

## EASE Seminar – Basic Level & Advanced Level

This is a general overview of our regular EASE Training Seminars. Please be aware that this document contains information on both levels we offer. Make sure which one is of interest to you before registering for a class.

AFMG EASE Seminars are split into two main levels with Level 1 (basic level) covers an overview of EASE and the basics of room modeling and sound system design. The EASE database, mapping results and visualization functions are discussed as well. An introduction is given into auralization and post-processing of calculation results. Case studies are presented and interpreted.

Level 2 provides an optimal introduction for participants who have experience with EASE. It includes advanced topics, particularly related to sound system design and room acoustics. Advanced simulation modules like raytracing and AURA are discussed as well as the details of the EASE loudspeaker data formats. The concepts of auralization are explained in-depth. Case studies are presented and interpreted.

---

### Day 1 (Level 1)

#### **1. Introduction & Overview**

- 1.1. Introduction of Participants
- 1.2. Class Objectives
- 1.3. EASE 4 Introduction
  - 1.3.1. *History and background of EASE*
  - 1.3.2. *Basic program modules and general settings*

#### **2. Build an EASE Model: Stadium** *Hands-on*

- 2.1. Prototypes
- 2.2. Add Materials
- 2.3. Standard Rendering
  - 2.3.1. *Use of dyes to check errors*

### **3. Build an EASE Model: Meeting Room** *Hands-on*

- 3.1. 3D Shapes
  - 3.1.1. *Build the first case*
- 3.2. Variations of a Model
- 3.3. Coating and Two-Fold Faces
- 3.4. Symmetry
- 3.5. View RT
- 3.6. Optimize RT

### **4. Auralizations: Meeting Room**

- 4.1. Meeting Room Auralizations (with listening)

### **5. Build an EASE Model on your Own: Assembly Room** *Hands-on*

- 5.1. Use of Architectural Drawings
- 5.2. Point to Common Model Problems
- 5.3. Potential Causes of Holes and Remedies

## **Day 2 (Level 1)**

### **6. Bad Model**

- 6.1. Common Model Problems and Fixes
- 6.2. Other modeling tools

### **7. Discuss and Review**

- 7.1. Problems with Building Projects

### **8. Unpack a Project** *Hands-on*

- 8.1. Assembly Room

## 9. Loudspeakers and Other Sources

- 9.1. Loudspeaker Formats in EASE
- 9.2. SpeakerBase
- 9.3. Format of Speaker Data
- 9.4. Polar Plots
- 9.5. Balloons
- 9.6. Graphical Representation of Speaker Data
- 9.7. Speaker Cases

## 10. Adding Loudspeakers: Assembly Room *Hands-on*

- 10.1. Position
- 10.2. Aiming Angles and Convention
- 10.3. Naming Loudspeakers
- 10.4. Isobars
- 10.5. SPL Conventions
  - 10.5.1. *Power Settings and Alternatives*

## 11. Key Acoustic Principles

- 11.1. Key Acoustic Principles
  - 11.1.1. *Reverberation*
  - 11.1.2. *Speech Transmission Index*
  - 11.1.3. *Noise*

