rational acoustics

A preview of…

Smaart v7

What's New in Smaart v7?

In short . . . Everything.

Smaart v7 is a completely new code base developed from the ground-up. By starting with a clean slate, we have been able to reconsider, revise and improve all areas of the program – from the program's fundamental architecture through to the details of the control interface. Version 7 is a quantum leap for Smaart in both power and elegance.

However, the changes to Smaart extend far beyond the application itself. One of the most exciting new features of Smaart v7 is ***Rational Acoustics*** itself. We are the same people who have been developing and steering Smaart for the last 12 yrs as SIA Software Company within EAW. Now however, as Rational Acoustics, we are a small, independent company focused only on Smaart. This means we can make decisions that make sense for our software and our market. And we can focus full-time on providing the high level of support and development that have been the hallmark of the Smaart platform. In other words, Smaart v7.0 is just the start.

So, what's new in Smaart v7?

Let's take a look . . .

Smaart v7 (beta)
Top Pane: Live IR Middle Pane: 4x Live RTA
Bottom Pane: 4x Live Transfer Function

Multi-Channel, Multi-Platform, Multi-Mania:
Smaart v7 is inherently multi-channel and multi-platform, able to access modern multi-channel input devices and operate native in both Windows and Mac Operating Systems (including 32- and 64-bit versions). And as you can see from the screen capture above, v7 can run multiple, simultaneous Spectrum and Transfer Function Measurements. Smaart 7 is truly multi-maniacal.

Built From the Start to Make Use of Power:
If there is one thing that has remained "constant" over Smaart's decade plus of evolution, it is the relentless expansion of the processing power, speed and memory in our personal computers. And with those comes the potential for greater measurement power and possibilities – *if* you can make use of it. From day one, the Smaart 7 code base was optimized to make use of the all power that modern processor configurations present, whether that be from one processor or eight. Your Smaart rig might not need to use all of your PC's power right now, but if history is any indicator, you will.

Smaart v7 System Hardware:
Recommended Configuration

- Microsoft XP, Vista or Windows 7 (32 & 64-bit)
  - or -
- Mac OSX 10.5 or 10.6 (Leopard & Snow Leopard)
- 2 GHz Dual-Core Processor
- Graphics Processor with 128 M dedicated video RAM
- Compatible Sound Hardware with ASIO, Wav or CoreAudio drivers

New Program Architecture:
One of the most powerful aspects of the new Smaart v7 platform is its object-oriented program architecture. Effectively, the program is built of many individual code modules that are run as independent, inter-related programs (objects). Say what? For users, this means that you can run as many simultaneous single-channel (spectrum) and dual-channel (transfer function) measurement engines as your PC will allow. [The v7 screen captures in this document were all made on a dual-core, 2 GHz Mac Pro. For users running the measurement power equivalent of Smaart v6, a 1 GHz single core would certainly be sufficient.]

This new architecture also means that Smaart is ready for expanded application/interaction beyond the basic program itself. Remote GUIs (Graphic User Interfaces), real-time data export/sharing with other applications and the creation of plug-in versions are all now possible and already on the drawing board.

Enhanced Data Acquisition:
Smaart v7's new data acquisition module now provides increased and improved access to the devices and signals in our system.

Features include:
- Unlimited input channels / devices
  - Able to access multiple devices
  - Able to access virtual devices
- ASIO, Wav and CoreAudio input
- Able to reference to internal sources
- Power calculation per input (SPL)
- Time Domain Filtering / Input Calibration

Simpler, Friendlier GUI:
Certainly, v7 has significantly expanded the measurement power of Smaart, but this does not mean that the user interface (GUI) needs to become dauntingly complex. In fact, to be manageable, the GUI necessarily needs to get cleaner, simpler and more streamlined as your measurement system gains complexity. What's the use of power if it can't be controlled? The hallmark of Smaart v7 operation is its elegantly focused user interface.

