Smaart is an analyzer we use in our work as audio engineers to view the frequency content of signals and to measure the response of our electrical and electro-acoustic systems. Much like medical instrumentation for doctors, these tools help us examine our sound systems in detail and help diagnose and solve problems. Moreover, as a software product, Smaart provides the capabilities of an extremely powerful hardware-based analyzer in a package that is affordable to the average audio professional.

As mix engineers, we use Smaart to identify tones/frequencies of interest and help us with tasks like feedback suppression and channel equalization. As system engineers, it assists us in the process of setting up and aligning our speaker systems in our performance environment.

**System Measurement Acoustic Analysis Real-time Tool (SMAART):**

**System Measurement** – This is a dual-channel analyzer. We can look at individual channels and take those signals apart to examine their level, frequency content, duration, etc. and we can compare two signals, the “what went in” of a system to the “what came out,” to determine what happened in between. In other words, what our systems (electronics, speakers, acoustical environments) are doing to the signals passing through them (frequency response, impulse response.)

**Acoustic Analysis** - By doing system measurements in/of acoustic environments we can use those measurements to help figure out how we can adapt our sound systems to our rooms, or vice versa.

**Real-time Tool** – This extremely powerful analyzer was actually built to be used, not as an academic experiment, but when and where we actually use our sound equipment – real-time in our shops, at our install sites, during our load-ins, and most importantly, in our actual show environments.

**So What’s New in Smaart v.7?**

- **Multi-Channel, Multi-Platform, Multi-Mania:**
  Smaart v.7 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 (both 32- and 64-bit versions). Meaning v.7 can run multiple, simultaneous Spectrum and Transfer Function Measurements.

- **Built from the Start to Make use of the Power:**
  From day one, the Smaart v.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.

- **New Program Architecture:**
  Smaart v.7 was designed using object-oriented program architecture. This means that you can run as many simultaneous single-channel (spectrum) and dual-channel (transfer function) measurement engines as your PC will allow. This also means that Smaart is ready for expanded application/interaction beyond the basic program itself including remote GUIs, real-time data export/sharing with other applications and plug-in versions.

- **Enhanced, Strengthened, Awesome-ized Measurement Engines:**
  All aspects of Smaart’s measurement engines were revisited and everywhere possible, improved. The resulting enhancements range from subtle, “under the hood” improvements to obvious quantum leaps in measurement power, stability, accuracy and ability.

- **Simpler, Friendlier GUI**
  Much effort has been expended in reducing unnecessary User Interface (UI) clutter. Many of the dialog box-based controls have been replaced with modern “point ‘n’ grab ‘n’ drag ‘n’ click” mouse-based controls. The direct-enter dialogs 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.
ENHANCED DATA ACQUISITION
Provides increased and improved access to the devices & signals in our system.
- Unlimited input channels / devices
- ASIO, Wav and CoreAudio input
- Able to reference to internal sources
- Time Domain Filtering / Input Calibration

REAL-TIME MODE: SPECTRUM ENGINE:
Multiple single-channel engines, 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 simultaneous display of multiple individual RTAs & “live averages” of active signals
- “Line-Over-Bands” view of RTA displays both raw and banded data

SPECTROGRAPH
- Scrolling 1000 (+) line history
- Real-time adjustable dynamic range
- Run two spectrographs simultaneously

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.
- Improved fractional-octave smoothing provides better trace readability
- Overload protection – TF average rejects data during input clip.
- Multi-channel input allows 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
- 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
“Navigator” pane:
Full IR record in linear view for controlling Time Domain zooming

Time Domain Zoom views:
Show zoomed portion of IR as Lin, Log or ETC

Frequency Domain view:
IR in Frequency Domain.

Spectrograph:
Shows IR as Spectrograph, with on-screen adjustable dynamic range
IR can be filtered in real-time.
IR filtered with standard Octave and 1/3rd Octave filter

NEW IN SMAART v.7.4
Released in fall 2012, the Smaart v.7.4 update features an enhanced and re-designed IR mode that includes the full functionality of Smaart’s renowned “AcousticTools Intelligibility Module”, with RT60 and early decay time (EDT) calculations (based on ISO standard methods), Clarity (C10, C35, C50, C80), %Alcons (Short and Long), and a fully featured STI measurement capability. Also added to the IR Mode with this release is the ability to display the Schroeder integration curve, new generator sources, and a basic wave recorder. This FREE update for all registered v.7 users provides a robust and intuitive set of tools for making and analyzing Impulse Response measurements