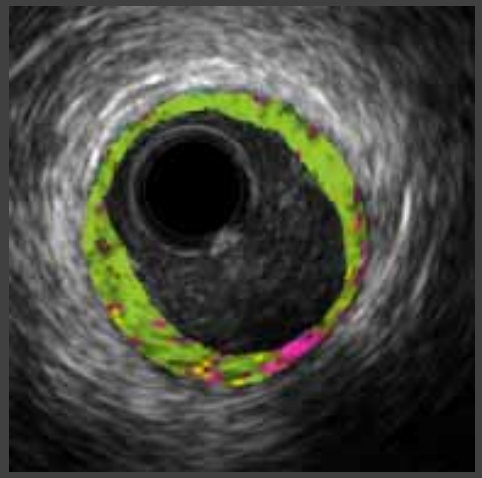


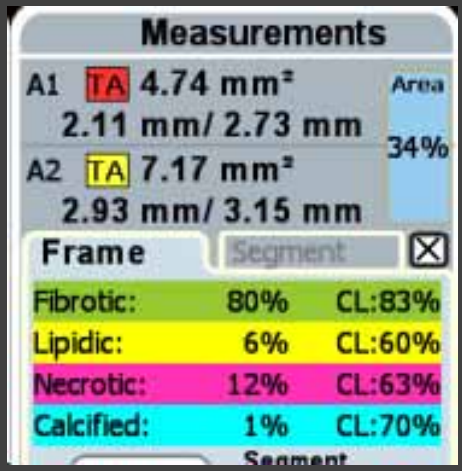
Clinicians must adjust border to correct Automatic Trace Assist system