Much effort in v7 development was put in to reducing unnecessary UI clutter. Many of the dialog box-based controls that once populated Smaart's interface have now been replaced with modern "point 'n' grab 'n' drag 'n' click" mouse-based controls. If you need to move a trace up or down, just grab it and drag it. If you need to change the dynamic range of your spectrograph, or the coherence blanking threshold for your transfer function trace, those controls are right on the plot. Of course the direct-enter dialog haven't gone away - you can still get to them – but they have been moved off of the top level interface, and out of the way.

Of course the most crucial areas of Smaart v7's development efforts lay in the heart of the beast itself: the new v7 measurement engines . . .

Smaart v7 Enhanced, Improved, Strengthened, Awesome-ized Measurement Engines:
All aspects of Smaart's measurement engines were revisited, considered and reconsidered, and everywhere possible, improved. The resulting enhancements range from quite subtle, "under the hood" improvements to obvious quantum leaps in measurement power, stability, accuracy and ability.

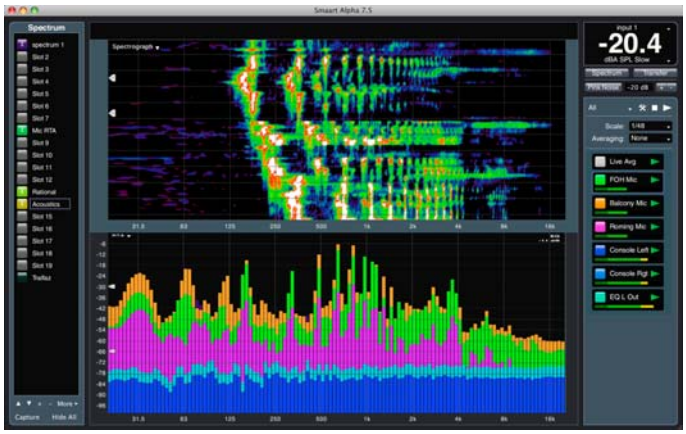
REAL-TIME MODE: SPECTRUM ENGINE
The user can configure as many single-channel engines as they need, each with the ability to produce its own RTA and Spectrograph data.

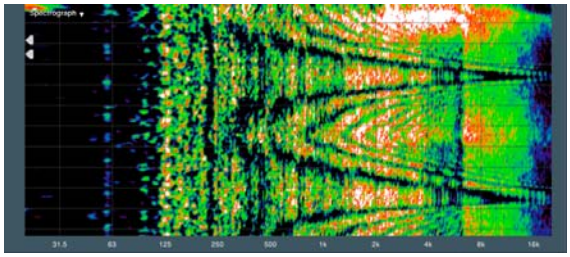
RTA

- Improved fractional-octave banding for RTA and Spectrograph, including 1/48th Octave

- Multi-channel input allows for simultaneous display of multiple individual RTAs - as well as "live averages" of active signals

