

Smart Operator: Advanced Course Description

Overview

The 2-day *Smart Operator: Advanced* class picks up where *Smart Operator: Fundamentals* leaves off, taking a deep dive into various topics which fall beyond the Fundamentals course. As such, this class is divided between morning lecture and afternoon lab practice. Attendees can expect an immersive hands-on experience using Smart through various laboratory exercises designed to mimic real-world alignment and optimization tasks. Lab exercises shall utilize multiple, diverse measurement examples and, as possible, recreate many of the same measurement tasks that are detailed in the Smart system alignment practicum (day 3 of Operator: Fundamentals) for attendees to perform using Rational Acoustics equipment.

Topics Covered

Lecture Topics:

Deep dives into Smart's mechanisms and special topics, including but not limited to:

- The many facets of data averaging:
 - Polar and Complex Magnitude Averaging
 - Temporal Averaging
 - dB & Power Averaging
 - Coherence weighted average (Transfer Function)
- Target curves
- Weighting Curves
- Data import and export
- IR measurement
- Measuring in a Networked audio environment
- SPL measurement
- Guest lecturers when available.

Laboratory Practice:

Smart Rig Set-up, Verification and Calibration

- Acquiring measurement signals - patching in basic and multi-channel measurement rigs
- Verifying your equipment – measuring your mics and IO's
- Calibrating for SPL measurements

Configuring Basic and Multi-Channel Measurement Set-Ups

- Minimizing brain-drain and confusion – Making intuitive configurations
- Use Global control settings or not? What are the benefits of varying control parameters within a measurement Group
- Room – EQ – Resultant: A classic configuration case

Setting System Timing

- Setting Delays for Support Systems (Fills and Delays)
- Setting Mains to Sub timing

5.1 Studio Alignment

- Spectral balancing, Dolby X-Curve
- Match system outputs
- Where to place the sub?

Energy Steering

- Utilize a custom 7 driver column array to steer broadband acoustic energy
- Examine energy interaction between elements
- Ensure matched response between multiple drivers and systems

Subwoofer Arraying

- Create and measure various directional arrays including Cardioid, End-Fired, and Reverse End-Fired.
- Strategies for accurately measuring low frequency energy
- Comparing LF Energy arrivals

Measuring Outside (*Weather permitting*)

- Measuring at longer distances (and why we love wireless)
- Strategies for dealing with wind.

Venue Alignment (*theater availability permitting*)

- Align an optimize a flown LCR system with delay fills and ground subwoofers
- Measure an installed sound system without the pressure of a sound check being imminent

Prerequisites:

Smaart Operator: Advanced **requires** the prior attendance of a *Smaart Operator: Fundamentals* course. Students who wish to attend this course but do not meet this pre-requisite must obtain Instructor/session host approval prior to registration. This session does not require prior measurement / system alignment experience; however it does assume a working knowledge of professional sound system engineering practices and basic audio fundamentals. If you have any questions concerning course prerequisites, please do not hesitate to contact Rational Acoustics prior to registration.

Required Equipment:

Students are expected and encouraged (but not required) to bring their own Smaart rigs (computer, interface, microphone(s)). All other equipment for labs will be provided by Rational Acoustics.

Attendance Limitations

Attendance is limited to 8 people per class to ensure the maximum amount of time and attention from the presenter and ample lab equipment availability. The above topics are a sample of what you can expect from an Advanced course, however these courses are designed to be formally informal. This course is an opportunity to hone your skills and work on *what you need to work on*. The presenter will offer flexibility in tailoring the course to the specific needs and requirements of each group.

Class Schedule

- **Day 1 schedule:** Class will start at 10am, with a lite breakfast and coffee provided by Rational Acoustics. Lunch will be at 12:30 (lunch provided). The class will conclude at 6pm. From 6-8pm Rational will provide dinner via an on-site cook out – to decompress and talk shop with other measurement geeks.
- **Day 2 Schedule:** Class will start at 9am, with a lite breakfast and coffee provided by Rational Acoustics. Lunch will be at 12:30 (lunch provided). Class will conclude at 5pm. If you need to get out a little early to catch a flight, inform the presenter and we will make sure you are accommodated.