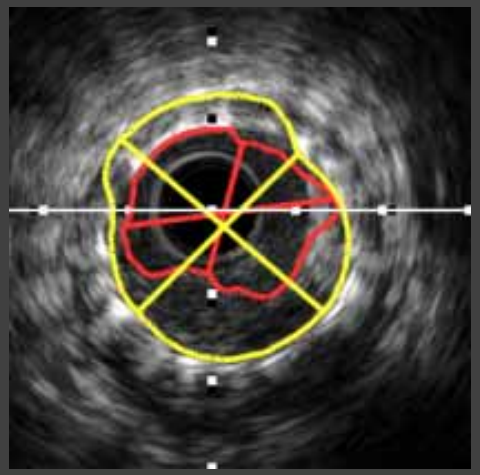


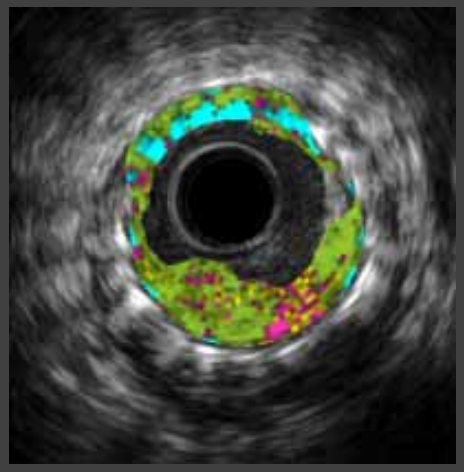


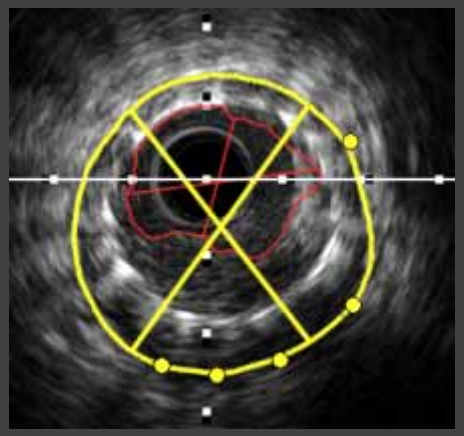


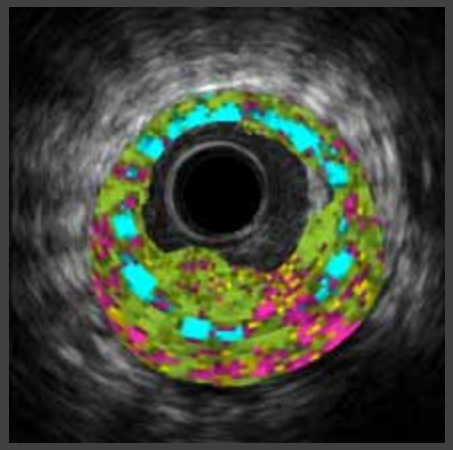


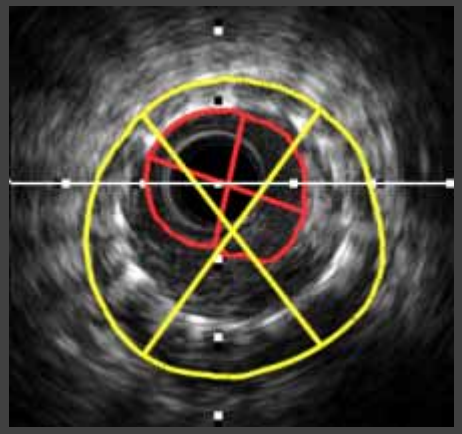


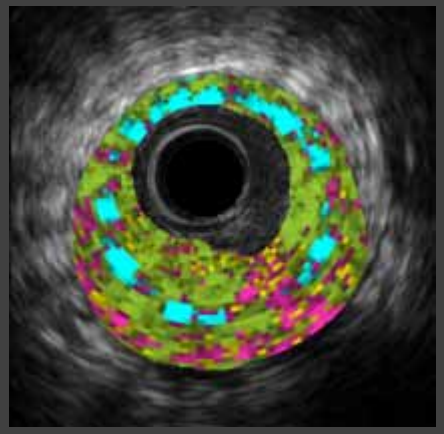


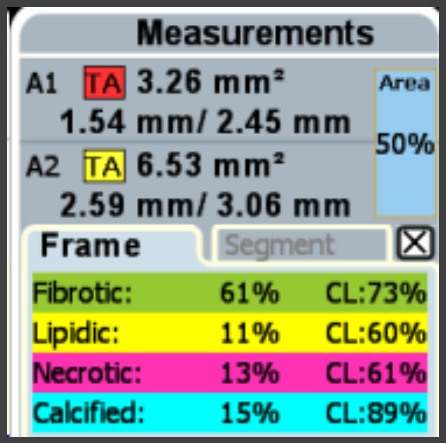




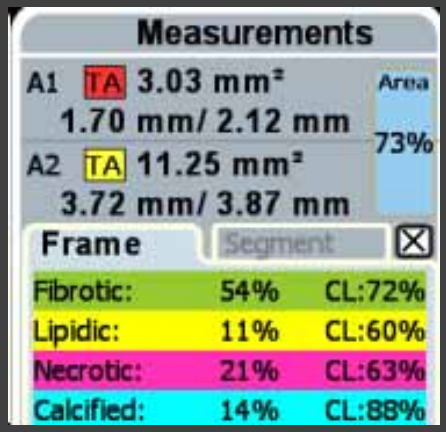




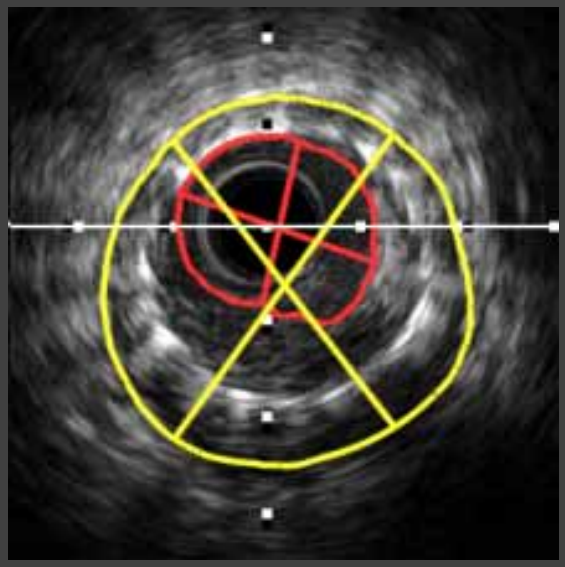


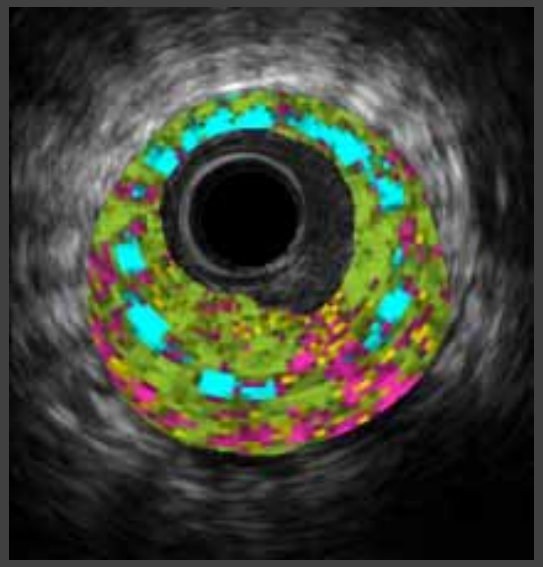

Measurements
A1 TA 3.26 mm²
1.54 mm/ 2.45 mm
A2 TA 6.53 mm²
2.59 mm/ 3.06 mm
Area
50%
Frame
Segment
Fibrotic: 61% CL:73%
Lipidic: 11% CL:60%
Necrotic: 13% CL:61%
Calcified: 15% CL:89%

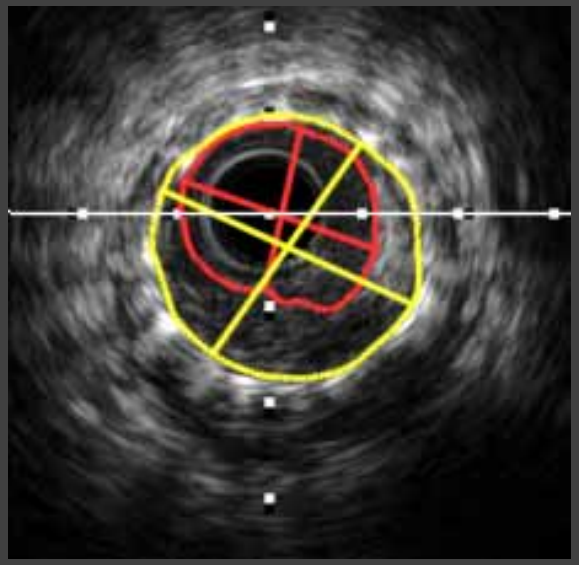
Trace Assist™
A1 TA 3.26 mm²
1.54 mm/ 2.45 mm
A2 TA 6.53 mm²
2.59 mm/ 3.06 mm
Done
Cancel
Delete
iColor™

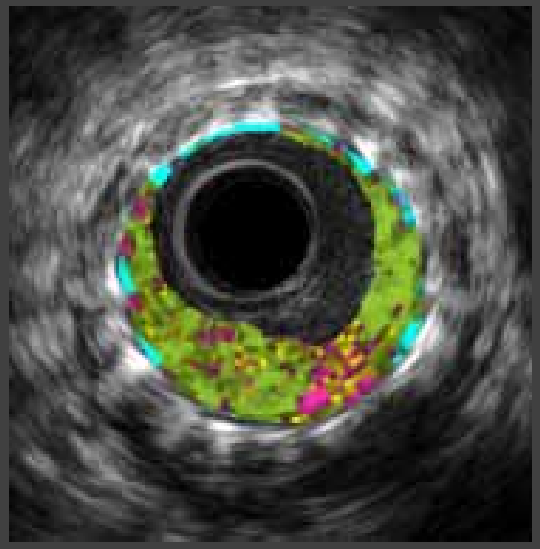

Measurements
A1 TA 3.03 mm²
1.70 mm/ 2.12 mm
A2 TA 11.25 mm²
3.72 mm/ 3.87 mm
Area
73%
Frame
Segment
Fibrotic: 54% CL:72%
Lipidic: 11% CL:60%
Necrotic: 21% CL:63%
Calcified: 14% CL:88%