"Line-Over-Bands" view of RTA displays both raw and banded data

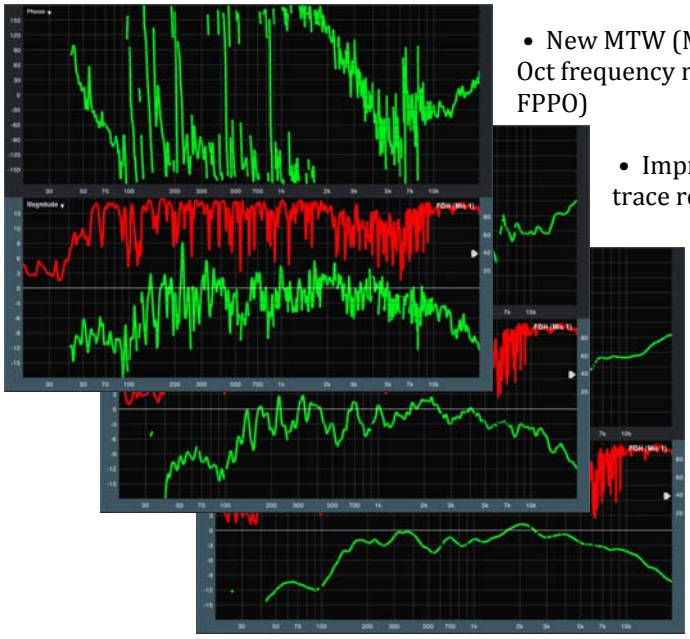




Spectrograph

- Improved color definition
- Scrollable 1000 (+) line history
- Real-time adjustable dynamic range
- Store and recall spectrographs

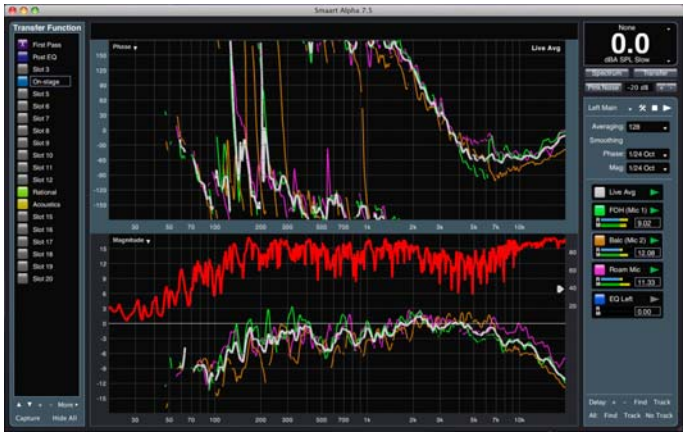
REAL-TIME MODE: TRANSFER FUNCTION ENGINE (Frequency Response):



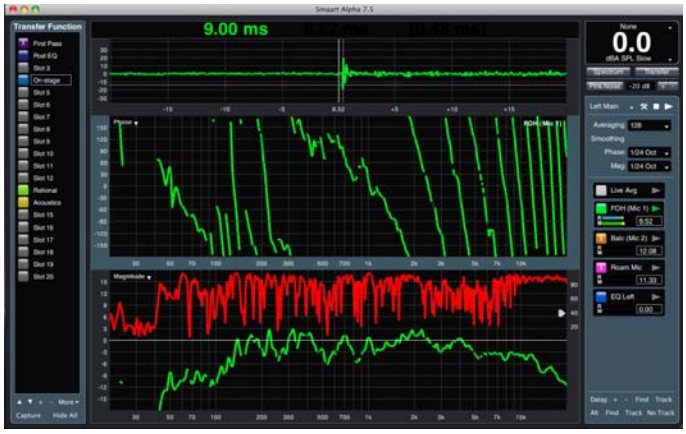
- New MTW (Multi-Time Window) FFT provides better than 48th Oct frequency resolution from 60 Hz up. (MTW takes the place of FPPO)
- Improved fractional-octave smoothing provides better trace readability
- New averaging algorithm greatly enhances trace stability
- Separate smoothing control for Phase and Mag. Traces
- Overload protection – TF average rejects data during input clip.

Multi-channel input allows for multiple, simultaneous transfer functions as well as the calculation of "live-averages" of those measurements

Groups of Transfer Function measurements can be configured for managing multi-channel system alignment



Live IR (Top data pane) shows the TF measurement in a linear IR view.