## 12. Mapping and Analysis: Assembly Room *Hands-on*

- 12.1. Add Audience Areas
- 12.2. Add Listener Seats
- 12.3. Area Layout

### **13. Mapping** *Hands-on*

#### 13.1. 2D vs 3D

##### *13.1.1. 2D or Area Mapping*

##### *13.1.2. 3D or Room Mapping*

#### 13.2. Mapping Results

#### 13.3. AURA Mapping

##### *13.3.1. Calculation Settings*

## **Day 3 (Level 1/2)**

### **14. Auralization of Direct Sound from Standard Mapping** *Hands-on*

#### 14.1. Probe with Direct Sound

#### 14.2. Using Auralizations to Check Echoes

#### 14.3. Identify Errors

### **15. Build a Complex Room: 2-Tier Stadium** *Hands-on*

#### 15.1. Two Prototypes: Build second tier

#### 15.2. Combine Projects

#### 15.3. Connect and Disconnect

#### 15.4. Move Objects

## **16. Advanced Editing Techniques**

16.1. Objects

16.2. Tables

16.3. Examples of Application

*16.3.1. Variation of occupancy levels*

*16.3.2. Scattering vs structured surfaces*

16.4. Packing a Project

## **17. Import/Export** *Hands-on*

17.1. Using AutoCAD and SketchUp

17.2. Getting information from drawings

17.3. 3D polylines and 3D faces

## **18. Ray Tracing: Assembly Room** *Hands-on*

18.1. Create Objects of Reflectors

18.2. Turn and Move Reflectors

18.3. Motives and Limitations of Ray Tracing

18.4. EASE Ray Tracing

*18.4.1. Ray Tracing on Selected Faces*

*18.4.2. Order, Length and Number of Rays*

*18.4.3. Ray Tracing Movie*

## **19. Questions & Answers**

## Day 4 (Level 2)

### 20. Introduction & Overview

- 20.1. Class Objectives
- 20.2. Modeling of Elements for Ray Tracing
- 20.3. EASE 4 Overview
  - 20.3.1. *Room Entry*
  - 20.3.2. *Materials and Speakers*
  - 20.3.3. *Mapping*
- 20.4. Absorption, Scattering and Other Concepts

### 21. Ray Tracing Impacts: Assembly Room *Hands-on*

- 21.1. Concepts and Limitations
- 21.2. Cut-off Settings
- 21.3. Probe
- 21.4. Analysis in Probe

### 22. AURA Mapping / AURA Response *Hands-on*

- 22.1. AURA vs EASE Mapping
- 22.2. Lock RT
- 22.3. Calculation Settings
- 22.4. AURA Mapping Results
- 22.5. Echograms vs Reflectograms
- 22.6. AURA Response
  - 22.6.1. *Hybrid Method*

## **23. GLL Modeled Loudspeakers**

### 23.1. Loudspeaker formats in EASE

#### *23.1.1. Shortcomings of other Methods*

#### *23.1.2. Advantages of the GLL Solution*

## **24. Loudspeaker Clusters vs. Arrays** *Hands-on*

### 24.1. Arrays (objects)

### 24.2. Using Objects to Adjust Levels Delays and Tilt

## **Day 5 (Level 2)**

## **25. Introduction to Auralization**

### 25.1. EASE 4 Auralization

## **26. AURA for Auralization**

### 26.1. AURA vs. Classical Ray Tracing Impacts

### 26.2. Echograms vs. Reflectograms

#### *26.2.1. Calculation Settings*

## **27. Auralization Theory and Procedure** *Hands-on*

### 27.1. Binaural Hearing and HRTF

### 27.2. Impulse Response and Convolution

### 27.3. File Formats

### 27.4. EARS

### 27.5. Stereo Systems

### 27.6. Ambisonics B-Format

**28. Acoustical Analysis of an EASE Model: Stafford**

- 28.1. Room Acoustics
- 28.2. Selection of Materials
- 28.3. Variations of a Model
- 28.4. Consultant Report

**29. Questions & Answers****30. Comparing Modeled and Measured Results: Shevlin**

- 30.1. Tuning a Model to Measurements
- 30.2. Scattering
- 30.3. Exporting to EASERA and Comparing Results

**31. Sound System Analysis: Beverly School**

- 31.1. Mono / Stereo
- 

**Intended Audience****Level 1**

- New users of EASE Junior or EASE Standard; covers all functions available in EASE Junior.
- Users of EASE Evac, EASE Focus or EASE Address who want to investigate entry-level room acoustics.
- Users switching to EASE who have a background in other modeling software.
- It is highly recommended for participants to have worked through the EASE tutorial (sections 2-4, 7 and 9).



## **Level 2**

- Advanced users who already know how to build a model in EASE and want to learn about advanced simulation and auralization.
- Advanced users who are interested in full-length, highly accurate AURA room acoustics calculations.
- It is highly recommended for participants to have attended the Level 1 EASE Class.