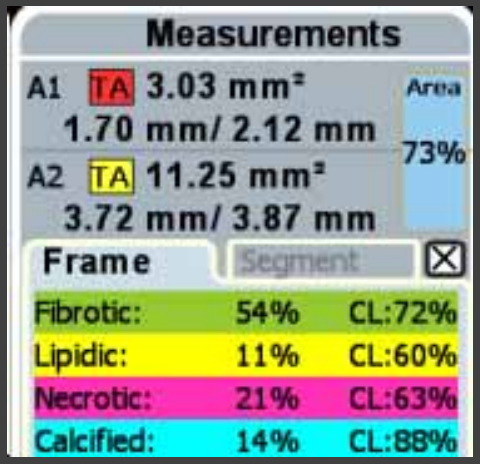
Region of interest



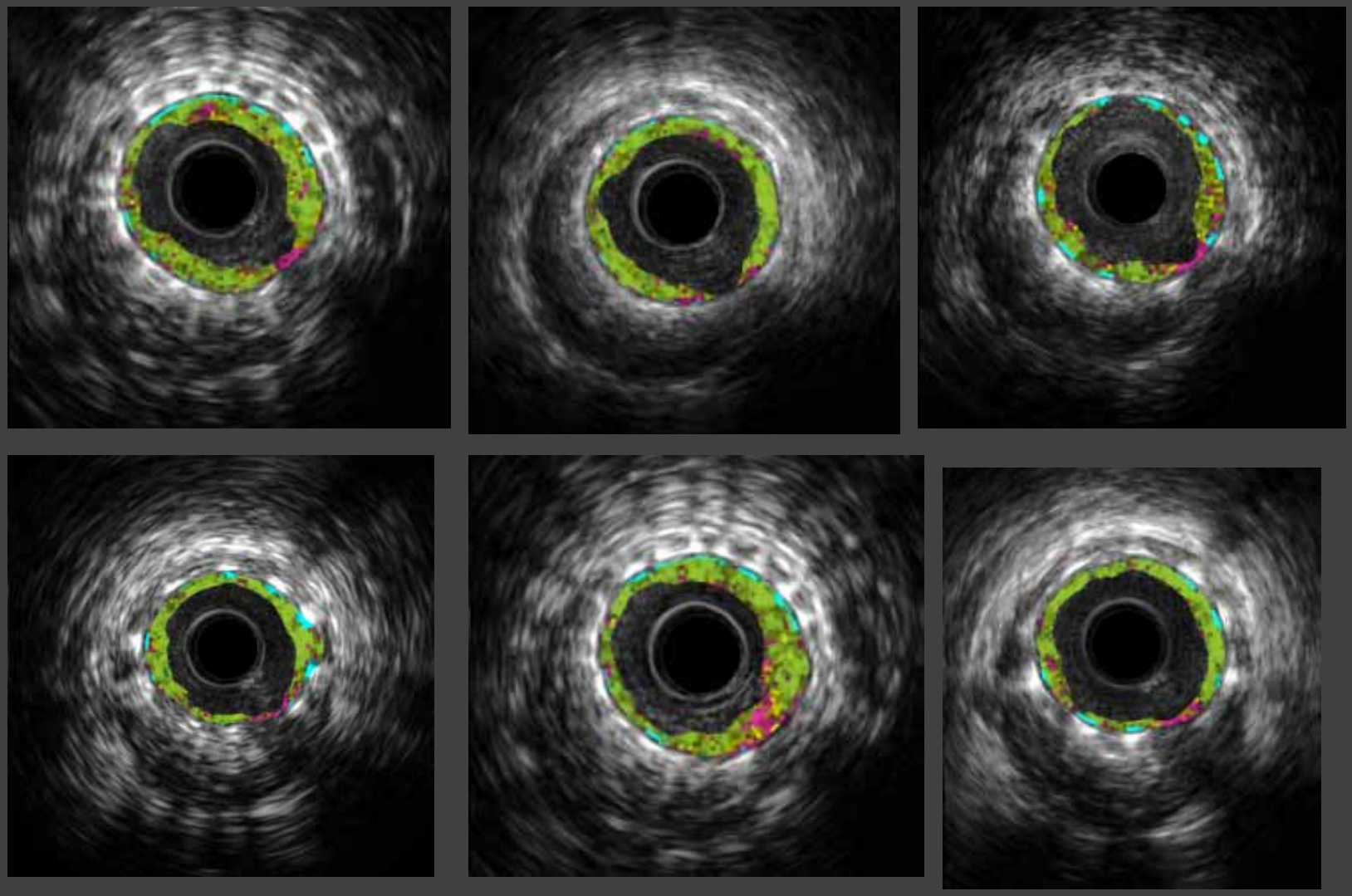




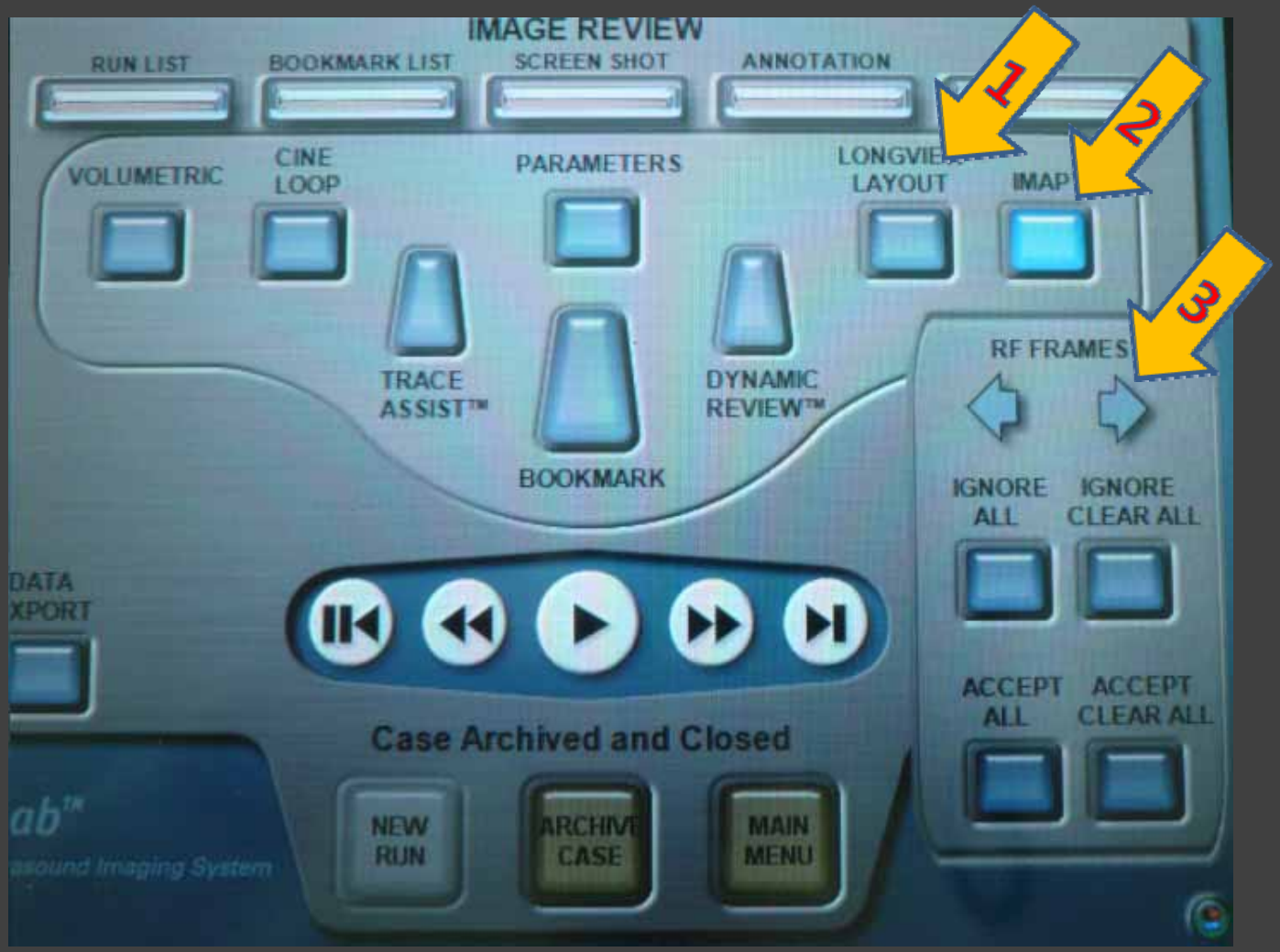