Live IR

- Window centered at the TF's delay
- User-selectable FFT size up to 32k
- FIFO Averaging up to 8 Averages

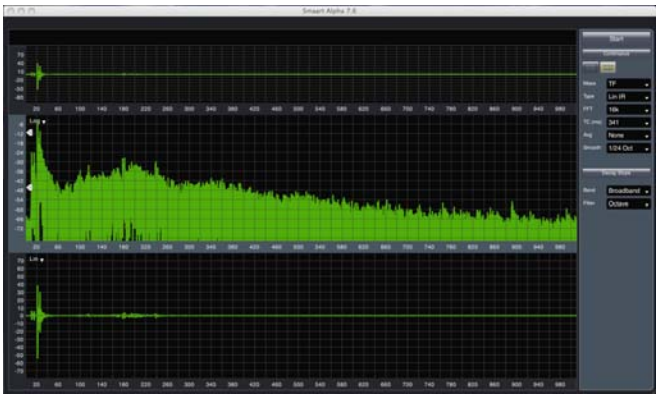
TF Delay Tracking

When engaged, Delay Tracking automatically measures and adjusts the TF delay for every measurement cycle! **Go ahead, move the mic, Smaart will track the delay change.**

IMPULSE RESPONSE MODE

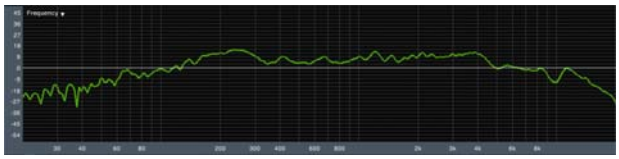
Smaart v7's Impulse Response mode has been significantly expanded to include much of the functionality from our AcousticTools software package, with the intent of giving a user a robust and intuitive set of tools for making and analyzing Impulse Response measurements.

"Navigator" pane:
Full IR record in linear view for controlling Time Domain zooming

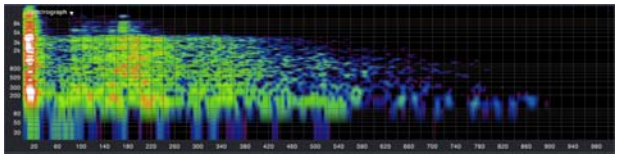


Time Domain Zoom viewss:
These show zoomed portion of IR as Lin, Log or ETC

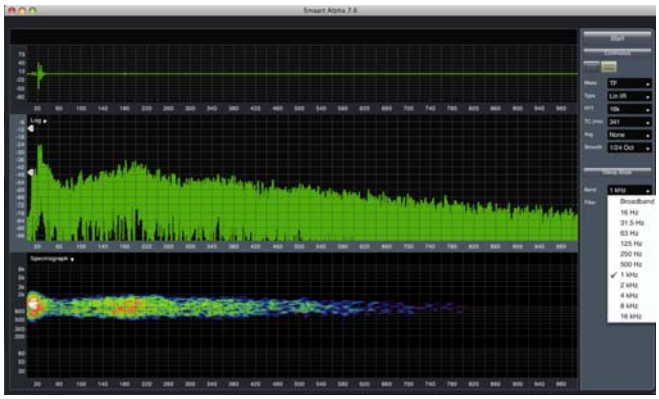
Frequency Domain view:
IR in Frequency Domain. (This feature was incompletely implemented in v.6.)



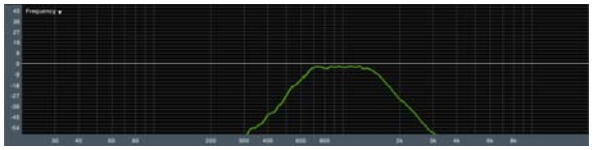
Spectrograph:
Shows IR as Spectrograph, with on-screen adjustable dynamic range



IR can be filtered in real-time.



Here the IR is filtered with an Octave wide filter at 1 kHz
(Shown in all three panes.)



And this is just the beginning. Watch for additional impulse response analysis features to be slipstreamed into Smaart 7 over the next year in the course of normal maintenance updates.

So there you have it. Smaart v.7: New code base, modern object-oriented architecture, enhanced data acquisition, improved GUI, awesome-ized measurement engines, and brand new features like delay tracking. And best of all, it is now backed by Rational Acoustics, a dedicated, independent company focused solely on the development and support of Smaart. It's not just the next version of the Smaart you knew, it's the beginning of the Smaart you deserve.