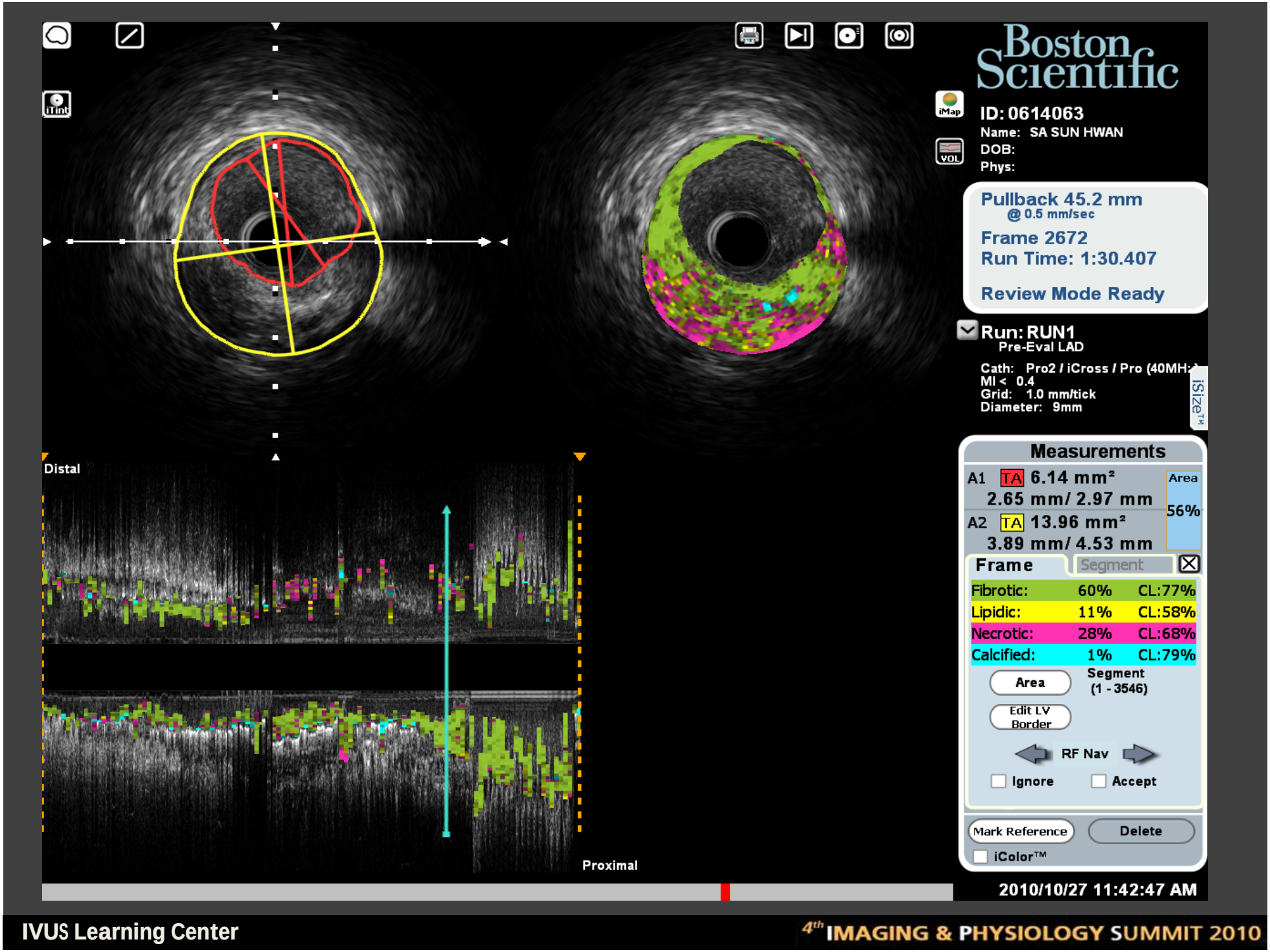


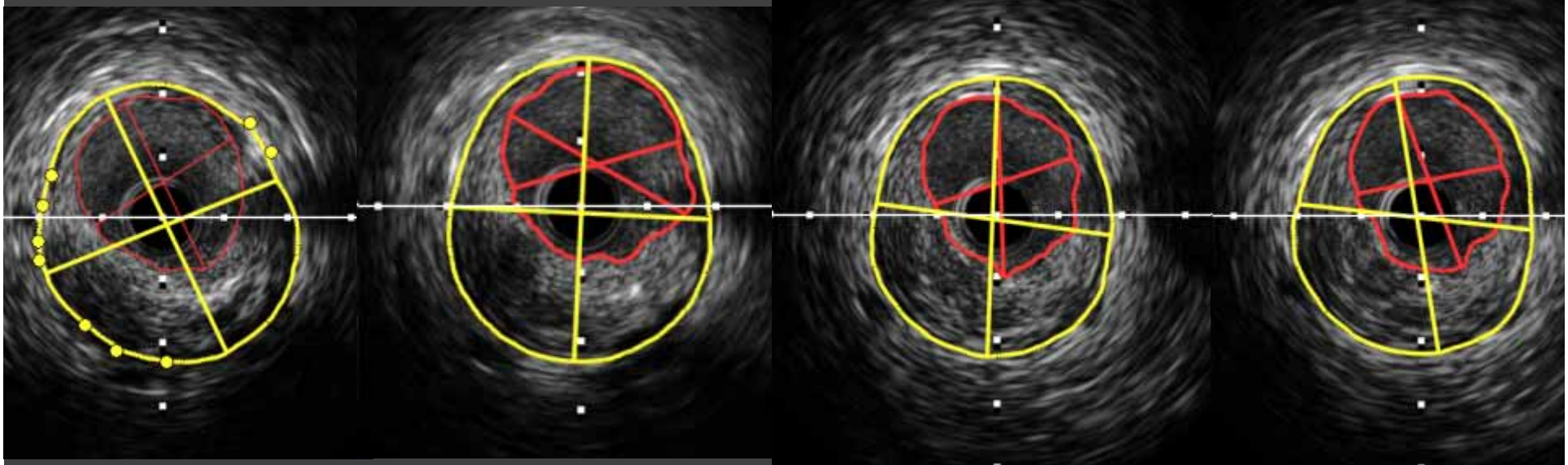
Example of iMAP for Neoimtima

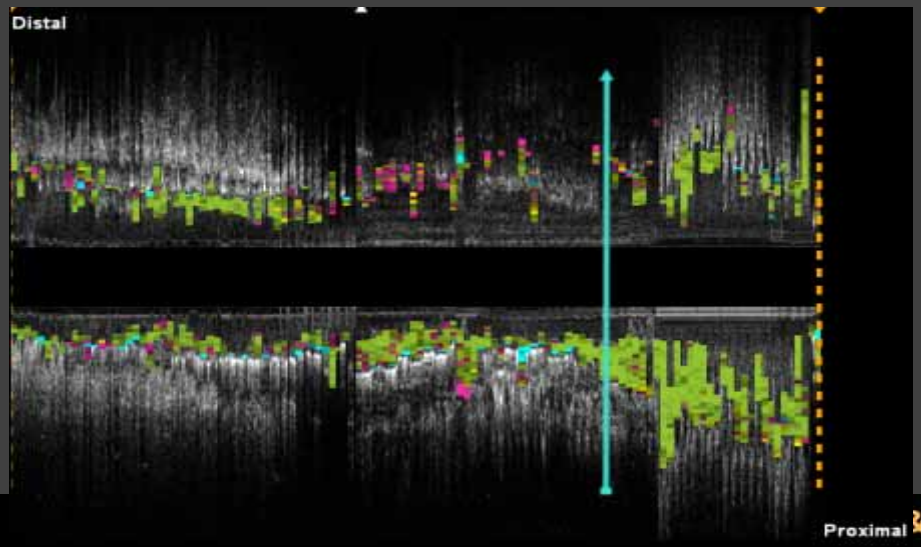


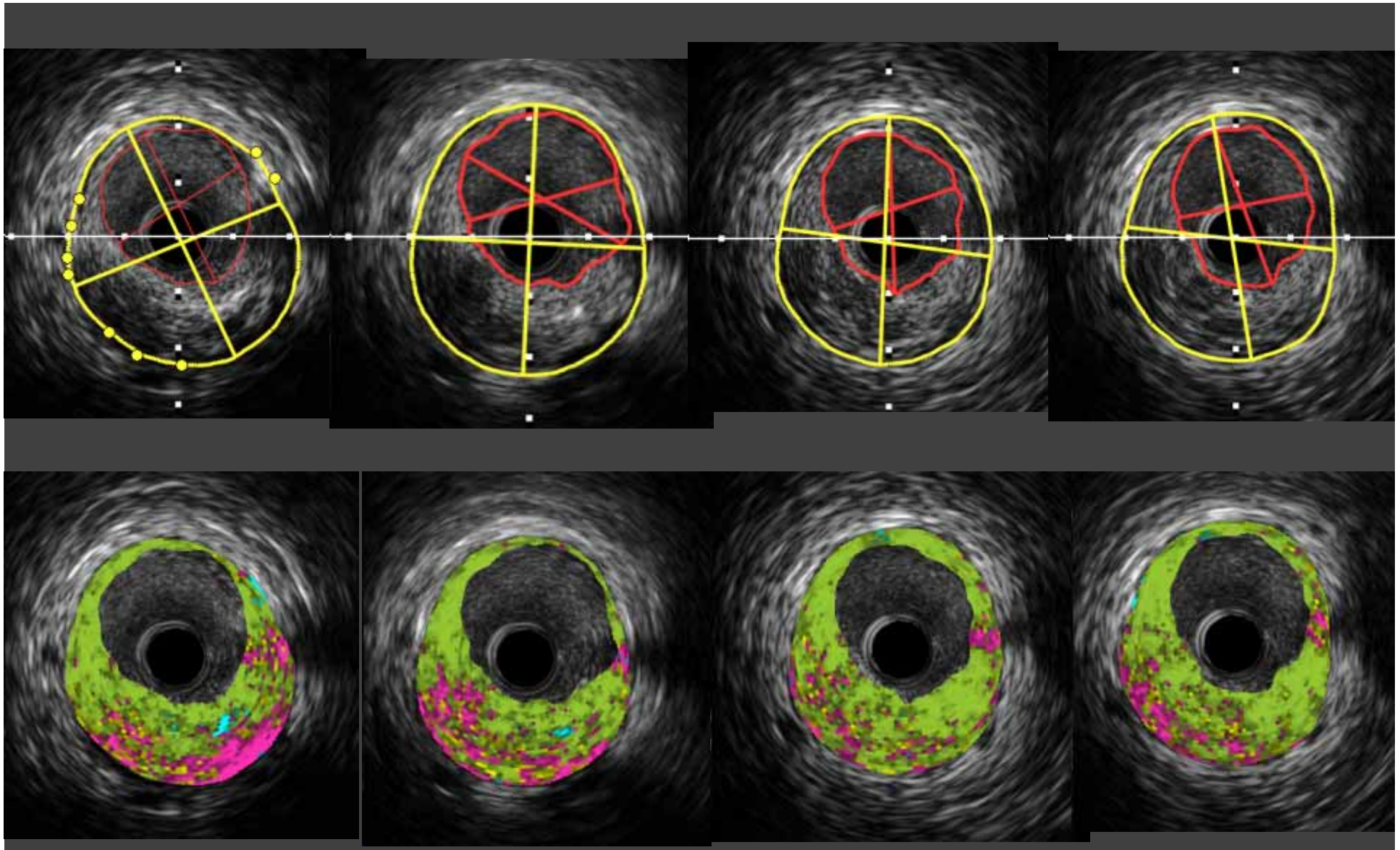
If you want to get frame of interest with iMAP,
Do not get grey-scale IVUS frame first.
Use Longiview Layout with RF frames




Boston Scientific
ID: 0614063
Name: SA SUN HWAN
DOB:
Phys:
Pullback 45.2 mm
@ 0.5 mm/sec
Frame 2672
Run Time: 1:30.407
Review Mode Ready
Run: RUN1
Pre-Eval LAD
Cath: Pro2 / iCross / Pro (40MH
MI < 0.4
Grid: 1.0 mm/tick
Diameter: 9mm
iSize™
Measurements
A1 TA 6.14 mm²
2.65 mm/ 2.97 mm
A2 TA 13.96 mm²
3.89 mm/ 4.53 mm
Area
56%
Frame
Segment
Fibrotic: 60% CL:77%
Lipidic: 11% CL:58%
Necrotic: 28% CL:68%
Calcified: 1% CL:79%
Area
Segment
(1 - 3546)
Edit LV Border
RF Nav
Ignore
Accept
Mark Reference
Delete
iColor™
Distal
Proximal
2010/10/27 11:42:47 AM




Distal
Proximal



Satisfy with Very Similar Frame , not exact !

After iMAP acquisition, then analysis

1. Save “Screen shot” and “Data export” to CD/DVD/Removable hard disk
2. Do not erase data on hard disk before Data export
3. Use option when archiving into DVD to off-line iMAP analysis
4. Off line analysis

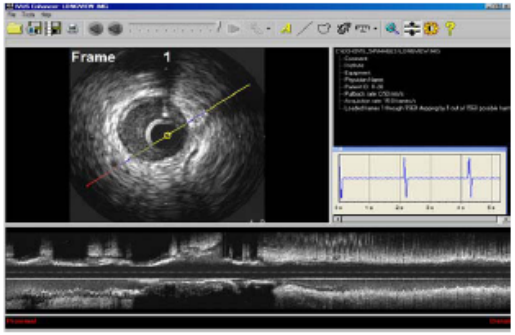
IVUS Enhancer™

DICOM, echoPlaque, and iLab File Review and Analysis

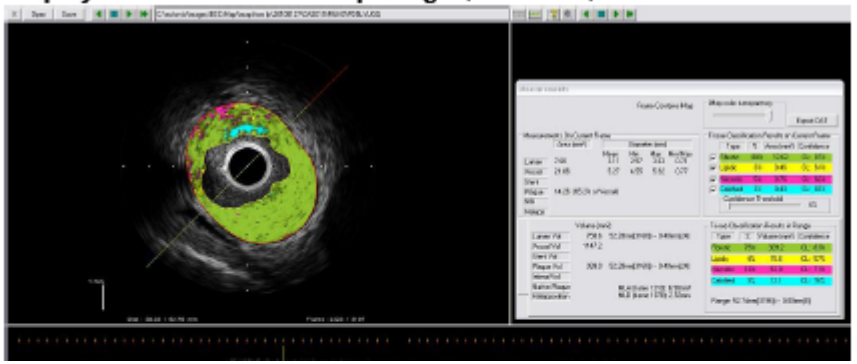
INDEC Medical Systems

IVUS Enhancer™, the newest component of the IVUS Plus and Foundation families, offe easy-to-use visualization capabilities, full length, real time longitudinal display with fu rotational capability, two dimensional quantification, flexible over any portion of the acquire pullback, and animation saving capabilities. Moreover, Enhancer is designed to be able to ru on laptops, so now IVUS analysis can travel with you wherever you go.

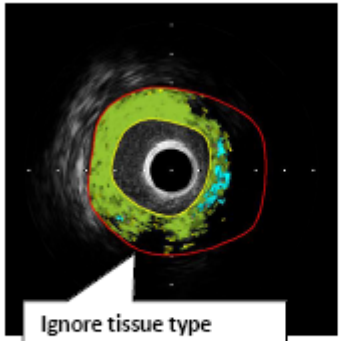
Review and Analysis of iMap™ Data Using INDEC's echoPlaque Software

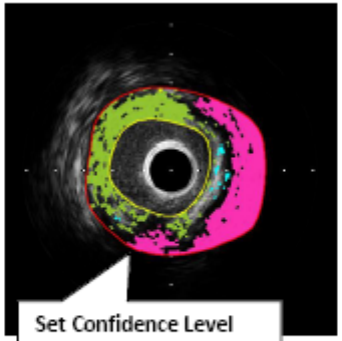


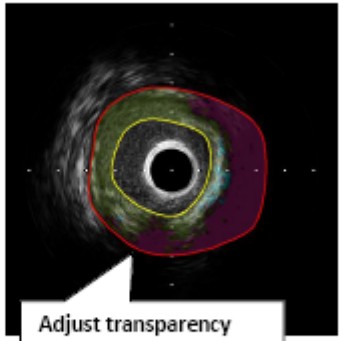
Display Boston Scientific iMap images, contours, and measurement results:



Additional features to improve and enhance analysis:


Ignore tissue type (necrotic is ignored)


Set Confidence Level threshold


Adjust transparency level of iMap coloring

Frame-by-frame and region results are shown in echoPlaque. In-depth results can be exported to Excel-compatible DAT spreadsheet files:

QIvus®

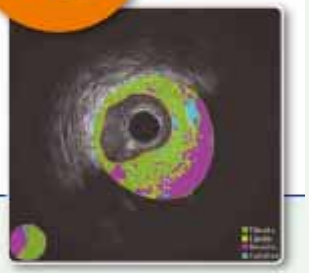
Everything You Need to Assess Intravascular Images

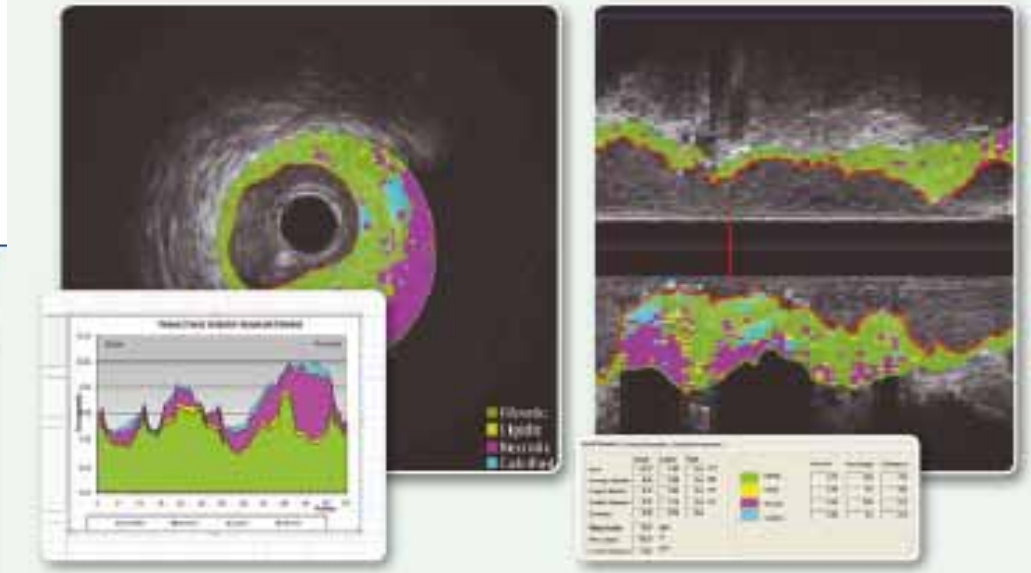
IVUS and OCT image data sets present a wealth of information. Getting the most out of that information in a fast, efficient way —that is what QIvus® helps you achieve.

Fast quantification, plaque visualization and tissue characterization give you all the facts and insights you need. What's more, you get them in a time frame of minutes, so that you can direct your attention to what really matters: treating your patients.

QIvus—everything you need to assess intravascular images.

Now with support for tissue characterization and OCT





QIvus Benefits

- Drastically reduces analysis time with its semi-automatic analysis and fast editing
- Gets more out of images already available

QIvus Features

IVUS

- Support for all data formats
- Time-saving automatic detection of lumen, stent and vessel border
- Powerful, intuitive and fast editing
- Single-slice contour detection and semi-automatic 3D contour detection

QIvus is a registered trademark of Medis medical imaging systems bv in the United States and in other countries.
QIvus® is based on image processing algorithms developed at the Division of Image Processing, Department of Radiology, Leiden University Medical Center.
The tissue characterization and optical coherence tomography (OCT) modules of QIvus have not received US FDA 510(k) market clearance and are not available for sale in the United States. If you are interested in these modules for scientific research purposes only, please contact us-sales@medis.nl.

VH™

Clas

ts

ination

els

ode

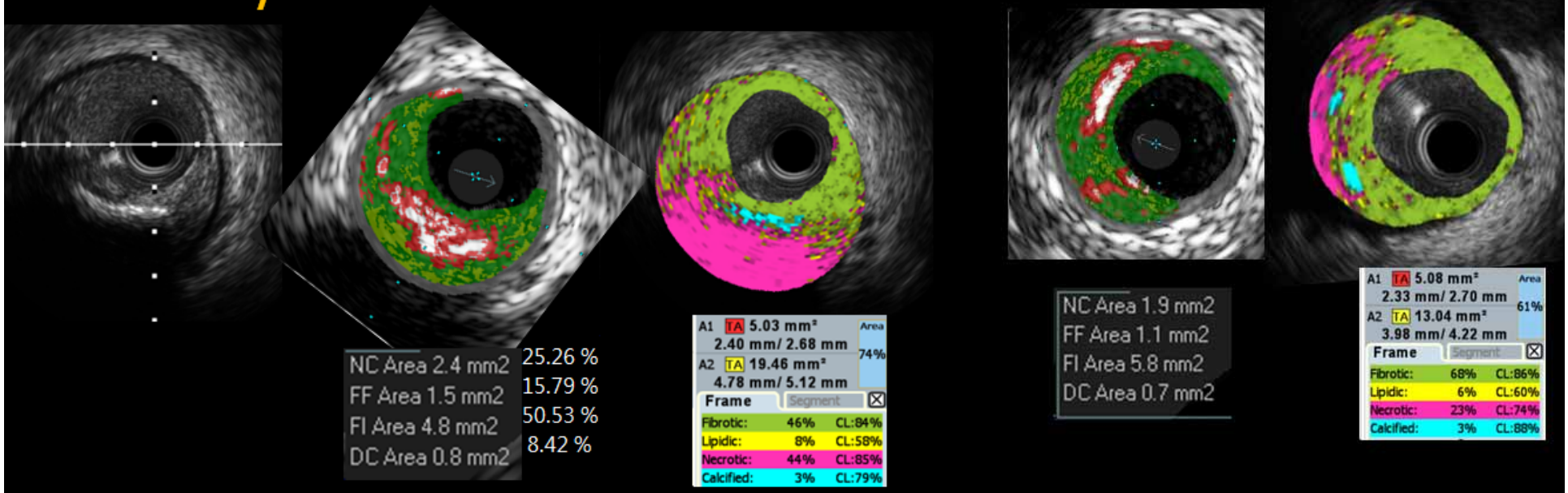
In

tic core

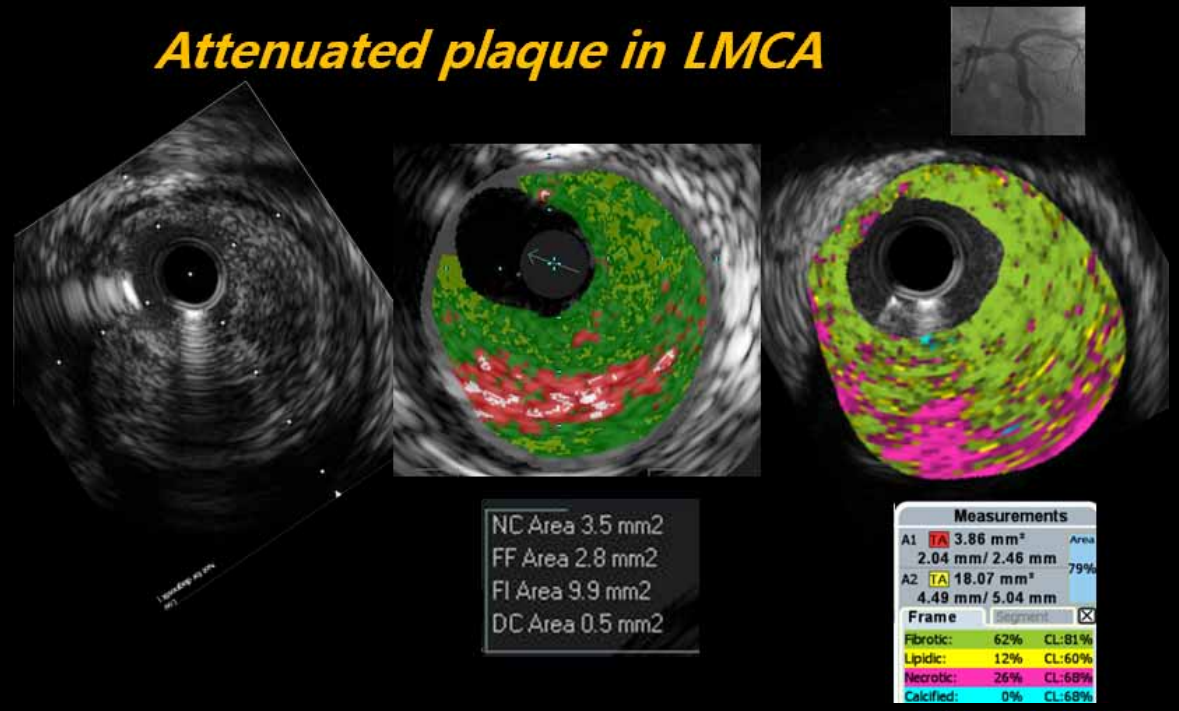
fied

40 MHz BSC iMap™	20 MHz Volcano VH™
Greyscale + Color	Color Only
Uses 13 Data Points	Uses 8 Data Points
Classifies through Spectrum Similarity	Classifies through Elimination
Includes Confidence labels	No Confidence labels
Volumetric Mode Included	No Volumetric Mode
Not ECG-gated. Instead, 2 frames/mm are captured	EKG-gated
Fibrotic Necrotic core Fibrofatty Calcium	Fibrotic Necrotic core Lipid pool Calcified

Calcified Plaques



Attenuated plaque in LMCA

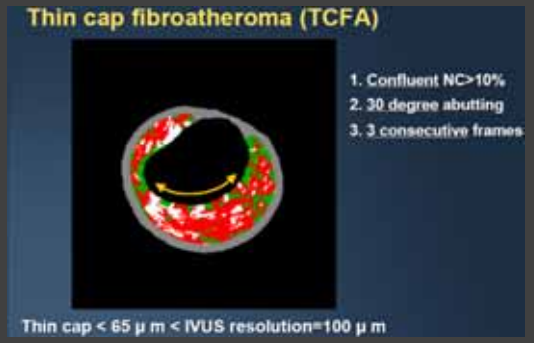


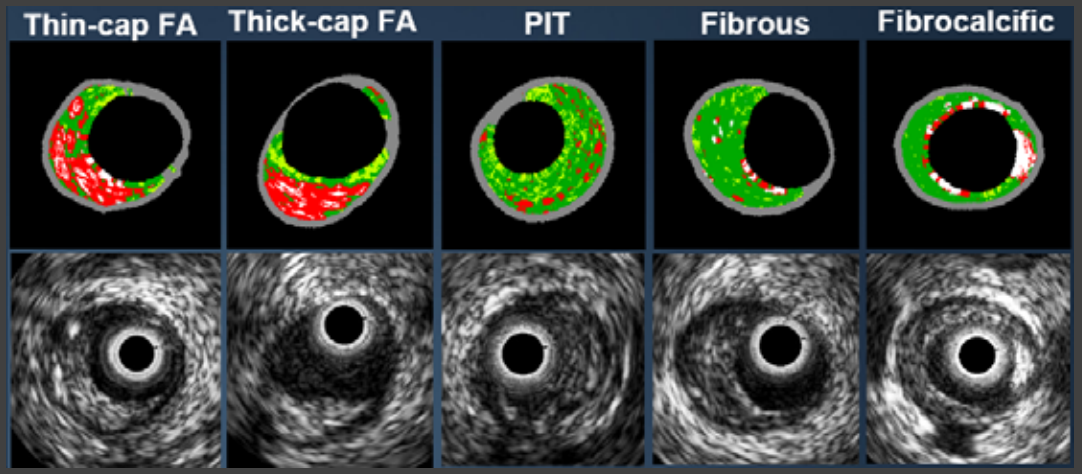
- **iMAP-IVUS**
  - Interpreted as less calcium and necrotic area
  - Nearly all shadow as necrotic core with high confidence level
    - Calcium / Wire artifact / Attenuated plaque ….
  - Did not showed peri-stent metal necrotic core
  - Could analyze specific regions of interest
  - Automatic iMAP capture with 2 frames/mm

- **VH – IVUS**
  - Also wire artifact as necrotic core in parallel wire
  - Peri-stent metal necrotic core
  - Plaque behind calcium ?

Personal opinions

- iMAP-IVUS needs more
  - Software upgrade for
    Area beyond all kinds of shadows
  - Systemized analysis tools (low cost)
  - Nationwide iMAP database and study group
    - ISR study for neo-intima ……
  - Need iMAP definition ?
    - Thin cap fibroatheroma
    - 5 types of Lesion





American Museum of Natural History in New York

THANK YOU